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National Institution for Transforming Tanzania: A Forward Outlook and Long-Term Approach

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Abstract: By the mid-1980s, the Government of Tanzania had realized that the past development policies and strategies were not adequately responding to changing market and technological conditions in the regional and world economy and were also not adapting to rapid changes in the domestic socio-economic conditions. In response, beginning mid-1986, the Government adopted socio-economic reforms which continue to be implemented to date. However, it has increasingly become apparent to the Government and its people that these socio-economic reforms are not adequately informed by a national long-term development philosophy and direction. It was out of the realization that these reforms had to be underpinned by a long-term development philosophy, if they were to be owned and sustained by the people, the idea of formulating a national vision emerged. Moreover, the Government recognized the importance of re-kindling the hopes and expectations of the people as well as their patriotism and nationalistic aspirations thus reinforcing the need for a national vision[1]. A vision for development is an articulation of a desirable future condition or situation which a nation envisages to attain and the plausible course of action to be taken for its achievement. In the process, it instils the courage and determination to rise to challenges at the individual, community and national levels. In 1999, Tanzania launched the National Development Vision 2025 (TDV 2025) as a tool to rally national efforts towards achieving the expected social and economic development goals. The launch was followed by a series of policy, institutional and systemic reforms in the 2000s. The breadth and depth of these reforms were substantial following the scale of economic challenges Tanzania had experienced in the 1980s and 1990s. During that period, the country had experienced a slower economic growth rate, severe shortages of essential goods and services, high inflation, low government revenue collection, shortage of revenue from exports, as well as large and unsustainable debt. National Institution for Transforming Tanzania, as the apex public policy think tank of the Government of Tanzania, and the nodal agency tasked with catalyzing economic development, and fostering cooperative federalism through the involvement of the government in the economic policy – making process using a bottom-up approach. Its initiatives with include; "20-year road map", "10-year vision, strategy, and action plan", "Digital Tanzania Program", "Tanzania BroAfDBand Mission", "Suluhu Innovation Mission", "Medical Education Reform", "Agriculture Reforms (Model Land Leasing Law, Reforms of the Agricultural Produce [1]Marketing Committee Act, Agricultural Marketing and Farmer Friendly Reforms Index for ranking regions, Skill Development Task Forces on Agriculture and up of Poverty)", "Indices Measuring Regions' Performance in Health, Education and Water Management", "Transforming Tanzania Lecture Series". NITT activities can be divided into four main heads: Policy and Programme Framework; Cooperative and competitive Federalism; Monitoring and Evaluation; Think Tank, Knowledge and Innovation Hub.

Keywords: National Institution for Transforming Tanzania, national vision, cooperative federalism, competitive federalism, policy think tank, research, flagship initiatives, national projects, sector reforms, long-term policies, policy and programme framework.

1.0 FRAMEWORK

1.1 Introduction

The need to replace the planning commission as a catalyst towards a new economic and social development vision for Tanzania emanated from the outcomes of economic reforms – especially those which were pursued since 1986. These social and economic reform measures were taken in response to the economic crisis that had persisted in the country and the world as a whole since the early years of 1980s. Secondly, the government had realized that those earlier development policies and strategies were not in consonance with the principles of a market led economy and technological development occurring worldwide. The government therefore started preparing three-year reform programmes with general strategies, focusing on only a few economic and social thrust areas, changing frequently. These structural adjustment programmes have been followed for a long time, about fifteen years.

Over this long period, the whole philosophy of working for the country's development and that of its people started losing direction and as a result the country lost its vision which had originally been based on long-term development objectives. The government of Tanzania and the society in general realized that the nation lacked direction and a philosophy for long-term development. The new Development Vision 2025 felt this vacuum, whereas National

[1] A vision is a vehicle of hope and an inspiration for motivating the people to search and work harder for the betterment of their livelihood and for posterity. A national vision therefore seeks to actively mobilize the people and other resources towards the achievement of shared goals. A shared vision arouses people's aspirations and creates the spark that lifts the nation out of the mundane.

Institution for Transforming Tanzania can refuel the vacuum in a prospective long-term run towards catalyzing industrialization and wealth creation for Tanzania to emerge as a land of unicorns and decacorns.
The Government started the formulation exercise of this development Vision in 1995. A Team of Experts, appointed from various sectors in the society, was the focal point under the auspices of the Planning Commission. Observing the need to build a national consensus over the Vision's objectives, people's participation was advocated right from the early stages of the exercise. People's participation was affected through various methods including conducting symposia, interviews and dialogue with various people, and meetings which brought together people from various social settings in society. The mass media was also closely involved through publishing special articles and features in newspapers, debates and discussions in radio and television programmes. The basic issues in the development Vision are elaborated in six areas:
First is an elaboration of the concept and scope of national development vision. This part describes attributes our country is expected to have attained by the year 2025. These include people having attained a high quality of life; peace, tranquillity and national unity; good governance; an educated society imbued with an ambition to develop; and an economy which is competitive with sustained growth for the benefit of all people.
Secondly, is a brief analysis of approaches of previous national development visions pursued since independence. This analysis spells out the observed successes and problems encountered which justified the need to formulate the new Development Vision.
Thirdly, the three principal objectives of the Vision 2025 - which are achieving quality and good life for all; good governance and the rule of law; and building a strong and resilient economy that can effectively withstand global competition. These objectives not only deal with economic issues, but also include social issues such as education, health, the environment and increasing involvement of the people in working for their own development. The thrust of these objectives is to attain a sustainable development of the people.
Fourthly, the important issues which must be borne in mind during the implementation of the vision's objectives. It outlines the basic pillars with which the society at large will be guided in order to ensure a successful implementation of the Vision. These implementation driving forces or pillars, include among others, the need for Tanzania society as a whole treasure a competitive development mindset as well as nurturing a self-reliance culture.
Fifthly, the basic guidelines on the implementation of the Vision which include noting the importance of undertaking reviews and reforms of existing laws and structures of various institutions in order to ensure that they meet the requirements of implementing the objectives of this Vision. The participation of the people in preparing and implementing plans for their own development is also emphasized, including putting in place an appropriate framework for coordinating and evaluating the implementation of the Vision. It is stressed that only through this participatory process that the Vision will be able to promote people's development and its management by people themselves. These are basic issues in making the people accept the responsibility to ensure the realization of their own development aspirations.
Internalizing in our mindsets all the important issues outlined in the 2025 Vision and refuel the NITT's vision as the planning commission Tanzania will have made a very big stride in, promoting the desire for economic development and people's welfare. NITT as the premier policy think tank of the Government of Tanzania, it will provide directional and policy inputs. Apart from designing long-term policies and programmes for the Government of Tanzania, NITT will also provide relevant strategic and technical advice to the Ministries under President's Office, Vice President's Office and Prime Minister's Office. NITT will act as the quintessential platform for the Government of Tanzania to bring regions to act together in national interest and thereby foster cooperative federalism.
NITT's constitution will be chaired by the Hon. President of Tanzania, with NITT's council will include Hon. Former Presidents and other appointed members in office. NITT's full time members will be Ministers of the respective ministries of Tanzania. In addition, temporarily members will be selected from leading universities and research institutions. NITT will develop itself as a Region-of-the-art resource centre with the necessary knowledge and skills that will enable it to act with speed, promote research and innovation, provide strategic policy advice for the government, and deal with contingent issues. It will be supported by an attached office,Monitoring Evaluation and Development Organisation (MEDO), a flagship initiative, Suluhu Innovation Mission (SIM), and an autonomous body, National Institute of Labour Economics Research and Development (NILERD).

1.2 Objectives and Features

Table 1: The key objectives and features of NITT.

S.No	**Objectives and Features**
01	To evolve a shared vision of national development priorities, sectors and strategies with the active involvement of Regional and Local Government.
02	To foster cooperative federalism through structured support initiatives and mechanisms with the Regions on a continuous basis, recognizing that strong regions make a strong nation.
03	To develop mechanisms to formulate plans at the village level and aggregate these progressively at higher levels of the government.
04	To ensure, in areas that are specifically referred to, that the interests of national security are incorporated in economic strategy and policy.
05	To pay special attention to the sections of our society that may be at risk of not benefiting adequately from economic progress.
06	To design strategic and long-term policy and programme frameworks and initiatives and monitor their progress and their efficacy. The lessons learnt through monitoring and feedback will be used for making innovative improvements, including necessary mid-course corrections.
07	To provide advice and encourage partnerships between key stakeholders and national and international like-minded think tanks, as well as educational and policy research institutions.
08	To create a knowledge, innovation and entrepreneurial support system through a collaborative community of national and international experts, practitioners and other partners.
09	To offer a platform for the resolution of inter-sectoral and inter-departmental issues inorder to accelerate the implementation of the development agenda.
10	To maintain a Region-of-the-art resource center, be a repository of research on good governance and best practices in sustainable and equitable development as well as help their dissemination to stakeholders.
11	To actively monitor and evaluate the implementation of programmes and initiatives, including the identification of the needed resources so as to strengthen the probability of success and scope of delivery.
12	To focus on technology up-gradation and capacity-building for implementation of programmes and initiatives.
13	To undertake other activities as may be necessary in order to further the execution of the national development agenda and the objectives mentioned above.

1.3 Verticals/ Cells

The different verticals, cells, attached offices, and autonomous bodies of NITT will provide therequisite coordination and support framework needed to carry out the above mandate. The list of verticals and cells include: Administration and Support Units; Agriculture and Allied Sectors; Linked Districts Programme Cell; Communication and Social Media Cell; Data Management and Analysis, and Frontier Technologies; Economics and Finance Cell; Education; Governance and Research; Governing Council Secretariat and Coordination; Industry-I; Industry-II; Infrastructure-Connectivity; Infrastructure-Energy; Micro, Small and Medium Enterprises; Natural Resources and Environment, and Island Development; Project Appraisal and Management Division; Public–Private Partnership; Rural Development; Science and Technology; Social Justice and Empowerment, and Voluntary Action Cell; Social Sector-I (Skill Development, Labour and Employment, and Urban Development); Social Sector-II (Health and Nutrition, and Women and Child Development); Region Finances and Coordination; Sustainable Development Goals; Water and Land Resources.

1.4 Governing Council of NITT

The Governing Council of NITT, comprising of all Ministries with legislatures will come into effect via a notification by the Cabinet Secretariat. The Governing Council will be reconstituted vide a notificationdated by the Cabinet Secretariat. The Governing Council as the premier body tasked with evolving a shared vision of national prioritiesand strategies, will actively involve regions, in shaping the national development narrative. The Governing Council, which embodies the objectives of cooperative federalism, presents a platformto discuss inter-sectoral, inter-departmental and federal issues to accelerate the implementation of the national development agenda. It's high time to highlight the importance of all of the above issues, especially the need for Tanzania to focus on modernized agriculture, animal husbandry, and food processing to become self-sufficient and a global leader in the agriculture sector. Tanzania should advocate for rapid urbanization that can become Tanzania's strength by leveraging technology to ensure ease of living, transparent service delivery and improvement in the quality of life for every citizen of Tanzania.

Tanzania's international economic cooperation in 2030 is a unique opportunity to showcase the diversityof Tanzania across the African continent and develop a mass movement around the world. Tanzania regions should focus on promoting 3Ts—Tourism, Trade and Technology—with the help of Tanzanian Missions around the world. Tanzania must focus on reducing imports, increasing exports, and identifying opportunities for the same. The NITT's Slogan 'Vocal for Local' is not the agenda of an individual political party but a common goal. It is reiterated that increased GST collection requires collective action by the Regional and Local Government which is crucial in strengthening our economic position. All stakeholders should be involved in the implementation of the National Education Policy and develop a clear, time-bound

roadmap for the same. This will define the national priorities for the next 25 – 27 years, the seeds we sow today will define the fruits reaped by Tanzania in 2048-50.

1.5 Tanzania Past Visions and Impediments

The Past Visions: Tanzania has gone through the national vision to achieve independence. Every Tanzanian understood and accepted that goal, which was a basic human right. However, having attained independence, it was realized that not everybody understood his or her consequent obligation; namely, that enjoying the fruits of independence implied hard work. Hence the post-independence catchword "*Uhuru na Kazi*".That catchword was intended to exalt the importance of hard work in realizing the development which was championed in the struggle for independence.

The other national vision was the Arusha Declaration. It articulated a philosophy of socio-economic liberation based on socialism and self-reliance as the long-term national goal of Tanzanians. The Declaration was accepted by the majority of Tanzanians and galvanized them behind its realization. Thus, since February 1967, the development vision of Tanzania as well as the policies for social and economic transformation have been guided by the principles and programmes enshrined in the Arusha Declaration.

It is notable, however, that the strategy of the Arusha Declaration did not sufficiently address the complexity and dynamic character of policies and incentive structures which were necessary to effectively drive the development process. The strategy was based overly on region-control of the major means of production, exchange and distribution and on the prospect of a growing and viable public sector (through public investment), as the principal engine of economic growth and development.

Notwithstanding these strategy shortcomings, the Arusha Declaration credibly sought to realize a set of fundamental moral, spiritual, ethical and civil values which stand the test of time. Thus Tanzania today prides itself of and enjoys national unity, social cohesion, peace and stability largely as a result of the Declaration's core social values. These values have to be acknowledged and should form part of the underlying underpinnings of the Vision 2025.

The Tanzania Vision 2025 aimed at achieving a high-quality livelihood for its people. attain good governance through the rule of law and develop a strong and competitive economy. It is envisioned that the following specific achievements would be attainable by the year 2025.

Impediments: The central thrust of the first two visions was the commitment to achieve substantial progress in attaining higher standards of living as reflected in the various development plans. In particular, Tanzania vowed to eradicate poverty, ignorance and disease. And although reasonable progress has been achieved in the fields of education and health, there is concern that the momentum and the level of progress made in these areas has not been equal to expectations. In fact, during the 1980s, the signs of reversal in some of the achievements became evident.

In this context, the underlying factors and forces which have persistently impeded the realization of the goals of the development plans and programmes need to be identified in order to engineer a break from the past and deploy more appropriate driving forces to assure socio-economic progress for the future. Four main impediments were identified: A donor dependency syndrome and a dependent and defeatist developmental mindset; A weak and low capacity for economic management; Failures in good governance and in the organization of production and ineffective implementation syndrome.

2.0 POLICIES AND PROGRAMMES

2.1 Introduction

NITT entrust is with the mandate to design strategic and long-term policy and programme frameworks and initiatives, and monitor progress and their efficacy, with the active involvement of regions, civil society, and other think tanks. NITT will take a lead to enhance macro-economic level growth along with its focus on micro-economic level all-inclusive welfare.

2.2 Linked Districts Programme

The Linked Districts Programme (LDP) will be part of an unprecedented period in the lifetime of the districts. The programme will act as a successful template of good and effective governance, under this programme Tanzania's 184 districts will show remarkable progress across key sectors that matter to the people. The core strength of the programme is its focus on data driven governance that drives evidence-based policy interventions at the district-level. NITT will monitor the 184 Linked districts on Key Performance Indicators (KPI) on a monthly basis.

The KPIs are designed in a way that the input and process indicators are being evaluated so as to achieve desirable outputs and outcomes across major socio-economic themes such as health & nutrition, education, agriculture & water resources, financial inclusion & skill development, and basic infrastructure. The robust monitoring strategy will enable the district administration to engage in cross-departmental reviews and drive convergence. The competition through the monthly release of delta ranks will keep the districts constantly motivated to improve the KPIs.

The districts will show significant progress across themes recursively. Under Health and Nutrition, districts will show good

progress in indicators related to pregnant women's health and child nutrition. Indicators such as antenatal care registrations, child immunisation, and provision of supplementary nutrition will show major progress. School infrastructure and basic infrastructure indicators such as sanitation and electrification will also have key elements.
The programme will continue to deliver results on yearly basis as it will synergize the efforts of all stakeholders – Regional and Local Governments, district administration, non-governmental organizations, private partners, civil society, and the masses. The line ministries will develop short-term and long-term plans to improve their respective indicators in the districts and professional officers will be appointed to guide and mentor the districts.
NITT will develop and use "The Tanzania Champions of Change" dashboard for real-time data collection and monitoring. NITT will capture the success stories through publications 'Stories of Change' and 'Best Practices'. The interventions – selected will base on the usage of behaviouralprinciples, innovation, replicability and potential for impact – demonstrate how behavioural insightsand innovative initiatives can drive outcomes on the ground. NITT will also regularly share the best practices with other districts to transform service delivery at the grass-root level. Significant progress could be achieved by scaling up these best practices that will emerge from the districts to other partsof the country grappling with similar challenges.

Linked Blocks Programme
NITT will undertake various efforts to replicate the LDP Model through flagship initiatives. The launch of Linked Blocks Programme (LBP) which aim to fast track holistic and sustainable development in hundreds backwardblocks will proceed with an extensive consultation with different ministries, regional and local government. The programme will support blocks to achieve accelerated and coordinated implementation of various schemes to improve their performance and come to par with the regions average at par or better than other blocks in the regions. Incentives for high performing blocks will work out and blocks that achieve noticeable progress on key indicators will be provided incentives. Under this Mission to improve performance across districts in Tanzania, Ministries/ Departments, which have most public interface, will have to shortlist the most districts on the basis of their respective KPIs and work towards bringing these districts at par with region averages in the next one year and the national average within the next two years.

2.3 Health and Nutrition

Integrative Health Policy
An integrative health policy to achieve inclusive, affordable, and evidence-based healthcare should be conceptualised. A core committee and four working groups will be constituted to look at coreareas of education, research, clinical practice, and public health administration, which will give recommendations or integrative approaches for functional integration. The recommendations will be presented to the Hon'ble Ministers of both administrative Ministries i.e. Ministry of Health and Ministry of Labour, Employment, Youth and Disabled People.

National Tele-Mental Health Programme
NITT, in collaboration with Tanzania Institute of Mental Health and Neurosciences, should conceptualize the framework for the national tele-mental health services, following pillars such as a national tele-mental health programme 24x7free counseling and care provisions to people. The programme is expected to improve access to quality mental health counseling and care services.

Orphan Drugs and Therapies for Rare Diseases
More than 7000 rare diseases are known today, affecting 300 million people worldwide and about thousands in Tanzania alone. The area of rare diseases is complex and heterogeneous. The number of disorders with known molecular basis is rapidly rising, but the number of approved therapies lags far behind. Keeping this in view, a committee on 'Drugs and Dosage Forms for Rare Diseases: Engagement with manufacturers' should be constituted with Member (Health), NITT as Chair and representation from Department of Pharmaceuticals and clinicians to consider identification of a set of priority disorders/indications and their corresponding treatments that can be enabled for domestic manufacturing of orphan drugs. Thus, the Committee has to convene meetings to engage with a shortlisted set of Active Pharmaceutical Ingredient (API) manufacturers.

Reforms in the National Organ Transplant Programme
Organ donation and transplantation is a government-regulated activity in Tanzania as per the provisions of the Transplantation of Human Organs and Tissues Act, which is yet to be passed by the Parliament. NITT will take the initiative to examine the National Organ Transplant Programme (NOTP) and enable the setting up of an improved and enhanced NOTP in collaboration with the Ministry of Health (MoH), and National Organ & Tissue Transplant Organisation (NOTTO).
NITT will prepare draft Standard Operating Procedures (SOPs) for Organ Transport for the line departments and institutions. The MoH will circulate the draft SOPs to the Ministries concerned, following which an introductory inter-ministerial meeting will be chaired by Member (Health) with participation from the health institutions and the National and Regional Organ & Tissue Transplant Organisations, wherein inputs from regions will be shared. Further work towards an enhanced National OrganTransplant Programme, in addition to strengthening the organ transport network, will be ongoing.

Increasing Accessibility for Assistive Technologies

Assistive Technology (AT) may include any items, equipment, software programme, or product system that are used to increase, maintain, or improve the functional capabilities of persons with disabilities. Besides this, ATs are also used to overcome the functional loss related to senile changes such asa decrease in vision or hearing or locomotor disability in the human body and also in overcoming disabilities owing to intellectual or learning disabilities. NITT will work closely with agencieslike Tanzanian Council of Medical Research (TCMR) and World Health Organisation (WHO) to understand the unmet need and potential of the sector in an effort to improve the access and reach of ATs to those who require it the most.

Transforming Emergency and Trauma Care System: Concept for a NewMission under the National Health Protection Scheme

Tanzania witnesses a huge burden of emergency and trauma cases, composed of a high proportionof the young, who are often the sole bread-earners and inflicts high out-of-pocket-expenditure,adding urgency to address these health issues. Addressing these issues would also contribute towards achieving multiple SDG targets, including halving the number of global deaths and injuries from road-traffic accidents by 2030 and also cover emergencies arising due to obstetrics, pediatrics, infections, NCDs and disasters. There is an immediate need to address these issues in a comprehensive manner, highlighting the need for a strong, holistic ambulance–emergency–trauma care system.

NITT will work on the scheme along with Ministry of Health, Ministry of Works and Transport and other stakeholders, and conduct a 100-facility study with All Tanzania Institute of Medical Science to assess the current Region of emergency care, besides studying models in various Regions and other countries, embracing WHO recommendations. Multiple high-level presentations on this scheme have been made, in developing countries involving the highest offices,wherein it has found traction and is under further refinement for better adaptation in Tanzania.

Expansion of MD Doctors Through Family Medicine Training Programme

It is expected that a vibrant MD Family Medicine Programme or course across Tanzania's premier Health institutes will spur the starting of such courses in medical colleges across the country. The medium- term goal is to have optimum access by people of Tanzania to family health/ general practice specialty professional healthcare. In light of the need to augment Family Medicine programs in medical colleges in the country, NITT will facilitate pathways for new All Tanzania Institute of Medical Science (ATIMS)/ Institutes of National Importance (INIs) in the country to introduce FamilyMedicine programs in their respective medical institutes.

Policy and Strategy for Health Insurance Coverage of Tanzania's Missing Middle

Subsequent to the release of the NITT report 'Health Insurance for Tanzania's Missing Middle', the National Health Authority in collaboration with NITT will suggest a strategy to extend the health coverage to the 'missing middle' which is a broad category of population which lacks health insurance, positioned between the deprived poorer sections and the relatively well-off organized sector. Accordingly, a multi- stakeholder committee, with Special Secretary, NITT as the Chair, will be constituted and include members from Ministry of Health (MoH), National Health Authority, and other stakeholders including from the insurance sector.

The Committee's tasks include: (i) devising a policy and strategy to extend or expand the health coverage to the missing middle under the ambit of National Health Authority (NHAS) or independent of it; (ii) devising the criteria for identification of the missing middle as an individual or group and strategize a mechanism for their plausible enrollment or subscription for these; suggesting ways for effective distribution, raising consumer awareness of health insurance; and suggesting implementation pathways for extending coverage to missing middle. The Committee will organize several stakeholder deliberations.

2.4 Asset Monetization

National Monetisation Pipeline (NMP)

Core Asset Monetisation is identified as one of the country's three pillars for enhanced and sustainable infrastructure financing in the Parliamentary Budgets. NITT will be tasked with creating the National Monetisation Pipeline (NMP) for core infrastructure assets. The NMP, NITT will lay down the framework for monetisation policy and listing the pipeline of potential core assets of ministries. As a gateway to generate investor interests, it's divestment policy will serve as a medium-term roadmap for identifying potentialmonetisation-ready projects across various infrastructure sectors, including roads, railways, aviation, power, oil and gas, and warehousing. NITT will work closely with the ministries on investment, industry, trade and transaction structuring (finance and planning), reviewing progress, and deliberating on inter-ministerial and structural issues.

Need for Tanzania NMP: Due to immense failure of Public Sector Enterprises, NMP will unlock the value of investments in such public sector assets by tapping institutional and long-term capital. Although the idea of creating 'structured public-private partnerships' to unlock value from under-utilised public assets makes eminent sense, several underlying issues also exist. NMP aims to envisage an aggregate monetisation potential of the big value in million dollar (s) projects through the leasing of assets of the government.

Table 2: The Need for NMP, Significance of NMP and Challenges associated to NMP.

S.No.	**The Need for National asset Monetisation Pipeline**
01	Cost Overruns: In some cases, project completion time is exceeded, leading to elevated project cost so much so that either the project itself becomes unviable at the time of its launching.
02	Overcapitalisation: Optimum input-output ratio is seldom observed in a majority of government infrastructure projects leading to their overcapitalisation.
03	A reluctance to implement labour reforms, a lack of inter-ministerial/ department coordination.
04	Poor decision-making.
05	Ineffective governance.
06	Excessive government control.
	Significance of NMP
01	Boost Economy: Generate better employment opportunities and drive the competitiveness of the Tanzania economy.
02	Utilising Under-utilised Public Assets: Through unlocking idle capital from non-strategic underperforming government owned assets.
03	Reinvesting the funds received into new infrastructure projects and augmentation of assets.
	Challenges Associated to NMP
01	Issue of Taxpayers' Money.
02	Cycle of creating and monetising assets.
03	Asset-specific challenges: Low level of capacity utilisation in gas and petroleum pipeline networks, regulated tariffs in power sector assets, low interest among investors in national highways below four lanes and multiple stakeholders which own stake in the entity.
04	Monopolisation: A significant criticism of the NMP is that the transfer would end up creating monopolies, leading to a rise in price. Monopolisation is inevitable in the case of highways and railway lines.
05	Out of sync with contemporary pressures: global warming, pandemics, wars, geopolitical chaos and fundamentalism.

Way Forward: NMP framework on paper looks very promising, but the Tanzania government should ensure proper execution to derive desired outcomes. There is a need for efficiency dispute resolution mechanisms, which is one of the key aspects of such a wide-ranged plan. The success of the infrastructure expansion plan would depend on other stakeholders playing their due role; hence all the strata should be able to work together through healthy competition to strengthen public enterprises, dealing with cronyism, multiple-stake holder approach and addressing systematic problems and generating social values. Thus, a high-powered Intergovernmental Group can be set up to re-examine the fiscal responsibility legislation of the Centre and Regions.

2.5 Industry

Production-Linked Incentive (PLI) Scheme

In order to provide an impetus to manufacturing in Tanzania and exports from Tanzania, NITT in consultation with several associated ministries and departments will anchor the introduction of a Production Linked Incentive (PLI) Scheme in key sectors. The PLI Scheme will be designed to incentivize incremental production for a limited number of eligible anchor entities in each of the selected sectors which will invest in technology, plant & machinery, aswell as in R&D. The Scheme will also have beneficial spillover effects by the creation of a widespread supplier base for the anchor units established under the scheme, thus generating massive primary and secondary employment opportunities. The schemes will be expected to lead to increased production and generate thousand of employment across anchored sectors. NITT will work extensively to prepare the contours of the individual PLI schemes along with the concerned Ministries/ Departments. CEO, NITT will be a part of Empowered Group of Secretaries (EGoS) for monitoring the PLI schemes of all the sectors.

Committee on Decriminalization

An inter-ministerial committee on 'Decriminalizing Non-compliance for Ease of Doing Business in Tanzania' will be constituted under the chairpersonship of CEO, NITT. NITTwill forward the data and learnings collated through the reviews of 25 ministries to DPIIT for further action and standardization across ministries. NITT will continue to support DPIIT in the exercise for decriminalization of noncompliance for ease of doing business.

Taskforce on Enforcement of Contract

A taskforce to study the implementation of the Commercial Courts Act, will be formed. In this regard, meetings will be held with representatives of the Supreme Court and some Commercial Courts to identify gaps in the procedure, human resource and infrastructure. Further, an online survey of all CommercialCourts and High Courts will be conducted to identify infrastructure and human resource bottlenecks.

Table 3: The list of sectors, ministries/ departments sector-wise outlays (demonstration).

Priority	Sectors	Ministry/ Department
01	Critical KSMs/ DIs/ APIs	Pharmaceuticals
02	Medical Devices	Pharmaceuticals
03	Large Scale Electronics Manufacturing	Electronics and Information Technology
04	Advance Chemistry Cell (ACC) Battery	Heavy Industries
05	Electronic/ Technology Products	Electronics and Information Technology
06	Automobiles and Auto Components	Heavy Industries
07	Pharmaceuticals Drugs Telecom	Pharmaceuticals
08	Networking Products	Telecom
09	Textile Products: MMF Segment and technical textiles	Textiles
10	Food Products	Food Processing Industries
11	High Efficiency Solar PV Modules	Energy
12	White Goods (ACs and LED)	Promotion of Industry and Internal Trade
13	Speciality Steel	Steel
14	Drones and Drone Components	Civil Aviation

2.6 Mission LiFE – Lifestyle for Environment

LiFE envisages bringing everyone together to adopt an environmentally conscious lifestyle for 'mindful and deliberate utilization, instead of mindless and destructive consumption'. Studies indicate that behaviors can help in reducing carbon emission substantially.

Tanzania believes that environment friendly behavior of an individual and the community in total can have a significant impact on the environment and climate crisis. A healthy and sustainable way of living based on traditions and the values of conservation and moderation is a key to mitigatingclimate change. Tanzania is the only African country that will include LiFE in its Nationally Determined Contributions (NDCs). NITT will steer the global aspects of this Mission enriching Climate Change as the core elective program to be taught in primary, secondary and university level.

A non-exhaustive list of individual LiFE actions across eight categories include: Energy Saving, Education Provision, Water Saving, Single use plastic reduction, Sustainable food system adoption, Waste reduction, Healthy lifestyle adoption, E-waste reduction.

These actions are specific and measurable, easy to practice, and non-disruptive to ongoing economic activities.

NITT will initiate the LiFE Global Call for Ideas and Papers to invite papers/ ideas from across the world aimed at individuals, households, and communities to drive climate-friendly behaviors.Top 75 ideas will be released as a working paper series, and the top 5 ideas will be awarded andacknowledged at an International LiFE conference scheduled in time.

Table 4: Results framework matrix (Proposal).

KPI Indicator	Unit	Target Value					
		Year I	Year II	Year III	Year IV	Year V	Total Value
People	Million	10	20	30	50	60	60 million
Villages	Thousand	5	11	14	26	31	31,000
Urban	Hundred	1.6	2.1	2.9	3.2	3.49	349
Districts	No.	63	72	98	116	184	184

3.0 MONITORING AND EVALUATION

3.1 Introduction

To increase efficiency and improve decision making, evidence-based policy-making is essential. The Monitoring Evaluation and Development Office (MEDO), an attached unit of NITT, envisions toinstitutionalize the application and use of monitoring and evaluation at all levels of government policy and programmes and help improve the efficiency, effectiveness, equity, sustainability, and achievement of results. Evidence based policy making, strengthening data systems and architecture, and strengthening M&E ecosystem are the key pillars of the MEDO.

In addition, NITT will also develop several indices and dashboards by focusing on effective management and better outcomes backed by data analysis.

3.2 Monitoring Evaluation and Development Office (MEDO)

MEDO as the apex Monitoring and Evaluation (M&E) body of the Government of Tanzania. UnderNITT's mandate of cooperative and competitive federalism, its ambit of work also includes technical advisory to Regions. To have functional autonomy, a separate budgetary allocation will beprovided exclusively to MEDO.

MEDO's role is: (i) to monitor the progress and efficacy of strategic and long-term policy and programme frameworks

as well as initiatives to facilitate improvements, including the necessary mid-course corrections; and (ii) to actively monitor and evaluate the implementation of programmes andinitiatives to strengthen the probability of success and scope of delivery.
List of major projects to be taken by MEDO include Output-Outcome Monitoring Framework, Data Governance Quality Index (DGQI), Monitoring of Global Indices for Reforms and Growth (GIRG), Institutionalizing and Promoting Evaluations, Engagement with Regions, Capacity Building.

Output–Outcome Monitoring Framework
The Output–Outcome Monitoring Framework (OOMF) is an important component of the parliamentary budgets. The goal is to institutionalize outcome monitoring, to shift the focus of line ministries of Government of Tanzania from tracking physical and financial progress, to tracking the results of work done. Salient features of OOMF are as follows:
(i) Every year, the Framework has to lay in Parliament along with the Budgets for four consecutive years, (ii) General Financial Rules will make OOMF an integral process for ministries/ departments which will cover all 25 ministries/departments, (iii) The Centrally Sponsored Schemes (CSS) will have a cumulative annual budgetary outlay, (iv) Output and outcome indicators tracked on the dashboard through progress andcompliance reports.
NITT along with the Secretaries of the ministries/departments will review (i) the progress of Central Sector/ Centrally Sponsored Schemes; (ii) monitor outcomes of schemes especially towards achieving the NationalDevelopment Agenda and Sustainable Development goals, (iii) progress on actionable points pertaining to the previous year's OOMF review meeting and (iv) other issues and challenges.
Further, to improve the quality of OOMF, a continuous capacity building exercise and systematic reviewof the framework and indicators of all CS/CSS schemes will be undertaken throughout the year. MEDO's constant endeavor will improve the capacity of officials working at different level of the government. The OOMF framework has immense potential in improving the performance of schemes and enhancing efficiency as well as effectiveness of government interventions. In this context, MEDO will organize several knowledge-sharing and capacity-building sessions with Region and Local government officials.

Data Governance Quality Index (DGQI)
The DGQI dashboard special for use by ministries/departments to gather the statusupdates on the data systems of ministries/ departments for each Quarters FYs. The draft reports including the findings of the rounds of DGQI, will be shared with ministries/departments.
With the objective of widely disseminating learnings from the DGQI exercise, a DGQI methodology toolkit will be published on the MEDO website and shared with Regions to enable them to conduct similar data maturity assessments.
A compendium of good practices in using administrative data for monitoring and evaluation will also be published on the MEDO website to promote peer learning among ministries/ departments and Regions.
A webinar on key insights from DGQI for Regions will be conducted. Similarly, a training session will be organized for Tanzanian Administrative Service probationers.

Institutionalising and Promoting Evaluations
MEDO will conduct evaluation under the overarching guidance of the Development Evaluation Advisory Committee (DEAC). The members of the committee will include CEO, NITT; Secretaries, Finance, Expenditure, and RuralDevelopment; and 3 independent experts. Studies will be taken up as per the rolling evaluation plan to be approved by the DEAC. Additionally, MEDO will also conduct evaluation based on the request received from Ministries/ Departments and also take up other evaluation/ assessments/ review as per need.

Evaluations of Schemes Requested by the Department of Expenditure, MoFP
MEDO will undertake a process of finalizing the evaluation studies of select Sector schemes in various sectors such as MSME, Commodity Boards, industrialisation, Science and Technology and Biotechnology pertaining to some ministries, as per the request of the Department of Expenditure. For the evaluation of these Sector schemes, the consultancy work will be awarded to variousconsultants/ institutions through a transparent tendering process.

Evaluations of Major Schemes
As per the mandate of DEAC, MEDO will undertake evaluation of various schemes related to roads, transport, connectivity, energy and food and nutritional security. Evaluations of other important Sector schemes and Sponsored Schemes will also be initiated.

Organization Evaluation Framework
MEDO will undertake evaluations of key organizations and public sector enterprises. In this context, MEDO will develop an Organization Evaluation Framework in the spirit of improving the efficacy of organizations that deliver services to the population at large. The said framework encompasses evaluation of an organization's performance in terms of its effectiveness (mission fulfilments), efficiency, ongoing relevance (the extent to which the organization adapts to changing conditions in its environment), and financial viability. Projects related to such organisations will also be evaluated. The objective of the project level evaluation is to identify the challenges, gaps, best practices and areas for improvement. This evaluation assesses project design and logical framework, relevance, effectiveness, efficiency and sustainability of projects, socio-economic impact and the role of otherdepartments and agencies in a project's success.

Capacity Building

One of MEDO's goals is to institutionalize the application of monitoring and evaluation at all levels of government policy and programs by helping improve the efficiency, effectiveness, equity, sustainability and achievement of results. MEDO will take several initiatives to build individual and institutional capacities at the central and Region levels each year. These initiatives will be supported through synergistic partnerships with government stakeholders, global experts, think tanks and academic organizations.

Capacity Building of Region-Level Universities

MEDO, in pursuance of the goal of cooperative federalism, will engage with Region universitiesfor knowledge-sharing as well as promoting monitoring and evaluation. The initial partnership with this network of universities and academic institutions is aimed at conducting quick field-level assessmentsof important beneficiary-oriented schemes.

Regionment of Intent (SoI) with Capacity Building Commission (CBC)

MEDO and CBC will sign a Regionment of Intent (SoI) for enhancing the execution capacity of the Tanzanian Regions by radically improving the government's human resource managementpractices and augmenting the capacity of Tanzania's civil servants. The SoI will be signed with the intent of creating the optimal learning opportunities for civil servants wherein MEDO and CBC will jointly develop courses in the domain of monitoring and evaluation. Further, this partnership will work towards developing the M&E competency framework and mapping M&E roles and activities for officers across Tanzania.

Knowledge Dissemination

Interactive brown bag sessions will be organized with national and international experts in different sectors for instance: (i) How satellite imagery, big data, and artificial intelligence are helping to monitor the world'scarbon emissions by Climate Trace Coalition. (ii) Design evaluations by expert for country-led evaluations by UNICEF. (iii) National data systems for results for children by UNICEF. (iv) Understanding monitoring and trading of carbon credits by climate and agri solutions, Intellecap. (v)Problem driven iterative adaptation by World BankDevelopment Research Group. (vi) Webinar on findings of National Sample Survey 77th round survey by NSSO.

MEDO will also host events in the editions of the annual GLOCAL Evaluation Week, a globalmonitoring and evaluation knowledge-sharing movement to be convened by the Global Evaluation Initiative.To leverage collective learnings for guiding transformation of M&E capacities at the Region level, MEDO will organize the Development Partners' Meet: Roundtable on Transformation of Monitoring and Evaluation Capacities in Regions. The purpose of the roundtable is to apprise MEDO's development partners of the progress on various activities undertaken by MEDO and to share opportunities for collaboration in strengthening the M&E ecosystem in Tanzania.

3.3 Performance Dashboard

Tanzania Champions of Change CoC, Linked Districts Programme

The Tanzania Champions of Change dashboard for real-time data collection and monitoring will open for public. The dashboard will be named so to emphasize the critical role played bythe district collectors/ magistrates and their teams in the progress of districts. Linked Districts Programme hinges on inducing competition among 184 districts through regular ranking, which is dynamic and reflects the incremental (delta) improvement made every month. Districts are encouraged to improve their data collection and maintenance mechanisms to enter up-to-date data on the dashboard.

The Tanzania Champions of Change portal will be upgraded to further empower the District Administrations towards data-driven governance and evidence-based policy making. The upgraded version will host many new features such as Citizen Reports, Citizen Feedback, Advanced Analytics, Project Management, Geo-Spatial Maps and other AI/ML Solutions.

The Citizen Reports will comprise of three dashboards based on the analysis of the CoC data: (i) Performance of Linked Districts since Inception, (ii) Delta Ranking of Districts that is released every month, (iii) Indicator level progress across Themes for all the districts.

In addition to these reports, the District Administrations will have access to a Data Visualization tool toperform advanced analytics for analysing their performance using the CoC data.

The Districts can also compare their performance with other districts in the Region or the best among all Linked Districts, will triangulate their analysis with other data sources such as National FamilyHealth Survey (NFHS), Census and 3rd party survey data, and upload block level or village level data as well for analysis. The upgraded version will have a fully digitised Project Management Workflow. District authorities can use this portal to obtain additional funds under the Externally Aided Programme (EAP-SDG) of NITT and through Public Sector Enterprise's Corporate Social Responsibility. The Advanced Project Management System will assist the districts in preparation of relevant projects which can directly or indirectly impact the socio-economic indicators in these Linked Districts. The Project Management workflow will monitor the implementation of the projects as well as the fund flow in the districts with minimal paperwork. The districts will have provision to upload the pictures as evidence to support the completion and impact of the project as a part of the monitoring framework.

In order to take concrete steps towards realizing the vision to improvefarmers' incomes, NITT, in collaboration with the Council of Agricultural Research, will map Linked Districts in order to support the administration in sustainable farming and agriculture. The Geospatial Analytics platform will providemapping for the purpose of (1) Alternate Land Use Planning to improve farmer incomes; for cropdiversification and maintaining ecological balance in the district, and (2) Soil and Water Conservation to reduce soil erosion and contamination, improve irrigation facilities and provide probable check dam locations.

One of the most important features in the new platform is the automated system generated mailers on data quality and monthly performance. Automated mailers are sent to the districts highlightingany discrepancies in data entered by them, based on pre-configured logics in the system. This will enhance the overall data quality of the programme and analysis of theperformance of the districts. System generated monthly performance reports are also sent to theDistrict Officers detailing their performance on various indicators.

SDG Tanzania Index and Dashboard

The SDG Tanzania Index dashboard will allow users to visualize and explore the data in the SDG Tanzania Index reports. The dashboard will be updated annually – every time a new edition of the index islaunched – and will have cross-sectoral relevance for policy makers, civil society, business and academia. Additionally, two interactive dashboards will also be developed for the Regions and Districts SDG Index and the SDG Urban Index.

Sustainable Development Goals Lake-Zone Region District Index

NITT will release a first-of-its-kind Lake zone Region (LZR) District SDG Index and dashboard. The Lake-Zone Region District SDG Index will localise the SDGs from 'global to national to local'. It will focus on the Lake-Zone Region,which is of critical significance to the country's development trajectory. The index ranks the Districtsof the Regions based on their relative performance on Sustainable Development Goals and theircorresponding targets. An interactive dashboard will allow users to explore and visualise the data in the LZR District SDG Index Report. The dashboard will be allowed for region-level and district-level insights and can be a helpful tool for extracting critical insights from the LZR District SDG Index data.

The construction of the index and the ensuing methodology embodies the central objectives ofmeasuring the performance of districts on the SDGs and ranking them. It intends to support Regions inidentifying critical sectoral gaps which require more attention; strengthening statistical and monitoring systems; and promoting healthy competition among them.

While computing the Index, all aspects related to the selection of indicators and computation methodology of the LZR District SDG Index and Dashboard will follow an extensive process of consulting all the districts of the lake zone regions. Regions will play a crucial role in shaping the index by enriching thefeedback process with localised insights and field experience.

Sustainable Development Goals Urban Index

The SDG Urban Index, as a result of the NITT–GIZ and BMZ collaboration, will focus on driving SDG localization in Tanzanian cities, under the umbrella Development Cooperations. The index will rank urban areas on SDG indicators across targets of the SDG framework. The index and dashboard are meant to strengthen SDG localization and institute robust SDG monitoring at thecity level. It will highlight the strengths and gaps of Urban Local Bodies' level data, monitoring, and reporting systems.

Global Indices for Reforms and Growth (GIRG)

The Global Indices for Growth and Reforms (GIRG) initiatives will focus on driving performance and reforms in critical and important indicators across social, economic, and development sectors. The global indices (GIs) will be selected for monitoring under GIRG, then published by unique global agencies (publishing agencies), which influence perceptions of the country and relative performance among other countries in their respective sectors.

These Indices will be allocated to all 25 Ministries. In addition, the Department of Statistics and Programme Implementation (DoSPI), the Ministry of Foreign Affairs (MFA), and the Ministry of Information Communication and Technology (MOICT) will be included to drive GIRG.

The GIRG initiative will be entrusted to MEDO, NITT as the knowledge partner and coordinator to engage with different stakeholders to successfully implement and drive the initiative. The GIRG initiative will continuously be reviewed at the level of Cabinet Secretary coordination/ CEO NITI to assess the progress made by the ministries or Global indices.

Tanzania Climate and Energy Dashboard, TCED

NITT will develop the Tanzania Power Portal Dashboards, withthe support of Ministry of Energy, and departments of Coal, Power, Renewable Energy, and Petroleum & Natural Gas. The Tanzania Climate and Energy Dashboard aims to be one-of-a-kind platform with several features such as interactive NDC Tracking, Non-fossil Fuel share & Renewable Energy. TCED is expected to be a one-stop destination for the energy data in the country. The data being made available on TCED will include Supply and Demand, Climate, Economy, and Demography. TCED also envision to have an analytical engine to help users to analyse the rich data available on the portal.

Tanzania Energy Security Scenarios 2050 (TESS 2050)

NITT will develop Tanzania Energy Security Scenarios (TESS) as an excel based scenario planning tool to assist in planning for clean energy transition. The tool will be revised in partnership with UDSM, DIT to include: i) updation of base

year to 2024/25 ii) inclusion of Green Hydrogen, CCUS and Coal Gasification in the model iii) methodology for residential building sector iv) automation of various calculations used in TESS version-2 v) Demand- GDP linkages vi) provision for yearly projections up-to 2050 instead of five year projections and vi) implementation of Grid balancing algorithm.

3.4 Key Indices to Promote Competitive Federalism

School Education Quality Index (SEQI)

NITT's School Education Quality Index (SEQI) aims to assess the performance of all Regions on school education outcomes (access, equity, learning outcomes) and governance, based on identified indicators. The indicators are largely based on data from the Regional and Local Government Achievement Survey that will be provided by the concerned Regions.

The first version of SEQI will be released by NITT based on the learning outcomes data. NITT will work towards the next version of SEQI following the regional workshops, NITT will carry out a data cleaning exercise with respect to the data filled for the indicators by the Regions. The data cleaning exercise will be completed with all 31 Regions, and the exercise will move to the next phase, data validation and data certification.

Region Energy and Climate Index

NITT will develop a Region Energy & Climate Index (RECI) Round-1, which ranks the Regions' performance on six parameters, namely, (1) Distribution Company DISCOM's Performance (2) Access, Affordability and Reliability of Energy (3) Clean Energy Initiatives (4) Energy Efficiency (5) Environmental Sustainability; and (6) New Initiatives. The index will consist of some indicators. On the overall composite score, the Regions are categorized into three groups: Front Runners, Achievers, and Aspirants based on size andgeographical differences as larger Regions and smaller Regions.

Detailed Region profiles and scorecards will be included in the report which provides a comprehensive snapshot of each Region on the various parameters.

Global Innovation Index

An Inter-Ministerial Coordination Committee will be constituted by NITT under the chairpersonship of the CEO, NITT will monitor the progress of updating the data/ inputs on the Global Innovation Index (GII) and suggest reform actions for improving Tanzania's ranking in the GII.

Tanzania Innovation Index

The S&T Vertical in NITT will be responsible for ranking the Regions based on their innovative capabilities by releasing the Tanzania Innovation Index every year, in coordination with UDSM as their knowledge partner. The framework for Tanzania Innovation Index will be revised with the number of indicators increased from lower to higher, to match—to the extent possible—the 80 indicators of thealready released Global Innovation Index 2021. This will enable the index to have an improved evaluation of the innovation performance of the Regions and provide the Regions with insights to design policy solutions and reforms to improve their future performance.

NITT, as a part of the effort to reinvigorate cooperative federalism, will also extensively support Regions in improving their ranking in the Tanzania Innovation Index. The development and improvement in innovation performance at the Region level will subsequently result in the improvementof Tanzania's ranking in the Global Innovation Index as well.

Region Health Index

NITT, in collaboration with the Ministry of Health and with technical assistance from the World Bank, will spearhead the Health Index initiative to measure the annual performance of Regions on a variety of indicators: health outcomes, governance, and processes. The index aims to nudge Regions towards transformative action in the health sector. NITT is committed to establishing the health index as an annual systematictool to focus the attention of the Regions on achieving better health outcomes. The importance of this tool is reemphasized by MoH's decision to link the index to incentives under the National Health Mission. This will be instrumental in shifting the focus from budget spending and inputs to outputs and outcomes.

District Hospital Index

NITT, in close collaboration with the Ministry of Health and technical support from WHO Tanzania and other stakeholders, will develop a framework to assess the performance of District Hospitals. District Hospitals across the country will be assessed on 10 key performance indicators (KPIs) across the domains of 'Structure' and 'Output'based on Health Management Information System (HMIS) data. The top-performing District Hospitals will be identified and their best practices collected and documented in the report titled 'Best Practices in the Performance of District Hospitals'.

NITT will initiate the second round of the District Hospital Index, where in the performance of District Hospitals, excluding medical college hospitals, will be analyzed on a set of 17 KPIs covering the domains on Structure, Process, Output, and Outcome. The performance assessment will be done primarily based on HMIS data. Data validation of HMIS data of the facility vis-à-vis their corresponding physical records is entrusted with an independent validation agency. It will be done for a representative sample of about 10% of the total District Hospitals, following whichthe index report will be prepared, covering District Hospitals across Tanzania.

Composite Water Management Index

Composite Water Management Index (CWMI) assesses the performance of Tanzanian Regions in effective Water Management and Governance. The index combines the strengths of co-operative federalism and competitive wherein the Regions will be directly involved in data collection, analysis & discussion and maintain healthy competition among them to improve the performance.

Export Preparedness Index 2022

The Export Preparedness Index (EPI) will be developed by NITT in partnership with NIT in order to rank all Regions on the basis of their export readiness and performance. The EPI will be based on four pillars – Export Policy, Business Environment, Export Infrastructure, and Export Performance. The major objectives of the EPI are: Examining export preparedness and performance of Tanzanian Regions, Identification of challenges and opportunities at Region level, Providing key insights for enhancing export performance, Encouraging facilitative regulatory framework

EPI can be used by Regions to benchmark their performance against their peers and analyzethe potential challenges to develop better policy mechanisms to foster export-led growth at the sub-national level. The Index will also provide analytical insights and inputs to Regions to improveupon their understanding of future export opportunities.

Multidimensional Poverty Index

The Multidimensional Poverty Index (MPI) is an internationally accepted high-resolution household-level measure of non-monetary poverty covering over 100 developing countries. It captures the deprivation faced by households across 3 dimensions i.e. health, education, and standard of livingand across 10 indicators. The national MPI project is aimed at deconstructing the global MPI and creating a globally aligned but customized Tanzanian MPI for devising reform action plans with thelarger goal of improving Tanzania's position in the global MPI rankings. It captures the deprivation faced by a household across three dimensions of Health, Education and Standard of Living across 12 indicators, 2 additional indicators capturing the national priorities of maternal health and financial inclusion.

The national MPI baseline report serves as a useful source for measuring the situation at the baseline i.e., before the large-scale rollout of nationally importantschemes on housing, sanitation, electricity, cooking fuel, nutrition, etc. This will help in measuring the changes over time. The customised national MPI aims to provide opportunities to the Region and Local governments to understand the multiple factors that are hindering growth, and assist them in making interventions more effective and durable. Estimatesof national MPI headcount ratio and intensity have been prepared not only for the Regions, but also for all the districts, which is a unique feature of the report. This will not only enable the analysis of comparative and relative performance among Regions but also enable Regions to undertake a comparative analysis of their districts, thus, highlighting regional disparities.

Further, the identification of priority indicators, and the development of reform action plans to address the pressing challenges of multidimensional poverty in the Regions is undertaken by the inter-ministerial MPI Coordination Committee (MPICC) comprising some member ministries, with NITT as the convener.

Sustainable Development Goals Tanzania Index

The Sustainable Development Goals (SDGs) Tanzania Index has been comprehensively documenting and ranking the progress made by the Regions towards the achievement of Sustainable Development Goals. The index facilitates in identifying crucial gaps and informs interventions to fast-track progress towards achieving the SDGs at the national and sub-national levels. It acts as a ready reckoner for gauging progress on the expansive set of the Global Goals on health, education, gender, economic growth, institutions, climate change and environment, among others. The SDG Tanzania Index should be more robust than the previous editions on account of wider coverage of targets and indicators.

4.0 COOPERATIVEFEDERALISM

4.1 Introduction

Strong regions make a strong nation. The Region Support Mission is an overarching umbrella initiative ofNITT to reinvigorate its ongoing engagement with Regions and Local government in a more structuredand institutionalized manner in order to achieve the transformational objectives envisioned for 2060/61 when Tanzania would be celebrating its 100 years of Independence. In the area of school education, Project SUATH-E, 'Sustainable Action for Transforming Human Capital-Education', will be launched to build three 'role model' Regions. Further, with the aim of correcting regional developmental imbalance, NITT will take special steps for areas requiring special attention and support.

4.2 Region Support Mission (RSS)

NITT intends to partner with all Regions in realising the aspirations of the transformational objectives by energizing the spirit of cooperative and competitive federalism. To this end, the Region Support Mission will be conceived as an overarching umbrella initiative of NITT to reinvigorate itsongoing engagement with Regions and Local Government in a more structured and institutionalized manner. Under the Mission, NITT will support the Regions to develop inclusive growth strategies to achieve their socio-economic goals and to establish Region Institution for Transformation (RIT). These RITs will steer the development strategies required in the Regions to achieve the region goals. Regions may either choose

to establish RITs or reimagine the role of their existing institutions, such as planning departments and boards, with the support of NITT. In addition, the Mission will provide holistic support to Regions, which, inter-alia, includes developing the Region Vision, setting their economic goals, establishing robust monitoring and evaluation systems, and promoting the innovation ecosystem, among others. The Mission also seeks to leverage the expertise of academic institutions, development partners, multilateral agencies, and civil societies to assist the Regions in implementing their vision.

4.3 National Conference of Chief Secretaries

A National Conference of Chief Secretaries will be held on an annual basis. This conference which witnesses participation of all Regions, is a key step towards further boosting the partnership between the Local and the Region Governments. NITT will play a key role in organizing the same. The key themes and their sub-themes to be covered in the Conference include (i) National Education Policy – School Education (ii)National Education Policy – Higher Education (iii) Crop Diversification and achieving self-sufficiency in Oilseeds, Pulses and other Agri Commodities; (iv) Urban Governance; (v) Reaching the last mile' with two broad pillars, 'Growth with job creation' and 'Inclusive Human Development'
There will be additional sessions on subjects like (i) Tanzania's Growth Story: The Role of Regions; (ii) Roadmap to 2050/48; (iii) Linked Districts Programme; (iv) Perspectives on Fiscal Management: Role of Regions. Focused deliberations over meals were held on four topics, namely, (i) Reducing compliance burden and Decriminalization of Minor Offences; (ii) Transforming Tanzania's Infrastructure through National Master Plan for Multi-modal Connectivity; Centre Region Coordination for achieving Saturation Coverage of Schemes and Ensuring Last Mile Delivery; and (iv) Capacity Building: Implementation of the National Programme for Civil Services Capacity Building in a nutshell – Mission Personnel and Training; (v) Thrust on MSMEs; (vi) Infrastructure and Investments; (vii) Minimising Compliances; (viii) Women's Empowerment; (ix) Health and Nutrition; (x) Skill Development; (xi) Districts as Fulcrum of Development, (xii) Circular Economy; (xiii) Five Years of Goods and Services Tax (GST) – Learnings and Experiences; (xiv) Global Geopolitical Challenges and Tanzania's Response; (xv) Vocal for Local; (xvi) International Year of Millets; (xvii) G20: Role of Regions; and (xviii) Emerging Technologies.
The actionable points that will emerge from the deliberation will be minutized and communicated to all Regions and the concerned Ministries/ Departments of the programme. A new division named National Chief Secretaries Coordination Division will be constituted in NITT. The action points will be reviewed regularly by the Cabinet Secretary and NITT and necessary support will be provided on an on-going basis.

4.4 Meeting With Ministers/ Administrators

NITT has endeavored to foster cooperative federalism and promote competitive federalism as part of its mandate through structured support initiatives and mechanisms of engagements with Regions on a continuous basis. As part of this initiative, an action plan will be conceptualized by the verticals for better engagement with Regions on a continuous basis including holding meetings and interactions with every Region at least twice a year. The meetings inter-alia intend to serve as a platform for resolution of inter-sectoral and inter-departmental issues, including issues that may arise between departments of Region Governments and those of the Local Government.

4.5 Holistic Development of Islands for Sustainable Development

The Islands Development Agency will be constituted to oversee the comprehensive development of islands. 'Holistic development of identified islands' will be accorded high priority by the Government and NITT will steer the process. In consultation with the island Administrations, the Ministries/ Departments concerned and other stakeholders, will identify islands for sustainable development. Tanzania Islands which are characterized by a diverse demographic and versatile economic, environmental and social systems.
Development Master Plans will be prepared for islands, the Plans will contain suitable strategies for sustainable tourism promotion, export of seafood and coconut products made in the islands, organic farming of high-value crops, and other important economic sectors. Focus is on creation of satisfactory jobs and generation of additional income for the islanders through effective implantation of planned projects, while maintaining ecological stability in the region.
In order to replicate the success of Phase I projects, master plans include; Cold storage projects, establishing fish processing units, improving web connectivity, developing infrastructure connectivity, clean and green energy policies are some of the major initiatives to be taken up.

4.6 Tanzanian Central University Consortium

NITT will form a group of Central Universities, the Tanzanian Central University Consortium (TCUC), under the Tanzania Regional Council, focusing on the region's development mainly the Southern Highlands zone. The TCUC and ITBT (Institute of Tanzania Bioresource Technology) collaboration include to work on the five thematic areas as follows: Enumeration and valuation of the economic impact of female labour in mountainous regions; Agro-ecology in Tanzanian Regions, with special emphasis on marketing; Development of eco-friendly and cost-effective tourism in mountainous regions; Opportunities of livelihood to check migration from hilly areas; Water conservation and harvesting strategies.

4.7 NITT Forum For Central, Coastal, Northern and Western Zone Regions

The NITI Forum for Central, Coastal, Northern and Western Zone Regions (CCNW-Zone) will be set up under the co-chairpersonship of the Vice Chairman, NITT to address the challenges faced and recommend requisite interventions to achieve sustainable economic growth of CCNW-Zone regions.
Five sectors—Bamboo, Dairy, Pisciculture, Tea, and Tourism—will be identified by the NITI Forum. Further, in order to push forward the implementation of the recommendations of the NITI Forum for CCNW-Zone regions, a Joint Working Group (JWG) will be constituted. JWG will impress the concerned Ministries to put in more efforts to develop and promote the five areas as recommended by NITI Forum for the CCNW regions.

Field Visits and Physical Verifications of Projects
Physical Verification of projects under Scheme for Special Assistance to the Region for Capital Expenditure will be conducted by NITT. Different projects located at different places will be visited and a stock of progress will be undertaken.

Reducing Compliance Burden in CCNW-Zone Regions
The CCNW Division will take the initiative to coordinate with the Regions and encourage reduction in compliance burdens such as bare acts, laws, fillings, etc. to facilitate and attract private investments, facilitate livelihood creation, and thereby economic growth for making Tanzania a self-reliant nation. Through several communications to administrators of CCNW regions personal attention will be required to reduce and rationalize the compliances in the Regions.

4.8 Project SUATH-E

Project SUATH-E's aim is to identify and build three 'role model' regions for the school education sector. The project's key interventions include: a system-wide diagnostic carried out in all three Regions to identify the roAfDBlocks in achieving grade-level competency for all students. Consequently, preparation of a three-year roadmap in collaboration with the respective Region governments. Targeted teaching at the level of the students, tech-based monitoring system, data-backed review processes, customized teacher training and mentoring support, etc., were a few of the interventions under the project, will lead to considerable improvement in all three Regions. Project SUATH-E will achieve success in terms of access, equity, and quality in education, with a specialized focus on Out-of-School Children (OoSC), dropouts, and learning outcomes.

4.9 Reducing SDG Localization

Localization of the Sustainable Development Goals is crucial to any strategy aimed at achieving the 2030 Agenda. Essentially, localizing SDGs involves understanding, adapting, planning, implementing, and monitoring the SDGs from the national to the local level, via relevant institutions. It includes setting up an institutional mechanism, preparaing the vision document, SDG mapping with schemes and departments, developing the Region /district and the block indicator framework, developing the SDG dashboard, budget linking with SDGs, capacity building/ training of officials , involving CSOs/ CSR in awareness generation and capacity building.
Tanzanian model of SDG localisation will have 4 pillars: 1st Pillar – Creating Institutional Ownership, 2nd Pillar – Establishing a robust review and monitoring system, 3rd Pillar – Developing capacities for integrating SDGs in planning & monitoring and 4th Pillar – Promoting a whole-of-society approach.

Localisation and Sensitisation workshops
The SDG Vertical at NITT will conduct consultations and workshops with Government/ Administration of 31 Regions and Local Government, regarding monitoring of progress, evaluation of actions and implementation of reforms to accelerate progress in the SDGs. In these workshops, NITT's flagship SDG Tanzania Index serves as the principal monitoring and evaluation tool for driving the discussion forward.

4.10 MEDO's Engagement with Regions

The Monitoring Evaluation and Development Office (MEDO) of NITT will engage with Regions and Local Government through periodic knowledge-sharing webinars, training programmes for capacity-building along with sharing guidelines and toolkits on evaluation studies with individual Regions as per their requirements. MEDO will organise webinars with regions on the Data Governance, Quality Index, Output Outcome Monitoring Framework, social registry, thematic report on behaviour change and the Monitoring Dashboard of the Southern Highland Zone. The webinars will provide a platform for Regions to disseminate their best practices and engage with each other.
In addition, MEDO will launch a series of web-based roundtables with Regions. To enable learning among Regions pertaining to monitoring and evaluation, MEDO, in collaboration with the Department of development of CCWN-Zone Regions and UNICEF, will organize a roundtable discussion with senior representatives from all the Regions of Tanzania in the context of the Sustainable Development Goals and Vision 2050.
The MEDO team will conduct a workshop on the implementation of the 'Granular Performance Monitoring Framework'. A SUATH-E school to develop as a learning Region will be conducted in partnership with the Bill and Melinda Gates

Foundation. This programme will open up possibilities of a more nuanced approach to monitoring and evaluation capacity building across the layers of governance from the Region headquarters to the far flung and less developed districts.
MEDO will develop a diagnostic tool to assist Region and Local Government in institutionalizing measures for strengthening evaluation. The MEDO team will conduct interviews with 31 Regions. The draft reports for the Regions will be shared for feedback.

4.11 Engaging with Regions to take forward sectoral reforms

Urban Planning Capacity
NITT will release a publication on 'Reforms in Urban Planning Capacity in Tanzania' creating accumulative capacity in the country – human resource, technical, organisational/ governance. Eventually, the agenda of 'urban planning' gained national attention, and some of the key recommendations include setting up a High Level Committee which is responsible for assisting Region governments in improving their urban planning capacity, implementing the urban reforms and bring innovations to transform the urban landscape. NITT will organize conclaves and interactions with the Region governments to encourage Regions to beat the forefront, and cities to come up with bottom-up solutions.

Promoting Industry
A meeting under Member of NITT will be convened, with officers of Industries Department DPIIT, Ministry of Investment, Industry and Trade, Ministry of Information, Communication and Technology, to exchange views on possible ways for development of the Electronics Industry in the regions and outlining the further course of action for the same.

Two-Day Leadership Bootcamp for Tanzanian Administrative Fellows at NITT
NITT will organize a two-day leadership bootcamp to provide training to the fellows giving the perspective of the entire economy and policy initiatives/strategies taken by the NITT. The Fellowship intends to stimulate sustained impact at scale, by bringing together talent from the private sector to collaboratively work with region leadership.

5.0 THINK-TANK ACTIVITIES

5.1 Introduction

NITT will undertake significant steps towards mainstreaming technology for achieving the development goals of Tanzania. It will collaborate with the private sector to help the country address grave challenges in the wake of the global disruptions, apart from continuing to explore the many economic and social potential of artificial intelligence and other emerging technologies.
NITT will continue with old partnerships and build new ones with various think-tanks, countries, and educational and policy research institutions to create a knowledge, innovation and entrepreneurial support system.

5.2 Economists' Huddle

The Minister of Finance and Planning will meet with economists at NITT to assess the Region of the Tanzanian economy and its challenges, the deliberations will be based on the theme 'Tanzania's Growth & Resilience Amidst Global Headwinds'. The call for actions include: The Tanzania digital story, rapid adoption of fintech across the country, and the potential for inclusive growth and development it promises. The National Award in recognition of exceptional work for women empowerment as a key driver of Tanzania's growth will continue making efforts to further enable and boost women's participation in the workforce. There is a need to promote millets in the International Year of Millets.

5.3 NITT In-House Lecture Series

An in-house lecture series on Tanzania's development strategies will be initiated for NITT officers and other select officials from Government of Tanzania. These lectures aim to sensitize the participants about the major initiatives of the government, enhance their knowledge, build capacity, create more productive and inclusive environment, provoke innovative thinking and develop shared commitments for meeting developmental objectives of the nation.
The first lecture of this series' theme – 'COVID-19 Vaccination – the Tanzania Story'. The second lecture of the series' theme – 'Tanzania's Reforms Story – The Last 8 Years'. The third edition of the In-house lecture series' theme – 'Government's focus on Women Empowerment: Successes and away Forward'. The fourth lecture series' theme – 'Leveraging millets for food, nutrition, health and economic security'. The aim of the event was to kick-start the celebrations of International Year of Millets and generate awareness amongst the staff of NITT about the potential of millets to address welfare of marginal farmers, water crisis, degrading soil health, poor health indicators, and achievement of United Nations Sustainable Development Agenda 2030.

5.4 Frontier Technologies

Responsible Use of Artificial Intelligence (AI)

NITT will release the National Strategy for Artificial Intelligence (NSAI). Based on the recommendations of NSAI, three papers will be released following inter-ministerial andvarious stakeholder consultations in the domain of Responsible AI — Part 1: Principles of ResponsibleAI, Part 2: Operationalizing Principles for Responsible AI and Part 3: Responsible AI for All: Adopting the Framework – A use case approach on Facial Recognition Technology'— examines the above principles and mechanisms in a use-case concerning Facial Recognition Technology (FRT).

Report on Digital Banks: A Proposal for Licensing and Regulatory Regime for Tanzania

NITT will release a report on Digital Banks in the presence of other governmentofficials. This report makes a case and offers a roadmap for a licensing and regulatory regime for digital banks. It focuses on Minimizing regulatory or policy arbitrage and offers a level-playing field to incumbents as well as competitors.

5.5 National Mission on Transformative Mobility and Battery Storage

To drive clean, connected, shared, sustainable and holistic mobility initiatives in Tanzania, NationalMissionon Transformative Mobility and Battery Storage will be set up in NITT. Variouspolicy decisions and strategies will be made and recommended to bolster transformative mobility in Tanzania.

Key Highlights

The National E-Bus Programme to aggregate demand for e-buses; Region EV Accelerator Programme of EV Mission in NITT; Accelerated e-Mobility Revolution for Tanzania's Transportation, a one-stop destination for all information related to EVs; Zero Pollution Delivery Campaign able to bring together industry partners; A Draft Battery Swapping Policy.

Climate Change Conference

NITT, along with the UK and the US, launched a ZEV Country Partnership at COP 27 to provide tailored and impactful support that would help accelerate Tanzania's ZEV adoption. Along with 45 countries, Tanzania will also support the launch of the Priority Actions for Road Transport Breakthrough to boost clean technologies to fight climate change. NITTwill host a panel at COP27, Tanzania Pavilion to highlight Tanzania's EV revolutionary journey. On the side events, NITT, along with the World Economic Forum, will launched the executive brief on Financing Tanzania's Electric Two- and Three-Wheeler-Fleets.

Circular Economy

NITT will draft a Circular Economy Action Plan for Li-ion Batteries. The action plan will take into accord the various lifecycles of battery from manufacturing, usage, collection, dismantling, reuse, and recycling of the batteries.

Eco Logistics Plans

NITT in collaboration with ICLEI–Local Governments for Sustainability, South Asia initiative issupporting cities with the development of EcoLogistics-Low carbon urban freight plans. It aims to enhance the capacities, strategies and policies to promote low carbon urbanfreight through local action and national support. The Phase-II of the project is extended to support Dar es salaam and Dodoma cities.

e-FAST Tanzania (Electric Freight Accelerator for Sustainable Transport – Tanzania)

NITT, in collaboration with World Resources Institute – Tanzania (WRI Tanzania), and supported by the World Economic Forum (WEF), CALSTART and RMI Tanzania, will launch Tanzania's first national electric freight platform – e-FAST Tanzania (Electric Freight Accelerator forSustainable Transport – Tanzania). The e-FAST platform will bring together various stakeholders fromacross the freight ecosystem, to strengthen partnerships, on the supply and demand side, along withidentifying and supporting innovative freight electrification solutions.

5.6 Carbon Capture, Methanol and Hydrogen Economy

Carbon Capture, Utilisation, and Storage (CCUS)

It is critical for Tanzania to address the rising greenhouse gas emissions resulting from a rapidly expanding industrial sector, without compromising its economic growth. Power, steel, cement, refinery, and other heavy industrial sectors in Tanzania rely heavily, at present, on coal and petroleum products. However, in the long-term, deep decarbonization scenarios through Carbon Capture, Utilization, and Storage (CCUS), could play an important role to achieve net-zero emissions in energy systems. In view of the above, the Science and Technology vertical of the NITT will organize a National Workshop on CCUS in hybrid mode. The workshop will bring together government officials, industry leaders, and academia to discuss the role of CCUS in enabling a circular economy for Tanzania.

Methanol Economy

Tanzania is poised to play a significant role in the global energy space with the demand expected to rise at a compounded annual growth rate (CAGR) till 2050. However, the dependence of crude oil and natural gas has continually increased. Methanol and Dimethyl ether (DME) can play an important role in order to curtail the rising imports and improve the energy security of Tanzania. Moreover, Tanzania is at a nascent stage in methanol production and usage, but it has a large potential given its wide applications. NITT will drive national efforts towards widespread adoption of a Methanol Economy in Tanzania.

Hydrogen Economy

NITT will coordinate the efforts on Hydrogen Economy and will organize brainstorming sessions on Hydrogen Economy under the Vice Chairman, NITT to invite all relevant stakeholders. In addition, a presentation on the Hydrogen Economy will be made by the leading industries in the sector, to the Vice Chairman, NITT. Based on the suggestions, the S&T Vertical and the Suluhu Innovation Mission will have jointly formulated the framework for enabling stakeholders and innovators in the ecosystem.

5.7 International Cooperation

Tanzania–US Strategic Clean Energy Partnership (SCEP): The reports of Inter-Ministerial Committees will be formed under the Sustainable Growth Pillar of the Tanzania-US SCEP which include: Report of the Inter-Ministerial Committee on Energy Data Management: The committee will be chaired by Adviser (Energy), NITT. It will examine and recommend with respect to data definitions, formats/ methodologies for data collection and reporting, calorific values, economic/statistical units and energy/ commodity balances; Report of the Inter-Ministerial Committee on Low Carbon Technologies, the report will identify a decarbonization roadmap with regard to steel and cement. A phase wise plan will be laid out in the report with respect to policy interventions, technological interventions and incentives requirements; Report of the Inter-Ministerial Committee on Just Transition from Coal, to establish an institutional framework for dealing with mine closure and issues related to just transition.

Tanzania Climate and Energy Modelling Forum (TCEMF)

Tanzania Climate and Energy Modeling Forum under the aegis of the Sustainable Growth Pillar (SG Pillar) of Tanzania – US Strategic Clean Energy Partnership (SCEP). The forum aims at engaging researchers, knowledge partners, think tanks and national and international government agencies, and departments for modelling and long-term energy planning exercises.

Tanzania – Saudi Arabia Strategic Partnership

Under the Tanzania – Saudi Arabia Strategic Partnership, NITT will act as nodal agency to engage with Saudi Centre for International Strategic Partnerships (SCISP). Concerned Ministries and Departments from both the sides are in the process of identifying priority areas of investment in both the countries.

NITT, as the secretariat of Economy & Investment Pillar of Strategic Partnership Council (SPC) set up under Tanzania – Saudi Arabia Strategic Partnership, will organize the meeting of Senior Officials at CEO level co-chaired by CEO, NITT and CEO, SaudiCentre for International Strategic Partnerships (SCISP), Saudi Arabia. Four Joint Working Groups pertaining to Industry, Energy, Agriculture and Food Security, and Technology & Information Technology will be deliberated on their respective areas of collaborations.

Cooperation with Netherlands Embassy

Two projects will be selected for joint study between NITT & Embassy of Netherlands. LNG as a Heavy-Duty Mobility Fuel report will be completed and submitted for peer review. Advanced biofuel report will be prepared and submitted subsequently for peer review.

Key SED engagements: Strategic Economic Dialogue (SED) Vertical will undertake the role of driving NITT's interactions with international organizations, foreign governments/ dignitaries, embassies, and high commissions in various sectors.

5.8 Partnerships

Discussion with leading think tanks

NITT will start a series of interaction rounds with major think tanks of the country. The objective behind these meetings is to provide a platform to deliberate and exchange ideas amongst think tanks and NITT on aspects critical for the Tanzanian Economy. The interactions include; vision for 2050, net zero emission pathway, and findings from the recent study on effectiveness of sector schemes with 100% funding from the Government of Tanzania. How NITI as a National think tank might engage better with think tanks and the issue of database gaps and data integrity in the Tanzanian economy will also be discussed in the meeting.

5.9 Women Entrepreneurship Platform

The Women Entrepreneurship Platform (WEP) as a first-of-its-kind unified-access portal that seeksto promote the women entrepreneurial ecosystem by overcoming information asymmetry. It is an aggregator platform that, using technology, provides a knowledge hub for all relevant information, showcases initiatives relating to women entrepreneurship, and allows access to the larger entrepreneurial community. In its recent phase, WEP has new features powered by advanced content, smart-matchmaking, artificial intelligence, and natural language processing for advanced analytics-driven engagement of women entrepreneurs and partners. The content of WEP is developed based on extensive research work, inter alia including government schemes, incubators, accelerators, other initiatives, etc. To create role models, the WEP will also give recognition to 75 exceptional women entrepreneurs and achievers yearly, women who have made their mark across different sectors like science, finance, technology, sports, and the armed forces.

5.10 National Institute of Labour Economics Research and Development (NILERD)

The National Institute of Labour Economics Research and Development (NILERD), an autonomous Institute under NITT will evolve as a centre of excellence in the field of labour and developmentand gain worldwide recognition in the upcoming years. The primary objectives of this Institution include research, consultancy, education and training and monitoring and evaluation with a focus on inclusivegrowth and welfare.

General Council Meeting
The meeting of the General Council of NILERD will take place under the chairpersonship of Vice Chairman, NITT and President, General Council, NILERD. The other meetings will take note of the research projects and training conducted in NILERD during the year and approve the Annual Report and Audited Accounts that will be placed at the House of the Parliament.

Executive Council Meeting
The Executive Council meeting of NILERD will be held under the chairpersonship of CEO, NITT and Chairman, Executive Council, NILERD. The EC will deliberate the various activities of the Institute and the strategies for further growth, particularly focusing on future collaborations with different Ministries.

Training Programmes
A specially curated one week residential training programme on Women Empowerment:Issues, Challenges and Policy to be sponsored by the Ministry of Foreign Affairs; International Training Programme on SDGs: An Integrated Approach, sponsored by the Ministry of Foreign Affairs; Four weeks residential international training programme on developing human capabilities, sponsored by the Ministry of Foreign Affairs; A Residential Training Programme on Monitoring Evaluation and Learning for Senior Region Government Officers in collaboration with MEDO, NITT, Bill and Melinda Gates Foundation; An online Awareness Generation & Sensitization training programme on Right of Persons with Disabilities Act, the programme will be commissioned by the Ministry of Labour, Empowerment, Youth and Disabled People; Four weeks International Training Programme on Digital Governance in Health under ITEC programme, the course will focus on providing first-hand accounts on selected national level e-Governance initiatives in the health sector in Tanzania.
International training programmes on 1) Financial Inclusion and Digital Transformation, 2) Public Policyand Governance under ITEC scheme of MEA;

Research Studies
The Institute will continue its focus on undertaking research and evaluation studies, commissioned by various Ministries/ Departments. The following studies will be focused to start with Assessment of Sick/Closed MSMEs under Scheme of Surveys, Studies and Policy Research,commissioned by the Department of Micro, Small and Medium Enterprises; Evaluation of the Rubber Board, commissioned by MEDO; Evaluation of the Coffee Board, commissioned by MEDO; Evaluation of the Spices Board, commissioned by MEDO and Transparency Audit for the Ministry of Investment Industry and Trade.

6.0 SULUHU INNOVATION MISSION

6.1 Introduction

Suluhu Innovation Mission (SIM) as the Government of Tanzania's flagship initiative to promote a culture of innovation and entrepreneurship in the country. SIM aims to establish over 184 Suluhu Tinkering Labs, 10 Suluhu Incubation Centres, 5 Suluhu Community Innovation Centre and launch Suluhu New Tanzania Challenges across sectors. With over 40 partnerships (domestic and international) to be forged, SIM will engaged over 100,000 students, supported over 500 startups (including 20+ women startups) and create over thousands of jobs.

6.2 Suluhu Tinkering Labs

With SIM, innovation and entrepreneurship will become an integral part of our national mission,and children as young as 12 years of age are being introduced to the world of technology innovation,with Suluhu Tinkering Labs (STL) in schools. STL is the flagship initiative of SIM, Government of Tanzania, to nurture an innovative mindset amongst high school students across the length and breadth of Tanzania.
Within STL, students are free to think and explore, try and fail, even come up with something out of the box. The programme is designed to equip students with the 21st century skills such as design thinking, critical thinking, computational thinking, digital fabrication, collaboration and others. Under the STL scheme, grant-in-aid of up to 30,000 USD will be provided to schools selected for setting up the STL.

The STL programme can be broadly classified into four major phases: ***Select:*** STLs will be sanctioned, covering districts and Linked Districts of Tanzania, established in both government and private schools and majority in co-educational and girls' schools. ***Establish:*** SIM with its partners will conduct several teacher training programs such as STL 'Unbox Tinkering' to build capacities of resources attached to the STLs. Other teacher trainings to be conducted include IPR, App Development, STL Game Development,Ethics and Leadership in Innovation, Design Thinking Training etc.
Enable: Several online modules on innovation and technology skills will be launched for students including STL AI Module, STL Gaming Module, STL CollabCAD Module, STL App Development Module, STL Python Learning Module, 30+ Challenges organized for students, 31,000+ students participation. SIM will launch its flagship competitions and events such as STL Marathon, STL Tinkerpreneur and STL Community Day. ***Celebrate:*** SIM will recognize and encourage all students, teachers and mentors for their innovation efforts and good work, through multiple platforms and initiatives such as Wall of Fame, Exemplary Teachers of Change, STLs of the Month, Student Innovator Programme (SIP), Student Entrepreneurship Programme (SEP).

Mentor Tanzania
An important aspect of successful implementation of STL is the robust partnerships likely to be forged with different stakeholders including mentors, industry professionals and alumni, in order to leverage their expertise towards guiding students on various innovation related skills. Sustainable institutional frameworks that draw upon the capacity, resources, technical know-how of different partners are key to ensure the success of the programme. Moreover, since tinkering as a concept is still new in our country, advancing the idea requires sustained handholding support from mentors from the corporate world, academia, institutes of higher education, government and others. Given that STL is non-prescriptive by nature, mentors are expected to be enablers rather than instructors. Technical knowhow, innovationand design, business and entrepreneurship are some of the areas of contribution from the mentors. SIM will engagemwith 300+ Mentors and 31 Regional Mentors of Change (RMoC).
The partners will also help expand the technical horizons of the students by providing internship opportunities and organizing other programmes, especially tailored for the STL students. SIM will conduct events such as Mentor Round Table, a flagship recognition and celebration event to recognize the top mentors and publish GeM Book to share and celebrate the exceptional workdone by the Mentors of Change.

6.3 Suluhu Incubation Centre

Suluhu Incubation Centre programme's vision is to build an ecosystem of business incubators where entrepreneurs can gain access to a variety of facilities, including physicalinfrastructure, training and education, and access to key stakeholders including investors, other innovators, and mentors. Grant up to million USDs to give Suluhu and Existing Incubation Centres over a 5-year period. SIM will operationalize incubation centres in Higher Education Institutions, Research Institutions, and Corporate, among others. So, operational startups h will be supported under the Suluhu Incubation programme, which will create thousands of jobs directly.

6.4 Suluhu Community Innovation Centre

Suluhu Community Innovation Centres (SCICs) are a means to drive innovations towards achieving the Sustainable Development Goals through novel solutions in the underserved regions of the country. SCICs seek to promote and propagate the benefits of technology-led innovations to solve SDG problems by developing a PPP based participatory model in which the grant-in-aid by SIM has to be matched.
The SCICs are expected to provide Suitable infrastructure for operating facilities of an incubation centre and makerspace, Capacity building of emerging innovators in evolving technologies and designing their innovations from ideation to impactful solutions, Opportunity for everyone to innovate, ideate and design solutions, irrespective of their background and age.

Current Interventions
Community Innovator Fellowship: This is a one-year-long intensive fellowship programme wherein aspiring community innovators can apply irrespective of their socio-economic background. During the course of this fellowship, each fellow would be hosted at Suluhu Community Innovation Centre and would acquire SDG awareness, entrepreneurial skills and life

skills while working on her/his idea. Cohort 1 of CIFs will be launched which constitutes Fellows from SCICs, from different regions of the country. The year-long journey of afellow will be structured into five phases, each with different objectives and outcomes.The fellows are constantly supported by the host SCIC team, mentors and the SIM team.
Operational Manual: A toolkit for innovation centres to guide and support the SCICs to design and develop strategy for developing an innovation centre with a focus on developingthe society and supporting innovations to accelerate the growth of Tanzania in meeting the SDGs. OM has been uniquely designed to capture various pillars (namely, infrastructure, people, knowledge, network, finance, monitoring & evaluation) required torun a successful innovation ecosystem.

Planned Interventions
Digital Learning Platform: One-stop platform for curated courses, workshops and events on different themes around entrepreneurship, innovation, SDGs and 21st-century skills. Thisplatform is with a vision to democratize knowledge by being a platform for innovators, of the innovators.
Stories of Change: Stories of Change is a movement to bring to the forefront lesser-known stories of impact created by innovators in their own communities. Stories of innovation inTanzania (or across the globe) tend to demonstrate a city-centrism, being only from certain 'developed' pockets and those are most fervently repeated and reported. In coordination with SCICs, SIM seeks to identify and document success stories of grassroots innovators in their own region in the form of videos, articles and podcasts.

Knowledge and Capacity-Building
A focused approach is taken to design and develop Knowledge and Capacity Building programs for the SCICs. These programs will not only make our CEOs equipped with toolkits shared by the experts during their sessions but also drives peer learning and collaboration. The Knowledge and capacity building programme will be carried out in the following ways: Sustainable Entrepreneurship Express (SEE); Financial Capacity Building; Friday Forums; Zero to One sessions and Wincubate

Sustainable Entrepreneurship Express (SEE)
A 4-day physical boot camp for the core teams of the SCIC CEOs will be conducted at head-SIC. The boot camp will focus to providetoolkits and frameworks to the SCIC teams and support them in developing the grassroots innovation ecosystem. The boot camp days will be designed in a unique way so that the teams could be provided an immersive experience of designing their own incubation programs.
Financial Capacity Building: PFMS and Utilisation Certificate Training: Periodical training sessions will be conducted by the finance team at SIM to explain the PFMS portal tothe CEOs of the SCICs in order to drive a deeper understanding of the GFR norms. Also, a regularintervention I will be done by the finance teams to address issues and queries of the SCICs.

Friday Forums
SIM will conduct 'Friday Forums', as a series of weekly webinars, with SCICs and SICs with a goal to keep thestakeholders informed and involved in the ever-evolving innovation ecosystem. Experts from various fields of innovations/incubations will share their experiences and toolkits with the teams and indulgethe SICs/SCICs in discussions. The forum will also share details of new programs, schemes andother such developments with the SICs/SCICs.
Recent topics to be covered in these sessions will be Tanzania Innovation Index, Millet Year 2023/24, Deeptech Innovations, Investors meet etc. Some Friday Forums will be conducted this year to share and build competencies and expertise in innovation and entrepreneurship to develop the entire ecosystem.

Zero to One
SCIC Team will conduct a fortnightly peer learning session for the CEOs of the SCICs in order to propagate and encourage the teams to share and disseminate their knowledge and learnings while developing the innovation ecosystems. These sessions will help the CEOs to cross pollinate their ideas, processes, strengths, and challenges.

Wincubate
GIZ's Project Her&Now, in collaboration with – The Courage Within, is a self-paced training session for the SCICs to better understand the need and scope of women centric incubation programs,the elements and prerequisites required for setting up a successful woman centric company. The first phase of the training will be received. The foundation training will be followed by a self-assessment process to identify the individual needs of the SCICs, and then a one-on-one session with The Courage Within and Her&Now to discuss possible ways to integrate and improve their models.

Monitoring & Feedback
Regular Monitoring and Evaluation of the SCICs will be conducted in order to ensure that the SCICs areencouraged to be milestone driven and course correct if needed based on the visions of the SCIC programme. Monitoring will be done in various ways, there are monthly touch base calls to support the progress of the SCICs, Quarterly Review Calls to support in course correction and providing feedback. Also, regular visits will be conducted by the team to the physical locations to meet and interact with the startups and innovators and understand the work on the ground.
An online monitoring and evaluation dashboard will be designed to enable automated tracking and evaluation of the progress of SCICs while enabling the team to provide better feedback.

6.5 Suluhu New Tanzania Challenge, SNTC

Suluhu New Tanzania Challenge (SNIC) is a flagship programme of Suluhu Innovation Mission, NITT.The programme aims to seek, select, support and nurture technology-based innovations that solve sectoral challenges of national importance and societal relevance.

The primary goals of the SNIC programme are to incentivize innovations in areas critical to Tanzania's development and growth – Education, Health, Water and Sanitation, Agriculture, FoodProcessing, Housing, Energy, Mobility, Space Application etc.

SNTC will solicit innovations in the prototype stage and supports the selected start-ups through to thecommercialization stage over a course of 12 – 18 months by funding millions of USD as per the education index and other associated support from the SIM innovation ecosystem.

6.6 SIM Ecosystem Development Programme (SEDP)

AEDP is strengthening the innovation and entrepreneurship ecosystem by building networks of relevantstakeholders to provide additional value to beneficiaries beyond the framework of structured programs.

Strategic Programs

CSR for Innovation: To promote and leverage CSR financing towards the innovation ecosystem in Tanzania, SIM will partner with big consulting firms to bring–corporates, incubators, accelerators, R&D institutions, and other key stakeholders in the ecosystemtogether–to enable the CSR collaborations for nurturing innovation in the country.

SIM-iLEAP (Innovative Leadership for Entrepreneurial Agility and Profitability). It will be launched with a view to support startups in overcoming two major bottlenecks–market andinvestor access. SIM-iLEAP, a series of Enterprise and Investor Demo Days will be organized by Suluhu Innovation Mission, NITT in partnership with Startup Incubators to set up enterprise-sponsored accelerator and innovation programmes and VISA to support its various initiatives, programs, and beneficiaries through a structured programme. SIM-iLEAP will complete six cohorts across the following diverse sectors: Fin-Tech, Cyber-security, Home-based Healthcare solutions, Fighting Air pollution through Innovation, Innovations in Audio-Tech, Innovations in Sports-Tech.

SIM PRIME: The SIM-PRIME (Programme for Researchers in Innovation, Market Readiness and Entrepreneurship) programme aimed at promoting early-stage science-based, deeptechnology ideas to market through training and guidance over a period of 12 months using a blended learning curriculum.

SIM-UNCDF: SIM and theUnited Nations Capital Development Fund (UNCDF) will roll out their first AgriTech Challenge cohort for its ambitious innovative Agri-tech programme that aims tohelp smallholder farmers across Africa and Asia to address their challenges in the aftermath of the pandemic.

New Partnerships

SIM will forge over 20 partnerships with various corporates and foundations and engage with industry leaders and faculty that support SIM beneficiaries through infrastructure and technology, market and investor access, creation of modules, and adoption of STLs.

A White Paper on 'Reimagining Healthcare in Tanzania through Blended Finance', will be released as part ofthe SIM-Early Stage Partnership. The white paper will offer an overview of blended finance and its role in promoting healthcare access in Tanzania, while providing case studies on how to apply blended finance approaches, and examining the current challenges to achieving blended financing at scale.

International Collaborations

NGWA & IWA: 'Next Generation Water Action (NGWA) Global Multi-hub Pre-event' will be conducted in NITT, followed by Virtual NGW A Global Multi-hub finals. NGWA is an international initiative with the ambition to engage young talents from leading universities and innovation hubs before, during and after the IWA (International Water Association) World Water Congress & Exhibition. The event happened simultaneouslyin 5 countries–Mexico, India, South Korea, Kenya and Denmark.

Region Innovation Mission

Suluhu Innovation Mission, NITT has initiated an SIM-Region partnership for helping in strengtheningthe existing innovation ecosystem in the Regions. SIM will propose joint efforts with Regions to create a strategy for Infrastructure, Processes, Human Resources, and Policies in building a holistic Innovation and Entrepreneurship ecosystem in the Region, and proposes to do so through the transfer of know-how, expertise, mentorship, and interconnections.

6.7 Vernacular Innovation Programme

Vernacular Innovation Programme (VIP) is an initiative of SIM targeted at decoupling creative expression from language of transaction in Tanzania's innovation ecosystem by building resources and robust ecosystem in each of Tanzania's scheduled languages and dialects.

Tanzania being a multilingual nation, it is only apt to provide an opportunity to every innovator to innovate and ideate in

one's own language of expression and VIP is a step towards the same. As an enabler, VIP aims to empower innovation in the grassroots by lowering the barrier of languages and imparting the right set of knowledge required for the quantum leap.
Programme Structure: The programme has been designed in phases in such a way that SIM does not only provide knowledge to the innovator but also take this ahead to build a thriving vernacularinnovation ecosystem. The Programme will be conducted in phases and will take a gradual step to move the innovators ready for pitching; Design thinking, Market research, Go to market strategy, Demo days.

6.8 Tanzania at VivaTech

Suluhu Innovation Mission will lead the Tanzanian contingent to the Viva Technology (VivaTech)–Europe's biggest annual technology conference dedicated to innovation and start-ups held in Paris, France. Previous year at VivaTech held during 15-18 June, 2022 in Paris, France – attracted more than 140,000 visitors, including 26,000 in-person, and reached more than 119 million people in 149 countries, generating billion views thanks to a rich collection of more than 500 exceptional innovations, 1400 exhibitors,including 60% in person, and 400 speakers from around the world.

7.0 SECTORAL ACHIEVEMENTS

7.1 Introduction

The various vertical, divisions and units are the spokes of the wheels that drive NITT. Each cell specializes in a particular domain and is mandated to provide technical input and expertise on that sector, deal with the respective Line Ministry/Department, and lead in evidence-based policymaking. The verticals provide the requisite support needed to develop NITT as a Region-of-the-art resource centre with the necessary knowledge and skills, which will enable it to act with speed, promoteresearch and innovation, provide strategic policy vision for the Government, and deal with contingent issues.

7.2 Agriculture

The Vertical will design new programmes and policies for agriculture and allied sectors to addressemerging challenges and harness upcoming opportunities. It will also provide inputs on key policydocuments such as Cabinet Notes, CCEA Notes, EFCs, and SFCs, among others. It will conduct both in-house research studies and partner with research institutes and academia. These studies analyze emerging issues, such as problems faced by farmers, food security, and the impact of various policies and developmental programmes. The various initiatives of the agriculture vertical are presented below.

National-level Workshop on 'Innovative Agriculture'
The Agriculture Vertical in NITT will organize a national-levelworkshop on "Innovative Agriculture". During the workshop, discussions will steer on Regions' initiatives and innovations in natural farming, soil health restoration, and climate change mitigation through natural farming. Participants from Regional and Local Governments, industry, farmers, academic and research institutions, NGOs and international organizations will join the workshop in blended mode.

Compendium of Success Stories of Natural Farming
NITT will make efforts to promote natural farming through various initiatives, realizing the relevance of this sustainable agricultural practice in the era of climate change anddeteriorating soil health. In order to document the practices of natural farming adopted by farmers from different regions in Tanzania and to create awareness among the wider farmer community, the Vertical will release a Compendium of Success Stories of Natural Farming. i.e., The bilingual (Swahili and English) compendium will contains 124 success stories from 31 Regions, covering farming practices of a variety of crops like paddy, wheat, millets, fruits, vegetables, sugarcane, and mix cropping.

Telemedicine for Livestock Safety
In human health-services, telemedicine mode of treatment has proven to provide timely support, especially during the Covid pandemic. A similar idea is proposed to be extended to the livestock sector, A database will be created, containing the details of veterinary doctors and veterinary institutes in the country. It is also proposed to create a 'Livestock Wellbeing System', where farmers and doctors canregister, and preventive and curative health services as well as information services may be availed. It is proposed that pilot projects to be carried out in selected Regions in the country, and thereby move forward with the design and hosting of the website.

Promotion of Millets
In pursuance of the proposal to be submitted by the Government of Tanzania, the United Nations will declare a year with respect to the International Year of Millets. NITT will sign an SoI with World Food Programme (WFP), focusing on mainstreaming millets through facilitation of knowledge exchange and capacity strengthening within and outside Tanzania, while supporting climate-resilient practices for improved food and nutrition security. The Mapping and Exchange of Good Practices (MEGP) initiative will be launched. During the launch ceremony, a web portal will be unveiled, inviting entries from various millet stakeholders in three categories — millet value chain,millet mainstreaming, and millet recipes. The MEGP programme seeks to collate and bring together the international and national best practices by regional conferences and

the publication of a compendium. Technical workshops will be conducted with Region and Local Governments and different agricultural research institutes.
NITT will also undertake in-house millet promotional initiatives such as introduction of millet based items in NITT canteens, conduct a series of training sessions for cooking millets and a lecture on 'Leveraging Millets for Food, Nutrition, Health and Economic Security', setting up a millet corner and a vending machine for sale of ready to eat and ready to cook millet products, etc.

Agroforestry for greening and restoration of waste land
Agroforestry is an agroecological nature-based land-use system that can simultaneously address many ecological challenges of the current era viz. food, natural resources, soil degradation and environmental security. Due to the significance of goods and services provided by agroforestry, the Government of Tanzania will underline the promotion of agroforestry and private forestry as a priority.
NITT will develop a geo-portal on "Greening and Restoration of Wastelands with Agroforestry (GROW)" to delineate and prioritize areas especially wastelands suitable for agroforestry interventions by using remote sensing datasets and GIS technology.

Working Group on Demand and Supply Projections
A working group on 'Demand and Supply Projections of Crops, Livestock, Fisheries, and Agriculture Inputs will be constituted by NITT. The working group, chaired by Director, ICAR–NIAP, will assess and project demand and supply of crops, livestock, fisheries and agricultural inputs for 2025-26, 2030-31, 2035-36 and 2040-41.

Development of Framework for Economic Valuation of Ecosystem Services in Agriculture
In recent years, intensive farming systems that utilize significant quantities of farm inputs in the form of chemical fertilizers, pesticides, labour, and capital made it possible to produce sufficient food to meet the current calorie needs of our population. However, indiscriminate use of inputsin farming has become a major driver of land use change, resulting in environmental damage and the degradation of several Ecosystem Services. Encouraging farmers to switch to sustainable crops/ farming systems may lead to upfront costs. Estimates of ecosystem services would help policymakers to make environmentally sustainable decisions while promoting sustainable production systems like natural farming.
NITT I will develop a framework to evaluate ecosystem services in natural farming. An Expert Committee will be constituted, involving experts from the public and private sector to develop toolkitsthat help in economic valuation of ecosystem services in agriculture.

7.3 Circular Economy
To give an impetus to the self-reliant Tanzania, NITT, in consultation with the Ministry of Union Affairs and Environment, departments of Forest and Climate Change will identify eleven areas – municipal solid and liquid wastes, scrap metal (ferrous and non-ferrous), lithium-ion (li-ion) batteries, tyre and rubberrecycling, gypsum, toxic and hazardous industrial waste, used oil waste, end-of-life vehicles, electronic waste, agriculture waste, and solar panels – to facilitate the transition from a linear to a circulareconomy.
Action plans, which include both regulatory and developmental initiatives, in 10 sectors will be finalized. Subsequently, the Circular Economy Cel will be constituted in NITT to give attention to the Circular Economy Mission. The various engagements of the Cell include below.

Circular Economy Action Plans
Notable progress will be achieved by the respective nodal Ministries on the Circular Economy Action Plans that will developed by NITT for 10 sectors. Extended Producers Responsibility (EPR) rulesfor e-waste, tyres, batteries, and plastics will be notified by the Ministry of Union Affairs and Environment, departments of Forest and Climate Change; they are in progress for other important sectors.
Work will be ongoing to finalize and release the Strategic Action Plan Report for Circular Economy withthe following two volumes: (i) Consolidated Action Plan and (ii) Tanzania's Strategy for CircularEconomy (Synthesis Report).

Long-Term Low-Emissions Development Strategies
NITT will prepare a report on 'Enhancing material efficiency and recycling: Strengthening the circular economy', to be included as one of the elements of 'Long-term Low-Emissions Development Strategies' that will be submitted to the Secretariat of the UNFCCC with the vision to reach net-zero by 2070/ 2080.

Support to Ministry of Works and Transport in operationalizing the Vehicle Scrapping Policy
A meeting will be held with the nodal Ministries under the CEO, NITT to discuss the Vehicle Scrapping Policy, following which a discussion paper will be developed consolidating the key issues, challenges, and next steps for operationalization of the VehicleScrapping Policy. A meeting with the Regions will be conducted to onboard them on the action plan for effective and quick implementation of the Vehicle Scrapping Policy at the Region level.

Creation of a Knowledge Portal

It is envisaged that over the next two years, a knowledge Portal will be developed to provide policy guidance and awareness regarding the extent of circularity achieved through real-time visualizations sourced by an analytics engine interacting with the individual data portals of line Ministries. The Portal will host a YouTube channel/ podcast/ blog for introducing policy announcements and sharingsuccess stories on circular economy implementation, in addition to other relevant material.

International and National Engagements

NITT will participate in a side event – Tanzania's Climate Friendly Sustainable Lifestyles: Transformational Solutions towards Sustainable Consumption Pathways, Circular Economy, and a Low Carbon Society at the Tanzania Pavilion in Egypt.

Another initiative with the Federation of Tanzania Chambers of Commerce and Industry, FTCCI to develop Unified Circularity Measurement Framework, which has been currently lacking. A stakeholder consultation workshop will be conducted with primary/ secondary producers and recyclers of automotive, Fast-Moving Consumer Goods, FMCG, and steel sectors. Preparation of aconsultation paper on Unified Circularity Measurement Framework will be initiated.

An overview of the Circular Economy Mission will be presented by CEO, NITT in the Virtual Conference of Chief Secretaries, which will include three sessions on Circularity – (i)Organic and Dry Waste, (ii) Used Water and (iii) Special Category Waste.

NITT will assist nodal Ministries in operationalizing sectoral strategy plans that will be prepared for red mud, fly ash, steel slag, and e-waste.

7.4 Data Management Analysis and Frontier Technology

The Vertical primarily deals with issues related to data management, leveraging technology for improved statistical systems, and promoting research and adoption of frontier technologies.

Thecore functions will cover broadly: (i) Formulation of policy papers and strategy documents in collaboration with experts from the Government, academia and industry, and conducting seminars and workshops. (ii) Managing pilot projects in frontier technologies intends to solve use-cases pertaining to areas such as health, agriculture, etc., in collaboration with public and private research institutes and industry bodies. Document learnings from the projects as policy documents. (iii) Collaborating with national and international think tanks, educational and policy research institutions, civil societies and industry to create a knowledge and innovation support system. (iv) Document issues related to data management and usage, and leverage technology for improved statistical systems and processes. (v) Hold workshops, training programmes, etc., on emerging technologies to build capacity inthe Government.

The various initiatives of the vertical are presented below:

Experience Studio on Drones

To promote a collaborative ecosystem aimed at fostering innovation and adoption of drones for public services, an experience studio on drones will be launched by the Minister of Works and Transport, Tanzania in the presence of NITT Vice Chairman and the CEO. The launch will be followed by an interaction with key stakeholders from the industry.

Drone Mission

A Drone Mission for Tanzania will be instituted in NITT to leverage Tanzania's market sizeand liberalized regulatory regime, promote the drone ecosystem, and enable the role of the government as a catalyst. The Mission will focus on regulatory dialogue, Centre–Region communications, streamline public Procurement and international collaboration activities.

National Data & Analytics Platform (NDAP)

NITT will launch the National Data & Analytics Platform (NDAP). The platform aims to democratize access to public government data by making data accessible, interoperable, interactive, and available on a user-friendly platform. It will host datasets from various governmentagencies, present them coherently, and provide tools for analytics and visualization. This public launch will follow a beta release of the platform that will provide access to a limited number of users for testing and feedback.

NDAP will follow a use-case based approach to ensure that the datasets hosted on the platform aretailored to the needs of data users from government, academia, journalism, civil society, and theprivate sector. All datasets will be standardized to a common schema, which will make it easy to merge datasets and do cross-sectoral analysis.

Unified Logistics Interface Platform (ULIP)

NITT, Unified Logistics Interface Platform (ULIP) for the logistics sector's task of exploring the role of technology in various sectors as one of the technology platforms will be conceptualised by NITT. The objective is to provide real time information to all stakeholders and converge visibility of multi-modal transport across the existing systems of various Ministries/ DepartmentsThe ULIP platform will be envisaged to enable industry players to get secure access to information related to logistics and resources available with various Ministries.

The project will be handed over to National Industrial Corridor Development Corporation for implementation . The systems from ministries will be integrated through more than ten APIs covering more than hundreds of data fields for usage by the

stakeholders. ULIP will have a dedicated portalthat will make the process of data request simpler, faster, and transparent.

Fintech Open Summit
A first-of-its-kind initiative, Fintech Open Summit will bring together regulators, fintech professionals andenthusiasts, industry leaders, the start-up community, and developers to collaborate, exchange ideas,and innovate. The summit will be inaugurated by the Minister of Roads and Transport, and Minister of Information Communications and Technology in the presence of NITT Vice Chairman.

7.5 Economics and Finance Cell

The Economics and Finance Cell aspires to ensure that Tanzania leans on a sustainable path as the world's fastest-growing large economy. The Cell strives to achieve this by driving policy reforms to increase productivity, accelerate capital formation, enhance global competitiveness in strategic sectors, improve access to finance, lower cost of capital for the Tanzanian economy, and improve the quality of living while expanding opportunities for every citizen.

Macroeconomic Analysis
Region of the Economy: Overall Economic Outlook & Roadmap for $ trillion economies.
A periodic exercise, with real-time performance analysis of Tanzania and the global economy will be presented to Senior Officers in NITT. Assessment of the Tanzanian economy is based on analysis of high-frequency indicators across sectors.

The Tanzanian Economy: Resilience and Leadership amidst global uncertainty
NITT Vice Chairman and CEO will present Assessment of global situation and its possible impacts on Tanzanian economy to Hon'ble Prime Minister. Various evolving scenarios and strategies to manage global headwinds will be prepared and Household Sentiment Analysis will be conducted by the E&F Cell.

Tanzania's Investment and Savings Rate and Current Account Balance
A presentation will be made by Vice Chairman, NITT on Tanzania's Savings and Investment Gap at the Economic Conclave Tanzania. On analysis, the savings rate of households, private sector and public sector slowdown investments of the private sector.

Strategic Disinvestment and Performance Improvement of CPSEs
The Economics and Finance Cell is mandated to conduct analysis and make recommendations for the disinvestment of strategic-sector CPSEs. Recommendations will be discussed with Secretaries of LineMinistries and subsequently submitted to the Department of Investment and Public Asset Management.
In the non-strategic sector, CPSEs under specific Ministries will be recommended for privatization, merger or for closure to the Committee of Group of Officers (CGO) which functions under the CEO, NITT.

Various Engagements with Multilateral Institutions
NITT will engage in a wide range of activities. This will include providing technical inputs to the Secretariat (on Draft Issue Notes and other key documents) as well as logistical support (attending meetings of Working Groups, organising workshops, etc). NITT will organise a High-Level Workshop for Group Working Line Ministries /Departments in collaboration with the Group Secretariat and the Ministry of Foreign Affairs. The workshop will be inaugurated by Pr. Secretary to PM and will be attended by senior Government officials across various Ministries and NITT.

International Monetary Fund Article Consultations
A meeting under the chairpersonship of CEO, NITT, will be held with the International Monetary Fund (IMF) for Tanzania Article Consultations. Inputs will be provided to the department of Economic Affairs (DEA) on the draft concluding Regionment of the IMF Mission.

AFDB's Tanzania Country Partnership Strategy, 2024-2028
A note will be prepared on envisioning the strategic directions and roadmap for Tanzania–AFDB partnership. Policies and ideas will be devised in lines of AFDB benefitting Tanzania from its multilateral expertise in financial, technical, advisory and knowledge support.

South Asia's Path to Sustainable and Inclusive Growth: IMF
A note will be prepared underlining the present context of issues and challenges of the South Asian region and Tanzania's role and developmental assistance in safeguarding the lives and livelihoodof smaller economies of the region during the pandemic period as well as devising the pathwaysin sustainable development of the South Asian region.

Meeting of the Consultative Group on Economics
NITT will organise a virtual roundtable discussion titled 'Economist Huddle' under the chairpersonship of the Vice Chairman, NITT. The discussion will have participants/experts from academia, industry, think tanks and multilateral institutions.

Discussion on Moody's Annual Review Sovereign Credit Rating
A meeting, along with Department of Economic Affairs, will be held with Moody's Investors Service (MIS) for annual review of Tanzania's sovereign bond rating. E&F will provide critical insights and opinions to Moody's on reaffirming the credit rating of Tanzania, highlighting its core strengths and resiliencefactors in countering the global headwinds.

7.6 Education

The Education Vertical seeks to facilitate a conducive learning environment through policy and programmes so that people can develop to their full potential. The Education Vertical strives to facilitate school readiness, socio-emotional learning, critical and higher-order thinking, and grade-level competency amongst children. It seeks to empower youth with employability skills, researchtemperament and subject matter expertise through high quality, accessible, equitable, accountable, and affordable education system.

School Education
Project SUATH Education
Several initiatives to ensure student and teacher learning under SUATH Education include Region-of-the-art school, online and offline student learning, learning outcomes-based remediation, IETL and level-based remediations, Foundation literacy and numeracy, Development of content for level-based learning and digital content, at–grade curriculum, District report cards - key tools to drive data-based decisions at the grassroots, Virtual Field Support (VFS) system to reach the last mile through technology, CM Rise Schools initiative implementation at the ground-level with master plans for civil infrastructure, learning recovery programme for grades 1 to form 2, district scorecards, Teachers' digital mediums, and applications to record the attendance of students, Teacher – Student connect via video calls, Development Support Services for Regions (DSSS), design and project management support for learning enhancement, establishment of Region PMU, rolling out School Readiness Programme (SRP), Post NAS Roadmap Workshop–Region & District Roadmap, rolling out Board Exam Pack, baseline survey to understand the learning loss of children, educationists and academicians to share their best practices and research papers,

Vision 2050 and Roadmap
Education is an important pillar that must be strengthened for Tanzania to become an economic and knowledge superpower, and a developed nation by 2050. The vertical will work with the 'Sectoral Group of Secretaries' constituted by the Government of Tanzania, on sectoral analysis andstrategies to prepare Tanzania's Vision 2050 and roadmap for school education and higher education.

7.7 Energy

The Vertical strives to provide top-quality policy support to all stakeholders to make Tanzania energy- secure. It aims to boost investment to achieve an efficient, sustainable, and clean energy system. The Vertical makes concerted efforts towards reducing energy import, ensuring an alternative supply of energy and enhancing domestic supply. It seeks to strengthen the energy infrastructure and resolve cross-sectoral issues. The policy framework is geared such that energy is supplied through efficient markets to improve Tanzania's competitiveness and spur economic growth.

Reform initiatives in the Renewable Energy Sector–Green Hydrogen Strategy
Technological breakthroughs will be required to move towards the climate change goals and limiting global warming. Green Hydrogen is one such option that may prove to be a game changer in decarbonizing hard to abate sectors – specifically in industrial sectors such as fertilizers, refineries, steel and heavy-duty transport. Tanzania should become global hub for Green Hydrogen production and exports. NITT will play a key role in promoting Green Hydrogen through the initiatives of National Hydrogen Energy Mission in consultation with Ministry of Energy. NITT in consultation with RMI will also release the report'Strategy for Harnessing Green Hydrogen'.

Power Sector Reforms
Advisory Group on Hydro Power Sector: An Advisory Group on Hydro Power will be constituted under Member (Energy), NITT for suggesting measures to improve viability of hydro projects and harnessing the unutilized hydro power potential in the country. The advisory group will work on development of (a) An action plan for River Basin Development and Hydropower Project in the Tanzanian Regions and (b) Design of funding modalities, so as to keep the long-term generation tariffs of hydropower projects where DPR/Techno-economic clearance/ financial closure is yet to be achieved at par with average national power purchase tariff.
Cause analysis and prevention steps for power crisis: In the first quarter of 2022/23, Tanzania faced a power crisis, due to lack of availability of sufficient power to meet high demand. NITT will conduct a detailed study on the possible causes for power shortage and suggest preventive steps to avoid such a situation in the future.

Geospatial Energy Map of Tanzania

NITT will collaborate with the Tanzanian Space Research Organisation (TSRO) to develop a comprehensive Geospatial Energy Map of Tanzania which will provide a holistic picture of Tanzania's energy sector. This includes visualization of spatial and non-spatial data on renewable and non- renewable power plants, oil and gas downstream sector, renewable energy potential, fossil fuel resources, and other energy assets in Tanzania. These maps will be useful for the planning of resources that may include infrastructure planning for upcoming solar parks, coal blocks, crude oil and natural gas pipelines.

Energy System model using TIMES-VEDA

NITT will develop an in-house energy sector cost optimization model using TIMES-VEDA. The model uses a bottom-up approach and simulates all the five sectors of the economy such as agriculture, industry, transport, residential and commercial buildings.

Renewable Purchase Obligation (RPO) target planning

NITT will estimate Region-wise Renewable Energy (RE) capacity that can be generated from within the potential available in the Region and can achieve the RPO target set by the Ministry of Power. This detailed exercise to be undertaken by NITT on the direction of PMO will also provide inputs such as: additional RE that needs to be procured from other Regions to meet RPO target and storage capacity required.

Research study of cost of transporting coal from one Region to another vis-à-vis cost of generation of electricity from coal and its transportation: NITT will constitute an expert group to analyse the optimal modal combination of transportation that can be put in place to ensure availability of coal to thermal power plants.

Coal Gasification: In the perspective of clean energy transition, the alternative clean use of coal needs to be also pursued. Coal gasification may be regarded as a cleaner choice than coal burning because it makes use of the chemical features of coal. To accelerate the efforts on coal gasification, a steering committee will make several policy recommendations especially on Coal Gasification.

7.8 Governance and Research

The Governance Division under NITT will deal with issues concerning the policies and programmes of Public Sectors and Sponsored Schemes, their implementation and monitoring with respect to Ministries and Departments – Department of Fertilisers, Department of Chemicals and Petrochemicals, Department of Consumer Affairs, Department of Food and Public Distribution System, Department of Personnel and Training, Department of Pensions and Pensioners' Welfare, Department of Administrative Reforms and Public Grievances, Department of Legal Affairs and Department of Justice. The Research Division oversees the Research Scheme of NITT, which aims at supporting various research studies.

Coverage and Beneficiary under National Food Security Act (NFSA), 1991

The National Food Security Act (NFSA) addresses the food security issues by providing subsidized food grains distribution programme to nearly two-thirds of the population. NFSA legislation conferred a legal right on beneficiaries to obtain entitled quantities of food grains at highly subsidized prices.

NITT will study the beneficiary inclusion/exclusion criteria under NFSA to ensure harmonization of the beneficiary identification criteria across Regions by Department of Food & Public Distribution (DFPD). Harmonisation of the beneficiary identification criteria across regions would help in reducing the gap in coverage of rightful beneficiaries and thereby improve targeting under NFSA.

Issues pertaining to the fertilizer sector.

Farmer's Registration for DBT in Fertilizer in collaboration with Secretaries of Department of Fertilizers, Department of Agriculture & Farmers Welfare, Department of Agriculture Research & Education, and Department of Land Resources will make subsidy-disbursal system more efficient and transparent.

The objective of the Integrated Plant Nutrition Management Scheme is to sustain Tanzania's food security through promotion of Integrated Plant Nutrition Management that takes care of environmental safety/ soil health, optimal yields and economic wellbeing of farmers along with providing conducive environment for growth of fertiliser industry. The main objective is to ensure availability of sufficient quantity of fertilizer to farmers at affordable price at appropriate time, to promote smooth production of fertilizer in the country and in case of shortfall, smooth and timely imports of fertilizers and finally to encourage balanced use of fertilizer.

Engagement with Industry and Academia

In coordination with NITT, College of Business Education, University of Dar es salaam will organise a Memorial lecture for the students at the college. The keynote address for the occasion of 'Transforming Tanzania – Role of NITT' will be delivered by member, NITT.

In coordination with National Institutes of Public Finance and Policy, NITT will host a delegation of senior officers of Government of Tanzania and Commissioners to understand the role, functions and strategies of NITT in nation building. The deliberations will be chaired by Member, NITT.

A special lecture on 'Realizing SDGs through Higher Education Institutions (HEIs) for Ensuring Equality and

Sustainable Society' will be delivered by Sr. Adviser (G&R) for the benefits of the participating Vice Chancellors of Universities.

Revival of Closed Urea Units
An inter-ministerial committee under the CEO, NITT, will monitor the setup of five new urea plants and resolve various issues during the process. These include three closed urea units of the Fertilizer Corporation under the Government Schemes and two closed units of the Private Fertilizer Corporation, which will be set up by a consortium of public sector undertakings. Several meetings of the inter-ministerial committee will be held on yearly basis. A meeting of Empowered Committee of Secretaries (ECoS), chaired by CEO, NITT, will be conducted for the approval of Substitution Agreement to be signed amongst Lenders for the Project.

Guidelines for Framework of Networking and Partnership with various organisations
As an apex think tank of the Government, the role of NITT is extremely wide and covers a rangeof activities such as fostering cooperative federalism, designing strategic and long-term policy andprogramme frameworks and initiatives, monitoring their progress and efficacy, creating a knowledge, innovation and entrepreneurial support system through a collaborative community of national andinternational experts, practitioners and other partners. In this context, Guidelines for engagement framework for networking and partnership between NITT and leading knowledge, research, philanthropic, corporate, bilateral and multilateral institutions will be developed. The guidelines are placed in public domain on NITT's website.

New Research Scheme of NITT (RSNA) Guidelines
In line with NITI's mandate to position itself as a knowledge and innovation hub, new set of guidelines,viz. 'Research Scheme of NITT' will be launched yearly. The revamped guidelines will aim at broad-basing research work including Institutional & individual based research, besides aiding reputedinstitutions for organizing seminars, workshops and conferences as well as providing non-financialsupport through the use of the NITI logo for various events.

7.9 Health and Family Welfare

The Health Division will provide advice and policy guidance to key stakeholders involved in public health development and management. It will engage with the Ministries of Health, the Department of Pharmaceuticals, the National Health Authority,Region and local governments. The Division will also collaborate with reputed international and nationalacademic institutions, research organisations, development partners and eminent experts to advancethe discussion towards making long-term impacts on policy approaches for the public health sector.

Compendium of Ayurveda, Yoga, Naturopathy and Homeopathy-Based Practices
NITT will release a compendium of health-based practices from regions, with detailed information about various initiatives and practices adopted by the regions for containing and managing the viral outbreaks.

Public Health Management Cadre
NITT will contribute to the development of guidelines for a Public Health Management Cadre in regions. It will envisage the cadre to strengthen management of both, health and hospital services in the public health sector by demarcating the clinical and public health functions.

Marketing Practices by Pharma Companies
Marketing practices by pharmaceutical companies have the potential to influence the prescription writing patterns of doctors/physicians which may be seen as inappropriate on part of the pharma industry and may amount to unethical conduct/practice by the medical professionals. The Uniform Code for Pharmaceutical Marketing Practices (UCPMP) for pharmaceutical companies should be enacted and put in operation to prevent unethical practices by the pharmaceutical companies.
A committee will be constituted by the Department of Pharmaceuticals under the Member (Health), NITT to consider various issues pertaining to UCPMP and to examine the requirement for a legally enforceable mechanism for regulating marketing practicesby Pharma Companies.

Pooling Research Resources for Facilitating Drug R&D
A Committee for Drafting SOP for Pooling Research Resources for Facilitating Drug Research andDevelopment will be constituted based on directions received from the Cabinet Secretariat and the reportof the Committee for Reforming the Drug Regulatory System in Tanzania. The committee will deliberate various aspects of leveraging infrastructure for drug R&D and compile a report based on insights gained through stakeholder consultations and inputs received from various agencies/departments/ministries.

National Ayurvedic, Yoga, Naturopathy and Homeopathy Research Consortium (NARC)
Ayurvedic, Yoga, Naturopathy and Homeopathy comprises the traditional systems of medicine practiced in Tanzania. There has been a renewed upsurge towards the traditional medicine systems recently. However, to meet the provisions of the international regulations, the data on Ayurvedic medicine's pharmacokinetics, pharmacodynamics, safety, etc.,

is essential to capitalize on this upsurge in terms of getting market authorization for Ayurvedic products as medicines at the global level.
NITT, in coordination with the Ministry of Health, will envisage the formation of a National Ayurvedic, Yoga, Naturopathy and Homeopathy Research Consortium (NARC) and prepare a concept note to prioritize Ayurvedic research through scientific collaboration within stakeholder Ministries and their departments/institutions in an institutionalized manner and to address the fundamental problem that is holding back the global uptake of Ayurvedic care.

Catalysing and Reforming Senior Care in Tanzania
With the accelerating pace of ageing, there is a need to reframe our thinking around ageing and the needs of the elderly. Despite government and private sector efforts, the system for senior care faces many challenges, including a lack of infrastructure and capacities to support the health and welfare of the elderly. There are several strategies under various welfare schemes and initiatives for senior citizens which can be better implemented through coordinated efforts by the Government and other stakeholders. The specific interventions are needed in four areas: Health and Medical, Social and Legal, Economic/Financial, and Digital, in terms of empowerment, service delivery & inclusion. NITT will prepare a draft report on Catalyzing and Reforming Senior Care in Tanzania.

Talking Mental Health: A Seminar Commemorating World Mental Health Day
NITT will organise an in-house mental health workshop to commemorate the World Mental Health Day. The session *Talking Mental Health* was primarily focused on the theme of awareness and sensitisation on mental health among the employees of NITT. The session will highlight the need to understand and talk about mental health and its overarching impact on overall wellbeing and functioning of people.

7.10 INDUSTRY-I

The Industry-I Vertical focuses on the continuous growth of trade and industry by developing new policies. The Vertical envisages holistic development of the industrial and mineral sector in Tanzania, encouraging optimum mineral exploitation, decreasing the import of various minerals, and strengthening the supply chain by means of value addition. The Vertical also plays a crucial role in enabling active engagement of the Regions and relevant stakeholders in achieving milestones for the industrial and economic development of Tanzania. It aims to bring together innovation, technology, and efficient management at the core of policy formulation and implementation.

Study on 'Integration of MSMEs on E-Commerce platforms'
Universal e-commerce access can be achieved by creating a digital infrastructure platform which will connect small sellers and traders to existing nationwide marketplaces. The Industry-I Vertical will undertake a study on 'Integration of MSMEs on E-Commerce platforms' to facilitate on-boarding of Tanzanian MSMEs on different E-commerce marketplaces. The study will cover evaluation of entire ecosystem existing in Tanzania for preparing a roadmap for integration of MSMEs across Tanzaniaon e-commerce platforms.

7.11 INDUSTRY-II

The Industry II vertical will deal with Steel, Textiles, Handlooms and handicrafts, Food processing, Marine products and plantation crops, Capital goods and Engineering. Automotives, Circular economy andBlue economy.

Blue Economy
Six sub-groups will be set up, and initiatives in these clusters will be coordinated by their respective Ministries. NITT will participate in the meetings to be convened by Multi-Agency Maritime Security Group (MSG) Policy, National Security Council Secretariat, and meetings of the sub-group on National Accounting Framework.

Tanzania–France Roadmap on Blue Economy and Ocean Governance
NITT will organize an annual bilateral roadmap dialogue on the blue economy and ocean governance. A preparatory meeting for the annual bilateral dialogue under the Tanzania–France roadmap will be held with the Ambassador for Poles and Maritime Affairs in the Ministry of Foreign Affairs in Paris, France. The Tanzanian delegation, led by Special Secretary, NITT, will have the participation of Secretary, MoES, and officers. The interaction will provide an opportunity for Tanzania to gain a better understanding of the French Ministries and agencies active in the domain of blue economy and ocean governance.

7.12 Infrastructure-Connectivity
The infrastructure Connectivity Vertical strives to create a transport system that is common, connected, convenient, congestion-free, clean, and cutting-edge. The Vertical will provide policy inputs and suggest interventions in the form of discussions and policy papers to the Line Ministries. It will also provide critical inputs to legislative bills.

Improving Logistics Efficiency – Logistics Park Network

The study will undertake a close interaction with Logistics Division at the Ministry of Investment, Industry and Trade, National Highway Logistics Management and other relevant line ministries/ departments. Spatialanalysis of Inland Container Depots, ICDs and Container Freight Stations, CFSs in Tanzania will be undertaken and compared with German Freight Villages. Learnings to be incorporated by relevant ministers in their plans and guide the National Master Plan for Multi-modal Connectivity.

National Master Plan for Multi-modal Connectivity

It is a multi-sectoral GIS-based Decision Support System and an extremely potent planning tool for strengthening logistics infrastructure. The Vertical will be co- opted as special invitee for Network Planning Group under leadership of Special Secretary Logistics.

Faster Adoption of Building Information Modelling

A programme has been initiated with Foreign, Commonwealth and Development Office, UK Government (FCDO) for faster adoption of digitalization and information sharing in construction sector. The programme targets extensive stakeholders' interaction for infrastructure construction sector and has a huge potential in terms of time and cost savings throughout infrastructure project lifecycles. Threeworkshops will be held, and a draft road map will be prepared by NITT.

Resilient Infrastructure (De-risking Infrastructure)

A research study has been undertaken with Swiss Re Institute focusing on the sectors of Roads, Portsand Airports. The resilient aspects also focus on Natural Catastrophe Resilience among other things includes guidelines for developing risk registers and undertaking infrastructure insurance.

Dedicated Freight Corridor (DFC)

For effective implementation of the project, the vertical will be responsible for monitoring the progress of the economically significant Dedicated Freight Corridor project.

Study on Maintenance, Repair & Overhaul (MRO) facilities

A study will be conducted on 'MRO in Tanzania: Trends, Challenges and Way Forward', under the chairpersonship of stakeholders concerned.

Infrastructure Development of Airports

The Infrastructure Connectivity Vertical will monitor the infrastructure development undertaken by theAirports Authority of Tanzania and prepare quarterly progress reports. Accordingly, thequarterly progress report of infrastructure developments in airports will be prepared and submitted tothe Prime Minister's Office.

7.13 Managing Urbanisation

The Managing Urbanisation (MU) Division will provide data-based policy inputs for making Tanzania's urbanisation manageable, economically productive, environmentally appropriate, and equitable. It will offer advice and policy guidance to key stakeholders involved in urban planning, development, and management. The Division will engage with the Ministry of Lands, Housing and Human Settlements Development, Region Governments as well as local governments in formulating policies, programmes, initiatives and reforms. It will also collaborate with various national and international academic institutions, research organisations, development partners and eminent experts to advance the discussion towards making a long-term impact on policy approaches for managing urbanisation.

Strengthening Governance of Urban Health systems

Tanzania is facing an unprecedented scale of urbanization as cities are becoming hubs of growth,innovation and creativity. To support this rapid urbanization and leverage the anticipated economic growth in the cities, it is essential to ensure health and well-being of the citizens and provide abetter quality of life for all. A research project will be initiated by the vertical to understand the existing landscape of urban health at a systems level using a holistic perspective, through a multidisciplinary approach. Eight cities will be selected for the comprehensive study of the proposed task.

Cities as engines of growth

NITT, with technical assistance from African Development Bank (AFDB), will undertake a researchproject that can pave path to a new approach to city planning with its foundation in urban economies.Multiple consultations will be conducted wherein the NITT and AFDB teams will interact with more than hundreds of stakeholders from several Regions. Based on this, key bottlenecks will be identified and recommendations for unlocking the potential of cities to become engines of economic growth will be prepared.

Transition from cash-based to accrual-based accounting system in Urban Local Bodies

With limited human resource and technical capacities, many Urban Local Bodies face difficulty to maintain the necessary level of services. Municipal Performance Index Report will highlight the poor performance of the ULBs in terms

of revenue & expenditure management, fiscal decentralization, and fiscal responsibility. The XV Finance Commission will recommend publishingof audited annual accounts as an entry-level condition for accessing grants for urban local bodiesto introduce a sense of urgency to this important reform. A handbook will be prepared with theInstitute of Chartered Accountants of Tanzania (ICAT) and ARF (Accounting Research Foundation) onbest practices and lessons learnt in transition from cash based to accrual-based accounting systems.

Linked City Programme (LCP)

The Vertical will develop the programme framework along with the indicators for identifying and monitoring 100 Linked cities in Tanzania following a number of deliberations, a set of indicators for shortlisting cities and monitoring the performance of Linked cities will be plotted. The preparatory work for rolling out the programme and the baseline data collection from urban local bodies will be set.

7.14 Micro, Small and Medium Enterprises (MSMEs)

The MSME vertical will deal with matters concerning to the policies and programmes of the MSME sector in Tanzania. One of the main objectives of the vertical is to assist in developing and taking forward the policies/ programmes of the Government of Tanzania for the development of the MSME sector.

The Vertical will commission a research study on 'MSME clusters to improve productivity and quality, with a focus on the creation of common infrastructure'. The vertical will also commission a research study on Impact Assessment of loan provision to the non-corporate, non-farm small/micro enterprises.

7.15 Natural Resources and Environment

The Natural Resources and Environment (NRE) Vertical of NITT will engage with three key segments – forests, biodiversity and wildlife and Island Development. The vertical will coordinate activities with the Ministry of Union Affairs and Environment.

Alternative products and technologies to plastics

An expert committee will be formed by NITT to assess the development of research on plastic alternatives or technologies making plastic biodegradable and regulatory approaches being taken up globally. The end product of the committee's study will be based on the market readiness, infrastructure needs, and regulatory framework required for adopting these products.

Provisions for interim approval/ provisional certification of biodegradable plastics

A discussion will be held on the probable interim standards for provisional certification of biodegradable plastics, given that fulldegradation is a time-consuming process. Collecting data from manufacturing/ developing companieswill also be considered in order to set the standards regarding the percentage of degradability.

Framing the Natural Climate Solutions (NCS) Strategy

The Vertical, in collaboration with the Nature Conservancy, will plan to identify potential pathways and sub-pathways to develop an operational NCS strategy. Further, guidelines will be developed for implementing NCS pathways such as restoring degraded land, reforestation and agroforestry.

Carbon capture and its utilization in generating green hydrogen

In association with Tata Institute of Fundamental Research, in India the Vertical will build a framework to integrate carbon capture with solar energy and green hydrogen. This could help in creating an ecosystem of about 10 MMTPA of green hydrogen production by 2030, reducing investment cost through scaling up manufacturing of renewable technologies and electrolysers.

Climate Finance

The Vertical will explore means to scale up green bonds and blue bonds, carbon pricing for Tanzania,etc. through utilization of financial instruments. It will look into framing a mechanism for developing a carbon market as per the Energy Conservation Bill, in sectors such as high-performance renewables, green hydrogen, biofuels/e-fuels, clean mobility, energy storage and greenmetals, etc.

Developing mitigation and adaptation pathways for transition to carbon neutral economy

The Vertical will develop a concept note on mitigation and adaptation pathways for Tanzanian conditions to transition to carbon neutral economy across sectors. Policy interventions and developing alternatives to fossil fuels in sectors of infrastructure, manufacturing, transportation, and electricity will enable achieving a carbon neutral economy. The concept of Green GDP will also be explored, which considers environmental factors such as biodiversity losses and costs attributed to climate change along withthe standard GDP of a country so as to help in ensuring sustainability of the country's economy.

7.16 Project Appraisal and Management Division (PAMD)

One of the core functions to be undertaken by the Project Appraisal and Management Division (PAMD) of NITT is the appraisal of public-sector programmes, schemes and projects. This division will be assigned to discharge the following functions: Prescribe guidelines and develop formats for the submission of proposals for projects and programmes for techno-economic appraisal; Undertake research studies to improve the methodology and procedure for appraisal of projects and programmes; Undertake techno-economic appraisal of major projects and programmes in the public sectors; Assist ministries in establishing proper procedures for preparation of reports of projects and programmes.

Appraisal of Public Programmes, Schemes and Projects

The Division will conduct comprehensive appraisal of projects/ schemes related to the Public Investment Board and the Expenditure Finance Committee (EFC). Revised Cost Estimate (RCE) proposals will also be appraised by the division to analyse the factors attributed to cost and time overruns and their impact on viability. In delivering this critical function, the PAMD through its techno-economic appraisals will bring about a paradigm shift in appraisal mechanisms and procedures for structuring and preparation of public projects and schemes. NITT, through its appraisal memoranda, will be a steering wheel and instrument in suggesting and bringing about systemic improvements aimed at efficacy of public sector schemesand spending in terms of delivery and outcomes.

7.17 Public-Private Partnership

The Vertical will work towards deepening the reach of public-private partnerships as the preferred mode for the implementation of infrastructure projects. It seeks to create time-bound world-class infrastructure and attract private sector and institutional capital in infrastructure.

PPP in Healthcare

NITT will formulate the Concession Agreement–Guiding Principles for PPP in Healthcare/Medical Education, and work closely with the Department of Economic Affairs (DEA) on the amendment to the Scheme for 'Financial Support to Public Private Partnerships (PPP) in Infrastructure', which enables grant of viability gap funding (VGF) to central and Region PPP projects in various sectors of social infrastructure including inter alia education and health. With the objective of making PPP projects commercially viable, grant from the Government of Tanzania can go up to 40% of the total project cost.
In this regard, NITT will conduct a series of discussions and Region dialogues for the uptake of VGF Scheme. NITT will also provide handholding to the Regions in identification of projects, preparationof concept proposals, and vetting of proposals by DEA.

PPP in Foodgrains Storage

NITT (PPP Vertical) will work closely with the Department of Food and Public Distribution Programme to leverage private sector investment and efficiencies in the country's wheat storage infrastructure. To spread across all regions, this PPP programme will envisage development of silos at different locations with a large storage capacity in LMT at gross. Combination of DBFOT, Design, Build, Finance, Operate and Transfer (land for the project to be provided by the Authority) and DBFOO, Design, Build, Fund, Own and Operate (land to be arranged by the privatepartner/investor) models, bid process for Phase I project (at least 80 locations) will be undertaken.

Dispute Resolution Mechanism – Ease of Doing Business

To promote ease of doing business for those who deal with the Government and to instill confidence in private investors and contractors, a Task Forcewill be constituted with participation from key CentralMinistries and Departments. The Task Force will develop an effective Conciliation Mechanism for time and cost-efficient resolution of disputes arising out of contracts and legal relationships between the Government (Ministries, CPSEs) and private investors/ contractor/concessionaire. The Task Force will conduct detailed deliberations. PPP Vertical, NITT, under the Task Force, will assist in formulation of the 'Guidelines for Resolution of Disputes between Government and Private Entities via Conciliation' as part of the Task Force's report – based on the inputs and suggestions of all themembers.

Region Support Initiatives towards PPPs and Asset Monetisation

The National Monetisation Pipeline recognises a crucial role of regions in scaling up asset monetisation efforts and raising financing for infrastructure projects in a sustainable manner. There is a significant appetite of investors for well-structured region level assets. However, investors seek visibility of the pipeline of proposals. Hence creating Region level monetisation pipelines is important. Towards this end, PPP vertical will engage with the various regions and organise workshops with region relevant departments(transport, power, urban, warehousing, sports, finance, ports).

Guiding Principles for Monetisation of Transmission Assets in the Public Sector through PPP

In view of significant potential of regions for monetisation of their transmission assets, and towardsevolving a common framework and approach for transmission companies, the Vertical will work with the Ministry of Energy in developing the "Guiding Principles for Monetization of Transmission Assets in the Public Sector" in consultation with relevant stakeholders. Considering the need to retain a degree of oversight through contractual mechanisms, protection of user interests and

maximisation of value to the public authority, this document will lay down the contours of monetisation of transmission assets through an Acquire, Operate, Maintain and Transfer (AOMT) based Public Private Partnership model.

Monetisation of tower assets through PPP mode

As telecom companies expand their 4G networks and plan for the impending arrival of 5G, the towers present suitable infrastructure for improving network and servicedensification to several service providers. Pursuant to potential assets identified under the National Monetisation Pipeline (NMP) for telecom assets, the vertical will work closely in taking necessary pre-transaction steps for monetisation of about 1000 telecom towers through a long-term PPP model. During the year, pre-feasibility and transaction structuring will be carried out and the proposal will be submitted by DoT to PPPAC for approval.

7.18 Rural Development

The Rural Development Vertical of NITT will provide overall policy guidance to the Department of Rural Development, Department of Rural Development. It will monitor the progress of the various schemes and programmes to be implemented by the respective Ministry. The Vertical will also analyse the draft documents and reports received from the Department of Rural Development and furnish comments of NITT on them for finalisation. The Rural Development Vertical will participate in various meetings on National Rural Economic Transformation Project and Start-up Village Entrepreneurship Programme.

7.19 Science and Technology

The Vertical seeks to strengthen the science, technology and innovation ecosystem in the country in association with regional Scientific Departments/Agencies by formulating science and technology specific plans/programmes and policies.

Consultation Group on Science and Technology

The group on S&T will be constituted for thepurpose of overseeing the management of S&T in the country and discuss the various issues which hamper the growth of S&T and how S&T could be used for the socio-economic development of the country.

Global Innovation Index

NITT will interact with World Intellectual Property Organisation (WIPO) and also top ranking countries – particularly, Switzerland, Sweden, and the Netherlands – to know their good practices toimprove Tanzania's ranking in the Global Innovation Index (GII). Based on the good practices of the top-ranking countries, NITT, through its Inter-Ministerial Coordination Committee under the chairpersonship of the CEO, NITT, will suggest some specific measures to all the Ministries/ Departments concerned of the Government of Tanzania, with the aim of improving Tanzania's position in the GII. Meetings of the Committee will be conducted, where the actions needed to improve Tanzania's performance in the ranking will be decided and delegated to the respective Ministry/Departments. The consolidated inputs, including datapoints, concerns, and suggestions, will be communicated to WIPO, and the data source agencies like UNIDO and UNESCO.

Monitoring implementation of the rural telecom programme

The implementation of the rural telecom project will be monitored regularly by the S&T Vertical. The realization of the implementation of the phase I of the rural telecom project will align with the corresponding phase II.

Mission for developing and commercializing of Indigenous Artificial Heart

With a view to examine the design and techno-commercial feasibility of developing and commercializingof Indigenous Artificial Heart, a mission committee will be constituted under Department of Cardiology, All Tanzania Institute of Medical Sciences. The committee will note the importance of prioritising thedevelopment of artificial heart at an economical price as the cases of myocardial infarction (heartattack) are increasing in Tanzania.

Seaweed Cultivation

Seaweeds have gained importance in recent times due to its multiple usages as food source, medicine, as a source material for edible packing, cattle feed, and fertilizer. The S&T Vertical will monitor closely and work with the Ministry of Union Affairs and Environment, department of Forest and Climate Change to promote seaweed cultivation in Tanzania and resolve outstanding issues and concerns of the department of Forest and Climate Change about seaweed cultivation in gulf areas of the country.

Perovskite Material Research and Development

Perovskite is a low-cost, industry-scalable technology and has shown remarkable progress in recent years with higher conversion efficiency. Several research groups in Tanzania will be actively involved inthe development of perovskite cells. Meetings to discuss the perovskite materials and the ongoing R&D work will be held in NITT with participation from Government Ministries and Departments, industries, academia, startups, etc.

Small-scale nuclear reactors to boost Tanzania's nuclear energy.

With a rising demand for power from various sectors, the Government of Tanzania should plan to increase the nuclear energy capacity threefold in the next decade to reduce the country's carbon footprint. This exercise will require a concerted effort to evaluate the feasibility of small- and medium-scale nuclear power plants and to further assess their benefits and challenges. A national committee will be executed to examine the techno-commercial feasibility of small-scale nuclear power plants. The committee will submit its report to the Department of Atomic Energy, Government of Tanzania, for the implementation ofthe recommendations.

Robotics and Online Gaming

Robotics & Automation as an industry has been growing at an exorbitant rate, revolutionizing manufacturing and other industries. An Inter-Ministerial Committee will be constituted by the Ministry of Information, Communication and Technology, Government of Tanzania to foster the development of the robotics industry in Tanzania.

7.20 Skill Development and Employment

The Skill Development and Employment Division will play a key role in (i) building and sharing knowledge for accelerating policy initiatives for making Tanzanian youth and workforce employable, (ii) identifying as well as offering solutions to critical issues concerning employment, jobs and livelihood creation. The Division will provide advice and policy guidance to key stakeholders involved inskill development, employment generation and social welfare. The Division will engage with the Ministry of Labour, Employment, Youth and Disabled People in formulating policy/ programme initiatives and reforms related to skill development, apprenticeships and employment issues. The Division will also collaborate with various research organisations, development partners and experts to advance research oriented towards making an impact on policy and programme initiatives.

'Tanzania's Booming Gig and Platform Economy:Perspectives on the Future of Work'

NITT will release a first-of-its-kind study – Tanzania's Booming Gig and Platform Economy: Perspectives and Recommendations on the Future of Work. The report will present a comprehensive perspective, workforce estimates and recommendations on the gig – platform economy in Tanzania. The report will provide a scientific methodological approach to estimate the current size and job-generation potential of the sector. A number of Roundtable Discussions will be organized during the year. The discussions will focus on crafting a roadmap for an inclusive future of work, with thematicsessions on social security, skill development, social inclusion and data rights. Regional outreach and dissemination workshops and policy roundtables on the gig and platform economy and the future ofwork will be planned in different cities.

Study on Understanding Barriers to Women's Labour force Participation

SDE Vertical, NITT will collaborate with Bill and Melinda Gates Foundation (BMGF) for a study on women's labour force participation across five sampled Regions, viz. Dar es Salaam, Dodoma, Arusha,Mbeya, and Mwanza. The study aims to unpack the demand and supply side factors behind female labour force participation in Tanzania, while experimenting with novel survey instruments to measure women's work.

Policy Brief on Enhancing Employment Opportunities in the Care Sector

According to the International Labour Organization (ILO), the care economy has the potential to create 475 million jobs worldwide by 2030, including 269 million new jobs. SDE Vertical will collaborate with ILO for developing a compendium of papers and a Policy Brief on Enhancing Employment Opportunitiesin the Care Sector. The Compendium and Policy Brief will highlight the potential for employment opportunities in the care sector that includes health, education and other care services.

Report on Transforming ITIs

Industrial Training Institutes (ITIs) are the backbone of vocational training in Tanzania. With anobjective to come up with transformative ideas for revamping the ITI ecosystem in the country, a study will be undertaken by the SDE Vertical. The study will involve field visits to ITIs across five regions and include a mix of high-graded and low graded ITIs. The research process will encompass interactions and consultations with multiple stakeholders including trainees, faculty, principals, administrative staff and DGT officials. The study report will come up with forward-looking recommendations for changes in the ITI ecosystem.

Final Linked Districts ranking indicators (LDR)

Skill Development and Employment vertical of NITT will engage with the department of Skill Development and Entrepreneurship for coordinating the skilling data on certain schemes for generatingfinal Linked Districts ranking indicators (LDR) for the Linked District. The work will includecompilation, tabulation and analysis of statistical data related to Linked Districts Ranking dataon Skill Development to come out with final Linked Districts ranking indicators (LDR). The data will then be shared with Linked District Programme (LDP) team of NITT on monthly basis.

Participation in Global Skills Summit

SDE Vertical will participate in the Global Skills Summit. Different themes of the summit include; Education to Employability – Making it Happen, The Future of Skilling: New World of Work.

Deliberations on Transforming the Entrepreneurship Landscape in Tanzania
With the objective to explore initiatives for promoting entrepreneurship, the vertical will organisebrainstorming sessions with experts and stakeholders. The deliberations will focus on possible ways of maximizing the outreach of existing entrepreneurship schemes, expanding access to credit, facilitatingentrepreneurship with infrastructure and expert networks to help entrepreneurs launch and scale businesses through a National Entrepreneurship Mission. The discussions will focus on possibilities for convergence of existing efforts and strong collaboration between the Centre, Region governments and District authorities that can help reinvigorate the entrepreneurship landscape in Tanzania.

7.21 Social Justice and Empowerment

The vision of the Division is based on the basic premise of paying special attention to those sections of our society that may be at risk of not benefiting adequately from economic progress. The Division will hold periodic reviews with different stakeholders – Line Ministries/ Departments, Regions and international agencies – involved in the inclusive development of the vulnerable sections of the society. It will also monitor the progress made in achieving the SDGs, seek to address development deficits and propose appropriate corrective measures. The Division will provide guidance to frame comprehensive policies and programmes for inclusive empowerment and human capital development of underprivileged sections of the society, such as the Scheduled Tribes, Other Backward Classes, Economically Backward Classes, Religious Minorities and social defence groups such as Persons with Disabilities, Senior Citizens/Aged, Victims of Substance Abuse/Drug Addicts, Destitutes and Beggars, etc.

Committee on Identification of NTs, DNTs and SNTs
The Government will constitute a committee for identification of De-Notified Trobes (DNTs), Nomadic Tribes (NTs), Semi-Nomadic Tribes (SNTs), and tribes not yet formally classified. The Committee will commission an ethnographic study through Anthropological Survey of Tanzania.

Expert Committee to Review Funds Allocation Under SCSP and TSP
An Expert Committee will be constituted to review the performance of Central Ministries/ Departments with regard to allocation and utilization of funds for the welfare of Scheduled Tribes. The Committee will interact with all Ministries/Departments. The vertical will frame a new arrangement for allocation of funds for the welfare of SCs and STs, adopted by obligating Ministries / Departmentsthat have habitat development / beneficiary-oriented schemes.

An Institutional Mechanism for Monitoring and Reviewing SCSP and TSP
NITT, in close collaboration with the nodal Ministries, will engage in developing a monitoring framework through online portals to monitor the Physical and financial progress on real-time basis.

Experts Meeting on Tribal Development
There are Vulnerable Tribal Groups spread across regions with declining or stagnant population, low levels of literacy, pre-agricultural level of technology and economically backward. Deliberations on initiatives and bottlenecks in tribal development will be summoned in a meeting of sectoral experts along with representatives from the respective ministry. The experts will suggest several measures and reforms such as exclusive sub-scheme for Particularly Vulnerable Tribal Groups, Effective implementation of Tribal Sub-Plan, Strengthening of Integrated Tribal Development Agencies (ITDAs), Strengthening of villages in Scheduled Areas etc.

7.22 Region Finances and Coordination

The Region Finances and Coordination Vertical will strengthen coordination with regions and serve as a single point of contact for all matters pertaining to finances of regions and multi-region issues.

Region Finance Briefs including analysis of Regions' Fiscal Health
Using the information available in Regional and Local Government Budgets, the Vertical will analyse regions' fiscal and financial health by assessing their performance in various key indicators like GSDP growth, percapita GSDP, receipts including resources generated from own taxes, expenditures including capital expenditure, social sector expenditure, fiscal and revenue deficit and its debt position. Cross Regions analysis of key macroeconomic indicators of the regions will be undertaken which is being used in regular interactions/ meetings with the government to provide inputs for future growth.

Allocation to Regions
The Government endeavors to assist the regions to meet the 'spillover liabilities' of their area specific schemes and projects for which budget provision has not been made after the implementation of the Finance Commission recommendations and also to provide for need-based assistance tothe regions keeping in view socio-economic-geographical factors. The Region Finance and Coordination Vertical will act as the nodal for all recommendations made from NITT to the Department of Expenditure, Ministry of Finance and Planning relating to 'Special Assistance' to Regions under the demand 'Transfers to

Regions' as a one-time support for various capital projects.

Region Factsheets

In order to provide 'at a Glance' information about various sectors of the region including health, labour and employment, education, agriculture, industry, finance, growth and economy, urbanization, water and sanitation, women and child development and track Regions' performance/achievement in flagship schemes of the Government of Tanzania, a template will be formulated by this vertical and circulated to all region verticals at NITT. The vertical will provide requisite support to the region verticals in development of the region factsheets for their respective regions. These Factsheets will be used by region verticals of NITT to provide evidence-based inputs to regions' policy making by assessing the regions' performance in each sector vis-à-vis the national performance.

Repository of Database

The vertical will maintain a region-wise database on key macro, social and financial indicators, which will be used by NITT for providing important policy inputs to the Regions on various policy matters.Information on central transfers will be updated on a monthly basis and uploaded on the KnowledgeManagement System (KMS) of NITT.

Action taken on issues raised by the Regions in the Governing Council Meeting of NITT

The vertical will coordinate with different Ministries/Departments and verticals within NITT foraction taken on issues raised by the Regions in the Governing Council Meeting of NITT.

Coordination with Department of Economic Affairs, Ministry of Finance and Planning

The vertical will coordinate with the Department of Economic Affairs (DEA), Ministry of Finance and Planning on thestatus of the ongoing Budgets pertaining to NITT. The progress of Budget announcements will be reviewed by the Government at various levels and periods.

Setting up of Working Groups

Working Groups were constituted for Strategic Prioritization Consultations based on the proposed six outcomes of the Cooperation Framework, viz., (a) Health and Well-being, (b) Nutrition and Food, (c) Quality Education, (d) Economic Growth and Decent Work, (e) Environment, Climate and Resilience, (f) Empowering People, Communities and Institutions. These outcome-wise WorkingGroups, steered by concerned Members, NITT will be set up under the chairpersonship of the Secretary of the corresponding outcome Ministry with representation from other relevant Ministries, UN Agencies and NITT.

National Validation Workshop

This will be validated at the National Validation Workshop on the Government of Tanzania– UN Sustainable Development Cooperation Framework (UNSDCF). This high-level hybrid congregation will meet delegates from Tanzania Ministries, heads of UN agencies, senior officials of NITT, and over hundreds of Senior Government Officials joining virtually from all Regions. A detailed results framework will be spelled out by the UN Country Team, the results framework will detail out the outcome indicators for each of the six outcomes that would form the basis of continued monitoring of the new Cooperation Framework.

New Cooperation Framework

The new cooperation framework is the most important instrument for planning and implementation of the UN development activities at country level in support of the implementation of the 2030 Agenda for Sustainable Development (2030 Agenda).

Best Practices in the Social Sector

As part of NITT's mandate to foster cooperative federalism, NITT and UNDP will compile the Best Practices in the Social sector in the form of a compendium. These best practices will be sourced from the Ministries/ Departments and the Regions. The aim is to highlight models which are innovative, sustainable, replicable, and impactful and also synthesize lessons for the future to expand quality of life at the grassroots level.

7.23 Sustainable Development Goals

NITT has the twin mandate to oversee the adoption and monitoring of the SDGs in the countryand promote competitive and cooperative federalism among Regions. The task at hand for NITT is not just to periodically collect data on SDGs but to proactively realise the goals and targets.

In 2015, the United Nations General Assembly adopted the document titled Transforming our World: 2030 Agenda for Sustainable Development, consisting of 17 Sustainable Development Goals and 169 associated targets. The SDGs were adopted as a universal call-to-action for people, worldwide, to address the five critical areas of importance by 2030: people, planet, prosperity, peace, and partnership. The 17 SDGs and 169 targets are integrated and indivisible and balance the three dimensions of sustainable development i.e. economic, social and the environmental. The determined goals and targets were expected to stimulate action over the next 15 years in areas of critical importance for humanity and the planet. The 2030 Agenda for Sustainable Development: Transforming our world pledge to focus on leaving no one

behind. Countries are primarily responsible for monitoring andreviewing the progress made in implementing the goals and targets at the national level, till 2030. There is a convergence of Tanzania's national development goals and agenda of, 'Collective Efforts, Inclusive Growth,' with the SDGs.
The Sustainable Development Goals (SDGs) Tanzania Index has been comprehensively documenting and ranking the progress made by the Regions towards the achievement of Sustainable Development Goals. The SDG Vertical at NITT will conduct consultations and workshops with Government/ Administration of 31 regions, regarding monitoring of progress, evaluation of actions and implementation of reforms to accelerate progress in the SDGs.

7.24 Trade and Commerce

Study to quantify the effects of importing coal and minerals on variousaspects of the Tanzanian economy
Given the huge potential of mineral and coal mining in accelerating economic growth and generating huge employment opportunities, NITT will undertake a study to highlight the benefits of indigenousproduction over imports under the direction of the PMO. GTAP-based CGE modeling will be used to understand the impact not only of imports but also of pushing for increased domestic production. Based on a framework created for the entire economy, simulations on the impact of imports and production will be analyzed.

Study on Export Promotion Councils
The study will examine the role and achievements of the existing institutional structures of exportpromotion that exist in Tanzania at all levels (Region, and district levels), especially the Export Promotion Councils (EPCs), Federation of Tanzanian Export Organizations, and Commodity Boards. The study will examine existing domestic best practices with respect to export promotion, includinginitiatives taken by Ministries/Departments/Region Governments or changes in policies with respect toexport promotion with a view to make recommendations on how Export Promotion Councils and the current institutional framework for export promotion in Tanzania can be strengthened.

Free Trade Agreements
Free Trade Agreements (FTAs) are arrangements between two or more countries or trading blocsthat primarily agree to reduce or eliminate customs tariff and non-tariff barriers on substantial trade between them. Globally, there has been an increasing trend with respect to entering into FTAs. Accordingly, the Trade Vertical will continuously engage with the Department of Commercein providing inputs on trade agreements. Through the use of economic modeling, the Vertical will provide to the Department of Commerce the estimated potential benefit of trade agreements (both existing and present).

Global Trade Analysis Project–Computable General Equilibrium (GTAP–CGE) Modeling
The vertical will undertake in-house research on Global Trade Analysis Project (GTAP) for analysing on-going FTAs of Tanzania. Further, it will undertake efforts to build capacity in the area of Computable General Equilibrium (CGE) modelling within NITT. The Vertical will receive permission for NITT to be a part of GTAP consortium to drive research in CGE modelling and get access to cutting edge research in economic modelling.

Capacity Building and Knowledge Creation
The vertical will organize series of seminars/presentations on relevant areas from time to time. The aim of these sessions is to help build capacity in the areas of trade and industrial policy. Several public seminars and workshops will be organized with UNESCAP, ITC–Geneva, Oxford Economics, Euro monitor, George Mason University, Purdue University, and European Commission, among others. The diverse areas such as international trade data, Russia–Ukraineconflict, physical input–output tables, trade negotiations research, competency for global challenges,etc. Some of the key workshops include:
AfDB Training Programme on Input–Output (IO) Analysis
Keeping in mind the importance of building capacity in learning and using Input–Output tables for policy analysis and research, the Trade & Commerce Vertical in collaboration with African Development Bank (AfDB) will organise a virtual workshop on Input–Output Analysis for NITT officials.
Session on Trade and Economic Implications of Electric Vehicles Growth
The vertical will organise a session to highlight the potential implications of electric vehicles (EVs)displacing gasoline and diesel vehicles, especially in the light and medium duty segment, under current levels of subsidies and a sustained reliance on imports of battery cells. The session will alsoexplore solutions on novel ideas to reduce reliance on battery imports through certain novelsuggested policy measures.

7.25 Tourism and Culture

The Tourism Division will provide strategic and directional guidance to the Region Governmentsfor the development of the tourism sector. The Division seeks to develop Tanzania into the most preferred destination for tourists through the development of responsible and sustainable tourism policies, focusing on niche tourism, eco-tourism and wellness tourism, infrastructure development, capacity development, and increasing tourist footfall. The Culture Division seeks to develop, preserve and promote Tanzania's arts, culture and heritage.

Challenges faced in Heritage Management in Tanzania and Policy Imperatives

Under Culture, documentation of heritage structures along with photographs will be undertaken. A report on 'Challenges faced in heritage management will be prepared by NITT'. The report will be a first of its kind that attempts to understand the quantum,nature and location of our built heritage across the country in order to arrive at some primary policiesand guidelines for its long-term protection, conservation and promotion.

Strategy Papers

Strategy papers will be developed, to be peer-reviewed by the World Travel Tourism Council (WTTC) with the themes on (i) Restoring Growth of Tourism in the Wake of Pandemic; and (ii) Promoting Spiritual Tourism in the Lake Zone Regions

7.26 Voluntary Action Cell

The Voluntary Action Cell in NITT will be entrusted with the task to promote partnership and voluntarism in the country. The cell will maintain the database of NGOs and Voluntary Organizations (VOs) in the country through the NGO portal, which will provide a system-generated unique ID, which is mandatory to apply for grants under various schemes of Ministries/Departments, to receive grants through the Foreign Contribution (Regulation) Act and CSR. Verification of the NGO through portal's unique ID will be done by the Ministries/Departments before releasing grants.

The NGO database will prove to be resourceful for a wide variety of communication and information needs, especially for information dissemination within the voluntary sector in Tanzania, and circulating details of various seminars, conferences, and award programs organized by the Ministries/Departments of the Government of Tanzania.

7.27 Water and Land Resources

The vertical will work towards ensuring equitable access to water and land resources while focusing on the sustainable development of the nation. It will formulate policy directions and advisories to harness the potential of advanced and ready-to-use technologies and promote research and development to achieve excellence in water and land resources management. The Vertical aims to enhance the standard of living of all citizens by enabling hassle-free access to these two crucial resources, and toequip all stakeholder organisations in attaining higher standards of service delivery without hampering sustainable development.

Compendium of Best Practices in Water Resources

There are numerous best practices adopted and succeeded by various government agencies, NGOs, civil societies etc. The Vertical will analyse and document best practices covering Agriculture,Groundwater, Watershed, Water Infrastructure and Climate Risk & Resilience which will be replicated across the country.

Rejuvenation of water bodies with community participation

NITT in association with two NGOs will execute a pilot project in Linked Districts, wherein the Government will spend thirty percent of the project cost. The NGO Partner will render technical support andcarry out community mobilization, monitoring & evaluation, and technological acquisitions, which will constitute about nine per cent of the project cost. Beneficiary community, at their own expense, will carter the excavated earth/silt to the farm field and spread it, which will account for the remaining 65 per cent.

The waterbodies in the Linked Districts will be rejuvenated leading to additional litres of surface water capacity to be created (a multiple of this will be created taking ground water recharge into account). This will have positively impacted water security in villages bearing a big population.

Preparation of methodology for assessment of water neutrality, waterpositivity and negativity

Water conservation, efficiency improvement, waste water treatment, reuse and recycle are paramount in ensuring water security. As more and more industries are striving to achieve circular use of water, clear methodology to define and assess water neutrality and water positivity are required. NITTwill constitute a steering committee under the Member, NITT with Secretaries of the departments concerned as members to achieve this objective. Representatives of academia and industry will also be an inherent part of this initiative.

Reuse of treated waste water for irrigation

Use of treated waste water has not gained much momentum in the country, though some of the regions are using it for industrial, landscaping and irrigation purposes to a certain extent. Considering the pace of urbanisation, quantity of treated wastewater will increase over the years and has to be put for beneficial use. Keeping this in view, a strategy paper covering different aspects of utilising treated wastewater for irrigation in peri-urban areas will be prepared.

International technical papers

The water and land resources vertical will publish technical papers viz. (i) Whitepaper on Tanzanian Urban Wastewater Scenario at World water congress, (ii) Impact of the Government of Tanzania schemes inWater– Energy–Food Nexus at International Conference on Irrigation and Drainage

Early Region Experiences on Agricultural Land Leasing Acts Implementation

A draft report will be prepared by the Centre for land governance in collaboration with NITT, with the title, Analysing Early Region Experiences on Agricultural Land Leasing Acts Implementation for Improved Land Governance & Inclusive Agricultural Transformation.

7.28 Women and Child Development

The Women and Child Development (WCD) Division will provide policy inputs for gender empowerment and improve the nutritional outcomes of women and children. The Division will design strategic and long-term policy and programme frameworks and initiatives for improving the nutrition of women and children, and monitors their progress and their efficacy. It will provide advice and encourage partnerships between key stakeholders and international and national think tanks, educational and policy-researchinstitutions. The Division will also maintain a region-of-the-art resource centre on nutrition.

Development of the Action Plan to Combat Malnutrition

A meeting will be held on achieving Linked nutrition outcomes and on cooperative federalism. Focus on the first 1000 days of life, adequate nutrition, immunization, high risk pregnancies, anemia, extra care of low-birth-weight babies by way of feeding counseling and kangaroo mother care, and better coordination among health workers will be the key components of the programme.

Pilot scale-up of Women and Infants Integrated Interventions for Growth Study

A two-day workshop on the pilot scale-up of the Women and Infants Integrated Interventions for Growth Study will be organised at NITT. The Government will express interest in replicating the interventions of the model in a pilot mode in coastal regions.

Improving dietary diversity through introduction of nutri-cereals in diets

The vertical will work towards enhancing the production and consumption of millets through their inclusion in the Public Distribution System and safety net programmes like Integrated Chikd Development Service ICDS and Mid-Day Meal MDM. A compendium on region-level best practices on production and consumption of millets will be ongoing.

Development of action plan for combating anemia

A consultation on Anemia Prevalence Programme will be held at NITT in hybrid mode, under the chairpersonship of Member (Health) and representatives from the Ministry of Health, National Center of Excellence and Advanced Research in Anemia Control, Tanzania (proposed), Institute of Economic Growth, UNICEF, and International Food Policy Research Institute.

Early Childhood Development

To focus on early childhood care and development, especially for the critical ages of 0–3 years, several meetings will be held under the chairpersonship of Member (Health), NITT. All Regions will be invited for consultation to share their models on early childcare and development towards children in the 0–3 age group. A draft policy paper on early childhood care and development will be prepared.

The National Family Health Survey

In collaboration with the Ministry of Health, National Family Health Survey will conduct unit-level analysis of the survey data for specific priority questions to be identified by NITT.

Take Home Ration: Good Practices across theRegion

NITT and World Food Programme will launch a report title 'Take Home Ration: Good Practices across the Region'. The report will present a set of good and innovative practices adopted in the implementation of the Take Home Ration value chain by the Regions. Aspects related to production, formulation, distribution, labelling, packaging, monitoring, quality assurance, social and behavioural change will be reviewed to generate a catalogue of good practices. This report will create opportunities for cross-learning between Regions.

Community-based Management of Acute Malnutrition

About 85–90 per cent children with severe acute malnutrition having no medical complications can be treated and managed in the community. Community-based interventions leverage multisectoral resources for prevention, early identification, and treatment. A draft compendium of region-level practices on Community-based Management of Acute Malnutrition (CMAM) will be developed.

Gender and Nutrition Booklets for Linked Districts

NITT will prepare an advocacy booklet on Gender and Nutrition for distribution in the Zonal Meetings in Linked Districts on the theme 'Impact on Women and Children'. Accordingly, these booklets will be prepared to cover situation analysis and strategy for improving health and nutrition outcomes of women, adolescent girls and children, best practices and region-specific salient featuresand recommendations for improvement in gender and nutrition.

Prevention of Sexual Harassment

An Internal Complaints Committee will be constituted in NITT to ensure safe and conduciveworking environment for women, in accordance with the Sexual Harassment of Women at Workplace(Prevention, Prohibition and Redressal) Act.

8.0 PREVIEW, REVIEW AND OVERVIEW OF THE FYDP II AND III

8.1 Introduction

The Third National Development Plan is the last in the implementation of the 15-year Long Term Perspective Plan which was specifically designed to implement the National Development Vision 2025 which aims to bring the Nation into a middle-income economy driven by industrialisation and human development. The decade of management of the previous two five-year development plans has laid a solid foundation for the implementation of the National Vision and witnessed our country entering a middle-income economy five years before time. The achievement has been geared by economic growth during the period of an average of 6.9 percent while the average per capita income (GNI) reaching 2,577,967 shillings (equivalent to US $ 1,080) in 2019, a level that is above the limit of US $ 1,036 set aside as a base for the country to join the group of countries with low-middle income status. On July 1, 2020, the World Bank declared Tanzania a country that qualified to achieve a middle-income economy. The government has continued to pursue the goal of building a society with a better life, peace, stability, and solidarity; good governance; an educated and learning society; and a competitive economy capable of inclusive and sustainable growth as identified in the National Development Vision 2025. Further, in sustaining this achievement there is a need to increase investment in human and other resources with a view to stimulating economic growth.

During the implementation of the First and Second Plans, the Government continued to implement various strategies aimed at accelerating the implementation of the National Development Vision which include: emphasis on increasing production capacity through industrial revolution; investment in key economic infrastructure; strengthening Government expenditure discipline and access to social services.

The First National Five-Year Development Plan 2011/12 - 2015/16 was implemented in tandem with the National Strategy for Growth and Poverty Reduction (MKUKUTA II). The Plan aimed to unleash growth opportunities for economic development whereas during the implementation of its Plan in line with MKUKUTA II as a nation we were able to rehabilitate the 2,707 km of Central Railway line; construction and rehabilitation of 2,775 km of paved roads; upgrading the Dar es Salaam port by increasing cargo handling capacity from 9.9 million tons in 2011/12 to 14.6 million tons in 2014/15; increase electricity generation from 900 MW in 2010 to 1,246.24 MW in 2015; increase the rate of food self-sufficient ratio from 104 percent in 2011/12 to 125 percent in 2014/15; and strengthening provision of education, water, health and nutrition services at all levels for urban and rural populations. Overall, the implementation of the first plan achieved approximately 60 percent of the planned targets.

Implementation of the Second National Five-Year Development Plan 2016/17 - 2020/21 geared by the slogan “Hapa Kazi Tu” has increased efficiency in achieving the objectives of the Second Five Year National Development Plan 2016/17 - 2020/21 by 93.8 percent. The Second Plan has had many successes in the implementation of major flagship projects including: Construction of Central Corridor Standard Gauge Railway (SGR); Julius Nyerere Hydropower Project - 2,115 MW; and Revamping Tanzania Airline Corporation Limited - ATCL. In addition, in the manufacturing sector, 105 percent of the targets were achieved whereby the sector’s contribution to GDP reached 25.1 percent compared to 21.1 percent in 2015/16. Similarly, the growth rate of production activities increased from 5.2 percent in 2016/17 to 8.5 percent in 2020/21 while the annual growth of the mining sector increased to 12.6 percent from 6.9 percent in 2015/16. In the social services sector, achievements include improving access to social services for rural and urban residents where school enrolment has increased at all levels of education, and access to health care services has reached the villages level. Further, the analysis of human development index shows that the country has made progress on human development indicators including increase in life expectancy; increase in literacy rate; decline in gender inequality index; and decline in the basic needs and food poverty.

The main objective of the Third National Five-Year Development Plan is to contribute to the achievement of goals of the Tanzania Development Vision 2025.

Preparation of the Third Plan has involved various stakeholders from the Government, the Private Sector, Civil Society, Non-Governmental Organizations, Development Partners and the community at large. Preparation also involved consideration of various documents that included: TDV 2025, the Long Term Perspective Plan 2010/11 – 2025/26, CCM Election Manifesto for the General Election of year 2020, speeches by the Fifth and Sixth Phase Presidents during the opening of the 12th National Assembly in November, 2020 and March 2021 respectively, The United Nations Agenda 2030 for Sustainable Development Goals (SDGs-2030), Addis Ababa Action Agenda for Financing for Development, Paris Agreement on Climate Change, EAC Vision 2050, SADC Vision 2050 and SADC Regional Indicative Strategic Development Plan (RISDP–2030) and the Africa Union Agenda 2063.

In implementing the Third Five Year National Development Plan the Government will focus on stimulating an inclusive and competitive economy, strengthening industrial production capabilities and service delivery, promoting investment and trade, bringing development to our citizens and building human resource capacity.

To facilitate its implementation, this Plan has been developed in line with the Implementation Strategy which is divided into three implementation plans. First, is the Action Plan which outlines all activities and objectives intended

for whole period of implementation. The second is the Financing Strategy (FS) that shows how to avail funding for development projects as well as other strategic steps outlined in the Plan. The latter has prepared a Monitoring and Evaluation Strategy (MES) for monitoring the implementation of projects to know whether the intended results are being met and prompt corrective measures whenever needed to ensure delivery of the intended results. Through the slogan of the Sixth Phase Government of Kazi Iendelee, each of us has a responsibility to fulfil assigned responsibilities effectively in order to achieve effective implementation of this Plan.

8.2 Review of FYDP II

This section highlights the evaluation of performance of the National Five-Year Development Plan 2016/17- 2020/21 (FYDP II). It presents results from the assessment of FYDP II implementation against set objectives, targets and performance indicators and provides insights on the achievements as well as, challenges to inform FYDP III strategic interventions.

8.2.1 Macroeconomic Performance

Growth of Gross Domestic Product (GDP): Tanzania has, over the past decade, continued to register robust economic growth coupled with a stable macro-economic environment that it has been enjoying since the turn of the century. Over the past decade, annual GDP growth was maintained at an average of 6 to 7 percent, peaking at an average rate of 6.9 percent between 2016 and 2019. Though impressive, the annual GDP growth rates are still lower than TDV 2025 targeted rate of more than 8 percent per annum, which was deemed necessary to eradicate absolute poverty and to take the country on a right path for realizing the ambitious objectives of the vision. Nevertheless, the country has been able to qualify as a lower middle-income country as of July 2020. According to the World Bank, Tanzania's Gross National Income (GNI) per capita increased from TZS 2,225,099 (USD 1,022) in 2016 to TZS 2,577,967 (USD 1,080) in 2019, exceeding the lower threshold for middle-income status (USD 1,035).

Over the period of FYDP II implementation, growth was attributed to continued execution of major infrastructure projects, particularly in transport and energy sectors; measures taken by the Government to improve management of the mining activities aiming at streamlining operations and curbing illegal and under declaration of minerals; enhanced efficiency in revenue collection and expenditure management; as well as improved performance of the agriculture sector due to favorable weather conditions.

The sectors with highest annual average growth rates between 2016 and 2019 were construction (14.4 percent); manufacturing (8.3 percent); transportation and storage (8.2 percent); mining and quarrying (8.0 percent); and information and communication (6.2 percent). The share of agriculture in total GDP declined from 29.0 percent in 2015 to 26.6 percent in 2019. The decline of the share of agriculture in total GDP and the corresponding rise in the shares of 'modern sectors' apparently confirms that structural transformation is taking place in Tanzania.

Inflation: The annual rate of inflation has remained in a single digit range, averaging of 4.4 percent over the past four years, slightly below the FYDP II projection of 5 percent per annum. Headline inflation declined from annual average of 5.2 percent in 2016 to 3.3 percent in 2020. Generally, the moderation has been on account of improved food supply in the domestic market and neighbouring countries, stability of global oil prices, and prudent fiscal and monetary policies.

Foreign Reserves and Exchange Rates: Over the last five years, the foreign exchange reserve levels have been sufficient to meet required imports, servicing external debt other external. For instance, as of December 2020, foreign reserves were USD 4,767.7 million, which were sufficient to cover 5.6 months' imports of goods and services. This is above the national monetary policy goal of 4 months and the EAC target of 4.5 months. Good levels of foreign exchange reserves were attributed to the increase in the value of export of goods and services and low oil prices. The size of the reserve not only serves as a cushion against external crises, but also a signal that imbues confidence for potential investors and creditors. In addition, the reserves have enabled the Bank of Tanzania to manage unwarranted volatility in the foreign exchange market. Through close supervision of the interbank foreign exchange market operations and bureaux de change, the Bank was able to manage perverse trading behaviour of market players that would bring instability in the exchange rate and 'speculative attacks' on the currency.

As a result, the value of the Tanzanian Shilling (TZS) against major foreign currencies has remained relatively stable. According to the Bank of Tanzania's Annual Report for 2019/20, while end of the period exchange rate for 2016/17 was TZS 2,230.1 to one USD, the end of the period rate for 2019/20 was TZS 2,295.5 to one USD.

The stability of the exchange rate is a result of the combination of effective management of fiscal and monetary policies and keen supervisory practices of the Central Bank in enforcing transparency and efficient trading in the foreign exchange market. Other factors contributing to the stability of the exchange rate include a decrease in the current account deficit and low inflation relative to the rates of inflation in Tanzania's major trading partners.

Fiscal Performance: Domestic revenue has been increasing consistently though below the set annual target. In 2019/20, domestic revenue realized was 13.7 percent higher than the amount collected in the previous year but was 8.6 below the annual target. In addition, domestic revenue as percentage of GDP increased from 13.4 percent in

2015/16 to 14.7 percent in 2019/20. The increase in revenue collection was a result of implementation of various domestic revenue policies focusing on widening tax base, strengthening management of existing sources especially by intensifying the use of electronic collection systems and other administrative measures. Table 1 summarises tax policy reforms during the FYDP II.

Table 5: Tax Reforms during Implementation of FYDP II

Tax Reforms	**Objectives**
During 2015/16	
Income Tax Reforms- Government reduced PAYE from 12% to 11% and the Government reduced the rates applicable to presumptive tax regimes by 25 percent.	To reduce tax burden to low-income earners; To induce voluntary compliance and reduce business cost.
During 2016/17	
Income Tax Reforms-Reduce PAYE from 11 to 9%	To reduce tax burden to low-income earners.
Excise Duty Reforms - Extend Excise Duty on Mobile Money Services to include commission payable from money withdrawal.	To limit tax evasion and increase Government Revenue.
VAT Reforms - Introduce VAT on fee based Financial services supplied; Abolish Exemption for Tourism Services and abolish exemptions to the armed forces and instead, provide allowances as an alternative suitable way to deliver goods to them.	To remove tax distortions and reducing exemptions; To enhance tax base and Government revenue; To ensure fairness to all member of armed forces and avoid loss of Government revenues.
Import Duty Reforms - Increase import duty rate on cement from 25 percent to 35 percent; Increase Import Duty on Furniture's from 15% to 20% and abolish exemptions to the armed forces and instead, provide allowances as an alternative and suitable way to deliver the goods to them.	To protect and promote local production of furniture as well as promotion of employment and to ensure fairness to all member of armed forces and avoid loss of Government revenues
During 2017/18	
Excise Duty Reforms - Merge Annual Motor Vehicle Fees with Fuels Excise by undertaking a reform through the revising upwards the excise duty rates on petrol and diesel by TZS. 40 per litre, from TZS 339/= to TZS. 379/= per litre of motor spirit.	To simplify collection mechanism, reduce collection costs, making it convenient for taxpayers to pay tax, improve compliance rate; To recover Revenue loss from the reform on abolishment of annual motor vehicles license fees.
Income Tax Reforms - 5% Withholding Tax to Small Miners and Increase qualifying amount for depreciation of non-commercial vehicles collecting all potential from Gaming Tax	To increase government revenue and correct income inequality and strengthening collection of Government revenue from gaming activities
During 2018/19	
Income Tax Reforms - Reduce the Corporate Income Tax rate from 30% to 20% for new entrants in Pharmaceuticals industries and Manufacturers of Leather Products for a period of 5 years.	To promote investment in the manufacturing of pharmaceutical and leather products so as to create employment opportunities and increase Government revenue; To save foreign exchange which is currently being used for the importation of these products,
Import Duty Reforms - Increase the import duty rate for Gap Sugar from 25% to 35%	To protect local industries.
Gaming Reforms - Increasing gaming tax from 15% to 18% on Gross Gaming Revenue for land-based casino operations; Increasing gaming tax from TZS 32,000 to TZS 100,000 per machine/ months on slot machines. Increase the rate of tax on sport betting from 6% to 10% on Gross Gaming Revenue; Increase the rate of Gaming Tax on Winnings from 18% to 20% for SMS Lottery, Sports Betting, Slot Machine Operations, National Lottery, Forty machines (Forty machines site), and online casino (Internet /online casino)	To Increase tax revenue from casino games; To Increase Government revenue from gaming tax collections; Increase Government revenue from gaming tax collections; and To Increase gaming tax collections and thus contributing more to the Government revenue.
During 2019/20	
Tax Reforms-To introduce Presumptive tax regime to taxpayers with annual turnover from TZS four million (4,000,000/=) and TZS hundred million (100,000,000/=) who will not be obliged to submit financial accounts to Tanzania Revenue Authority for determining income tax. (a) Proposal to introduce the turnover tax for PIT traders.	To reduce the tax compliance burden on small businesses as well as to align the tax rates with the minimum amount of turnover required for businesses to use Electronic Fiscal Device (EFD) machine.

The reorientation of expenditure towards public investment reflects the Government's commitment to narrow the infrastructure gap and thus facilitate private sector investment and economic growth. The aim of the fifth phase Government was to increase development spending to the tune of 30–40 percent of the total budget as articulated in the FYDP II to finance development projects. Development spending increased from 22.5 percent of the actual budget in 2015/16 to 31.4 percent in 2019/20. Budget dependency continued to be in single digit for the past five years with the ratio of concessional loans and grants averaging at 9.3 percent of the total budget in 2019/20. In GDP terms, development spending has increased to 6.3 percent of GDP (2019/20), up from 4.3 percent in 2015/16. Capital investments have been directed towards the construction and rehabilitation of health and education facilities, Government buildings in Dodoma, transport sector projects such as the standard gauge railway, the energy sector projects of Kinyerezi I&II, construction of Julius Nyerere Hydropower Project (JNHPP), and the construction, upgrading and rehabilitation of airports across the country.

The fiscal deficit narrowed from 3.4 percent of GDP in 2015/16 to 1.4 percent in 2019/20. It remains below 3 percent, which is the set target for macroeconomic convergence in the EAC and SADC. The deficit is financed through foreign and domestic borrowing. In the short to medium term, the deficit is expected to widen (but within the agreed target) as Government continues to implement major infrastructure projects such as the new standard gauge railway (SGR) and power infrastructure.

Financial Sector Performance: The Bank of Tanzania has continued to implement and sustain monetary policy which aims at increasing credit to the private sector. In this regard, the Bank of Tanzania reduced the discount rate from 12.0 percent to 9.0 percent and further reduced it to 5 percent in May 2020. Also, the Bank of Tanzania has continued to inject liquidity into the economy through different financial instruments in order to meet market requirements. These measures have improved liquidity in the money markets. In terms of interest rates on Treasury bills, the rates have been reduced from 17.49 percent in December 2015 to an average rate of 11.06 percent in December 2020. The overall time deposit rate has declined from 9.3 percent registered in December 2015 to 7.09 percent in December 2020.

For the past five years the banking sector has remained sound and stable with capital and liquidity levels being above minimum regulatory requirements. As of 31st December 2019, there were two private credit reference bureaux operating in Tanzania, namely Credit info Tanzania Limited and Dun & Bradstreet Credit Bureau Tanzania Limited. During this period, 55 out of 56 banking institutions were submitting data to the credit reference databank, which amounted to 98.21 percent of the financial institutions required to submit data to the CRB. By the end of 2019, the number of borrowers and loans submitted by banking institutions to the databank reached 5.22 million and 3.9 million, respectively. Also, the number of banking agents have increased from 3,299 agents in December 2015 to 28,358 agents in December 2019.The growth in the number of banking agents is reflected by the increase in the volume and value of transactions. The volume of cash deposits by agents was TZS 5,464.9 in billion in 2019 compared to TZS 28.37 billion in 2015 whereas the volume of withdrawals was TZS 1,833.1 billion and TZS 4.14 billion respectively. Total Market Capitalization of 28 companies listed on the DSE increased to TZS 19,676.92 billion in 2018, compared to Total Market Capitalization of TZS 16,464.3 billion recorded in December 2015. The number of companies listed at the DSE has also increased to 28 companies in 2018, compared to 18 companies in 2015, which is equivalent to a 55.6 percent increase.

Debt Sustainability: Tanzania's national debt continued to be sustainable throughout FYDP II implementation period. All debt burden indicators show that Tanzania remains at a low risk of debt distress, with all relevant debt ratios below the thresholds for distress. The Composite Indicator (CI) calculated based on the October 2020 World Economic Outlook (WEO) for Tanzania is 3.07, indicating that the country's debt-carrying capacity is strong. In nominal terms, the public debt was 39.0 percent of GDP in 2019/20. Debt Sustainability Analysis (DSA) 2020 results indicated that the present value (PV) of external (public and private) debt-to-GDP ratio in 2019/20 stood at 16.4 percent against the threshold of 55 percent and was projected to decrease moderately in the medium-term to long-term, reaching 14.0 percent by 2030/31. The long-term projection is supported by strong GDP growth and expected slowdown of borrowing after completion of major projects under the FYDP II. The present value (PV) of external debt-to-export is projected to decrease from 103.9 percent in 2019/20 to 81.2 percent in 2025/26 and thereafter to 68 percent by 2030/31. The liquidity indicators, as measured by the ratios of debt service to exports, is projected to decrease from 11.9 percent in 2019/20 to 11.1 percent in 2025/26 (Table 2).

Table 6: External Debt Sustainability Indicators

External DSA	**Threshold**	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	**2023/2024**	**2024/2025**	**2025/2026**	**2030/2031**
*PV of debt-to-GDP **ratio***	55	16.3	17.3	17.5	17.9	17.9	17.2	16.7	14.0
PV of debt-to-exports	240	103.9	113.2	109.7	103.5	94.3	87.9	81.2	68.0
Debt service-to-exports	21	11.9	14.0	13.4	10.6	10.3	10.7	11.1	11.1

Source: Ministry of Finance and Planning

The Debt Sustainability Analysis (DSA) suggests that overall risk of debt distress for Tanzania is low, reflecting the recent GDP rebasing and reclassification of the country from a medium policy performer to a strong policy performer, which raised its debt carrying capacity and accompanying debt burden thresholds. All debt burden indicators remain below the thresholds under stress tests.

Foreign Direct Investment (FDI): During FYDP II, Tanzania continued to invite foreign investors. The value of Foreign Direct Investments has been increasing over time (Table 3). The sectors (sub-sectors) that attracted FDIs include mining and quarrying, finance and insurance, food and accommodation, manufacturing and agriculture. Most of the FDIs1 originate from the Canada, Kenya, Germany, China, India, Mauritius, the Netherlands, Oman, South Africa, United Kingdom, the United Arab Emirates, and the United Regions.

Foreign direct investments (FDIs) bring in new capital, along with technical, managerial and networking capabilities. Among the concerns that feature frequently include the speed of investor facilitation and administration of incentives as well as the costs of obtaining permits (work, residence, building, licenses and approvals). At the Tanzania Investment Centre (TIC) which is a formal investment promotion agency, a One Stop Centre (OSC) was established, in order to make possible provision of (most of) the facilitation services by government agencies under 'one roof'. This arrangement saves the investor's cost in time and money by removing the need for moving from one MDA to another.

Table 7: Foreign Direct Investment between 2016 and 2019

Year	**2016**	**2017**	**2018**	**2019**
FDI (Million USD)	755.4	937.7	971.6	990.6

Source: Bank of Tanzania

8.2.2 Sectoral Performance

Agriculture Sector: The key targets were to attain real growth rate of 7.6 percent; GDP share of 29.4 percent; 24.9 percent share in total exports and share in total employment at 56.5 percent. Over the past four years, the sector has grown by an annual average of 5.1 percent, accounted for an average of 27.7 percent to GDP, 24.1 percent to export earnings and 65 percent of total employment. Cash crop production increased to 1,156,389 tonnes in 2018/19 (from 796,502 tonnes in 2015/16). Food crops production continued to flourish such that food self-sufficiency reached 118 percent. Exports of horticultural produces rose to USD 779 million in 2018/19 (from USD 412 million in 2015). Irrigated area increased to 694,715 hectares in 2020 (from 461,376 hectares in 2015). Food crops storage capacity increased up to 621,000 tonnes in 2020 (from 371,000 tonnes in 2015).

Most farmers/livestock keepers/fishermen still use very low technology and production and productivity is very low even by regional standards. Productivity is still low and so is the level of commercialization. According to the preliminary results of 2019/20 agriculture census only about 20 percent of the 13.5 ml. hectares planted used improved seed and only 2.8 ml. Hectares (about 20 percent) used mineral fertilizers.

Also, during implementation of FYDP II, the Government constructed new irrigation infrastructure and repaired the old irrigation infrastructure. This has led to an increase in the irrigation area, from 461,376 hectares in 2015 to 694,715 hectares in 2020. Until December 2020, the Government was continuing with the construction of irrigation schemes in Kigugu-Mvomero (200 ha); Mvumi – Kilosa (249 ha); Msolwa Ujamaa – Morogoro (675 ha); Njage – Kilombero (325 ha) and Shamba la Mbegu Kilangali – Kilosa (400 ha). Furthermore, production of quality seeds has increased from 36,614 tons in 2015 to 71,000 in 2020. The completion of construction of seeds laboratory in Morogoro has led to production of 14,700 kilograms of pre-basic rice/paddy seeds (TXD 306, TXD 88, Komboka, Tai, Supa and NERICA 1). The construction of five warehouses for storage of rice under Expanded Rice Production Project have been completed. Also, the availability of fertilizer has increased from 302,450 tons in 2015 to 727,719 tons in 2020.

Livestock: During the period under review the population of cattle reached 33.4 million, poultry (83.28 million), of which traditional chicken were 38.77 million and improved/hybrid chicken were 44.51 million; pigs (2.14 million) and donkeys (657,389). Improvements of private sector owned cattle ranches and investments in beef processing factories have started to flourish. Annual livestock vaccine production has increased from 26,367,200 doses in 2015/16 to 58,016,325 doses in 2019/20 equivalent to an increase of 120 percent. The incidence of animal diseases has decreased from 20 percent in 2015/16 to 11 percent in 2019/20 respectively. Also, livestock mortalities due to diseases have decreased from 352,726 in 2015/16 to 221,732 in 2019/20 equivalent to 37 percent decline. The decrease in the incidence of livestock diseases is due to the construction of 104 new dips and the rehabilitation of 542 dips. During the period under review, livestock sub-sector growth has been stagnated where the average growth was 4.9 percent. However, during 2020 the livestock sub-sector growth reached 5 percent. Furthermore, the contribution of livestock subsector to GDP has had inconsistence growth. However, during 2020, the contribution of livestock subsector to GDP was 7.2 percent.

Construction Sector: The construction sector has also consistently expanded its share of GDP. The sector's GDP in 2019 share stood at 14.2 percent, which is 3.1 percentage points higher than the baseline of 11.1 percent and 3.0 percent points higher than the end of FYDP II's target of 11.8 percent. Over the past four years, the sector has been growing by 14.3 percent per annum. The growth of the sector has been primarily driven by the works on the road network, buildings and mining industries. In the road network, for instance, the Government has made massive investment by tarmacking a total of 3,537.0 kilometres of roads between 2015/16 and 2019/20; rehabilitating 300.9 kilometres of trunk roads, and construction of 10 large bridges, airports and other infrastructures (e.g., health facilities, Government buildings in Dodoma, student hostels at the University of Dar es Salaam).

The formal construction sector has been growing at a fast rate; but along with it, informal construction (building of structures, mainly dwellings without contracts, for instance, in many urban and rural settlements). Like in most Sub-Saharan African countries, many large-scale infrastructure construction contracts have been awarded to foreign contractors. Generally, local construction firms face shortage of funds (capital) and technical and managerial capability to undertake most of the foreign-funded and large projects.

The fifth-phase Government has taken keen interest in encouraging domestic firms to enhance their technical capacity to compete along with global (large) players. The presence of large international firms (including also in mining and gas sub-sectors) offers scope for technology transfer and the development of local firms to explore opportunities for upgrading, taking advantage of the possible access to (new) technology (transfer). In the meantime, the Government has also spoken firmly against corrupt practices in the sector in order to have transparent operating environment in which domestic private companies can thrive.

Energy Sector: During implementation of FYDP II electricity generation capacity has increased to 1,602.3 MW in 2019/20 from 1,308 MW in 2015/16. The rate of electricity loss has also declined from 19.0 percent in 2015/16 to 16.4 percent in 2019/2020. The number of customers connected to the national grid reached 2,766,745 in 2020 from 1,473,217 in 2016 and an overall Electricity Access Rate has increased from 67.8 percent to 78.4 percent in the same period. About 99.6 percent of the total population in urban areas have access to electricity while households connected are 39.9 percent. The households electrified by solar photovoltaic technology are 30.4 percent. Access to electricity in rural areas has increased from 49.3 percent in 2016 to 69.6 percent in 2019/20. The number of villages with access to electricity has increased from 2,018 villages in 2015 to 10,018 villages in December 2020. Further, the number of rural households connected to electricity has increased from 16.4 percent in 2016/17 to 24.3 percent in 2019/20. The increase in access and connectivity in rural areas was attributed to, among others, the Rural Energy Agency (REA) programme.

The Energy Access and Use Situation Survey in Tanzania (2019/20) shows that the main energy source for cooking is firewood (63.5 percent) followed by charcoal (26.2 percent), Liquefied Petroleum Gas (5.1 percent), electricity (3 percent) and other sources (2.2 percent). Likewise, there is an increase in the use of modern energy sources for lighting, whereby in 2020, about 36.3 percent of households are using electricity as the main source of energy for lighting compared to 25.1 percent in 2016. This is followed by solar power which is used by 30.4 percent of households and rechargeable battery/torch (23 percent). The traditional sources of energy for lighting from kerosene have decreased from 22.3 percent in 2016/17 to 6.4 percent in 2019/20. While four (4) percent of households use other energy sources for lighting.

Mining Sector: During 2016 to 2019, the growth of mining sector has averaged 8.0 percent and its contribution to GDP has increased from 4.6 percent in 2015/16 to 5.9 percent in 2019/20. Also, revenues from export of minerals have increased from USD 1,912 (equivalent to TZS 4,464.71 billion) in 2015/16 to USD 2,898.8 (equivalent to TZS 6,769.0) in 2019/20 and non-tax revenues (fees and other charges) have increased from TZS 196 billion in 2015/16 to TZS 528.3 billion in 2019/20. The mining sector contribution have continued to increase since 2016/17 partly due to radical changes in extractive industry policies, rules and regulations, strategies that plugged the loopholes that hitherto hindered the flow of benefits out the natural endowments to the country's citizenry.

Among the efforts and actions taken by the Government included construction of the wall at Mirerani (24 km long) to curb rampant smuggling of Tanzanite and establishment of mineral trading centres (39 centres) to enable orderly sales of minerals. Export of raw minerals was banned in preference for local value-addition processing. The 2017 legislation requires all minerals to be beneficiated in the country. In another bold move, in 2019, the Government was able to garner development agreements and issue of Special Mining Licences (SMLs) for Bulyanhulu, North Mara and Geita, Tulawaka and Buzwagi. In May 2017, new mines, Shanta Gold's medium scale and New Luika Mine were opened, adding more firms in gold mining in the country. Also, the Government and Barrick established Twiga Minerals Corporation which is jointly owned by the Government (16 percent of shares) and Barrick (84 percent of shares). In 2019/20 Barrick disbursed TZS 100 billion to the Government as dividend. Other effort included Government partnership with LZ NICKEL Company to mine nickel minerals whereby Tembo Nickel Corporation Limited has been established where the Government owns 16 percent of shares and LZ NICKEL Company owns 84 percent of shares.

In terms of employment, between 2016/17 and 2019/20, the sector contributed 1,000,505 jobs, of which 809,696 (80.9 percent) were direct employment. The artisanal, small-scale mining sub-sector employs about 1.5 million people in rural areas, contributing not only to household income but also supporting Government's efforts to reduce poverty

particularly in rural areas.

Trade: In respect of trade there is an increased share of Tanzania's exports to SADC from the baseline share of 12 percent (2015) to 14 percent (2019). The share of exports to EAC has declined from 16.0 percent (2015) to 12.3 percent in 2019. Other progress includes an increase in manufacturing exports to EAC from 6.3 percent (2016) to 10.8 percent (2019) which is 3 percentage points higher than the FYDP II's target of 7 percent. The target for the share of exports to SADC has been surpassed reaching 26.4 percent (2019) against the target of 22 percent by 2020. Exports to EAC have increased from USD 430.6 in 2016 to USD 674.4 in 2019. In SADC, exports have increased from USD 1,112.7 in 2016 to USD 1,350.9 in 2019. The value of exports in SADC has increased due to increase in export of minerals compared to exports of manufactured goods.
Despite the recorded achievements realized in the period under review, trade sector encountered some challenges which are; Failure to meet international quality standards and or failure to compete, lack of information on availability of preferential markets, existence of non-tariff barriers especially along the border, lack of commitment/will by some private sector to meet the demands of specified markets, higher cost of doing business, lack of cold chain and storage facilities at the port and air ports for storage of manufactured and horticultural goods, lack of e-commerce skills and platforms and the onset of COVID-19 pandemic.

Tourism Sector: The number of tourists increased from 1,137,182 in 2015 to 1,527,230 in 2019. Positive progress is also observed from the FYDP II's indicator, 'earnings from tourists.' The earnings increased from the baseline figure of USD 1.9 billion in 2015 to USD 2.6 billion (equivalent to 6,071.3 TZS) by 2019 which is 36.8 percent increase from the baseline. Other achievements are an increase of licenced tourism operators from 1,242 in 2016 to 2,051 in 2020, also cultural tourism enterprises increased from 66 in 2016 to 76 in 2020. However due to the COVID-19 pandemic shock, the earnings are projected to significantly decline, and likely to fall short of the FYDP II's target of USD 3.6 billion.

Industrial Development: The FYDP II identifies industrialisation, along with human development and implementation effectiveness, as the main policy objectives and a key driver of economic transformation. In 2016, the Government prepared an action plan for implementing FYDP II with regards to industrialisation. The strategy promoted the use of domestic inputs, improving an enabling environment for private sector investment and mobilisation of Foreign Direct Investments (FDIs). During the past four years of FYDP II 8,477 industries were established, of which 201 were large-scale, 460 were middle-scale, 3,406 were small and 4,410 were micro enterprises. Also, in 2019/20 alone, 303 industries were established, of which 138 were large establishments (95 established under Tanzania Investment Centre - TIC).
The establishment of these industries has led to the increase in the number of industries from 52,633 in 2015 to 61,110 industries in 2019. These establishments have increased the number of newly created jobs from 254,687 in 2015 to 482,601 in 2019. The contribution of industrial sector to GDP has increased from 7.9 percent in 2015 to 8.5 percent in 2019. The average growth of 8.3 percent in industrial sector has led to increases in the production of different manufactured goods. Overall, as of September 2020, Government achieved 75 percent of the targets set in 2015/16.
In pushing the agenda further, the Government called upon the Pension Funds to participate in industrialisation by financing the revamping of manufacturing industries that had long stopped production and investing in new industries. In response to this call, over 35 industries were funded by the Pension Funds, creating 250,000 jobs. The major industries so established include:
(i) An investment worth TZS 54 billion for a Shoe Factory in Moshi in cooperation with TIRDO and the ParastSuluhu Pension Fund (PPF);
(ii) ANationalSocialSecurityFund(NSSF)JointVentureprojectfortheconstructionofa200,000tonnesper year sugar factory at Mkulazi Prison in Morogoro;
(iii) A TZS 9 billion NSSF loan to revive the Mwanza Milling Factory; and TZS 4.7 billion investment to expand the NDC Biotech Product in Kibaha; and
(iv) Over TZS 339 billion have been invested by Pension Funds in 12 firms and several others.

Education: Implementation of the Secondary Education Programme II involved construction of vital infrastructures in 3,904 schools (3,021 primary schools and 883 secondary schools); 547 dormitories, 101 houses for teachers; 25 administration buildings and 43 libraries. Infrastructures across all education levels have been improved through renovations of old schools, strengthening teaching and learning infrastructures and renovation of colleges of education. Use of ICT in teaching and learning has been increase by procuring ICT equipment for the institutions which were rehabilitated. This has led to increased enrolment of students studying mathematics, science and ICT subjects. Out of 89 old schools, 84 schools have been renovated and infrastruc- tures in 54 Folk Development Colleges (FDC) have been improved.
During the implementation of FYDP II, the number of classrooms has increased from 115,665 in 2015 to 136,292 in 2020; desks from 3,024,311 desks in 2015 to 8,095,207 desks in 2020; primary schools from 16,899 in 2015 to 18,158 in 2020. Also, the number of secondary schools have increased from 4,708 schools in 2015 to 5,402 schools in 2020. In addition, the Government continued to provide higher education loans where a total of 2.26 trillion shillings was disbursed; continuing to fund leadership allowances for head teachers, student compensation and school operating

grants where 1.22 trillion shillings was provided for funding free primary education; the establishment of vocational training centers in vocational education institutions; and the strengthening of technical colleges and universities. Similarly, 1,696 schools have been provided with science laboratory equipment. Of these, 1,625 are public schools (commonly known as Ward Schools) and 71 are the oldest schools.

Overall, the assessment revealed that the implementation of Second Five-year Plan 1contributed to: an increase in the number of students enrolling in vocational training from 196,091 in 2015/16 to 320,143 in 2019/20 and vocational education from 117,067 in 2015/16 to 151,379 in 2019/20; an increase in the number of students enrolling in universities in the country from 65,064 in 2015/16 to 87,813 in 2019/20; and an increase in the number of beneficiaries of higher education loans from 125,126 students in 2015 to 132,392 in 2020. In addition, the pass rate for Standard Seven examinations has increased from 67 percent in 2015 to 81.5 percent in 2019 and Secondary (Form Four) from 68 percent in 2015 to 80.7 percent in 2019. Similarly, higher education graduates reached 60,940 in 2019/20, 90,849 vocational training in 2018/19 and vocational education 86,547 in 2019/20. During the period of implementation of the Second Plan, an amount of 3.15 trillion shillings has been spent on improving the education sector. The indicators of the education sector are as follows:

Gross Enrolment Ratio: Gross Enrolment Ratio (GER) in pre-primary education declined from 112 percent in 2016 to 76.2 percent in 2020. The decline is a result of decline in the pupils eligible for enrolment. The GER in primary education has been steadily increasing over the years since 2016 and stands at 110.3 percent in 2019 compared to 91.3 percent in 2015. Similarly, in 2020, the Gender Parity Index (GPI) is at 1.01 meaning the numbers are closer in terms of male and female pupils. With regard to lower secondary education, the GER experienced an increasing trend from 36 percent 2016 to 43.9 percent 2020. The increasing trend, in an increasing population, indicates that more students are transitioning from primary to secondary education. The increase in enrolment in pre-primary, primary and lower secondary levels is mainly attributed to the implementation of "Fee-Free Basic Education Policy", improving teaching and learning environment including rehabilitation and construction of infrastructures as well as strong partnership between Government, the private sector, Faith-Based Organisations (FBOs) and Community-Based Organisations (CBOs).

Net Enrolment Ratio: The Net Enrolment Ratio (NER) in pre-primary experienced a declining trend as it decreased from 44.6 percent in 2016 to 38.7 percent in 2019. The NER for girls stands at 40.3 percent slightly higher than for boys at 39.6 percent as shown in Figure 1.0. This indicates that there is relative gender equity in enrolment of pupils in pre-primary schools. The huge increase in Net Enrolment in 2016 is no doubt due to the Government's introduction of fee-free basic education. In the same vein, NER in primary education increased from 84.0 percent in 2016 to 95.4 percent in 2019; implying high participation of official school-age population in primary education. This reveals also that the contribution of both Government and Non-Government education stakeholders to improve access and equity in primary education is bearing fruit. However, the great majority of pupils are enrolled in Government schools, even though both Government and Non-Government schools have shown an increase in enrolment. Regarding lower secondary, NER increased slightly from 33.3 percent in 2016 to 34.8 percent in 2019.

Pupils/Teacher Ratio: A Pupil Teacher Ratio (PTR) of 1:25 is considered optimum for pre-primary schools. The national PTR has improved from 1:114 in 2016 to 1:104 in 2020. This improvement is a result of an increase in the number of pre-primary teachers from 10,991 teachers in 2018 to 13,227 teachers in 2020. In primary education, PTR declined from 1:42 in 2016 to 1:56 in 2020. The decline in PTR is attributed to the decrease in total number of teachers by 5.8 percent from 206,806 in 2016 to 194,736 in 2020. However, the situation is expected to improve on account of the 13,000 newly employed teachers in October 2020.

Universal Secondary Education: The Government has made ordinary level secondary education universal. This is consistent with aspirations of the Education Sector Development Plan (ESDP) 2016/17-2020/21. The ESDP aimed at transforming the sector into an efficient, effective, outcome-based system and ensure equitable access to education and training for all, including the most disadvantaged in line with Sustainable Development Goal Number 10 (SDG 10). The priorities included equitable participation and completion of fee-free basic education for all, with particular attention to marginalized groups, children with disabilities and out-of-school children and completion of twelve years of education through universal access up to lower secondary education. As a result, GER increased from 30.1 in 2016 to 31.0 in 2018; and NER from 27.0 in 2016 to 31.0 in 2018. Significant reduction has been achieved in school dropouts and out-of-school children. Outcomes in terms of improvement of schooling of both boys and girls due to adoption of universal secondary education are promising. The rapid increase in number of children in schools has generated pressure in terms of need for more classrooms, teachers, and expansion in budget. These factors are critical for protecting and raising the quality of teaching and learning going forward.

Technical and Vocational Education Training (TVET): TVET provides alternative educational and training opportunities after primary, ordinary secondary (O-Level) and advanced secondary (A-Level) education levels, aimed at producing artisans, technicians skilled workers, and professionals to be engaged in fields such as construction, manufacturing agriculture, mining, transport, energy and information and communication technology (ICT). There are two regulatory authorities responsible for TVET institutions:

(i) The National Council for Technical Education (NACTE) which oversees quality assurance and quality control of technical education and training of all tertiary education institutions, (non-universities); and

(ii) TheVocationalEducationandTrainingAuthority(VETA)whichoverseesqualityassuranceandquality control of vocational education and training.

As of January 2019, NACTE had registered 540 Technical Institutions. The overall admission capacity for 2018/19 is

254,172 trainees. Currently, there are 603 institutions in the country, of which 28 are owned by VETA and have a total enrolment of 34,326 trainees. There are 575 Vocational Training Centres owned by non-government service providers. The total enrolment capacity for all VETA-registered Vocational Training Centres is 222,680. Folk Development Colleges (FDCs), currently numbering 55, offer folk education and vocational education and training programmes. FDCs equip trainees with knowledge and skills for self-employment and self-reliance and abilities to solve immediate problems in the communities. The main skills provided are in areas of agriculture, carpentry, masonry, mechanics, tailoring, cookery, animal husbandry, electrical installation and related fields. Currently, there are 5,783 artisans trained by FDCs in collaboration with other stakeholders.

The Government has carried out a number of interventions to improve quality, access and equity. These interventions include rehabilitation, strengthening and expanding of existing Infrastructures of TVET institutions. In the budget for 2019/2020, the Government has allocated funds for the construction of 25 District Vocational Training Centres. The Government has also completed the establishment of Centres of Excellence at technical levels, construction of technical colleges and rehabilitation of 54 Folk Development Colleges.

Skills Development: A study of the labour market conditions in the country by (then) Planning Commission President's Office-Planning Commission (PO-PC) (2014), The Study on National Skills Development to Facilitate Tanzania to Become a Strong and Competitive Economy by 2025 shows the urgent need to address the mismatch between the level of skills employers look for in job seekers, on the one hand, and the levels of skills job seekers possess as acquired in the course of education and training. The study points out that most employers in the public and private sectors report that the levels of skills of many of the job seekers fall short of the required standards. Notably most job seekers are found to have low 'soft skills'. Here, low soft skills mean weaknesses in communication skills, lack of self-confidence, lack of innovativeness/creativity, inadequate self-drive in problem solving, leadership, and slow capacity to adapt or put knowledge in practical terms, time management, customer attention and, above all, attitude towards work and teamwork.

Youth Empowerment: Various initiatives have been taken to ensure youth are economically empowered, these include; provision of training to 28,390 youth on entrepreneurship education, business administration and formalization of youth owned business companies. Furthermore, a soft loan worth 32.6 billion has been issued to 2,560 youth groups. To make sure the youth are properly up brought, a total of 78 National Training of Trainers on Life Skills were trained and ultimately facilitated training of 12,500 Peer Educators at district levels. Life skills education at different levels is important to prepare the youth towards self-identification, vision setting and rational decision making.

Health Sector: During implementation of FYPD II the number of health facilities in the country has increased from 7,014 in 2015 to 8,783 facilities in December 2020. The Government constructed 1,198 new dispensaries, 487 health centres, 99 District Council Hospitals, 10 referral hospitals in Geita, Katavi, Simiyu, Njombe, Songwe, Mwanza, Shinyanga, Singida, Manyara, Arusha and Mara. Also, the Government continued with construction of three Zonal Referral hospitals (Southern Highlands Zone Referral hospital-Mbeya; Southern Zone Referral hospital in Mtwara and Lake Zone Referral hospital in Geita-Chato). Also, the Government completed the rehabilitation of Ward number 18 (Sewa Haji) and construction of wards for private patients at Muhimbili National Hospital. The construction of emergency services building and renovation of X-ray building in Dodoma Referral Hospital has been completed. Also, the construction of Uhuru hospital in Dodoma is 98.2 percent complete.

Performance of other indicators in the health sector is as follows:

Maternal mortality, Neo–nSuluhu Mortality and Under-five Mortality: Tanzania's under-five mortality rate is declining at an encouraging rate, followed by infant mortality rate. This is due to the improvements made in health services delivery across the country. Under-five mortality rate has declined from 67 per 1,000 live births in 2015/16 to 50 per 1,000 live births in 2019/20. Tanzania has continued to be one of the leading countries in Africa in vaccinating children under one year. In 2019/20, 98 percent of all children under-one-year-old were vaccinated compared to 82 percent in 2015/16, thus exceeding the 90 percent target set by the World Health Organisation (WHO). Also, during 2019/20, 81 percent of all pregnant women made four (4) or more visits at antenSuluhu clinics compared to 39 percent in 2015/16 implying that more pregnant women receive quality care and advice on safe birth control methods. The number of pregnant women giving birth at health facilities increased from 64 percent in 2015/16 to 83 percent in 2019/20.

Population Dynamics: Total fertility rate was recorded at 4.9 births per reproductive woman in 2019, a decline from 5.2 births per woman recorded in 2016. One of the consequences of the high fertility rate amidst rapidly declining mortality is that Tanzania's population grows at a relatively high pace, and heavily youthful, with children between 0-14 years old constituting about 44 percent of the total population. The 2012 Census revealed that Tanzania age dependency ratio was 92, implying that there were 100 people in age 15–64 supporting 92 persons in age groups 0-14 and 65 years and above. The high child dependency burden has important ramifications for economic productivity. Parents with many children tend to struggle to provide for quality health, education, nutrition, emotional and other needs of their children, which undermines the quality of human capital in the next generation of the workforce. High fertility rate is also associated with low levels of female education and limited participation of women in the formal labour market. This implies that high fertility rate causes high dependency ratio which increases the burden of care and lower workforce participation particularly for by women and girls.

Governments in high fertility countries also struggle to provide quality education and health services for children and

have limited resources available for investing in development infrastructure and other enablers of economic growth. As noted in the 2006 National Population Policy and Five Years Development Plan (FYDP) II, rapid population growth and the high dependency burden are the key factors undermining socioeconomic development in Tanzania. These policy documents note that rapid population growth retards growth in national output by slowing the process of capital formation, as increased consumption draws resources away from saving for productive investment. The strains caused by rapid population growth are felt most acutely and visibly in the public budgets for health, education and other human resource development sectors.

Stunting and Wasting Prevalence: Tanzania National Nutrition Strategy has continued to guide nutrition issues, aimed at reducing all forms of malnutrition. The nutrition situation among children under-five years has improved. The percentage of children under the age of five underweight has decreased from 13 percent in 2014/15 to 10 percent in 2019/20 while children born underweight at less than 2.5 kg has also declined from 6.5 percent in 2014/15 to 5.6 percent in 2019/20.

Prevalence of HIV: The prevalence of HIV/AIDS in the country shows a declining trend following improved prevention strategies, intensified HIV testing and counselling programmes as well as social and behavioural change programmes countrywide.

Tuberculosis Incidence: Tuberculosis has continued to be among the top causes of death in the country. During 2019/20, 92 percent of TB patients were treated and recovered compared to 90 percent who were treated and recovered in 2014/15. In addition, participatory TB and AIDS services have improved and HIV testing for TB patients has reached 99 percent in 2019/20, up from 93 percent in 2014/15.

Malaria Incidence: Malaria deaths in all age groups have decreased by 67 percent from 6,311 in 2015 to 2,079 in 2019. Out of 2,079 deaths for the year 2019, under-five accounts for 957 deaths (46 percent) of all malaria deaths. The confirmed cases of malaria have been registered to increase from 2015 to 2019 due to constant availability of diagnostic facilities especially malaria Rapid Diagnostic Tests (mRDTs). The introduction of Malaria Service and Data Quality Improvement (MSDQI) package has also increased the performance of the health facilities on malaria indicators.

The National Health Insurance Fund (NHIF) is a vehicle for accessing quality health services for all. As of March 2019, the Fund had registered 4,217,211 beneficiaries, equivalent to eight percent of the Tanzanian population. The number of NHIF members increased from 753,892 in 2016/17 to 858,446 in 2017/18 and to 966,792 in 2018/19. NHIF beneficiaries were equivalent to 7.4 percent of all Tanzanians, while Community Health Fund (CHF) beneficiaries were 23.6 percent of all Tanzanians. By 2019 the CHF had covered 13,029,636 beneficiaries, equivalent to 25 percent of the Tanzanian population. Hence, the combined coverage of NHIF and CHF between 2015 and 2019, increased from 20 percent to 33 percent. Tanzania is now reviewing its Insurance Act 2019, with a view to establishing a Single National Health Insurance (SNHI) fund, and thus replace the current NHIF and CHF systems.

The Government, in collaboration with various stakeholders, has continued to implement water supply projects in rural and urban areas. Between 2015 and 2020, a total of 1,423 water supply projects were constructed with the cumulative number of 131,370 Water Points (WP) benefiting 25,359,290 people, equivalent to 70.1 percent of the rural population. However, basing on WPs functionality, out of 131,370 constructed only 86,780 (65.06 percent) were functioning, 8,481 (5.9 percent) were functioning but needed repair, 32,109 (24.44 percent) were not functioning and 5,888 (4.6 percent) were abandoned. This shows that more focus is required on sustainability so as to ensure the little resources available are utilized effectively to achieve high impact. Reviving the non-functional water points shall be a priority rather than starting new projects. In the urban areas, the proportion of population with access to piped or protected water source reached 80 percent. Investments in the water sector including the Rural Water Supply and Sanitation Programme (RWSSP) explain the observed improvements.

8.2.3 Overall Performance

The overall assessment of the implementation of FYDP II reveals that the country performed very well in maintaining macroeconomic stability. About 93.8 percent of macroeconomic targets were met. In terms of Industrial sector performance of about 75 percent of the targets were met. Contribution of manufacturing sector to GDP increased to 8.5 percent in 2019 up from 7.8 percent in 2016. The sector also recorded an annual average growth of 8.3 percent in the same timeframe. Some 8,477 industries were established by June 2020, creating some 482,601 new jobs. In the manufacturing sector the set targets for FYDP-II were achieved by 66.6 percent. The interventions in the agricultural sector and sub sectors during FYDP II resulted in positive performance for attaining about 77 percent of set targets. The sector's real growth rate increased by an average of 5.1 percent in the past four years of implementing FYDP II. In mining sector all targets (100 percent) set during FYDP II were met. Annual growth in Mining sector increased to 17.7 percent in 2019 from 6.9 percent in 2015/16, while share of the sector to GDP increased from 4.9 percent in 2016 to 5.2 percent in 2019.

The share of Tanzania's exports to SADC has increased from 19.0 percent in 2015 to 24.5 percent in 2019. In tourism sector significant success were observed whereby, the number of tourists visiting Tanzania reached 1,510,151 in 2019 from 1,137,182 in 2015), accompanied with increased number of nights spent per tourist from 10 days in 2015 to 13 days in 2019. Earnings from tourism increased from USD 1.9 billion in 2015 to USD 2.6 billion in 2019. The overall performance for the targets of the infrastructure and services development was 91 percent. This has been attributed to achieving outcome targets during the FYDP-II implementation. Also, assessment has revealed that individual

interventions that have attained almost 100 percent or more include connecting public institutions to e-Government (247 percent), increase in people using internet (177 percent), ports position in global ranking (105 percent), and regions connected to electricity (95.7 percent).
Overall performance in social services was high whereby about 70 percent of the planned targets were fulfilled as evidenced by the reduction of infant and under five mortality rates to 38.4 percent and 53 percent per 1,000 births, respectively; maternal mortality rate reduction by 25.7 percent, and increased births attended by skilled workers overall, Tanzanian's life expectance increased from 61 to 66.7 years. Access to water supply has increased to 85 percent in Dar es Salaam, 80 percent in Regional Headquarters and 64 percent in District Headquarters. The proportion of households using protected water source in the rainy season and during dry season reached 88 percent and 77 percent, respectively. The proportion of households with any toilet facility has reached 93 percent. The targets set for water and sanitation had been attained by 80 percent by December 2018. In the education sector achievements are mainly in respect of rolling out of fee-free education policy, construction of classrooms, increased enrollment into teachers' colleges, supplying teaching equipment, laboratory equipment and ICT. Also, Gender Parity in education enrollment has improved from pre-primary to Ordinary level. In terms of governance, during implementation of FYDP II there was a significant increase in the number of women in the parliament.

8.2.4 Emerging Issues

During implementation of FYDP II a number of challenges were encountered. These somewhat slowed down the implementation of development projects. The challenges are technical/operational and financial in nature; others are sector-specific, and others cut across all sectors, mainly concerning institutional capacities and legal and regulatory frameworks. The second category of challenges are those that specifically relate to implementation effectiveness.

Challenges Faced by Sectors
The most common sector-specific challenges are conveniently listed under 'sector-groups' with a caution that the degree to which they affect the individual sectors differ, and that at more detailed technical/technology related issues differ widely.
The following are worth highlighting:

(i) Productive sectors (agriculture, construction, manufacturing): low levels of technology application; insufficient storage and value-addition facilities; high costs of production; and inadequate availability of inputs and raw materials; financing (capital) for investment;
(ii) Industrial development: Low skills levels, knowledge and capacity-building need to be improved through vocational/technical training, apprenticeships etc.; inadequate capital; low commercial banks credit. Industrial credit accounts for 10.5 percent while the largest share of credit is given to personal loans which account for 27.4 percent followed by trade at 20.5 percent) and Low FDI flow due to increasing of domestic investment in areas where FDIs flows were previously attracted as well as global shocks;
(iii) Infrastructure sectors: inadequate capacity and capability of the local construction industry; rapid technological changes including security threats; unplanned urbanization; and lack of regular and efficient maintenance mechanisms; and
(iv) Social services: Limited access, equitable and quality especially in remote rural areas; and

Limitations to Implementation Effectiveness

i. Delays in Execution of Implementation Strategy: The FYDP II Implementation Strategy came into action in 2017 two years after endorsement of FYDP III. Implementation Strategy involved four documents i.e., FYDP II Action Plan, Monitoring and Evaluation Strategy, Financing Strategy and Communication Strategy. Delays in the execution of these important tools led to delays in the implementation of some of the activities and projects; it also affected the measures put forth in mobilising resources to finance FYDP III;
ii. Difficulties in Compiling Information Private Sector Investment: It has been a challenge to document information regarding the contribution of private sector on plan implementation as there is no proper methodology to capture private sector contribution. For the projects that have been identified in FYDP II, the turn up for private sector investment was not impressive and the information of the interventions and businesses conducted by private sector were sporadic, which that made it difficult to make informed decision on the magnitude of their investments;
iii. Weak Preparation of Projects: Project preparation starts from the moment the idea is conceived. Many sectors do not have an adequate number of personnel with sufficient expertise on to prepare the projects. As a result, most of the projects were too poorly developed to attract finances from domestic and international funders;
iv. Unsteady Flow of Funds for Development Projects: Timely disbursement of funds for development projects has adversely affected by factors such as long negotiations with lenders, circular nature of revenue collection, lengthy procurement and untimely disbursement of funds from DPs. For such reasons, some institutions have failed to utilize the funds on time. The other scenario is increased cost of implementing the projects due to delays of payments for the certificates raised by the contractors;
v. Private Sector Involvement in Financing and Implementation of Development Interventions: Despite the significant contribution of the private sector to the economy during the implementation of FYDP II, there are

number of challenge which limit the direct participation of private sector in financing and implementation strategic and priority projects of FYDP III;

vi. Availability and quality of data: one of the major concerns found during the implementation of the FYDP II is relates to availability and quality of data. In some cases, datasets are incomplete, making it difficult to make precise analyses of trends and projections.; and

vii. Weak M&E Reporting at All Levels: Lack of an integrated M&E framework was an impediment to measuring actual impacts of development at all levels. This made it difficult to identify critical issues that needed deeper analysis and right policy responses in a timely manner. There is lack of capacity to synthesize information that is collected for timely strategic decision-making and accountability. Overall, there is inadequate human resources capacity with respect to staffing and specific technical expertise to identify and disaggregate available data by locality and socio-economic groups. Coordination, management and reporting of new data among multiple partners involved in implementing the national policies need to be improved. With each sector doing its own M&E, consolidating of the reports becomes tedious and may sometimes be ignored.

8.2.5 A Way Forward of the FYDP II

Maintaining Macroeconomic Stability: Macroeconomic stability requires interventions, which address balance in fundamental macroeconomic variables such as inflation rate, exchange rate, interest rate, balance of payments, fiscal deficit, and external debt, promotion of external trade as well as effective management of both demand- and supply-side can ensure economic stability. One of the key factors for a stable macro economy is expanding the scope for tax and non-tax sources of domestic revenue. Macroeconomic management shall pay close attention to possible exogenous risks and trade practices that may destabilise external balance stability.

Improving Quality of Service is Critical: With regard to social services, investments dedicated to quality-of-service improvements have to be implemented. This is far from suggesting that quantity (e.g., coverage, outreach, etc.) is no longer a concern. There will remain a need for better, more precise planning and forecasting of "quantity", that is, an optimal number of physical facilities and distribution of the same in the country as total population rises. Examples include construction of school/college buildings, health facilities and equipment, sanitation/ sewers etc. This is important since quality also depends on the Region and adequacy of the physical facilities.

Skills development interventions: Human resources capacity is a cross-cutting challenge in terms of both level of staffing and quality (proficiency) across sectors. Sectors have to devise short and medium-term training programmes to fill up positions with the right competencies. However, as noted in the Introductory chapter, this will best be pursued through concerted skills development interventions involving partnerships linking: (i) technical and vocational education and training (TVET) and higher-degree programmes, with more emphasis on the former, that is, the TVET channel; (ii) Government; and (iii) the private sector (industry) and other non-Region actors, mainly the Faith-based, community-based and civil society actors.

Improving engagement framework with the private sector: During the FYDP II, the political commitment and stance on promoting private sector investments is strong and clear. The major bottleneck is translating these political and policy directives into follow-up actions or implement them to the letter at all relevant levels of government (central, regional, local). There will be a need to revisit the strategies for productive inclusion of domestic investors-small and medium scale-in the competitive economy and accelerate the pace of formalisation of the informal sector.

8.3 Strategic Positioning for Implementation of FYDP III

The FYDP III aims to guide the national effort towards the attainment of TDV 2025, making Tanzania a middle-income, competitive and semi-industrialised economy with shared growth and high-quality human development. The chapter presents the basic considerations, thrust and justification for the proposed conceptual framework by identifying areas most pertinent to guarantee attainment of the TDV objectives. It amplifies, among other things, science, technology and innovation in raising the country's competitiveness for more gainful participation in global trade.

FYDP III builds on lessons and carries forward the achievements from previous national development frameworks, beginning with the poverty reduction strategies and later (as guided by) the LTPP. FYDP I emphasised on unleashing growth potentials through infrastructure projects while FYDP II reinvigorates industrialisation. As with poverty reduction strategies, the FYDP I & II stressed progressively high human development as the ultimate goal.

Building hard and soft infrastructure for Least Developed Countries (LDCs) for instance Tanzania is a continuous process so as industrialisation. The proposed interventions under FYDP III aim to continue expanding the networks of transport infrastructure, water supply, the national grid (electricity) and communication including high speed internet to all rural and urban locations of the country. The infrastructure networks will support access to markets and easier delivery of social services. Economic policy will focus on promoting macroeconomic stability and business environment for enterprise growth, ensuring sustainable use of the country's natural resources as well as exploiting the potentials of geographical location. These create and strengthen the productive capacity and basis for stronger growth of the economy.

Attaining a middle-income status boosts the expectations for consolidating the position by 2025. However, it is

understood greater momentum is required, since as noted in Chapter Two, the country has consistently fallen short of the annual GDP growth target of 8 percent or more stipulated by TDV 2025. Efforts to strengthen industrialisation, trade and competitiveness agenda are expected to improve productivity and export performance. The FYDP III theme integrates multiple, linked objectives of building a strong, competitive economy, an economy that is industrializing and exporting more value-added products and services while consolidating domestic market. Achieving an increasing share in global trade requires:

a) Good understanding of the mega-trends, opportunities and challenges posed by the current global economic order, hence the need to explore more the concept of international competitiveness; and
b) Building a strong productive base through continued structural transformation characterized by shift of factors of production and the relative shares of agriculture, manufacturing and services in total output (GDP), as well as sophistication of final products.

For this reason, the FYDP III incorporates the drive for greater competitiveness, to domestic and international levels, in all sectors, driven by STI-based capacity to diversify production and exports. Besides economic growth, other objectives of TDV 2025 is to improve human development have to be attained. Thus, more growth is required to generate adequate financial resources to finance social development interventions. Faster growth will also enable the country to avoid slipping back to the low-income country bracket. The FYDP III is, therefore, expected to drive the country towards upper middle-income status.

In addition to expanding exports, Tanzania has reason to nurture the domestic market for most of her value-added (manufactured) products as the economy develops in terms of both income and quality of life befitting the middle-income status. A steady domestic market, as per capita income rises, will allay some of the risks due to unforeseen shocks to Tanzania's performance in foreign markets. In general, strong economic growth will help build resilience and preparedness for possible other shocks such as pandemics, extreme weather, fluctuations in external commodity prices, new/competing suppliers and geopolitics.

In the endeavour to Realising Competitiveness and Industrialisation for Human Development, FYDP III adapts to Tanzanian circumstances and draw lessons from industrialised and industrialising countries in developing strategies and setting priorities. International and regional economic arrangements and conventions on environment and climate, among others, provide insights on a range of strategic guides on the social dimensions of development.

8.4 Guiding Norms and Values for FYDP III

The FYDP III recognises the paramount of national unity and social cohesion, rule of law, respect for human rights, equitable society and peace and security as prerequisites for sustainable and inclusive socio-economic development. Tied to these values are good governance, continued fight against corruption and proper use of the nation's natural and financial resources.

Under the FYDP III and beyond, economic policy will aim at building an economy that is inclusive, competitive and integrated, underpinned by industrialisation and services driven by modern science, technology, and innovation (STI). For FYDP III to have the desired socio-economic impact, economic management will, at the minimum, observe the following supporting conditions:

(i) That economic growth (GDP) steadily grows at not less than 8 percent per annum, aiming specifically at consolidating the country's status as a middle-income country; both in terms of income and indicators of social development; and that the country does not slip back into low-income country bracket;

(ii) That Tanzanians shall maintain and uphold full right to their economic choices, with regard to ownership and exploitation of the country's natural resources of land and air space, water, mineral wealth, petroleum and natural gas, wildlife and forestry resources, and that the resources shall benefit all citizens;

(iii) That the country shall exercise very close oversight over extraction of the natural resources. This will include building local technical capacity in the technologies of extracting, processing and other value addition activities; increased local capacity for contract management and negotiations over production and sharing of benefits thereof; maximizing local content; and that extraction shall be sustainable in terms of environment for the benefit of current and future generations;

(iv) That the country continues to expand the basic economic infrastructure (networks of surface, marine, and air transport; power and water); and that all development projects make clear budget provision for Operations and Maintenance (O&M); and protection of infrastructure against vandalism and any forms of sabotage in order to sustain the flow and quality of infrastructure services;

(v) ThatthecountrycontinuestoexpandthedigitalinfrastructureTheNationalICTBroAfDBandBackbone - for country-wide quality mobile telecom networks in order to enable the citizens to benefit from the digital revolution including development of digital-based services in finance, health, education, public administration, judicial services and market information;

(vi) That agricultural sector will be transformed and commercialized consistent with considerations of climate smart agriculture (CSA) that farmers shall be incentivized to invest beyond food security needs, sustainably increase productivity and incomes, adapt and build resilience to climate change, and where possible reduce and/or remove greenhouse gas emissions;

(vii) That, through international relations, Tanzania will actively work for global and regional peace and use economic diplomacy to guide and promote foreign trade and investments while standing up for fair competition within the

country and between the countries and the rest of the world;

(viii)That improved, transparent business-enabling conditions are put in place and implemented for private enterprise growth and for the formalization of the informal sector. In this regard, minimum requirements shall include:

a) Consolidation and harmonization of the regulatory conditions for registration, paying fees and levies and other requirements in order to make it easier for businesses to comply, including in paying taxes.
b) Revisit the mandates of regulatory institutions for clearer separation of revenue-generation and facilitative roles.
c) Application of digital capacities to curb corruption practices including minimizing corruption-prone person-to-person contacts in the course of such facilitation.

(ix) With regard to employment creation, apart from nurturing private enterprise growth, more interventions shall be pursued to promote productive and decent job-creation through:

a) Radical review and strengthening of existing support schemes for youth, women and people with disabilities for special skills and low-interest rate loans; and
b) Targeted support to technical/engineering graduates who develop tech-start-ups with special interventions for young women engineers.
c) In both (a) and (b) cases, monitor, support and evaluate their growth and loan repayment for more others to benefit.

(x) Thatgovernmentengagesininvestment/businessactivitiesthatareofstrategic,nationalinterestand those in which the private sector has least interest or is not financially able to undertake; and that both Region-owned and private enterprises shall strive to sharpen their competitiveness in local and global markets;

(xi) That the scope for public-private sector dialogue is expanded and that issues of mutual mistrust are addressed; and

(xii) That stable and predictable investment/business environment is maintained in order to attract both local and foreign investors. Among other steps, efforts will be made to:

a) Maintain macroeconomic stability - high GDP growth, domestic revenue mobilisation and anti-inflation measures, supported by stable stance with supportive monetary, fiscal and financial policies;
b) Reduce dependence on foreign aid;
c) Expand and improve human capital base, for a population that is educated and learning, and is skilled especially in science and technology;
d) Ensure the workforce is adequately motivated and compensated;
e) Improve and protect welfare and working conditions of workers in all sectors; and
f) Strengthen environmental conservation and protection in order to mitigate adverse effects of climate change.

8.5 Experience from Global Context of Competitiveness

A competitive economy may be conceived as the one whose nationals and firms are able to sell goods and services, under free and fair conditions, in global trade at competitive prices and quality. This presumed frictionless international trade. For an individual country, the objective is to raise domestic employment and the nation's global market shares in trade and inflows of foreign capital, while strengthening its productive base and acquiring capability to flexibly diversify its structure of production and exports in response to changing market conditions.

For a variety of reasons, international competition is not always fully free and fair. For economic and even political reasons, countries apply tariffs, non-tariff barriers and even outright sanctions. In recognition of this, the multilateral trading system provides for options for countries to agree such "market access" and/ or preferential trade arrangements which the signing parties consider to be mutually beneficial. But such arrangements barely conceal the underlying 'mutual competition' among countries; rather, behind the scenes, nations strive to ensure the better conditions for their national enterprises to excel in order to secure and raise export markets (shares), attract foreign capital and maximise on or protect domestic jobs. The nations do so by managing an attractive business/investment policy environment, considering infrastructural services, quality of the labour force, efficiency of customs, stable tax and regulatory framework, among other factors.

In many of the compilations of rankings of countries by competitiveness, several factors appear that nations' policy makers focus on in their attempts to assist their national enterprises to grow and compete interna- tionally and to attract new (foreign) investments. When put together, these factors imply actionable areas for government and domestic firms. These include: macroeconomic stability; quality of infrastructure (transport, energy/electricity, telecommunications); human capital (talent, skills, wellness, creativity, integrity); efficiency of institutions; level of capital/financing; transparency of the transparent regulatory frameworks; cost of doing business; exchange rate stability; and the role of Government in supporting Research and Development.

Factors that enhance competitiveness also play a role of influencing attractiveness of the country to foreign direct investment. Countries strive to reduce domestic costs of production (by putting in place more efficient infrastructure) and increase labour productivity as a basis for creating competitive advantages. Competitive advantages are simply value-addition activities that are underpinned by STI, above and beyond the simple (elementary) processing of traditional comparative advantages. Innovation makes possible new products/ varieties (diversification of production base and of exports), lowering costs and increasing output and standards (quality). Innovations introduce new techniques, new products and new methods of organising production, exchange and networking. Experience from advanced industrial countries and industrialising Asia, show that government funding of STI and R&D infrastructure

has been instrumental in supporting innovations. In some instances, governments apply forms of coercion to ensure that results of R&D and innovations are put into practice to improve the competitiveness of national businesses.
Experience therefore shows that it is human capital - more specifically - superior knowledge and technological development that can cause a transformational change in export performance, reflected in the knowledge and technology content of manufactured exports. This is important for Tanzania; whose exports have long been concentrated in a few primary exports. STI-based human capital should make possible diversification and ability to take part in the evolving Global Value Chains (GVCs). In general, the benefits of competitiveness go to countries that excel in science and technology-led creation of 'competitive advantage', which is a superior enhancer of export performance, that is, as and when the shares of medium and high technology content in total manufactured exports increase.
With regard to foreign direct investment specifically, governments of developing and developed nations alike have, for the last six decades, created public institutions, commonly known as investment promotion agencies (IPAs), to assist in facilitating foreign investors. Inflows of foreign investors mean new, additional capital that comes along with new (advanced) technologies, managerial and marketing know-how, networking, and have the potential to boost exports. Developing countries like Tanzania, in addition, have to pay further attention to facilitating domestic investors in support of a nascent private sector.
Another perspective for Tanzania's current and future development endeavours is to avoid 'global rush' by advanced industrialised countries, for natural resources, particularly minerals, oil and gas resources in developing world, including Africa. For the developing countries, the choice is to either:
(i) to continue exporting the resources in their natural Region (unprocessed), with only limited local processing or (ii) to do a good deal of local value-addition before exporting them. Option number
(ii) is the correct route to take for the national interest in developing countries.
However, this option requires a combination of
(i) strong 'national human capital' in terms of knowledge, science and technology and
(ii) political will power to wrench the best deal for the country. The same may be argued for all other natural resource sectors including fisheries and forestry resources.
A study of Asian economies that became lower-middle income and graduated to upper-middle income between 1960 and 2014, and became successful exporters, found that apart from individual country-specifics, such as demographics, financial sector development, and hard-working populations, the respective governments:
(i) Prioritized (and still prioritize) spending on human capital development as a basis for local value-addition, R&D and innovation;
(ii) Laid basic infrastructure;
(iii) Instilled good governance, both Region and corporate;
(iv) Supported the development of a strong 'indigenous capitalist class'; and
(v)Designed and pursued export promotion and policies that quickly helped them transit from import substitution. In particular, the countries purposefully built local technological capabilities that enable them to develop, fabricate plants over time, and thus gradually reduced over-reliance on imported plants and technologies.
In countries like South Korea, Brazil, Chile, Indonesia, Malaysia, Singapore, Thailand and Vietnam, the Government created a persuasive vision and rallied the majority of the population behind that vision. The leadership was complemented by a responsive, disciplined population, and focused on enterprise development. In response, the local capitalist class developed the capacity of participating in the global value chains at par with more seasoned multinational corporations.

8.6 Framework of FYDP III

The FYDP III conceptual framework is built around the focus on consolidating the middle-income status and quality of desired outcomes. The concept links the following five sub-themes, the implementation of which will require cross-sector coordination/collaboration:
(a) More active pursuit of competitiveness, driven by new knowledge and STI and digital revolution in all sectors. There is greater scope for value-addition activities to achieve modernisation and improvements in productivity and quality of goods and services.
(b) FYDP III shall deepen industrialisation and services provision which are reinforced by new knowledge, STI and digital revolution: More specifically, the country will raise the number of manufacturing establishments, with STI-led value-addition in all productive sectors and services. This will make a more sustainable basis for strong domestic supply and export. In addition, a qualitative noble transformational change in the composition of the country's exports is to attain a greater proportion of medium- and high-content manufactured exports.
(c) Trade and Investment: Export growth can be attained under conditions of: continuously
(i) enhanced competitiveness
(ii) and deepened industrialisation and service provision. The best scenario is where most exports embody medium- to high-technology content, since such exports of goods and services command steadier prices than primary exports. Recognising the role of private sector in production and trade, FYDP III calls for the role of Government in promoting and facilitating private investment and private sector participation in international trade. In the meantime, as the country continues to import mainly capital and intermediate inputs for industrial development, the long-term goal

shall be to have an industrial strategy that enables the country to increase capacity to manufacture at least some of these goods locally.
(d) The equality of the desired outcomes of FYDP III is synonymous with the high level human development and in tandem with TDV 2025. This will be achieved through spending on social development interventions, with particular attention to improved access to education, health, water, public administrative services, law and order, etc. in order to maximize inclusiveness of development.
(e) Skills development will amplify as a way of addressing the low soft skills. Such skills development from the early levels of schooling (nursery levels) all the way up, will prepare the youth for self-employment. Attention will also be paid to raising the levels and quality of the technical and vocational education and training (TVET) channel, as well as the rare, highly specialised skills in order to raise and sustain productivity and competitiveness and the capacity of the local expertise in developing/exploiting the country's vast natural resources and manning large engineering development projects. The skills development interventions reinforce those proposed as factors that enhance skills development.
The sought-for competitiveness, industrialisation and service deepening, and trade and investment together lead to economic growth while social development adds up to the quality of economic growth. The framework (Figure 2) features governance as a fundamental condition without which economic growth and social development interventions cannot take place on a sustained basis.

8.6.1 Good Governance

Governance entails a bundle of national priceless values which include: national unity and social cohesion of the people of the United Republic of Tanzania; peace and security; a just and equitable society, upholding human dignity; rule of law; and political stability. The concept further, demands accountability of both the citizenry and those in position of leadership. Clear provisions are made in FYDP III to guarantee participation of all citizens in making key choices in production (work) and in the distribution of the proceeds of growth.
Under governance there is Government commitment to foster strategic public-private sector engagement and government leadership in promoting international economic relations. In the case of the latter, Tanzania is pursuing 'economic diplomacy' towards improved global, regional and national peace and security, equality and respect of territorial sovereignty. These are conditions without which production and trade activities cannot take place smoothly within and across nations. Economic diplomacy fosters the promotion and facilitation of flows of investment, trade and ideas (knowledge, experiences, negotiations, settlements) for mutual (win-win) gains from trade and economic independence. Domestic trade and investment promotion institutions and diplomatic missions will, together, organise information about the country's investment opportunities and tourist attractions and communicate the same in foreign countries.
Going forward, the FYDP III will bank on the trust and public confidence that has been inspired by concrete good-governance and improvements in public services during the implementation of FYDP II. Firm steps taken during the period include stern court and other actions against corruption; removal of ghost workers from public service; curbing theft of minerals and other natural resources; and brakes on the trade in and use of narcotics. Increased discipline at workplaces, including in the use of public finances on concrete projects and social programmes rekindled public goodwill and endeared the citizenry to the agenda of protecting the nation's natural resources and national cultural values and ethics.

8.6.2 Economic Growth

Economic growth invokes the desire to enable the increase in productivity and innovation in all sectors of the economy. Both productivity and innovation entail competitiveness at individual, firm and national level. Most of all, competitiveness is expected to lead to improved export performance. Under this block there are three closely related sub-blocks: Competitiveness or 'a competitive economy' as per TDV 2025 document (p.12), with key 'determinants' in Figure 4.1. This is followed by industrialisation and Service; and trade and investment. Industrialisation and Services is now established sine-qua-non for economic transformation, considering the relative significance in national output of (a) Manufacturing; (b) Agriculture (crops, livestock, forestry, fishing), mining and (c) Services and Trade within which 'export-led' growth is embedded, and analysed along with foreign direct investment.

8.6.2.1 Competitiveness

Factors that influence the level of competitiveness of the economy: (a) human capital enhancement (b) enabling business/investment environment, (c) market organisation and (d) digital revolution (also known as 4th Industrial Revolution). In most literature, these appear in various models and international comparisons of the various aspects of competitiveness. It is noted, however, that these factors interact one way or the other, mainly in the ways they relate to or reinforce private enterprise development.

(a) Human Capital Development

Competitiveness is advanced primarily by human capital. Human capital development involves creation and use of knowledge and STI to increase productivity and competitiveness in all sectors. It is advancement in human capital that increases the knowledge and technological content in productive activities and products in all sectors such as manufacturing, agriculture, mining, construction and services. For countries like Tanzania, it is important to exploit the advantages of late comers by intensifying training and grasping the latest digital technologies which are set to take productivity and innovative capacities to new levels in all industries and services.

Further, human capital propels innovative capabilities, including in managerial and networking capacities. It imparts technological flexibilities that allow the innovating firms to respond quickly to changes in demand and tastes. It is noted that TDV 2025 envisioned an economy that is not only competitive but also one "with the capacity to articulate and promote national interests and to adjust quickly to regional and global market shifts". The capacity to 'adjusting quickly' to market shifts' can be met by STI-driven capacity. Innovating firms are capable of carrying out product innovations into new products, designs, variety/uses and process innovations or ability to fairly quickly adjust scale, increase plant efficiency, save on inputs for more output, reduce costs and increase in productivity. All this are key to keep the firm competitive and growing.

The factor 'human capital' is cumulated from early child development, nurtured by good health, nutrition throughout the schooling and working experience, focusing in the disciplines of science, technology, engineering and mathematics (STEM). Investment in STEM has long attracted attention in advanced countries as an effective way of boosting innovation, mainly in manufacturing. STEM is also credited for the exponential technological progress in Asian countries. Further, concerted efforts are key in encouraging female students to pursue STEM subjects. In addition, giving priority to youth and people with disability in the area of human capital development is helpful for both youth and people with disability.

The FYDP III exhorts availability of resources to ensure basic, advanced and tertiary education and technical/ vocational training are equipped for STI and inclusive digital learning/teaching. This will include continuing to expand physical infrastructure and facilities in line with projected changes in the demographics, in order to allow quality education and health provision that meet standards (number of students/pupils per class, student/teacher, student/teacher ratios, teaching aids; doctors-population ratios, for instance). Adequate quality of education that meet the prescribed standards will ensure availability of quality human capital resource for the nation.

In short, distinctive actions for accumulation of human capital may be itemised as follows:

(i) Basic and advanced level education: Continue improving reach and quality of basic and advanced level education, equipped for next-level STI and digital learning and teaching.

(ii) Universities and technical colleges and R&D institutions to re-orient the curricular around STEM subjects with more fieldwork/practical attachments. To that effect, formal links between the institutions of higher education and vocational and technical training and the labour market (public sector and corporate/ private sector) shall be emphasised in order to reduce/eliminate skills mismatch.

(iii) Strengthen technical and vocational education and training (TVET) channel by (a) strengthening and expanding current technical and vocational education and training (b) designing a higher-level training programme (3 to 4 years advanced) for deepening technical expertise beyond the current programme to create a new crop of super-technicians;

(iv) Provide a special fund (out of existing ones) for the graduates from colleges to incentivise them to design 'joint' business-cases (projects) and fabricate prototypes (innovations); Design/implement programmes enable technology start-ups to link up with and benefit from the proposed national digitalisation strategy.

Role of Innovative Institutions

The Government, through its 'innovation institutions' will plan the best way to fast-track efforts in this direction. This will involve revisiting the original mandates and assess what it should take for them to produce solutions to farmers, manufacturing enterprises and other users of technologies. These institutions include the Commission for Science and Technology (COSTECH), the Tanzania Engineering and Manufacturing Design Organisation (TEMDO), Centre for Agricultural Modernisation and Rural Technology (CAMARTEC), Tanzania Industrial Research and Development Organisation (TIRDO), Small Industries Development Organisation (SIDO), and for public health (National Institute for Medical Research, NIMR). On board also are the universities or equivalent higher education institutions which cover several disciplines, teaching and carrying out research.

The research findings will be implemented through a series of activities such as rounds of technical specifications and designs, experimentation, prototypes, reliability tests, consumer and user safety tests as well as patenting and/copywriting. Finally, mass-production will be undertaken after project appraisal protocols.

(b) Enabling Business and Investment Environment

Business and investment environment entail a number of issues, including: creating right set of institutions, policies, laws, and regulations that are efficient in facilitating businesses and investment to become profitable and sustainable. Besides, it is necessary to ensure macro-economic stability and supportive infrastructure that reduce costs of doing business, and transparent and predictable legal and regulatory frameworks.

The FYDP III will continue to expand networks and improve quality of infrastructural services to improve efficiency and lower costs of operations. In addition, improved infrastructure promotes inclusiveness through facilitating access to other social amenities such as clean and safe water, health and education facilities, markets and financial services.

While indeed a lot has been done to address the cost of doing business through implementation of the '*Blueprint*' action plan, there are still some issues that need to be addressed. These include unfair competition, the scope of public-private sector dialogue and *mutual mistrust* between the private and public sector.
Actions have to be taken to increase competition. This implies that competition should be fair or made to be so through stringent enforcement of relevant legislation. Tendencies for 'predatory practices' by more powerful companies against smaller and upcoming enterprises must be checked.
The scope for the public-private sector dialogue will be extended or as much as possible be made representative enough of the micro, small and medium enterprises at sub-national levels.
Sector characteristics need to be taken into account in order to accommodate the relevant needs.
As entrepreneurs seek to comply with regulations governing ease of starting, registering, operating a business, paying taxes, obtaining permits, capital, and networking, issues of *mutual mistrust* between the private and public sector will be addressed. In particular, the mistrust will be resolved through mutual understanding of the two sides (business community and relevant public sector authority) and putting in place a clear and transparent mechanism that promote compliance.
The institutions involved in facilitating investments applications, registration, permits, etc. will review their operational procedures and explore the possibility of jointly working out a consolidated investment facilitation arrangement that is straightforward, short and transparent (regarding permits, licenses, etc.).

(c) Markets
'Market' is another factor that appears in international rankings of competitiveness in various settings. The main markets are for goods, services and factor inputs (land, labour and capital). Both domestic and foreign investors are interested in the quality and marginal productivity of factor inputs and how efficiently the market functions and are regulated. In labour, investors look for talent/skills and integrity. For Tanzania, land is another factor that features as a challenge for investors. Financial sector development is critical in mobilising and channelling of capital to most profitable ventures. Markets also involves import and export of goods and services. Existence of regional and international trade 'agreements' on trade in goods and services, and 'trade wars' even among signing parties (partners) implies that international trade is 'not so free' after all.
It is important for countries like Tanzania to devote attention and resources to enable domestic private sector to acquire technical knowledge required to meet quality, health, environmental and other international standards. Tanzania's horticulture sector is one of the sectors that has successfully met the international standards and hence managed to penetrate external markets. The FYDP III will, therefore, champion an export development strategy that sorts, at sector level, and develops such technical capabilities.

(d) Digital Revolution
Digital revolution (also, digitalisation) includes current and rapidly growing range of new technologies based on digital applications that are accelerating efficiency in production, services and governance systems. They include innovation like robotics, artificial intelligence (AI), the"internet of things"(IoT), industrial biotechnology, nanotechnology and advanced materials, cloud computing, block chain, energy storage, 3D printing, Big Data, to mention just a few.
Although it is not readily feasible to gain entry into many of the frontline digital technologies, several countries including in Africa are already seeing a rising number of innovation start-ups, such as in Artificial Intelligence (AI), cloud computing and block chain. For example, West Africa, block chain is enabling efficient verification of property records and transactions. Block chain is immutable, impersonal and can therefore reduce risk of fraud or favouritism. Financial inclusion has been attributed to application of electronic payments platforms and virtual savings and credit supply platforms.
FYDP III calls for deployment of STI and an enabling environment for private enterprise investment in the research on digital technologies of the 4iR. Envisioned too is job creation potential for a population (especially the youth) that is becoming tech savvy thanks to expanding mobile telephony and the internet. To be 'future ready' for digital-technology uptake, investment in cutting-edge STI and ICT infrastructure and digital skills are paramount. The services sector is claiming a big share in the GDP (national accounts) and it is one of the areas that stand to benefit immensely from digitalisation.
A national digitalisation strategy shall help in guiding efforts through a fairly new terrain of digitalisation by considering:
(a)Need for a flexible and dynamic legal and regulatory framework to guide digital innovation activities such as research and new tech start-ups. The framework would consider fair competition, protection of patents (intellectual property rights), registration, cyber security and ethical issues among others;
(b) Financing strategy involving public and private sectors in support of tech start-ups; and
(c) Establishment of industrial R&D and innovation parks to link universities and private sector in order to track the transition of AI or block chain any other innovation from lab to market.

8.6.2.2 Industrialisation and Services

Industrialisation has three boxes (i) Manufacturing (ii) Agriculture, Mining and other Extractive Industries, and (iii) Services. The key underlying notion to industrialisation is value-addition, occasioned by knowledge and skills accumulated through experience and training. The principle applies to all productive sectors and services, improving productivity and inventiveness to enhance competitiveness. In Figure 4.1 the entire area within which the three boxes are located is populated by competitive enterprises, both private and Region-owned. A balance is to be agreed: which enterprises the Region enterprises run and which ones the private sector runs. The Region administers regulation (Enabling Business Environment) and policies guiding the entire set of competitiveness factors.

(a) Manufacturing

According to the National Accounts of Tanzania, Manufacturing includes manufacturing of; food prods; beverages; tobacco products; textiles; leather and related products; wood products; chemical and chemical products; pharmaceutical & medical chemicals; rubber and plastics products; basic metals; computer & electronics products; machinery and equipment; motor vehicles, trailers, transport equipment; furniture and other. The current structure of the manufacturing sector in Tanzania is dominated by small scale establishments. These need to grow. The larger ones need to become steadier. Most of the activities are concentrated in the manufacture of food products, wearing apparel and furniture. There are few establishments that produce more technologically advanced products.

Reflecting on the typology of the knowledge and technology content of industrial activities in Table 4, URT/ UNIDO (2012) report finds that most Sub-Saharan African countries' manufactured exports are made from resource-based, low-technology establishments. In order to catch up and produce medium- and high-tech manufactures, massive investments in human capital are needed.

Table 8: Increasing Knowledge and Technology Content (selected examples)

Low-tech manufactures	**Medium-tech manufactures**	**High-tech manufactures**
Food and beverages, cement, cut gems, glass, textile fabrics, leather manufactures, simple metal parts, furniture jewellery, plastic products.	Passenger and commercial vehicles and parts, motorcycles and parts, synthetic fibres, chemicals and paints, fertilizers, engines, motors, industrial machinery, ship building.	ICT/data equipment, TV sets, transistors, turbines and other power generating machinery, pharmaceuticals, optical precision equipment, aerospace.

Source: Extracted from URT/UNIDO 2012

In principle, however, manufacturing-industry will continue to be a lifeline for the development and co-development of all other sectors and services. The sector's long-term objective shall be to consolidate itself into a sector capable of designing and fabricating machines and parts thereof for use in resource-based manufacturing and beyond. There is need to support private enterprise workshops that venture into fabricating parts, machines tools and metal works in general.

To realise this there shall be strategic links between human capital (STI/STEM) interventions, R&D, vocational training, manufacturing and 'modernisation' of the extractive industries – in order to identify relevant/ appropriate technical solutions.

Contribution of Export Processing Zones (EPZs)

Partly as a result of failure of the Import Substitution Industrialisation Strategy (ISI), the EPZs emerged as a tool for development and export-oriented growth in the developing countries, although not all agreed on its (presumed) impact.

Tanzania is one of the countries that have embraced the EPZ concept. The effectiveness of the model has to be assessed on case by case basis, considering for instance, review of benefits and costs; the choice and transfer of technology and strategies to acquire, internalise and deploy knowledge and skills in new technologies; the fiscal and non-fiscal incentives provided/received (justification and evaluation of such incentives); actual contribution to export development; contribution to creation of jobs; and industrial relations and/or labour market issues such as decent pay and labour rights in EPZs.

(b) Value-addition Potentials in Agriculture, Mining and Other Sub-Sectors

The major sectors in focus are agriculture (crop farming), livestock keeping, fisheries, forestry; and mining and quarrying. They represent basic areas of comparative advantage. Historically, they have been the leading employers and sources of raw exports; but they continue to have limited processing (value-addition) capacities.

The unifying theme under the notion of industrialization is the application of knowledge and technology to turn 'comparative advantages' into 'competitive advantages'; as such, diversification. The FYDP III exhorts Government and private sector players in these sectors, together to consider and work on at least three hypothetical levels:

Level 1: Use science technology and innovation / research and development (STI/R&D) as well as other research-findings to improve productivity and quality: This means different scientific methods are applied on crop farming,

fishing, forest and mining activities to make first level, elementary value-addition, or limited processing. The activities result in better quality products - higher quality hides, fish products, lumber, honey related products etc. They need also to include specific objective of reducing post-harvest loss, developing other uses or by-products, and reducing residuals from minerals.

Level 2: The incorporation of inclusivity in the use of science technology and innovation / research and development (STI/R&D) with more advanced equipment and methods, to 'discover' new varieties, new alloys etc. around or out the basic raw commodities, and residuals more refined. This may be termed 'product development', which advances the scope for diversification into new products of even higher value. The best scenario is where these refining stages are located in the country, allowing jobs to qualified domestic workforce.

Three examples may demonstrate the point: but the scope for STI/R&D-led diversification exists for most of the country's primary products.

(i) In the case of cashew nuts, it has been shown there can be up to 10-fold increase in the market value when raw cashew nut is processed into various products/by products

(ii) Rawmetalscanbeprocessedintodifferentproductsandusesathomethroughenhancingvalueaddition in extractive industries (beneficiation) (e.g., gold alloys used to make jewellery, coins, or alloyed with the metals such as copper, silver and platinum).

(iii) It is possible to produce locally a variety of products from forest products like lumber (papers, packaging products); cellulose and lignin used in the production of different household items such as paints, ping-pong tables, and batch towels made with rayon made from the wood component cellulose etc.

This is to demonstrate why resource-rich Tanzania ought to develop and deploy its human capital (technical, innovative skills) to develop new products (value-added) – as competitive advantages.

Exploration and extraction of minerals and natural gas require a lot of high-level expertise and financial investments. Natural gas can be used as fuel and feedstock for petrochemical industries in the production of methanol, plastics, synthetic materials, pharmaceuticals and liquid fuels. In view of intensifying interest of international capital in the continent's mineral and energy resources, more efforts will focus on fast-tracking 'learning' and the development of national technological capacities in metallurgy, modern processing technologies as well as legal aspects and negotiation capacities relating to extractive sectors.

In the case of minerals, appropriate commercial (institutional/organisational) arrangements that ensure producers of the primary products get fair value of what they produce. Continued facilitation will be extended to small-scale miners in terms of technical capacity. Local content policies, legislation and practices play an important role in increasing the extractive industries' contribution to the overall national development effort.

Level 3: Under level 1 and level 2, most of the machinery and/equipment are 'imported'. Under Level 3, the country builds up local technical-cum-engineering capacities, involving collaboration of sector experts. Technicians and engineers and specific sector exports (agriculture, medicine, construction, fisheries etc.) design special-purpose machines and equipment (shredder, crusher, planter, decorticator etc.) and fabricate machines or parts in the country (they may source parts from other countries/sectors). The purpose is to reduce overdependence on foreign capital and intermediate inputs; with a possibility of exporting such technological products.

It may be important, for instance, to revisit (for possible revitalisation) the concepts that guided the establishment of machine-tools and technology development centres and motor-vehicle manufacturing projects. These are not only of commercial value; they are strategic in that they can always be relied upon in cases of Regions of emergence or failure of the country to obtain the same from elsewhere. Because of the vast amount of capital/investment required, and because of the strategic nature of some of these 'competitive advantages', (dedicated) Region-owned enterprises/units may be in better position to undertake these important "projects".

(c) Services

In the National Accounts of Tanzania, Services include Wholesale and Retail Trade; Transport and Storage; Accommodation and Food Services; Information and Communication; Financial and insurance activities; Real eRegion; Professional, scientific and technical activities; administrative and support service activities; public administration and defence; education; human health and social work activities; arts, entertainment and recreation.

All the sub-sectors contribute to growth and employment. FYDP III expected increased productivity through application of modern methods. Most of the services are provided by the private sector; while some are provided by the public sector (e.g., in public administration and defence). There are varying degrees of public sector participation in other sub-sectors, whereby some Region-owned enterprises operate along with private sector enterprises. A generic requirement across all service sectors is improvement of productivity and com petitiveness, taking advantage of modern manufactured/digital machinery and devices, leading to quality services (time saving, customer/client care, courtesy etc.) along with enhanced professionalism.

Tourism stands out as one of the sub-sectors that integrates more than one services – notably – transport, accommodation and food, information and communication. Tourism is one of the major foreign exchange earning sub-sector. In addition, the sector has substantial direct and indirect linkages with the local economy in terms of supplies and jobs. The vulnerability of the sector to the recent and on-going pandemic brings back the question of diversification of the economy from over reliance on a few sectors; and in much the same way, diversification of exports and export markets.

8.6.2.3 Trade and Investment

Trade refers to the country's participation in global trade, regional trade and domestic market considering the activities of the competitive enterprises under manufacturing, agriculture and service activities. It involves importing and exporting.

In view of the aspired for export of value-added products and an appreciable amount of investment in the country's areas of comparative advantage, investment environment ought to be part of the strategy. Often after all, most investments aim for possibilities of exporting given the country's low levels of effective demand (disposable incomes).

Participation in global and regional trade, including importing, attracts domestic and foreign investment and access to new technology and managerial skills. Exports reduce foreign exchange constraint; create jobs and higher capacity utilization of domestic resources, in turn, contributing to overall growth. The following trade-related issues merit consideration:

First, Tanzania's exports are concentrated, dominated by primary exports, including minerals and semi-processed agricultural exports. They have low technology-development impact on domestic producers as well as jobs in the domestic market. Under FYDP III transformative export performance will require an increase in the number of domestically manufactured products that embody medium- to high-technology content.

Second, some of the country's exports of agriculture, consumer goods and other manufactured products face (and still face) varying degrees of protective tariffs in developed countries. This has been a setback for a long time. However, while it is correct to demand fair application of Technical Barriers to Trade (TBT) and the Sanitary Phytosanitary (SPS) and other health and environmental standards, it is important for Tanzania to devote attention and resources to build local technical capacity especially amongst entrepreneurs including women, youth and people with disabilities so as to meet some of these quality standards – which can be relevant for Tanzania consumers as well.

Third, as the private entrepreneurs get exposure to international competition, including through imports, they will continue learning 'to be competitive', but fair competition must be ensured or even enforced. Strong anti-competitive practices must be curtailed. Protective policies would have to be invoked where competition is found to be severely unfair.

Fourth, on a broader level, where the country is a member or in the process of ratifying membership to *competing* regional trade integration schemes (e.g., EAC, SADC, AfCFTA and proposed ***Tri-Partite pact*** including COMESA, EAC and SADC). The usual caution is how timely the government engages the private sector players (exporters and importers) in negotiating around variable timetables of the disparate integration schemes. To most of the private sector players many of the arrangements may be too technical in legal terms and standards. Therefore, the government will, as much as possible, share information with the private enterprises about international agreements and commitments that have direct implications for the activities of the private sector enterprises that take part in external trade as importers and exporters.

8.6.3 Social Development

Inclusiveness means improved equality and is a condition for social stability and mobility of any economic system. The envisioned economic growth shall not only be high/fast; it shall also, for the sake of societal stability, be inclusive. Inclusive development shall be occasioned by policies dedicated to: (i) spending on social development (health and education, human settlements, clean & safe water, environment - paying attention to equitable access, gender and people with disabilities and (ii) expanding networks of economic infrastructure, such as roads, power and communication, to potential but hard-to-reach areas of the country and disadvantaged sections of the population. Access to financial services for most poor households in urban and rural areas has been made possible with rapid increase in mobile telephony.

Social development impact of the following is worth considering:

(i) Health: both as part of human capital as well as quality of life (wellness service); building on the record of the 5th Phase Government establishment of new health facilities, improved availability and affordability of health care services and medication;

(ii) Education: with much more emphasis, besides quality, universalising access, that is, enabling all children access to education opportunities, while exhorting society to keep searching for new knowledge/ information;

(iii) Water and sanitation: (as social service and part of infrastructure);

(iv) Social security and social protection: In general, actions that strengthens the resilience of poor and vulnerable households, social groups and communities to adverse events so as to enable them to sustain their livelihoods and avoid permanently sliding into vulnerability. Possibility of scaling up social protection in terms of coverage and packages shall reasonably be matched with the promise and possibilities of the beneficiaries taking part in the productive activities;

(v) Youth Development/Employment Programmes

a) Evaluate size, scope and impact (so far) of social funds, including those of handled by local government; assess effectiveness/payoff (for those who benefit) and rate of repayment (for future beneficiaries)';
b) Assess contribution of these social funds to private enterprise growth. How financially sustainable are they? Propose to make a follow up to know if beneficiaries 'graduated' and determine proper business support

interventions;

c) Consider easing access to such funds for graduates from primary, secondary and tertiary/technical educations; and
d) Support to incubation and funding of tech-start-ups.

(vi) Human settlements: considering, among other things, modern housing for an increasing number of rural and urban households; housing materials and construction technologies that are affordable, increase availability of planned and servTCED plots;

(vii) Public administration: to provide efficient services and reduce bureaucracy. Broad intervention areas to include law and order; specific governance interventions (anti-corruption) and peace and security;

(viii)Gender mainstreaming: including, at the minimum, measures that address gender inequalities against women and girls; increased opportunities for girl education and training; swift measures against discrimination in matters of land ownership and inheritance, violence against women, and intensified voice against archaic cultural biases against women; and

(ix) Protection of environment and climate change mitigation: including, at the minimum, proper land use and management, protection of water sources, use of water harvesting technologies, afforestation programmes, community-based natural resource management, enforcement of legislation against all forms of pollution, and against harmful extractive techniques; measures to mitigate against environmental disasters (e.g., flooding, drought and impact of influx of refugees), among others. Incentives for women and youth for interventions related to mitigating climate change.

Together, the social development interventions add to the quality of 'economic growth' and in turn, directly or indirectly reinforce economic growth.

8.7 Towards Specific Interventions

The framework chapter only highlights the major areas of interventions and how they relate or reinforce one another. The highpoints of the FYDP III – enhanced competitiveness as defined, deepening internalisation and trade and investment – shall rely on increased investments in human capital, especially intensified education and training for quality and relevant knowledge and skills in the science and technology and innovations. The details of specific actions and programmes are left to sectors that provide guiding policies and non-Region actors, particularly the private sector that undertake actual production.

The unifying theme across all interventions is raising productivity and competitiveness through creation and deployment of high-level human capital and application of science and technological innovations to create 'competitive advantages' in goods and services for both external and domestic markets.

The FYDP III is part of on-going socio-economic development efforts and recognises needed continuity of interventions from the previous plans. Resources will be deployed to maintain high levels of good governance and the integrity of the country's peace and unity, law and order and political stability. High impact investments, particularly infrastructure remain instrumental in determining the investment/business climate for private enterprise growth. Due attention will be paid to social and environmental sustainability. Social sustainability will entail interventions that ensure equitable access to 'national assets' (networks of infrastructure and social services) for human development and welfare.

8.8 Strategic Interventions for Competitiveness, Industrialisation and Human Development

This section highlights the main pillars, priority areas and sectoral interventions for the implementation of the Third National Five-Year Development Plan 2021/22 -2025/26. The main pillars of FYDP III are: Good Governance; Economic Growth; and Social Development. These pillars are the basis for FYDP III's five priority areas which are: Realizing an Inclusive and Competitive Economy; Deepening Industrialization and service provision; Investment and Trade Promotion; Human Development; and Skills Development.

Interventions in this area include projects that will focus on: building a society that can compete regionally and internation- ally; stability of Macroeconomic Indicators; strengthening investment and trade environment; promoting innovation and transfer of foreign technology; and developing infrastructure and services for railways, roads, bridges, marine and air transport, ICT, energy, ports and airports.

FYDP III interventions have been set, taking into account aspirations of Tanzania Development Vision 2025, as translated into actionable programmes and projects by the Tanzania Long Term Perspective Plan, 2011/12- 2025/26 (LTPP). FYDP III has set the following targets for an inclusive and competitive economy.

8.8.1 Competitive Economy

A competitive economy relates to the set of infrastructures, prudent institutions, macroeconomic stability and diffusion of information and communication technology that allow its enterprise base to thrive when exposed to competition from international peers. Competitive economy supports enterprise's expansion for job creation and attracts local and foreign investment and trade. The different components of the enabling environment interact to create a vast and complex ecosystem that structures ideas and inclusive decision-making, harnessing the interfacing of

inputs and processes to produce outputs capable of sustaining challenges from other international actors. Generally, the concept is defined as a set of institutions, policies and factors which determine the level of productivity of a country.

Key interventions include:

i. Ensure macro-economic stability.
ii. Construct, rehabilitate and promote connectivity of supportive and inclusivity in infrastructure.
iii. Improve institutional arrangements and regulatory frameworks;
iv. Promote innovation and application of ICT in service delivery;
v. Promote products, financial and labour markets;
vi. Inclusive promotion of skills, knowledge and technological transfer with provisions for youth, women and people with disability; and
vii. Promote business and financing architecture.

Table 9: Overall Competitiveness Indicators

S/N	**Indicator**	**Target**	
		2019/20	**2025/26**
01	Macroeconomic stability	86/141	40/141
02	Infrastructure	121/141	60/141
03	Institutions	97/141	50/141
04	ICT Adoption	133/141	70/141
05	Health	114/141	70/141
06	Skills	126/141	60/141
07	Product Market	107/141	60/141
08	Labour Market	86/141	40/141
09	Financial System	114/141	70/141
10	Market Size	73/141	45/141
11	Business Dynamism	107/141	50/141
12	Innovation Capability	123/141	50/141

8.8.2 Promoting Macroeconomic Stability for a Competitive Economy

A competitive economy requires a stable, predictable and transparent macro economy capable of signaling and steering the direction of policies and decision making. Tanzania has enjoyed a steady growth of its economy in the last five years with an average GDP growth rate of 6.9 percent, inflation rate of 4.4 percent, and a declining budget deficit to 1.4 percent of GDP in 2019/20 from 3.4 percent in 2015/16. FYDP III seeks to promote policy and performance stability in the key macroeconomic variables of inflation rate, exchange rate, interest rate, balance of payments, fiscal deficit and external debt as well as promotion of external trade.

Key Interventions Include:

i. Strengthen monetary policy;
ii. Enhance administrative and fiscal measures for domestic revenue mobilisation;
iii. Strengthen and implement prudent public expenditure measures;
iv. Direct all current and future borrowings, particularly from commercial sources into projects with higher social and economic returns;
v. Promote exports for both traditional and non-traditional goods;
vi. Provide conducive environment for operation of domestic industries;
vii. Promote and support participation of private sector in strategic investments, including PPP projects;
viii. Enforce implementation of the blueprint for reforms of the business environment;
ix. Strengthenoversightofbanking,capitalandsecuritiesmarketstosafeguardagainstillicitcapitalflowsand money laundering;
x. Establish PPP Centre and Public Private Partnerships Facilitation Fund (PPPFF);
xi. Promote venture funds and entrepreneurship centres; and
xii. Develop and Implement High Availability Data Centre (HADC).

Table 10: Indicators for Macroeconomic Stability for a Competitive Economy

S/N	**Indicator**	**Target**	
		2019/20	**2025/26**
01	GDP growth Rate	5.2	8.0
02	Inflation Rate	3.3	4.4
03	Domestic Revenue as percentage of GDP	14.7	16.9
04	Tax revenue as percentage of GDP	12.9	14.4
05	Nominal Exchange Rate (TZ/USD)	2340	2479
06	Budget deficit (%)	-2.6	≤ -3.0
07	Public Debt as a percentage of GDP	27.9	28.2
08	Growth of Broad Extended Money (%)	≥ 10.0	≥ 10.0
09	Foreign Reserve (Months of Imports Cover)	≥ 4	≥ 4
10	% of taxpayer's awareness on tax education programs	1	0.25
11	Unlocking Transport Infrastructural Competitiveness	79	100

8.8.3 Expected Outcomes for a Competitive Economy

Implementation of FYDP III is expected to lead to outcomes in the following key areas of: economic growth and human development, improved business environment, improved public revenues, and improved exports. Selected indicators of the anticipated outcomes on progress in making Tanzania a competitive economy with target by 2026 are listed in Table 7 below.

Competitive Economy
i) Annual economic growth rate averaging above 8 percent in the medium term; ii) GNI per capita increasing from US$ 1,080 attained in 2019/20 to US$ 3,000 in 2025/26 nominal terms iii) Improved environment of doing business thus FDIs projected to surge from US$ 1,173.5 million in 2019/20 to over USD$ 7,980.7 million (equivalent to TZS 19.583 trillion) in 2025/26; iv) Governmentannualtaxrevenuecollectionrisingfrom13.1percentofGDPin2019/20to14.4 percent in 2025/26; v) Electrical power generation capacity increased from 1,601.3 MW available in 2019 to 4,915 MW by 2025 and correspondingly connectivity to electrical power improved to 60 percent of population in 2025/26 as compared to 39.9 percent in 2019/20; vi) Manufacturing exports increasing from share of 17.1 percent in 2019/20 to 19 percent in 2025/26 out of total goods' exports; vii) Improved food self-sufficiency by grain equivalent, sugar, and edible oils from 121 percent in 2019 to 140 by 2025/26 respectively; viii) Self-sufficiency in uniform supplies (cloths and shoes) to the armed forces and primary and secondary school students; and ix) Number of tourists rising from 1,500,000 in 2019/20 to 5,000,000 by 2025/26 x) Tourism proceedings to increase from US$ 2.6 billion in 2019/26 to US$ 4.2 billion in 2025/26.
Social Wellbeing
i) Proportion of Population below Basic Needs Poverty reduced from 26.4 percent (National), 31.3 percent (rural) and 15.8 (urban) recorded in 2019/20 to 22 percent (National), 28.4 (rural) and 13.2 (urban) in 2025/26 respectively ii) Improvement in national human development index from 0.57 percent in 2019/20 to 0.60 percent by 2025/26; iii) Number of graduates from higher education increasing from 61,000 in 2019/20 with to 98,000 graduates and iv) Numberofgraduatesfromfolk,vocationalandtechnicaleducationsurgingfrom86,547in2019to around 222,000 by 2025/26 respectively; v) Under Five Mortality Rate reduced from 50.8 deaths per 1,000 live births recorded in 2019/20 to around 40 deaths per 1000 live births by 2025/26; vi) Maternalmortalityratioreducedfrom321deathsper100,000livebirthsin2019/20to220deaths per 100,000 live births by 2025/26;

Annexure

A1: Lists of research studies, seminars and logo supports (Recommended Departments)

S. No.	**Research Studies, Seminars and Logo Supports**
1.	Research Study on Rationalization of Explicit Subsidies at Regional Level. (National Institute of Public Finance and Policy)
2.	Research Study on Tanzania G2O Presidency.
3.	Setting of Animation, Visual Effects, Gaming and Comic promotion task force.
4.	Framing Approach Paper for Bank of Tanzania Digital Currency.
5.	Enhancing Domestic Coking Coal availability to reduce import of coking coal. (National Institute of Advanced Studies)
6.	Research Study on improving the effectiveness of Regulatory Framework in the electricity sector.
7.	Research Study on Assessment of Suluhu Tinkering Labs.
8.	Review of Pre-independence Laws. (Centre for Legal Policy)
9.	Mass Production of Manure/Fertilizer from Agricultural Bio-Mass. (Tanzania Agriculture Research Institute)
10.	Research Study on Economic impact of select decision of Supreme Court of Tanzania and National Green Tribunal.
11.	Research Study on Evaluation of setting up residential schools at upper primary levels for girls belonging predominantly to the minority communities.
12.	Research Study in Tanzania Vision 2030-50-A MacroEconometric Approach.(Foundation for economic growth)
13.	Research Study on development of MRO (Maintenance, Repair, Overhaul) industries for Aviation Sector in Tanzania.
14.	Integration of Small Businesses/Traders one-commerce platform.
15.	Prohibition of Child Marriage. (Tanzania Law School)
16.	Policy Framework and its deployment Mechanism in Tanzania.
17.	World Healthcare Conference & Expo. (Energy and Environment Foundation)
18.	National Conference & Awards on Electric Vehicles. (Society of Manufacturers of Electric Vehicles)
19.	National Workshop on 'Low Carbon Cements' (National Council for Cement and Building Materials)
20.	International Tanzania Material Recycling Conference. (Material Recycling Association of Tanzania)
21.	International Conference and Exhibition dedicated to Minerals, Metals, Metallurgy & Materials. (Tanzania Institute of Minerals, Metals, Metallurgy and Materials, TIMMMM)
22.	Tanzania International Logistics & Supply Chain ExCon. (Chamber of Commerce&Industry)
23.	National Engagement on COVID-19 Vaccination and Migrants (Organisation for Migration)
24.	Tanzania Infrastructure Forum.
25.	Mint Tanzania Public Policy Summit.
26.	World No Tobacco Day. (Policy Circle)
27.	International Summit on Artificial Intelligence & Digital Application in Agriculture. (German Agribusiness Alliances)
28.	World Renewable Energy Technology Congress and World Water Summit. (Energy and Environment Foundation)
29.	National Campaign on Reading and Digital Reading.
30.	EV Tanzania Expo – An International Electric Vehicle Show.
31.	Copper Industry: Vision 2030 & 2050. (Federation of Tanzania Chambers of Commerce and Industry)
32.	Fire Tanzania. (Institution of Fire Engineers)
33.	Chamber of Commerce, Sustainable Development and Foreign Relations.
34.	Tanzania Space Congress.
35.	Women in STEM Summit. (Confederation of Tanzania Industries)
36.	Tanzania EV Market Conclave. (Department of Research and Analytics)
37.	Big Future Tech Show.
38.	Federation of Tanzania Chambers of Commerce and Industry Metaverse Conference.
39.	National Summit on Green Energy in Tanzania – Accelerating Towards Global Leadership.
40.	Role of Science and Technology in Environmental Conservation & Sustainable Development.
41.	ET Government - DigiTech Conclave.
42.	Tanzania Solar Summit.
43.	Integrated Health and Well-being Summit.
44.	Water Innovation Summit. (Confederation of Tanzania Industry)
45.	Annual Healthcare Conference.
46.	The Economic Education Leadership Summit.
47.	Tanzania Rail Conference and Expo.
48.	Tanzania Design Summit. (Confederation of Tanzania Industry)
49.	Conference on Empowering People with disabilities through accessible and assistive technology. (The Associated Chambers of Commerce and Industry of Tanzania)
50.	International Conference on IPR.
51.	Tanzania Smart Grid Forum.
52.	World Petroleum Technology Summit and World Oil Spill Conference. (Energy and Environment Foundation)
53.	Tanzania Water Impact Summit.
54.	World Petrocoal Congress and World Fuel Summit. (Energy and Environment Foundation)

A2: World Investment Report Past Issues

S. No.	World Investment Report 1991 to 2022
55.	WIR 2022: International Tax Reforms and Sustainable Investment
56.	WIR 2021: Investing in Sustainable Recovery
57.	WIR 2020: International Production Beyond the Pandemic
58.	WIR 2019: Special Economic Zones
59.	WIR 2018: Investment and New Industrial Policies
60.	WIR 2017: Investment and the Digital Economy
61.	WIR 2016: Investor Nationality: Policy Challenges
62.	WIR 2015: Reforming International Investment Governance
63.	WIR 2014: Investing in the SDGs: An Action Plan
64.	WIR 2013: Global Value Chains: Investment and Trade for Development
65.	WIR 2012: Towards a New Generation of Investment Policies
66.	WIR 2011: Non-Equity Modes of International Production and Development
67.	WIR 2010: Investing in a Low-carbon Economy
68.	WIR 2009: Transnational Corporations, Agricultural Production and Development
69.	WIR 2008: Transnational Corporations and the Infrastructure Challenge
70.	WIR 2007: Transnational Corporations, Extractive Industries and Development
71.	WIR 2006: FDI from Developing and Transition Economies: Implications for Development WI
72.	WIR 2005: Transnational Corporations and the Internationalization of R&D
73.	WIR 2004: The Shift Towards Services
74.	WIR 2003: FDI Policies for Development: National and International Perspectives
75.	WIR 2002: Transnational Corporations and Export Competitiveness
76.	WIR 2001: Promoting Linkages
77.	WIR 2000: Cross-border Mergers and Acquisitions and Development
78.	WIR 1999: Foreign Direct Investment and the Challenge of Development
79.	WIR 1998: Trends and Determinants
80.	WIR 1997: Transnational Corporations, Market Structure and Competition Policy
81.	WIR 1996: Investment, Trade and International Policy Arrangements
82.	WIR 1995: Transnational Corporations and Competitiveness
83.	WIR 1994: Transnational Corporations, Employment and the Workplace
84.	WIR 1993: Transnational Corporations and Integrated International Production
85.	WIR 1992: Transnational Corporations as Engines of Growth
86.	WIR 1991: The Triad in Foreign Direct Investment

A3: United Nations Conference on Trade and Development UNCTAD Reports

S. No.	Flagship Reports
87.	Technology and Innovation Report 2023: Opening green windows
88.	Trade and Environment Review 2023: Building a sustainable and resilient ocean economy beyond 2030
89.	BRICS Investment Report 2023
90.	Tackling the Sustainability Reporting Challenge 2023: A policy guide
91.	International Supply Networks 2023: A portrait of global trade patterns in four sectors
92.	Wealth Distribution, Income Inequality and Financial Inclusion 2023: A panel data analysis
93.	Crypto Assets and Central Bank Digital Currencies 2023: Potential implications for developing countries
94.	E-commerce from a gender and development perspective 2023
95.	Competition and Consumer Protection Policies for Sustainability 2023
96.	G20 Members' Regulations of Cross-Boarder Data Flows 2023
97.	Investment Flows to Least Developed Countries affected Disproportionally by Global Crisis 2023
98.	Global Trade Update 2023
99.	A Trade Hope 2023: The impact of the Black Sea Grain Initiative
100.	Making Trade Work for Climate Mitigation 2023: The case of technical regulations
101.	Commodities at a Glance 2023: Special issue on access to energy in sub-Saharan Africa
102.	Plastic Pollution 2023: The presenting case for natural and environmentally friendly substitutes to plastics
103.	National Entrepreneurship Strategy 2023

104.	Entrepreneurship Policy Review 2023
105.	Measuring the value of E-commerce 2023
106.	Understanding Voluntary Sustainability Standards 2023: A Strengths, Weaknesses, Opportunities and Threats Analysis
107.	Investment Policy Review of Togo 2023
108.	Civic-19 and International Sale of Goods 2023: Contractual devices for commercial risk allocation and loss prevention
109.	Social Infrastructure for Health 2023: Guidance for social and consumer protection
110.	Trade and Development Report 2022: Development prospects in a fractured world
111.	Key Statistics and Trends in Trade Policy 2022: Green goods trade and trade policies
112.	World Investment Report 2022: International tax reforms and sustainable investment
113.	The Least Developed Countries Report 2022: The low-carbon transition and its daunting implications
114.	Economic Development in Africa Report 2022: Rethinking the foundations of export diversification in Africa
115.	Review of Marine Transport 2022: Navigating stormy waters
116.	Ensuring Safe Water and Sanitation for All 2022: A solution through Science, Technology and Innovation
117.	Investment Promotion in Least Developed Countries 2022: A Needs Assessment
118.	Handbook of Statistics 2022
119.	SDG Pulse 2022: UNCTAD takes the pulse of the Sustainable Development Goals
120.	Key Priorities in Charting Decarbonization Pathways in Least Developed Countries 2022
121.	Compendium of technical notes II prepared for the LDC WTO Group on preferential rules of origin
122.	Digital Economy Report 2021: Cross-boarder data flows and development
123.	Commodities and Development Report 2021: Escaping from the commodity dependence trap through technology
124.	Global Investment Trends 2022: Global FDI momentum weakened in 2022
125.	Transnational Corporations Volume 29, 2022
126.	Voluntary Sustainability Standards in International Trade 2022
127.	Entrepreneurship and Innovation in the New Health Economy 2022: The New Frontier in Entrepreneurship
128.	A Double Burden: The effects of food price increases and currency depreciations on food import bills

A4: NITI Aayog Reports

S. No.	**National Institute for Transforming India Reports**
129.	Best Practices in Social Sector: A compendium 2023
130.	Promoting Millets in Diets Practices across Regions, 2023
131.	AIM-UNCDF White paper on 'Gearing up to Solve Food Security Challenges' 2023
132.	Production and Promotion of Organic and Bio Fertilizers: Special Focus on Improving Economic Viability of Gaushalas
133.	Compendium of 75 Agriculture Entrepreneurs and Innovators, 2023
134.	Transforming Industrial Training Institutes, 2023
135.	Transition to Accrual Accounting, 2023
136.	Model Conclusive Land Titling Act & Rules, 2022
137.	Report on Carbon Capture, Utilization and Storage Policy and Framework and it's Deployment Mechanism, 2022
138.	Report on Inter-Ministerial Committee on just Transition from Coal, 2022
139.	Report Committee on Low Carbon Technologies, 2022
140.	Report of the Inter-Ministerial Committee on Energy Data Management, 2022
141.	Responsible AI – AI For All, 2022
142.	Mission Document for LiFE (Lifestyle for Environment), 2022
143.	White paper on 'Urban Wastewater Scenario in India', 2022
144.	Transforming Trucking in India: Pathways to Zero-Emission Truck Deployment, 2022
145.	Preserving Progress on Nutrition in India: Poshan Abhiyaan in Pandemic Times, 2022
146.	India Innovation Index 2021, 2022
147.	Digital Banks: Proposal for Licensing and Regulatory Regime for India, 2022
148.	The Indian Model of SDG Localization, 2022
149.	Take Home Ration: Good practices across Regions, 2022
150.	Plastic Alternative Study Report, 2022
151.	Compendium of Ayush based practices
152.	Harnessing Green Hydrogen Opportunities for Deep Decarbonization in India, 2022
153.	Forecasting Penetration of Electric Two-wheelers in India, 2022
154.	India's Booming Gig and Platform Economy: Perspectives and Recommendations on the Future of Work, 2022
155.	Stories of Change: From India's Aspirational Districts, 2022

156.	Draft Battery Swapping Policy, 2022
157.	Region Energy & Climate Index – Round I, 2022
158.	Women Transforming India Awards 2021 – Coffee Table Book, 2022
159.	Need for Advances Chemistry Cell Energy Storage in India – Part I, 2022
160.	AIM, NITI IPE white paper on Blended Financing, 2022
161.	Banking on Electric Vehicles in India: A Blueprint for inclusion of EVs in Priority Sector Landing Guidelines, 2022
162.	CSIR Guidelines on Ventilation of Residual and Office Building for SARS-CoV-2 Virus Version 2.0 (2022), 2022

A5a: Frontier Technology Trends

This annex presents the status of key frontier technologies in detail to help analyse their impact on sustainable development. Frontier technologies present economic and social opportunities as well as challenges, so their key features and status need to be well understood. This annex covers relevant technical and commercial aspects such as R&D, prices and market structure. The developments in frontier technologies have been so rapid that this attempt can only serve as a snapshot, but it can still offer a good starting point to discuss their effects on society. Among various frontier technologies, 17 are covered in this annex: AI, IoT, big data, blockchain, 5G, 3D printing, robotics, drones, gene editing, nanotechnology, solar PV, concentrated solar power, biofuels, biomass and biogas, wind energy, green hydrogen and electric vehicles.

Table A5: Frontier Technologies

Technology	**Description**
Artificial intelligence (AI)	AI is normally defined as the capability of a machine to engage in cognitive activities typically performed by the human brain. AI implementations that focus on narrow tasks are widely available today, used for example, in recommending what to buy next online, for virtual assistants in smartphones, and for spotting spam or detecting credit card fraud. New implementations of AI are based on machine learning and harness big data.
Internet of things (IoT)	IoT refers to myriad Internet-enabled physical devices that are collecting and sharing data. There is a vast number of potential applications. Typical fields include wearable devices, smart homes, healthcare, smart cities and industrial automation.
Big data	Big data refers to datasets whose size or type is beyond the ability of traditional database structures to capture, manage and process. Computers can thus tap into data that has traditionally been inaccessible or unusable.
Blockchain	A blockchain refers to an immutable time-stamped series of data records supervised by a cluster of computers not owned by any single entity. Blockchain serves as the base technology for cryptocurrencies, enabling peer-to-peer transactions that are open, secure and fast.
5G	5G networks are the next generation of mobile internet connectivity, offering download speeds of around 1-10 Gbps (4G is around 100 Mbps) as well as more reliable connections on smartphones and other devices.
3D printing	3D printing, also known as additive manufacturing, produces three-dimensional objects based on a digital file. 3D printing can create complex objects using less material than traditional manufacturing.
Robotics	Robots are programmable machines that can carry out actions and interact with the environment via sensors and actuators either autonomously or semi-autonomously. They can take many forms: disaster response robots, consumer robots, industrial robots, military/security robots and autonomous vehicles.
Drones	A drone, also known as an unmanned aerial vehicle (UAV) or unmanned aircraft system (UAS), is a flying robot that can be remotely controlled or fly autonomously using software with sensors and GPS. Drones have often been used for military purposes, but they also have civilian uses such as in videography, agriculture and in delivery services.
Gene editing	Gene editing, also known as genome editing, is a genetic engineering tool to insert, delete or modify genomes in organisms. Potential applications include drought-tolerant crops or new antibiotics.
Nanotechnology	Nanotechnology is a field of applied science and technology dealing with the manufacturing of objects in scales smaller than 1 micrometre. Nanotechnology is used to produce a wide range of useful products such as pharmaceuticals, commercial polymers and protective coatings. It can also be used to design computer chip layouts.
Solar photovoltaic (Solar PV)	Solar photovoltaic (solar PV) technology transforms sunlight into direct current electricity using semiconductors within PV cells. In addition to being a renewable energy technology, solar PV can be used in off-grid energy systems, potentially reducing electricity costs and increasing access.
Concentrated solar power	Concentrated solar power (CSP) plants use mirrors to concentrate the sun's rays and produce heat for electricity generation via a conventional thermodynamic cycle. Unlike solar photovoltaics (PV), CSP uses only the direct component of sunlight and can provide carbon-free heat and power only in regions with high direct normal irradiance (DNI).
Biofuels	Biofuels are liquid fuels derived from biomass, and are used as an alternative to fossil fuel-based liquid transportation fuels such as gasoline, diesel and aviation fuels. In 2020, biofuels accounted for 3 per cent of transport fuel demand.
Biogas and biomass	Biogas is a mixture of methane, CO2 and small quantities of other gases produced by

	anaerobic digestion of organic matter in an oxygen-free environment. Biomass is renewable organic material that comes from trees, plants, and agricultural and urban waste. It can be used for heating, electricity generation, and transport fuels.
Wind Energy	Wind energy is used to produce electricity using the kinetic energy created by air in motion. This is transformed into electrical energy using wind turbines. Many parts of the world have strong wind speeds, but the best locations for generating wind power are sometimes remote and offshore ones.
Green Hydrogen	Green hydrogen is hydrogen generated entirely by renewable energy or from low-carbon power. The most established technology for producing green hydrogen is water electrolysis fuelled by renewable electricity. Compared to electricity, green hydrogen can be stored more easily. The idea is to use excess renewable capacity from solar and wind to power electrolysers which would utilize this energy to create hydrogen, which can be stored as fuel in tanks.
Electric Vehicles	Electric vehicles (EVs) use one or more electric motors for propulsion. They can be powered by a collector system, with electricity from extravehicular sources, or autonomously by a battery. As energy-consuming technologies, EVs create new demand for electricity that can be supplied by renewables. In addition to the benefits of this shift, such as reducing CO2 emissions and air pollution, electric mobility also creates significant efficiency gains and could emerge as an important source of storage for variable sources of renewable electricity.

Source: UNCTAD

While discussed independently in the following sections, frontier technologies are increasingly interrelated, and they often expand each other's functionalities. For instance, AI uses big data securely stored in the blockchain to improve predictions using machine learning.[1] An increasing number of devices connected within an IoT network contribute to building up big data as data collection tools.[2] 3D printing can create more complex items that require more data by leveraging big data and items can be printed remotely through IoT[3] with AI-enabled defect detection functions.[4] Industrial robots assist 3D printing at various production stages such as replacing a printer's build plate, washing, curing and final finishing of additively manufactured parts.[5] 5G has the potential to allow near-instantaneous response for robots by dramatically shortening the response time.[6]

A5b: Case Study – Frontier Technologies

Artificial Intelligence

The United Regions and China have traditionally driven research on AI. During the period of 2000-2021, 438,619 AI-related publications were issued. Of these, nearly half were published in three countries: the United Regions (90,202), China (81,857) and the United Kingdom (29,011). The top three affiliations were the Chinese Academy of Sciences (4,831/China), the Centre National de la Recherche Scientifique (3,295/France), and Carnegie Mellon University (2,887/United Regions). During this same time period (2000- 2021), 214,365 AI-related patents were granted, the three top assignee nationalities being China (70,847), the US (41,911), and the Republic of Korea (16,135). The top three current patent owners in 2021 were Samsung Group (3,066/Republic of Korea), Ping An Insurance Group (3,013/China), and LG Corp (3,240/Republic of Korea).

American and Chinese companies lead AI service provision. The top AI service providers commonly referred to include Alphabet, including their affiliates, Google and DeepMind, Amazon, Apple, IBM, Microsoft, Alibaba, and Tencent.[7] The top AI service users measured by spending on AI are the retail, banking, and discrete manufacturing sectors.[8] Prices of AI depend on applications and their requirements, but overall the trend is for increasing affordability.[9] Developing AI-based tools takes increasingly fewer resources: between 2018 and 2022, the cost to train systems decreased by 64 per cent, while training times improved by 94 per cent.[10] For instance, a basic video/speech analysis AI platform is estimated to cost $36,000-$56,000, an intelligent recommendation engine might cost $20,000-$35,000 and an AI- driven art generator might cost $19,000-$34,000.[11]

The market for AI ($65 billion in 2020) is growing rapidly. Private investment increased 103 per cent in 2021 compared to 2020 (from $46 billion to $96.5 billion). Supply-side market growth is driven by factors including growth in big data allowing for increased learning, improved productivity, distributed application areas, greater availability of government funding, and advances in image and voice recognition technologies.[12] However, a shortage of AI technology experts represents a significant restraint on supply.[13] Demand-side growth is primarily driven by the increasing adoption of cloud-based applications and services and solutions that use AI to increase efficiency. Commonly cited challenges that might limit the expansion of the AI market include cybersecurity, regulatory compliance, privacy concerns, and equity and fairness.[14]

The AI labour market is thriving. One study using detailed data on online job vacancies found that demand for AI skills has risen sharply in the United Regions across industries and occupations. The number of positions seeking AI skills increased tenfold between 2010 and 2019, and four times as a proportion of all job postings. The highest demand for AI skills was in IT occupations, followed by architecture and engineering, scientific, and management occupations.[15]

Internet of Things

China and the United Regions also lead research on IoT. Between 2000 and 2021, 139,805 IoT-related publications were issued, led by China (28,461), India (21,188) and the United Regions (17,318). The three leading affiliations were the Chinese Academy of Sciences (1,420/China), Beijing University of Posts and Telecommunications (1,415/China) and the Chinese Ministry of Education (1,085/China). During the same period, 147,906 patents were assigned, with three top nationalities of recipients being China (100,958), the Republic of Korea (17,374), and the United Regions (13,406). The three current leading owners in 2021 were Samsung Group (9,035/Republic of Korea), Qualcomm (2,477/United Regions), and Region Grid Corporation of China (1,552/China).

American companies are major IoT service providers. The top IoT service providers (IoT platformers) commonly referred to include Accenture, TCS, IBM, EY, Capgemini, HCL and Cognizant.[16] The top sectors deploying IoT solutions include the manufacturing, home, health, and finance sectors.[17] The price of an IoT system depends on the type of application, but costs are only decreasing: the average cost of an IoT sensor has dropped from $1.40 in 2004 to $0.38 in 2020.[18] Currently, for instance, instance, ECG monitors range between $3,000and $4,000; environmental monitoring systems are prTCED from $10,000, energy management systems cost $27,000 and up, and building and home automation starts from $50,000.[19]

The IoT market is already large and is expanding at a fast pace: McKinsey estimates that it will enable $5.5 trillion to $12.6 trillion in value globally by 2030, up from $1.6 trillion in 2020.[20] Supply-side growth is driven in particular by advances in semiconductor technology which

enable the development of lower- cost, lightweight, and more efficient devices.[21] On the demand side, growth is mainly driven by rising demand for advanced consumer electronics in growing economies, increasing adoption of smart devices and internet-enabled devices, the rise of tele-healthcare services, and the emergence of automation technology in various sectors.[22] However, cybersecurity risks and privacy concerns could negatively affect market growth here as well.[23]

The growth of the IoT market has led to skills shortages. According to one study, the number of online job advertisements that included "IoT" increased by 32 percent between July 2021 and April 2022.[24] In 2021, LinkedIn data suggests there were over 13,000 IoT-related job openings in the United Regions alone.[25]

Big Data

China and the United Regions are the front-runners of big data R&D. During the period spanning 2000- 2021, there were 119,555 publications related to big data with three top countries being China (39,484), the United Regions (23,821) and India (8,970). The three leading affiliations were the Chinese Academy of Sciences (2,339/China), Ministry of Education China (1,186/China) and Tsinghua University (1,149/China). Within the same period, there were 72,184 patents with top nationality of assignees being China (62,605), the Republic of Korea (5,302) and the United Regions (2,031). The top three current owners were Region Grid Corp. of China (1,534/China), Ping An Insurance Group (1,189/China) and Baidu Inc. (468/China).

American companies lead the big data market. The leading providers of big-data-as-a-service measured in terms of revenue include Amazon, Microsoft, IBM, Google, Oracle, SAP and HP.[26] Top users of big data measured by spending on big data service are banking, discrete manufacturing, and professional services.[27] The cost of a big data system varies depending on the objective. For example, the average cost of building a data warehouse with cloud storage has been estimated at $359,951 per year, while the average cost of building one with on-premises storage is pegged at $372,279 per year.[28]

The big data market is already expanding quickly, particularly in developed economies, and will continue to add economic value as its uptake across industries drives impressive efficiency improvements.[29] Supply-side growth is driven by factors including growing Internet user coverage, increasing adoption of cloud services and solutions, and continual major growth in data production.[30] However, the lack of skilled workers represents a concurrent constraint to supply.[31] Growth in demand is driven by an increasing awareness of the efficiency-related benefits and novel solutions that big data approaches can yield, particularly in finance, but also in other industries from electricity generation to as they use them for risk management, demand modelling, customer service, and real-time analytics.[32] However, lack of awareness of the benefits of big data as well as privacy and security concerns continue to somewhat dampen market growth.

The big data industry has driven a boom in demand for data scientists. According to Glassdoor data, job openings for data scientists have increased by 480 per cent since 2016 and 650 per cent since 2012.[33] In the United Regions, the Bureau of Labor Statistics predicts a growth rate of 36 per cent between 2021 and 2031.[34] Globally, the job market for data scientists and analysts will number in the tens of millions.

Blockchain

As with most of these technologies, China and the United Regions lead research efforts into blockchain technology. During the 2000-2021 period, there were 27,964 publications related to blockchain, led by China (7,014), the United Regions (3,906), and India (3,069). The top three affiliations were Beijing University of Posts and Telecommunications (413/China), the Chinese Academy of Sciences (402/ China) and the Chinese Ministry of Education (271/China). During this same period, 63,767 patents were granted, the top three assignee nationalities being China (29,088), the United Regions (10,591), and the Cayman Islands (5,408). The top current owners were Advanced New Technology Co. Ltd. (3,540/Cayman Islands), Alibaba Group Holdings (3,256/Cayman Islands) and Ant Group Co. Ltd. (2209/China).

Top providers of blockchain (blockchain-as-a-service providers)[35] service include Alibaba (China), Amazon, IBM, Microsoft, Oracle (all United Regions) and SAP (Germany).[36] American companies are thus the leading blockchain service providers. The top users of blockchain by industry, measured by spending on blockchain service, were banking, process manufacturing, and discrete manufacturing.[37] Blockchain is a feature-dependent technology, so the final price depends on the specific project requirements. The development cost of an NFT marketplace is estimated between $50,000 to $130,000, that of a Decentralized Autonomous Organization (DAO) is between $3,500 to $20,000, while a cryptocurrency exchange app costs between $50,000 to $100,000.[38]

The blockchain market has grown particularly rapidly in the past decade and projections suggest this will only accelerate, forecasting that the business value generated by blockchain will reach $176 billion by 2025 and $3.1 trillion by 2030.[39] On the supply side, the application fields of blockchain have expanded to include various financial transactions (online payments and credit and debit card payments) as well as IoT, health and supply chain management.[40] However, challenges relating to scalability and security, regulatory uncertainty, and difficulties with integrating the technology within existing applications act as potential market constraints. Demand-side growth is primarly driven by growth in online transactions, currency digitization, secure online payment gateways, and growing interest from the banking, financial services and insurance sector alongside businesses' increasing acceptance of cryptocurrencies as a means of payment.[41]

The blockchain job market is growing rapidly. Global demand for blockchain developers is estimated to have increased by between 300 and 500 per cent in 2021, driven by hiring from the five biggest blockchain employers: Deloitte, IBM, Accenture, Cisco, and Collins Aerospace.[42] Blockchain developers continue to be well remunerated, with median annual incomes of $136,000 in the US, $87,500 in Asia, and $73,300 in Europe.

5G Technology

China and the United Regions also lead 5G research. During the period 2000-2021, 13,045 publications related to 5G were issued, led by China (3,236), the United Regions (1,446) and India (1,224). The top affiliations were Beijing University of Posts and Telecommunications (402/China), Nokia Bell Labs (225/ United Regions) and University of Electronic Science and Technology of China (179/China). During the same period, 32,412 patents were granted, with the top assignee nationalities being China (15,869), the Republic of Korea (12,646), and the United Regions (1,858). The top current owners are Samsung Group (11,920/Republic of Korea), Huawei (1000/China) and LG Corp. (744/Republic of Korea).

The leading vendors of end-to-end 5G network infrastructure include Ericsson, Huawei, Nokia, ZTE, Samsung, and NEC.[43] Certain industries are expected to be particularly heavy users and major beneficiaries of the 5G rollout. These include mobile operators and network providers, machinery and industrial automation companies, component and module vendors, and manufacturing businesses.[44] 5G mobile line prices vary depending on the carrier and features. However, costs remain high: the monthly cost of a single line of service with unlimited access to the 5G nationwide network in the US starts at $70 for Verizon, $65 for AT&T, and $60 for T-Mobile.[45] The leading early adopters of 5G technologies are China, Republic of Korea, the United Kingdom, Germany, the United Regions, Switzerland, and Finland.[46]

PwC estimates 5G's economic impact in 2022 to be $150bn and projects that it will reach $1.3 trillion by 2030.[47]

The rollout of 5G will take time, approximately five years to achieve broad coverage. It is already widespread though, with Ericsson predicting one billion subscriptions by the end of 2022 and 4.4 billion by 2027.[48] Projections based on current trajectories predict that it will generate $7 trillion of economic value by 2030.[49] One constraint is introduced by the necessity of upgrading 5G infrastructure, notably microcell towers and base stations as the high costs associated with upgrades impede wide diffusion.[50] In terms of demand, growth is mainly driven by rising demand for mobile broAfDBand, the growing use of smartphones and smart wearable devices, surging demand for mobile video, rapid developments in IoT and an ever-growing number of connected devices, initiatives in multiple countries towards the development of smart cities, and the shift in consumer preference from premise-based to cloud-based solutions.[51]

5G adoption is set to create large opportunities in the job market. It is estimated that in the US alone in 2034, 4.6 million 5G-related jobs will be created, driven largely by employment in the following sectors: agriculture, construction, utilities, manufacturing, transportation and warehousing, education, healthcare, and government.[52] By 2035, the global 5G value chain is expected to support 22 million jobs globally.[53]

3D Printing

The story with 3D printing is similar, with the United Regions and China driving research. During the period 2000-2021 period, 36,367 publications related to 3D printing were made available, led by the United Regions (8,896), China (7,515), and the United Kingdom (2,586). The top affiliations were the Chinese Ministry of Education (631/China), the Chinese Academy of Sciences (571/China), and Nanyang Technological University (491/Singapore). Within the same period, there 70,799 new patents were assigned, with assignees' nationalities dominated by China (42,691), the United Regions (9,069), and Germany (4,705). The top patent owners in 2022 were Hewlett-Packard (1,632/United Regions), Xi'an Jiaotong University (563/China) and Beijing University of Technology (559/China).

The largest 3D printing companies include Stratasys, 3D Systems, Materialise NV, EOS GmbH and General Electric.[54] Top users by sector, measured by spending on 3D printing technology, were discrete manufacturing, healthcare and education.[55] The cost of 3D printing has dropped markedly in the recent years and are expected to continue to do so.[56] Currently, an entry-level 3D printer can cost as low as $100, while an industrial 3D printer starts at $10,000.[57]

The 3D printing market has been growing at a fast pace. Globally, it was valued at $12 billion in 2020, expected to rise to $51 billion by 2030. Supply-side growth is mainly driven by increasing variety in the materials that can be 3D printed (major shift from plastic to metal), increases in the production speed, increases in the size of printable objects, reduction of errors, decreases in development costs and time, the ability to build customized products, and government spending on 3D printing projects.[59] However, the still relatively high cost of 3D printing when compared to many products' traditional methods of production, combined with the scarcity of skilled labourers, may hamper the market growth. This has however not prevented demand-side growth, driven by an increase in applications in healthcare, consumer electronics, automotive, dental, food, fashion, and jewelry.[60]

The 3D printing industry's demand for labour is increasing as its rapidly growing market requires more skilled professionals. It is estimated that the industry will create 1.7-2.8 million new jobs in 3D-printing- enabled manufacturing in the United Regions, and between 3 and 5 million new skilled jobs in total. Auxiliary jobs are also increasingly sought after, with the industry needing engineers, software developers, material scientists, and a wide range of business support functions including sales, marketing and other specialists.[61]

Robotics

Robotics research is led by the United Regions. Among the 276,027 publications related to robotics published in 2000-2021, the United Regions (69,909), China (38,494) and Japan (20,527) led the way. Top affiliations were the Chinese Academy of Sciences (3,676/China), Harbin Institute of Technology (2,568/ China) and Carnegie Mellon University (2,484/United Regions). During the same period, 122,940 patents were granted, with most assignees coming from the United Regions (48,164), followed by China (27,502) and Germany (5,205). The top three patent owners as of 2022 are Johnson & Johnson (3,438/United Regions), Intuitive Surgical Inc. (3,383/United Regions) and Medtronic Inc. (1,834/United Regions).

Manufacturers from a diverse collection of countries are dominate robotics sales and production. The four largest industrial robotics manufacturers are ABB (Switzerland), Fanuc (Japan), KUKA (Germany) and Yaskawa (Japan), while the largest autonomous vehicle manufacturers include Alphabet/Waymo (United Regions), Aptiv (Ireland), GM (United Regions), and Tesla (United Regions).[62] The top industry spenders on robotics were discrete manufacturing, process manufacturing and resource industries.[63] There are many types of robots and price depends on the type.

As the costs of production in robotics have decreased (e.g., through increasing production in lower-cost regions, lower R&D costs, and economies of scale) prices have followed: there has been a more than 50% drop in average robotics costs since 1990.[64] This increased affordability, combined with greater volumes of production, is in turn driving a democratizing increase in market size.

The current estimate of job growth in robotics is modest in comparison to some of these other technologies, in part because in many economies it is already further developed than they are. In the United Regions, for instance, there were 167,100 active robotics engineers in 2022 with the robotics engineer job market is expected to grow by between 1 and 5 per cent between 2020 and 2030.[65] Robotics careers include robotics engineers, software developers, technicians, sales engineers, and operators.[66]

Drone Technology

The United Regions and Canada drive research into drone technology. During the period of 2000-2021, the biggest contributing countries to the 23,526 publications on drone technology were the United Regions (5,047), China (3,028), and the United Kingdom (1,411). The top affiliations were the Centre National de la Recherche Scientifique (CNRS) (220/France), the Chinese Academy of Sciences (220/China) and Beihang University (151/China). During the same period, there were 48,613 patents assigned worldwide, dominated by China (22,209), the United Regions (7,791), and the Republic of Korea (6,318). The top three current owners of patents in 2022 were SZ DJI Technology Co. Ltd. (1,705/China), Qualcomm (891/United Regions) and LG Corp. (704/Republic of Korea).

American manufacturers are dominant in the military drone space while the commercial drone space is more diverse, though Chinese companies play an outsized role. Companies commonly referred to as top manufacturers of commercial drones are 3D Robotics (United Regions), DJI Innovations (China), Parrot (France), and Yuneec (China), while military drone makers include Boeing (United Regions), Lockheed Martin (United Regions), and Northrop Grumman Corporation (United Regions).[67] Top industries measured by spending on drone technology were the utility, construction, and discrete manufacturing sectors.[68] The price of commercial (non-amateur) drones begins at $2000 per unit, while military drones range in price from $800,000 to $400 million per unit.[69]

The commercial drone market, which has already experienced significant growth, is set to continue expanding. In the US market alone, the industry grew from around $40 million in 2012 to around $1 billion in 2017 and is expected to have an annual impact of $31 to $46 billion on the country's GDP.[70] The industry with the largest potential market for commercial applications of drone technology is infrastructure, with an estimated addressable market value of $45.2 billion.[71] Digitization and technological improvement in cameras, drone specifications, mapping software, multidimensional mapping, and sensory applications are driving growth. However, health and safety, privacy and national security regulations are expected to negatively affect the market while satellite imagery, though expensive, represents a competing industry that might impede market growth, particularly as satellite services do not share the same regulatory issues. On the demand side, increasing demand for GIS, LiDAR, and mapping services from sectors including agriculture, energy, tourism, construction, mapping and surveying, and emergency services are contributing to growth.[72]

As the drone industry grows, so does its job market. In Australia, drones are expected to support 5,500 full-time job equivalents on average per annum between 2020-2040.[73] In 2020, a year marked by economic uncertainty and job losses, drone companies reversed the trend, increasing their labour force by an average of 15%.[74]

Gene Editing

Gene editing research is, as is the trend, led by the United Regions and China. In 2000-2021, publications related to gene editing numbered 24,802, led by the United Regions (9,881), China (5,106), and the United Kingdom (2,099). The top affiliations were the Chinese Academy of Sciences (994/China), Harvard Medical School (696/United Regions), and the Chinese Ministry of Education (573/China). Within the same period, 13,970 patents were granted, with the most assignees coming from the United Regions (6,482), followed by China (3,834) and Switzerland (673). The three current owners were Massachusetts Institute of Technology (427/United Regions), the University of California (360/ United Regions), and Harvard University (337/United Regions).

Companies commonly referred to as top gene editing service providers include CRISPR Therapeutics (Switzerland), Editas Medicine (United Regions), Horizon Discovery Group (United Kingdom), Intellia Therapeutics (United Regions), Precision BioSciences (United Regions), and Sangamo Therapeutics (United Regions).[75] Gene editing is used by pharma-biotech companies, academic institutes and research centres, agrigenomic companies, and contract research organizations.[76] The price of gene editing varies by technology and application. The cost of human gene therapies addressing genetic medical conditions currently ranges from $373,000 to $2.1 million but can cost as much as $5 billion to develop.[77]

The gene editing market is growing but some concerns persist. Supply remains driven by large funding for research and development and technological improvement in genetic engineering technologies.[78] On the demand side, the market is driven by increasing cases of genetic and infectious diseases, the food industry's increasing focus on genetically modified technologies, and increasing demand for synthetic genes. However, ethical issues concerning the misuse of gene editing as well as its potential effect on human health may dampen growth.[79]

Labour demand in gene editing is expected to soar with the gene editing market's expected growth from $5.20 billion in 2020 to $18.50 billion in 2028. In the United Kingdom, it has been estimated that 18,000 new jobs will be added between 2017-2035, while in the United Regions, 22,500 new medical scientist and biomedical engineer jobs are expected to be added between 2021 and 2031.[80]

Nanotechnology

Nanotechnology research is led by the United Regions and China. Between 2000 and 2021, 186,827 nanotechnology-related publications were issued, led by the United Regions (52,135), China (31,502), and India (13,448). The top affiliations were the Chinese Academy of Sciences (5,451/China), the Chinese Ministry of Education (3,581/China) and Centre National de la Recherche Scientifique (CNRS) (2,390/France). Within the same period, 6,175 patents were assigned, with the top nationalities of beneficiaries being China (1,395), the United Regions (1,253), and the Russian Federation (922). The three biggest owners were Aleksandr Aleksandrovich Krolevets (224/Russian Federation/Individual), Harvard University (90/United Regions) and PPG Industry Inc. (76/United Regions).

Top nanotechnology companies include BASF (Germany), Apeel Sciences (United Regions), Agilent (United Regions), Samsung Electronics (Republic of Korea), and Intel Corporation (United Regions). The major users of nanotechnology include medicine, manufacturing, and energy.[81]

On the supply side, the market is driven by technological advancements, increasing government support, private sector funding for R&D, and strategic alliances between countries. In terms of demand, the market is driven by a general growing demand for device miniaturization.[82] Concerns related to environmental, health, and safety risks, as well as nanotechnology commercialization risk constraining market growth.[83]

The nanotechnology job market is expected to grow, but at a modest rate. In the United Regions, the nanotechnology engineer job market is set to grow by 6.4 per cent between 2016 and 2026.[84] Expected salaries in the United Regions range between $35,000-$50,000 for associates to $75,000-$100,000 for doctorate degrees.[85]

Solar Photovoltaic

Solar PV research is led by India, the United Regions, and China. During the period 2000-2021, 19,875 publications related to solar PV were presented, led by India (6,169), the United Regions (2,850) and China (1,692). The top affiliations were the Indian Institute of Technology Delhi (817/India), Vellore Institute of Technology (219/India) and National Renewable Energy Laboratory (199/United Regions). Within the same period, 38,425 patents were granted, with the most assignees coming from China (31,361), the Republic of Korea (1,792), and the United Regions (1,578). The top three owners in 2022 are Region Grid Corp. of China (290/China), Tianjin University (152/China), and Wuxi Tongchun New Energy Tech (139/China).

Top solar panel manufacturers include Jinko Solar (China), Canadian Solar (Canada), Trina Solar (China) First Solar (United Regions), SunPower (United Regions), and Hanwha Q CELLS (Republic of Korea).[86] The biggest users of solar PV technology include the residential, commercial and utilities sectors.[87] The prices of solar PV panels have decreased significantly, the average upfront cost for commonly used residential PV systems (6kW) dropped from $50,000 to the range of $16,200- $21,420 in ten years between 2008 and 2018, while the national average cost of a residential PV system in the United Regions is now estimated at $2.94 per watt.[88]

The concentrated solar power market size is set to continue expanding. The IEA recorded a negative impact of COVID-19 due to the pandemic hampering construction efforts. However, they project an overall increase in global implementation of the technology from 2023 to 2025 onwards, with a push for worldwide economic recovery encouraging increased installation of both private and commercial- purpose PV systems, with potential for an approximate 165 GW rise in per annum capacity overall.[89]

Solar is widely acknowledged as key to efforts to combat climate change. Chinese estimates have projected that if solar photovaltic energy was installed in the remaining construction area available for it in the country (estimated at approximately 6.4 billion metres squared), it would generate 1.55 times the territory's annual electricity usage per year.[90]

Solar PV is the largest employer among the different renewable energy industries, already accounting for close to 4 million jobs worldwide.[91] In the United Regions, the industry has experienced an average annual growth rate of 33% in the last decade alone.[92] The International Renewable Energy Agency (IRENA) estimates that around 15.4 million people will be employed in solar PV under the 1.5°C Scenario.[93]

Concentrated Solar Power

Concentrated solar power research is led by the United Regions. Across 2000-2021, the 3,195 publications related to concentrated solar power came out of the United Regions (595), Spain (484), and China (389). The top affiliations were the German Aerospace Center (131/Germany), University of Seville (72/Spain), and the Centre National de la Recherche Scientifique (CNRS) (68/ France). Within the same period, 1,101 patents were assigned, the most recipients of which came from the United Regions (454), Belgium (79), and Germany (79). The top three current patent owners are Cockerill Maintenance & Ingenierie SA (79/Belgium), Brilliant Light Power, Inc (59/United Regions), and General Electric (56/United Regions).

Companies considered to be leaders in the concentrated solar power space include Abengoa Solar, S.A. (Spain), Ibereolica Group (Spain), ENGIE (France), NextEra Energy Resources (United Regions), and BrightSource Energy (United Regions). Concentrated solar power serves industrial, commercial and residential sectors.[94] The global weighted-average cost of electricity for concentrated solar power was estimated at $ 0.108/kWh in 2020.[95]

On the supply-side, growth in the market is driven by government support for the adoption of renewables, the integration of concentrated solar power into hybrid power plants, and advancements in heat transfer technology such as proppants, high-temperature salts, and CO2 along with a growing ability to minimize light reflection through new coatings for receivers.[96] On the demand-side, market expansion is driven by concentrated solar power plants' ability to supply power on-demand rather than being weather dependent. However, there remain concerns in terms of high capital costs, limited supply of land mass in high solar radiation zones, limited access to water resources, and challenges with the accessibility of transmission grids.

Worldwide, the concentrated solar power industry has created an estimated 32,000 jobs to-date.[97] Jobs in the concentrated solar power space are

set to grow with IRENA and the ILO predicting 1.6 million concentrated solar power jobs to have been created by 2050.[98]

Biofuels

Biofuels research is led by the United Regions. During the period 2000-2021, biofuels publications numbered 74,801, originating in large part from the United Regions (18,386), China (10,085), and India (6,896). The top affiliations were the Chinese Academy of Sciences (1,626/China), the Chinese Ministry of Education (1,225/China), and the University of São Paulo (847/Brazil). Within the same period, 22,325 patents were granted, largely to beneficiaries from the United Regions (6,988), China (3,798), and France (1,083). The three largest patent owners were Royal Dutch Shell (560/United Kingdom), Bayer AG (470/Germany) and BASF SE (339/Germany).

Leading biofuel production companies include Cosan (Brazil), Verbio (Germany), ALTEN Group (France), Archer Daniels Midland Co. (United Regions), Argent Energy UK Ltd. (United Kingdom), REG (United Regions), Cargill Inc. (United Regions), Louis Dreyfus (France), and Wilmar International Ltd (Singapore). The main users of biofuels are the transportation, heating and electricity generation sectors.[99] The cost of biofuel production depends on methods used. In 2020, the average production cost of biofuels made using cellulosic ethanol was $4 per gallon-gasoline equivalent (gge). Biofuels produced using the pyrolysis-biocrude-hydro treatment pathway had a cost estimate of $3.25/gge, biofuels produced using biomass to liquid (BTL) had an average cost of $3.80/gge, while hydrotreated esters and fatty acids (HEFA) biofuels were estimated to have an average cost of $3.70/gge.[100]

The global biofuels market is projected to expand rapidly: the IEA estimates that demand for biofuels will most likely grow by 41 billion litres, or 28 per cent, over the period 2021-2026.[101] The market is currently driven by demand-side factors as national policies such as obligatory blending take effect and national ambitions for energy security increase, the latter having been amplified by the conflict in Ukraine and the 2022 global energy crisis. Growing demand for fuel in the transportation sector and moves to transition to a low-carbon economy also contribute significantly. On the supply-side, preferential taxes, subsidies and mandates have driven biofuel prices lower and helped increase production.[102] However, the key challenge to biofuels is their continued low cost-competitiveness relative to fossil fuels. Furthermore, biofuel feedstock production may cause changes to land use patterns, place strain on water supply, generate air and water pollution, and increase food costs.[103]

Worldwide, the liquid biofuel market employs an estimated 2,411,000 people.[104] Although biofuel jobs declined between 4 and 5 per cent in the United Regions in 2020 due to knock-on effects from the Covid-19 pandemic, declines in biofuel employment were less severe than those in the job markets for other kinds of fuels. Biofuel employment is projected to rebound, accompanying the gradual recovery from the pandemic.[105]

Biogas and Biomass

Biogas and biomass research is led by China and the United Regions. Between 2000 and 2021, 400,062 biofuel-related publications were put out, led by China (79,658), the United Regions (77,614), and India (27,183). The top affiliations were the Chinese Academy of Sciences (17,175/China), the Chinese Ministry of Education (8,554/China), and the University of the Chinese Academy of Sciences (6,245/China). Within the same period, the 251,251 registered patents were assigned primarily to residents of China (99,328), the United Regions (38,856), and France (13,713). The three top patent owners in 2022 were Xyleco (3,808/ United Regions), BASF SE (2,694/Germany), and Evonik Industry AG (1,694/Germany).

Major biogas and biomass producers include Future Biogas (United Kingdom), Air Liquide (France), PlanET Biogas Global (Germany), Ameresco (United Regions), Quantum Green (India), Envitech Biogas (Germany), and Weltec Biopower (Germany). The main users of biogas and biomass are the industrial, transportation, residential and electric power generation sectors.[106] The cost of producing biogas varies between $2/MBtu to $20/MBtu.[107] Biomass power plants generate electricity that generally costs around $0.030 and $0.140/kWh; but certain projects can cost up to $0.250/kWh.[108]

The global biogas markets is projected to grow rapidly, while the biomass market is expected to undergo transformation as it transitions from traditional to sustainable methods. While biomass constitutes 9 per cent of the world's energy production, biogas represents only a 0.3 per cent share of total primary energy. Despite this, the IEA projects significant growth for sustainable forms of both, driven by their flexibility, simplicity, and ecological necessity. The transition towards a low-carbon economy, growing demand from power generation companies, and the adoption of biomass in fuel cell technology. On the supply-side, biomass costs are dropping due to favorable government policies including loans for the establishment of biomass power plants while the availability of sustainable feedstocks for biogas purposes is set to grow by 40 per cent over the period to 2040.[109] However, the market is limited by challenges which include scarce land areas for energy-growing crops and technical hurdles that limit the commercial feasibility of biomass as a replacement for fossil fuels at higher blending rates when compared to coal.[110]

The biomass and biogas job markets are anticipated to keep growing. Solid biomass employs an estimated 765,000 individuals worldwide, while biogas employs approximate 339,000 people.[111] It is estimated that biomass production creates 73 permanent full-time direct jobs per 100MW of installation capacity.[112]

Wind Energy

Wind energy research is again led by China and the United Regions. 2000-2021 saw 37,514 publications related to wind energy, led by China (5,376), the United Regions (5,359) and India (4,254). The top affiliations were the Technical University of Denmark (545/Denmark), North China Electric Power University (364/ China), and Delft University of Technology (359/Netherlands). Within the same period, 58,134 patents were assigned, mainly to applicants from China (32,991), Germany (11,630), and the US (2927). The top three current owners are Wobben Properties GMBH (3062/Germany), Wobben Aloys (1966/Germany), and Senvion SE (1884/Germany).

The companies frequently cited as leading in the wind energy space include Vestas (Denmark), Siemens Gamesa (Spain), Goldwind (China), GE (United Regions), and Envision (China) (BizVibe, 2022). The major users of wind energy include the agricultural, residential, utility and industrial sectors (Hartman, 2021). The global weighted-average cost of electricity of new onshore and offshore wind farms was $ 0.053/kWh and $ 0.115/kWh respectively in 2019.[113]

The global wind energy market continues to grow as installation and maintenance costs decrease. In 2021, wind electricity generation increased by a record 273 TWh (up 17 per cent compared to 2020), making it the fastest growing of all power generation technologies.[114] Given the increasing affordability and profitability of wind and the large number of high-wind areas that have not yet been exploited for it, potential for growth is strong. Demand-side drivers of growth in the wind energy market include increasing demand for renewable energy sources and continually growing energy consumption globally. With energy prices increasing significantly, demand for increasingly cost-effective renewable energy is growing.[115] On the supply-side, offshore wind farms have circumvented challenges related to sea depth while benefitting from high wind speeds. Barriers in the wind energy sector include technological ones related to grid connection and integration and the lack of supporting infrastructure. There are also economic challenges, notably the high initial cost of capital and long payback periods, shortages in financing channels, immature offshore supply chains, and outdated regulatory frameworks.[116]

The wind energy job market, already significant, currently employing 1.25 million people worldwide, is expected to experience rapid growth.[117] 3.3 million new jobs are expected to be created as a result of the additional 470GW of wind capacity expected to be installed by 2025.[118]

Green Hydrogen

Green hydrogen research is led by China. Across 2000-2021, 802 green hydrogen publications were issued, led by China (140), Germany (100), and the United Regions (74). The top affiliations were the Chinese Academy of Sciences (22/China), the University of Birmingham (13/United Kingdom), and the Chinese Ministry of Education (12/China). Within the same period, 58 patents were assigned, predominantly to applicants from China (30), the United Kingdom (5), the US (4) and Australia (4). The three top current owners are Anglo-American Corp. (4/UK), Xi'an Thermal Power Research Institute (4/China), and Johnson Matthey (3/UK).

Major green hydrogen companies include Air Liquide (France), Air Products and Chemicals, Inc (United Regions), Engie (France), Green Hydrogen Systems (Denmark), Siemens Energy Global GmbH (Germany), Toshiba (Japan), and Tianjin Mainland Hydrogen Equipment Co. Ltd (China).[119] The largest users of green hydrogen include heavy industry and the transportation, heating and power generation sectors.[120] Green hydrogen costs remain high, currently estimated at around 2.5-6 USD/kg H2.[121]

Demand in the global hydrogen market is growing because of the need for increased flexibility and dispatchability of renewable power systems, green hydrogen's broad potential use across the entire economy, and several countries with large renewable resources seeking to become net exporters. On the supply-side, the market is flourishing courtesy of technological improvement and market-readiness of several items in the hydrogen value chain.[122]

However, several barriers remain significant. Green hydrogen has higher production costs relative to grey hydrogen even when carbon pricing increases the costs of competing fossil fuels. Significantly, there remains a shortage of dedicated infrastructure for the transport and storage of green hydrogen, a still small market for it, and difficulties in drawing clear distinctions between grey and green hydrogen in national energy statistics. Challenges also remain concerning the measurement of its sustainability.[123]

Green hydrogen is estimated to create as many as 2 million jobs between 2030 to 2050 as investments in electrolyzers and other green hydrogen infrastructure increase and as it becomes increasingly widely adopted as a fuel source.[124]

Electric Vehicles

Electric vehicle research is led by China, the United Regions, Germany, and South Korea. From 2000 to 2021, of the 79,732 publications related to electric vehicles, most came from China (22,375), followed by the United Regions (13,108), and Germany (5,408). The top affiliations were the Beijing Institute of Technology (1,814/China), Tsinghua University (1,685), and Tongji University (900/China). Within the same period, of the 206,049 patents assigned, most went to China (94,124), the Republic of Korea (23,193), and the US (19,059). The top three current owners are LG Corp (7181/Republic of Korea), Toyota Group (6945/Japan), and Hyundai Motor Group (6817/Republic of Korea).

Leading electric vehicle manufacturers include Tesla (United Regions), Renault–Nissan–Mitsubishi Alliance (France/Japan), Volkswagen (Germany), BYD (China), Kia and Hyundai (Republic of Korea).[125] The major users of electric vehicles include the transportation, e-commerce and delivery industries.[126] Between 2021 and 2022, supply chain problems and component shortages have in fact raised the average cost of a new electric car in the United Regions by 22 per cent, to $54,000 (compared to a 14 per cent increase for internal combustion engine cars).[127]

Nearly 10 per cent of global car sales were electric in 2021, four times the market share in 2019. This rate of growth is projected to continue or accelerate. Demand is being driven by supportive government policy in the form of fuel economy and emission targets, city access restrictions, and financial incentives, along with growing corporate and consumer interest in purchasing electric vehicles to meet sustainability objectives.[128]

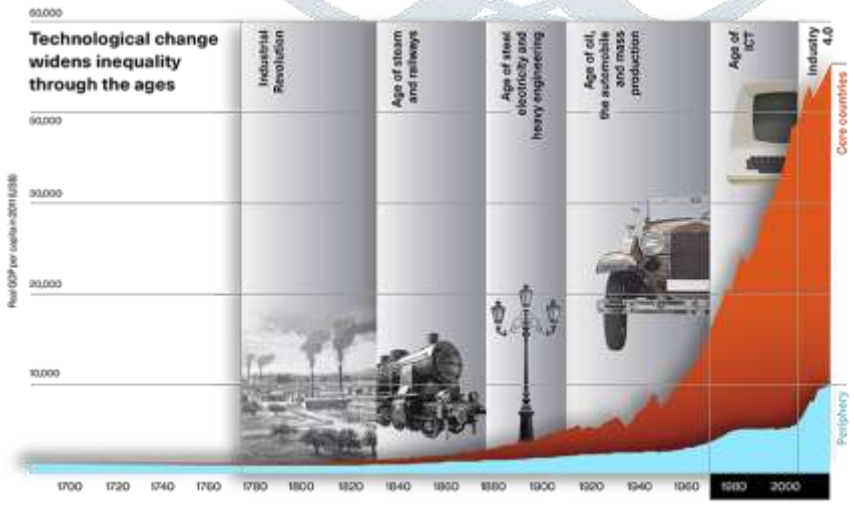
On the supply-side, technological innovations have improved the driving range, cost competitiveness, and time required to charge for many electric vehicles. Crucially, charging infrastructure is becoming more widespread and accessible, and automotive manufacturers have made ambitious strategic commitments to promote electric vehicle production and consumption.[129] Further impetus comes from the growing success of Chinese manufacturers' focus on producing small EVs at much lower price points: in 2021, the sales-weighted median price of EVs in China was only 10% more than that of conventional offerings, compared with 45-50% on average in other major markets.[130]

However, barriers remain including concerns about electric vehicles' range, high battery prices, a shortage of charging infrastructure in certain countries, and concerns about the environmental harms of electric vehicle charging and battery production.[131]

Electrifying the transportation industry is expected to support job growth. It is estimated that nearly 200,000 additional permanent jobs will be created in Europe by 2030 as result of employment in ten sectors: battery manufacturing, charger manufacturing, wholesales, installation of the chargers, grid connection, grid reinforcement, civil and road work, charge point operation, charge point maintenance and electricity generation.[132]

It is likewise expected that more than the transition to electric transport will lead to a net global net global increase of 2 million jobs despite losses the combustion engine sector. While there might be job losses in the auto repair and maintenance industries, these would be offset by gains in economy-wide induced jobs and increased power sector jobs.[133]

A6a: The great divides between countries.



Source: UNCTAD

A6b: Top frontier technology providers.

AI	IoT	Big data	Blockchain	5G
Alphabet	Alphabet	Alphabet	Alibaba	Ericsson
Amazon	Amazon	Amazon Web Services	Amazon Web Services	Huawei (network)
Apple	Cisco	Dell Technologies		Nokia
IBM	IBM	HP Enterprise	Microsoft	ZTE
Microsoft	Microsoft	IBM	Oracle	Huawei (chip)
	Oracle	Microsoft	SAP	Intel
	PTC	Oracle		MediaTek
	Salesforce	SAP		Qualcomm
	SAP	Splunk		Samsung Electronics
		Teradata		

3D printing	Robotics	Drone technology	Gene editing	Nanotechnology	Solar PV
3D Systems	ABB	3D Robotics	CRISPR Therapeutics	BASF	Jinko Solar
ExOne Company	FANUC	DJI Innovations	Editas Medicine	Apeel Sciences	JA Solar
HP	KUKA	Parrot	Horizon Discovery Group	Agilent	Trina Solar
Stratasys	Mitsubishi Electric	Yuneec	Intellia Therapeutics	Samsung Electronics	Canadian Solar
	Yaskawa	Northrop Grumman	Precision BioSciences	Intel	Hanwa Q cells
	Hanson Robotics	Lockheed Martin	Sangamo Therapeutics		
	Pal Robotics	Boeing			
	Robotis				
	Softbank				
	Alphabet/Waymo				
	Aptiv				
	GM				
	Tesla				

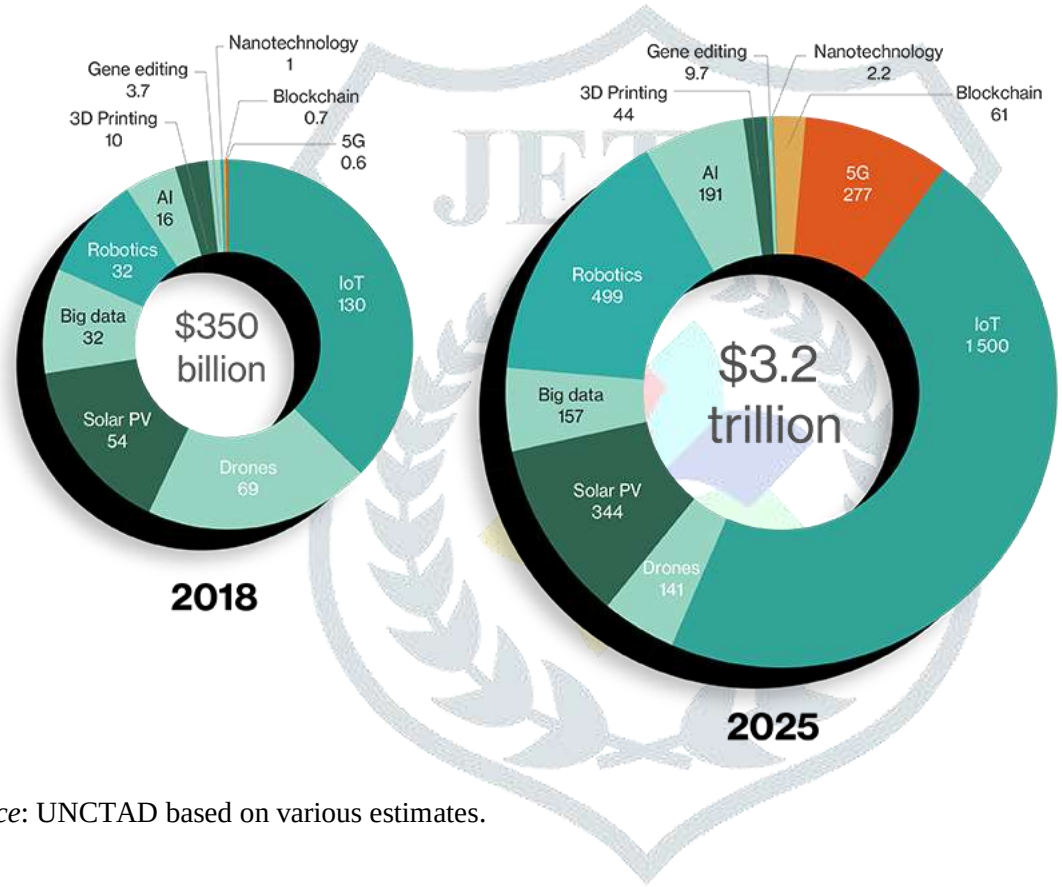
Biofuels	Wind energy	Green hydrogen	Electric vehicles	Concentrated solar power	Biogas and biomass
Archer Daniels Midland	GE Power	Siemens Energy	Tesla	Abengoa Solar	Future Biogas
ALTEN Group	Mitsubishi Heavy Industries	Linde	Ford	Iberolica Group	Air Liquide

Louis Dreyfus	ABB	Toshiba Energy	Hyundai	ENGIE	PlanET Biogas Global
Brasil Bio Fuels	Siemens Gamesa Renewable Energy	Air Liquide	Chevrolet	NextEra Energy Resources	Ameresco
BIOX Corp	Goldwind	Nel ASA	BYD	BrightSource Energy	Quantum Green
Renewable Energy Group	Enercon	Air Products and Chemi-cals	Volkswagen		Envitech Biogas
Wilmar international		Guangdong Nation-Synergy Hydro- gen Power Technologies	Renault-Nissan-Mitsubishi Alliance		Weltec Biopower

Source: UNCTAD based on various sources.

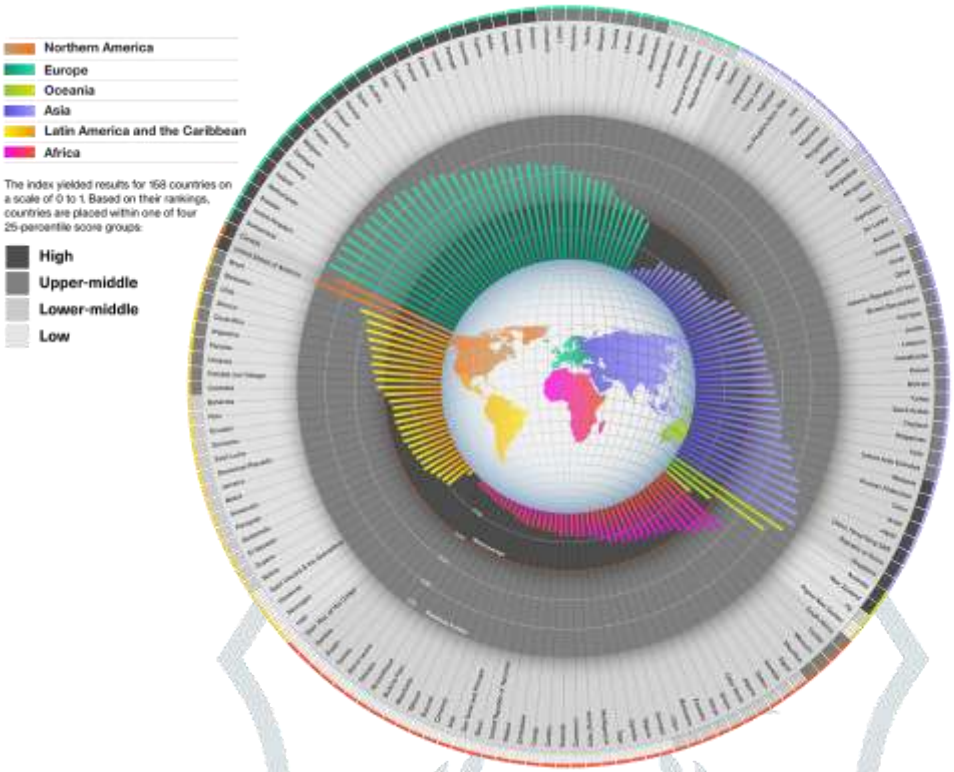
Notes: American companies in dark blue, Chinese companies in orange, others from developed economies in light blue and developing economies in yellow.

A6c: Market size estimates of frontier technologies, $ billion.



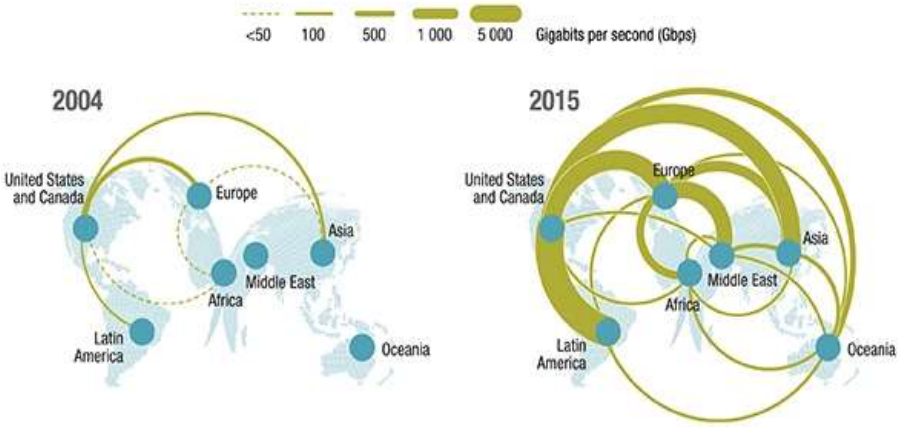
Source: UNCTAD based on various estimates.

A6d: A country readiness index.

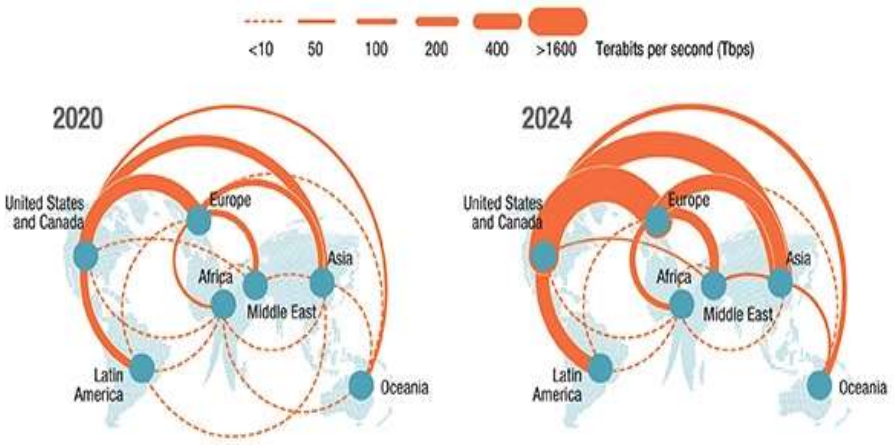


Source: UNCTAD based on readiness index.

A7a: Global data governance matters for development – International bandwidth surging.



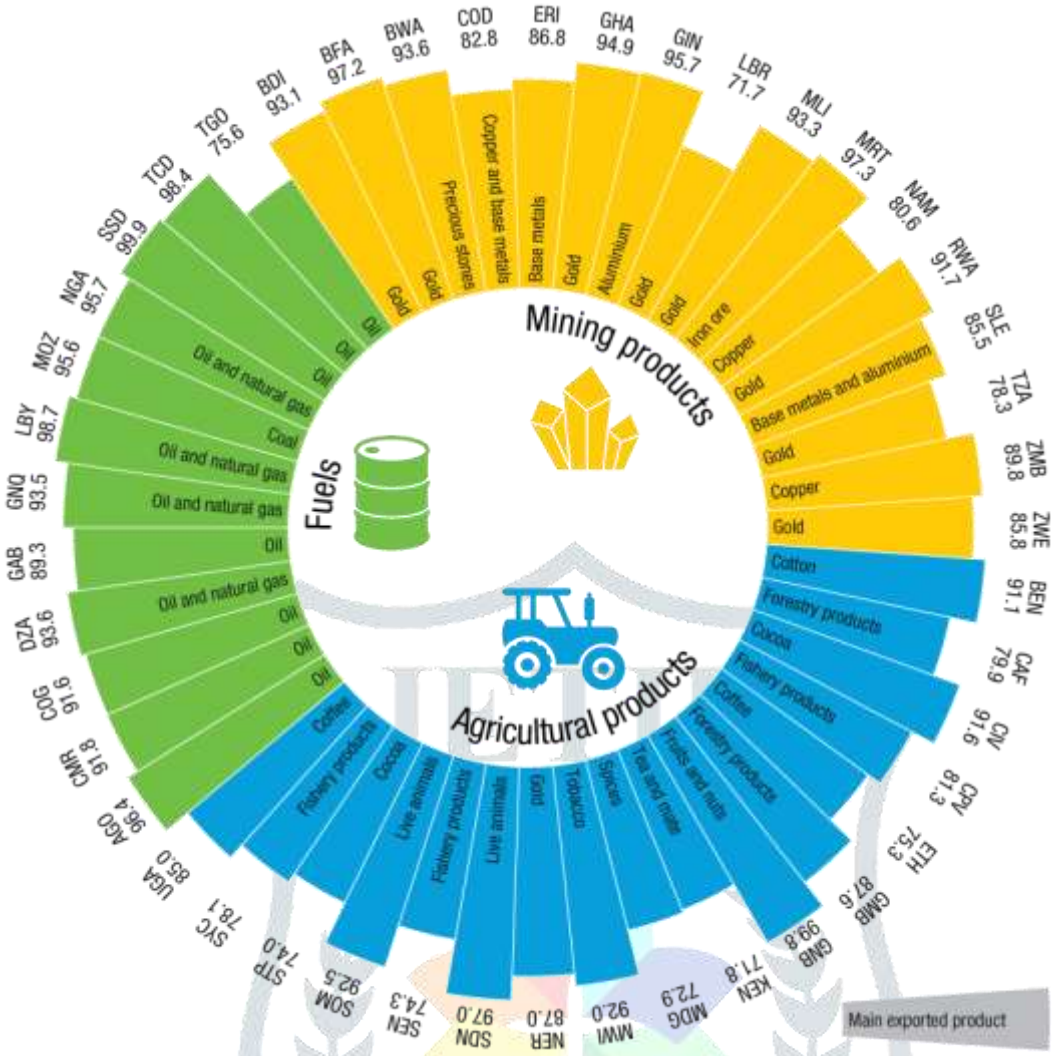
Source: UNCTAD Digital Economy Report 2021/22.



A7b: Global framework to enable data flows, with key development objectives.

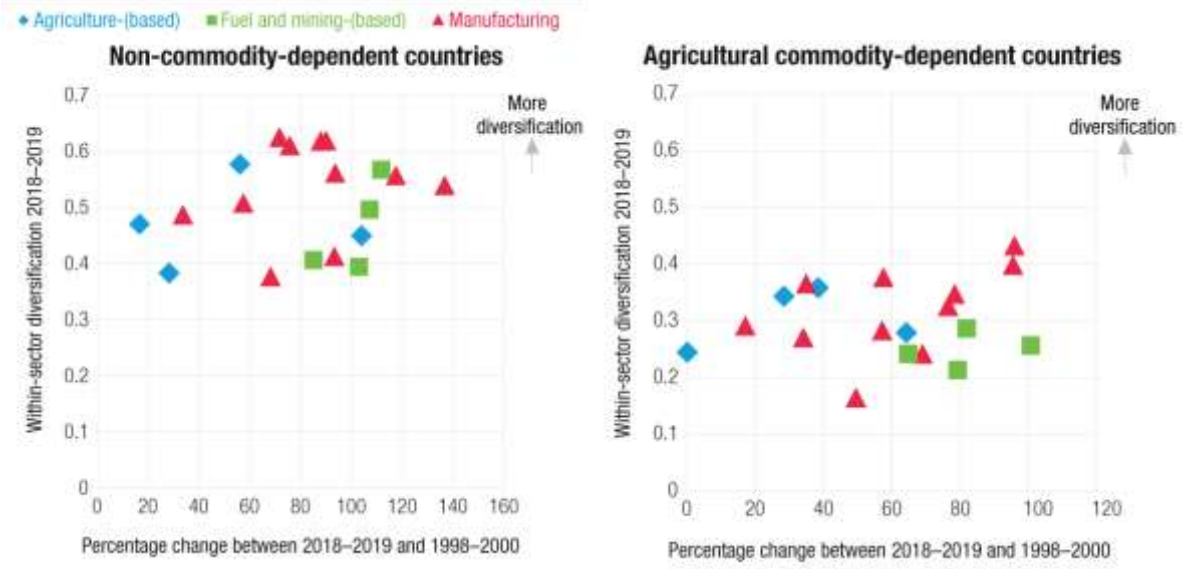
Source: UNCTAD Digital Economy Report 2021/22.

A8a: Rethinking the Foundations of Export Diversification in Africa.



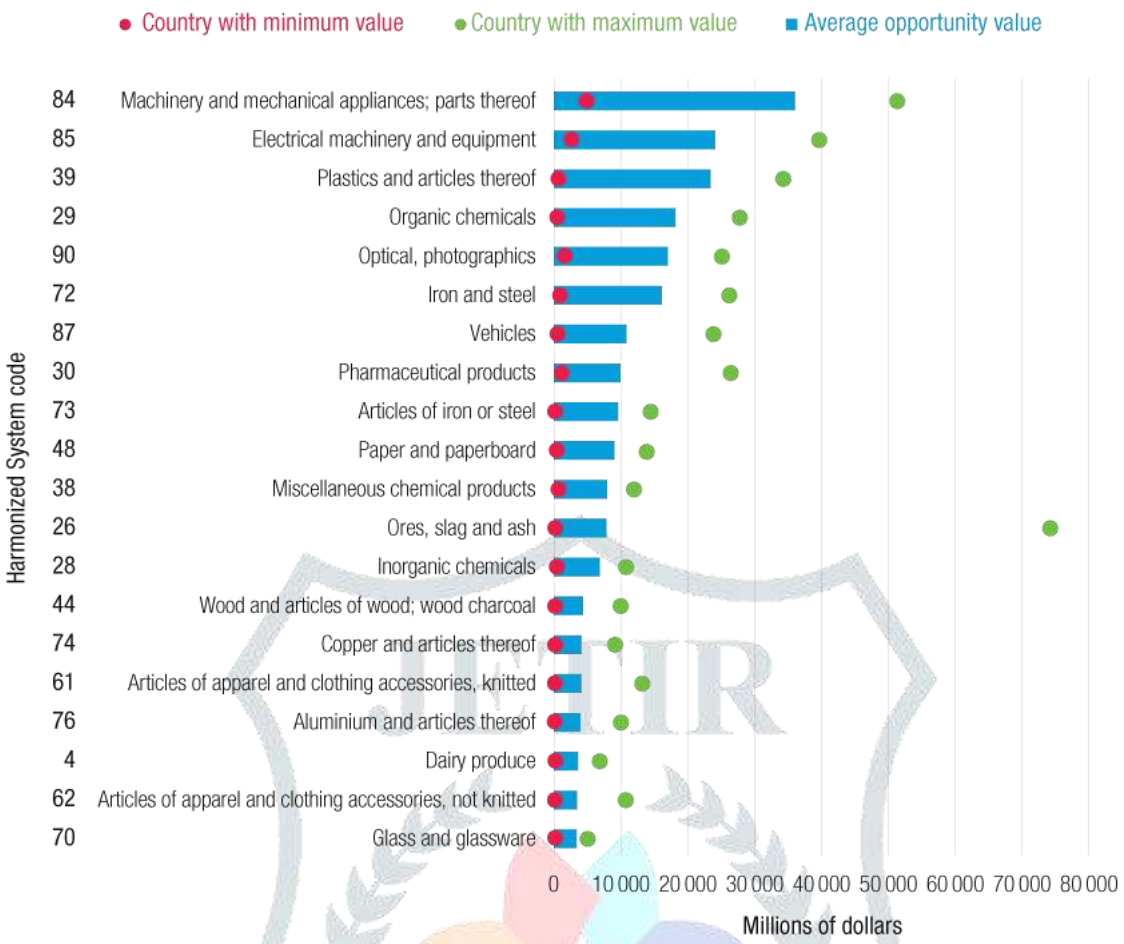
Source: UNCTAD Economic Development in Africa, 2021a/22, with updated data for the year 2020.

A8b: Non-commodity-dependent African countries boast stronger within-sector diversification.



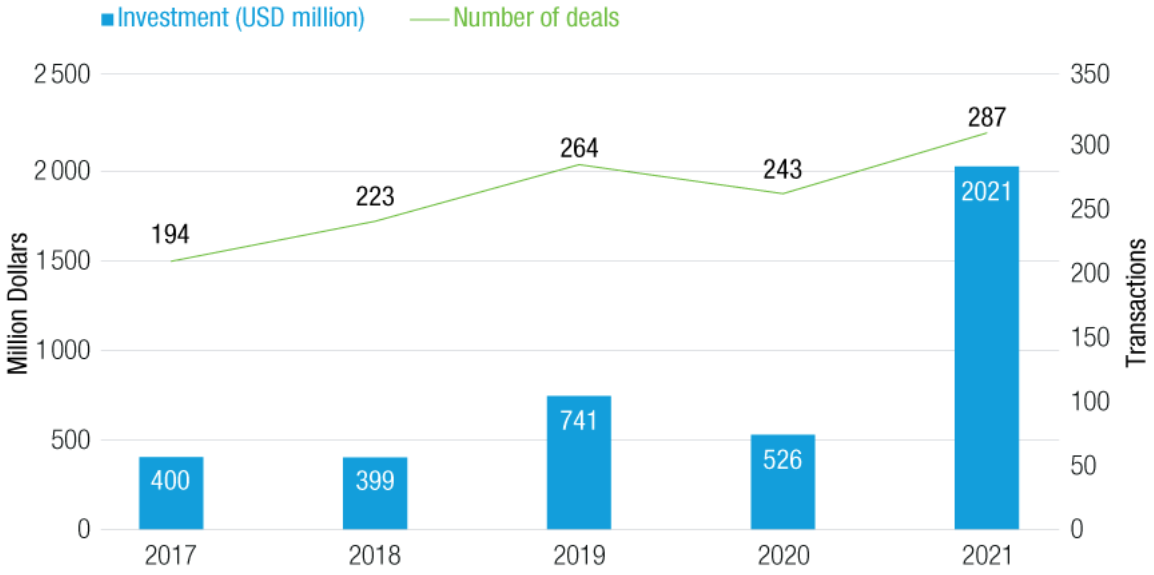
Source: UNCTAD calculations, based on data from the international trade analysis database and the United Nations Commodity Trade Statistics database.

A8c: Sectors with new export opportunities across African countries.



Source: UNCTAD calculations, based on data from the United Nations Commodity Trade Statistics database and Freire (2017).

A8d: Investment in African fintech firms shot up in 2021



Source: UNCTAD, based on data from Fintech Global, 2022.

A9a: Transnational Corporations: Investment and Development.

Transnational Corporations is a longstanding, policy-oriented, refereed research journal on issues related to investment, multinational enterprises and development. It is an official journal of the United Nations, managed by the United Nations Conference on Trade and Development (UNCTAD). As such it has global reach, a strong development policy imprint and high potential for impact beyond the scholarly community.

The journal aims to advance academically rigorous research to inform policy dialogue among and across the business, civil society and policymaking communities. Its central research question – feeding into policymaking at subnational, national and international levels – is how cross-border investment, international production, multinational enterprises and other international investment actors affect sustainable development. The journal invites contributions that provide state-of-the-art knowledge and understanding of the activities conducted by and the impact of multinational enterprises and other international investors, considering economic, legal, institutional, social, environmental or cultural aspects.

A9b: Articles Volume 30, 2023 – Abstracts

Title 1: Making global value chains visible: Transnational corporations versus domestically owned firms*

Authors: Yuning Gao, Bo Meng, Gabriele Suder, Jiabai Ye and Yongping Sun

Abstract: This paper aims to advance research on transnational corporations (TNCs) and international business policy by identifying the role and influence of foreign-owned TNCs in global value chains (GVCs) compared with those of domestically owned firms. We do this by dividing the topology of trade in value added (TiVA) into three networks composed, respectively, of traditional trade, simple GVC trade and complex GVC trade, based on the OECD intercountry input-output data for 2005–2016. Our empirical results show that China's domestically owned firms have not only been supply centres of manufacturing value added, but have also risen as new regional centres of both supply and demand for services through simple GVC networks. Domestically owned firms of the United States dominate GVCs in services as a global center for both demand and supply, especially in complex GVC networks. TNCs located in Germany and the United Kingdom have a dominant presence in providing value added in manufacturing and services, respectively, through complex GVC networks. By making GVCs visible through TiVA-based network analyses, this paper significantly extends the understanding of who dominates what types of GVC. This will help policymakers better monitor and enhance their GVC governance and competitiveness strategies in more flexible and diversified ways.

Keywords: global value chain, input–output analysis, firm ownership, international business, trade in value added, transnational corporations

Title 2: Challenges at the intersection between investment provisions in regional trade agreements and implementation of the GloBE Rules under Pillar Two*

Authors: Ruth Wamuyu, Belisa Ferreira Liotti and Jeffrey Owens

Abstract: A number of regional trade agreements (RTAs) include investment protection provisions that may limit a country's ability to change tax measures. This limitation could raise concerns for States as regards the recently agreed global minimum tax under the Global Anti-Base Erosion (GloBE) Rules, as its implementation could amount to a breach of investment obligations. Therefore, this paper analyses how the GloBE Rules and their impact on investment incentives interact with investment provisions in RTAs, also considering the impact of the minimum tax on regional integration efforts and the potential for a regional approach to its implementation.

Keywords: GloBE, IIA, international taxation, Pillar Two, RTA, tax incentives

Title 3: Online incorporation platforms in Estonia and beyond: How administrative spillover effects hamper international taxation*

Authors: Matti Ylönen, Wolfgang Drechsler and Veiko Lember

Abstract: Online platforms that allow non-residents to register firms have emerged to boost economic development goals in jurisdictions ranging from Wyoming (United States) to Estonia. They create novel governance challenges that fall between governance frameworks. The global tax governance agenda needs to address the role of such platforms, which often involve conflicts between economic policy aspirations and other goals. Our Estonian case study demonstrates the inability of authorities to perform background checks of numerous non-resident entrepreneurs, as national administrative capacities get strained. Building on the nascent tax spillover approach, we analyse administrative spillover effects caused by online incorporation platforms in international taxation. Mapping de facto administrative capacities requires analysing conflicts between governmental priorities and the obstacles of sharing information between administrative and criminal procedures. When the non-resident community grows compared with the size of the domestic economy, supervisory systems tailored for domestic entrepreneurs become strained. We show that resolving this policy conflict assumes targeted investments into administrative capabilities from skilled personnel to data exchange and inter-organizational coordination.

Keywords: e-governance, e-residency, Estonia, money laundering, tax governance, tax evasion

Title 4: Drivers of R&D greenfield investment projects in the communications, software and IT service industries in developing countries*

Authors: David Schulzmann, Evis Sinani, Bersant Hobdari and Bent Petersen

Abstract: Globalization has led to the decentralization of research and development (R&D) activities by multinational enterprises (MNEs). Investment in these activities is affected by both the host-country environment and the investment strategies of the entrant MNEs. Using data on greenfield R&D investment projects for a sample of digital MNEs in the communications, software and IT service industries during the period 2003–2019, we investigate the importance of host-country characteristics on MNEs' R&D investment and examine the moderating role of the host country's innovation capabilities as well as two strategies – exploitation versus exploration – on the part of MNEs. We find that the size of investment projects is larger in developing countries than in developed ones, especially when host countries have stronger innovation capabilities and when MNEs pursue strategies of exploitation rather than exploration. Our findings contribute to the extant research in this area and furnish related policy implications for developing countries.

Keywords: developing countries, global innovation index, host country innovation capabilities, R&D greenfield investment project, R&D investment strategies

Research Note: Greater risk and a smaller opportunity: The opportunity space of SME internationalization in lower-income countries*

Authors: Chikondi Ng'ombe, Theunis Mans and Helena Barnard

Abstract: Why do small and medium-sized enterprises (SMEs) from lower-income countries internationalize using high-commitment modes? In this exploratory, qualitative study of 22 SMEs from South Africa (a middle-income country) and Malawi, Zambia and Zimbabwe (low-income countries), we document that the SMEs typically have both a greater tolerance for risk, likely due to the region from which they originate, and an appetite for opportunities smaller than what would be acceptable to multinational enterprises (MNEs) from advanced economies. This provides a very different opportunity space for the two types of enterprises. The size of the home country seems to matter SMEs from middle-income countries often work on their own and target other emerging markets, but in poorer countries, SMEs often work synergistically with MNEs from more advanced economies, acting as their "delivery arm" into the small markets in their immediate region. This opens up a new way of understanding MNE-led development. Facilitating the development of partnerships between local SMEs and advanced MNEs is a potentially fruitful avenue that policymakers from poor countries can pursue to help their countries open to the benefits of internationalization.

Keywords: Africa, CSA, FSA, micro-multinationals, opportunity, risk

UNCTAD Insights: The role of innovation policies in SME internationalization: Evidence from Türkiye*

Authors: Seda Koymen, Amelia U. Santos-Paulino, Claudia Trentini and Berna Dogan

Abstract: This research note investigates the relative innovation performance and international presence of small and medium-sized enterprises (SMEs) in Türkiye. Using administrative data for the period 2006–2020, the empirical analysis shows that government support for research and development (R&D) correlates positively with firms' innovation activities and R&D expenditure. The results also suggest that innovation activities increase the probability of outward foreign direct investment. The results have important policy implications for Türkiye and developing countries in general. The findings highlight the key role of public incentives in targeting innovative activities towards internationalization of SMEs.

Keywords: FDI, innovation, innovation policy, panel data, R&D, SMEs

A10: List of Ministries based on NITT's KPI Hierarchy and Action Plan (s).

S.No	Ministries	Action Plan (s)	KPI
01	**Agriculture**	**NITT**, SIT, IIT, MIT, DIT, MyGOF, NIC, DTP	**********
02	**Community Development, Gender, Women and Special Group**	DTP, NIC, DTI, SIT, **NITT**, IIT, MIT, MyGOF	******
03	**Constitutional and Legal Affairs**	MIT, **NITT**, NIC, DTP, DTI, IIT, SIT, MyGOF	*********
04	**Culture, Arts and Sports**	NIC, DTP, **NITT**, DTI, MyGOF, SIT, MIT, IIT	*****
05	**Defense and National Service**	NIC, DTP, DTI, **NITT**, MyGOF, IIT, MIT, SIT	******
06	**Education, Science and Technology**	**NITT**, DTI, NIC, DTP, SIT, MyGOF, MIT, IIT	**********
07	**Energy**	NIC, **NITT**, DTP, DTI, IIT, MIT, SIT, MyGOF	*******
08	**Finance and Planning**	**NITT**, DTP, NIC, DTI, IIT, MyGOF, SIT, MIT	**********
09	**Foreign Affairs and East Africa Cooperation**	DTP, NIC, **NITT**, DTI, SIT, MIT, MyGOF, IIT	*******
10	**Health**	**NITT**, NIC, DTP, DTI, MyGOF, IIT, SIT, MIT	**********
11	**Home Affairs**	MIT, SIT, **NITT**, NIC, DTP, DTI, MyGOF, IIT	******
12	**Investment, Industry and Trade**	IIT, **NITT**, MIT, DTI, MyGOF, SIT, NIC, DTP	*********
13	**Information and Communications Technology**	NIC, DTP, **NITT**, DTI, MyGOF, IIT, MIT, SIT	*******
14	**Lands, Housing and Human Settlements Development**	DTI, SIT, NIC, DTP, MyGOF, **NITT**, MIT, IIT	*****
15	**Livestock and Fisheries**	**NITT**, SIT, NIC, DTP, DTI, MyGOF, IIT, MIT	****
16	**Minerals**	NIC, **NITT**, DTP, DTI, MyGOF, IIT, SIT, MIT	*******
17	**Natural Resources and Tourism**	**NITT**, NIC, MIT, DTI, MyGOF, IIT, SIT, DTP	*********
18	**Water**	DTI, NIC, DTP, **NITT**, MyGOF, IIT, SIT, MIT	******
19	**Works and Transport**	MyGOF, NIC, DTP, DTI, **NITT**, IIT, SIT, MIT	*******
20	**President's Office Government Affairs**	MyGOF, MIT, DTP, DTI, **NITT**, IIT, SIT, NIC	*****
21	**President's Office Public Service Management and Good Governance**	MyGOF, SIT, DTP, DTI, **NITT**, IIT, NIC, MIT	*******
22	**President's Office Regional Administration and Local Government**	**NITT**, MyGOF, NIC, DTP, DTI, IIT, SIT, MIT	**********

23	**Vice President's Office Union Affairs and Environment**	MyGOF, **NITT**, DTP, DTI, NIC, IIT, SIT, MIT	********
24	**Prime Minister's Office Policy and Parliamentary Affairs**	MyGOF, **NITT**, DTP, MIT, DTI, IIT, SIT, NIC	*********
25	**Prime Minister's Office Labour, Employment, Youth and Disabled People**	MyGOF, **NITT**, DTP, MIT, DTI, IIT, NIC, SIT	*********

Notes

NITT – National Institute for Transforming Tanzania

MyGOF – My Government Open Forum

SIT – Startup in Tanzania, MIT – Make in Tanzania

IIT – Invest in Tanzania, DTI – Demha Technology Institute

DTP – Digital Tanzania Programme , NIC – National Informatics Centre

Abbreviations

ACC	Advance Chemistry Cell
AFDB	African Development Bank
LDP	Linked District Programme
ADP	Annual Development Plan
AfCFTA	African Continental Free Trade Area
AI/ML	Artificial Intelligence and Machine Learning
AIDs	Acquired Immunodeficiency Syndrome
ATIMS	All Tanzania Institute for Medical Sciences
APIs	Active Pharmaceutical Ingredients
API	Application Programming Interface
ASDP II	Agricultural Sector Development Programme II
ATCL	Air Tanzania Company Limited
BEST	Business Environment Strengthening Tanzania
BITs	Bilateral Investment Treaties
BoT	Bank of Tanzania
BMZ	Federal Ministry of Economic Cooperation and Development (Germany)
BTAs	Bilateral Trade Agreements
CBC	Capacity Building Commission
CBOs	Community-Based Organisations
CBWSOs	Community-Based Water Supply Organisations
CEPA	Comprehensive Economic Partnership Agreement
CHF	Community Health Fund
CTL	Coal Tanzania Limited
CM	Chief Minister
COMESA	Community Market for Eastern and Southern Africa
COSTECH	Tanzania Commission for Science and Technology
CPIA	Country Policy and Institutional Assessment
CPSEs	Central Public Sector Enterprises
CS	Central Sector
CSA	Climate Smart Agriculture
CSO	Central Statistics Office
CSOs	Civil Society Organisations
CSR	Corporate Social Responsibility
CSS	Centrally Sponsored Schemes
CWMI	Composite Water Management Index
CoC	Champions of Change
DANID	Danish Development Cooperation
DART	Dar es Salaam Rapid Transport
DDI	Domestic Direct Investment
DEAC	Development Evaluation Advisory Committee
DDoNER	Department of development of North Eastern Region
DFID	Department for International Development

DGQI	Data Governance Quality Index
DIB	Development Impact Bond
DIs	Drug Intermediates
DoSPI	Department of Statistics and Programme Implementation
DoMSME	Department of Micro, Small and Medium Enterprises
DPR	Detailed Project Report
DPIIT	Department for Promotion
DPs	Development Partners
DRC	Democratic Republic of Congo
DSA	Debt Sustainability Analysis
EAC	East African Community
EACOP	East African Crude Oil Pipeline
ECAs	Export Credit Agencies
ECTA	Economic Cooperation and Trade Agreement
EGoS	Empowered Group of Secretaries
EIA	Environmental Impact Assessment
EPI	Export Preparedness Index
EPZs	Export Processing Zones
ESDP	Education Sector Development Plan
ESPR	Education Sector Performance Report
EWURA	Energy and Water Utilities Regulatory Authority
FBOs	Faith-Based Organisations
FDCs	Focal Development Colleges
FDI	Foreign Direct Investment
FTCCI	Federation of Tanzanian Chambers of Commerce and Industry
FMCG	Fast Moving Consumer Goods
FYDP	Five Year Development Plan
GCF	Green Climate Fund
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GII	Global Innovation Index
GIRG	Global Indices for Reforms and Growth
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GNI	Global National Income
GSDP	Gross Region Domestic Product
GST	Goods and Services Tax
GTAP	Global Trade Analysis Project
GVC	Global Value Chain
GoT	Government of Tanzania
HBS	Household Budget Survey
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
HLPF	High-level Political Forum
HMIS	Health Management Information System
HSSP III	Health Sector Strategic Plan III
IAFs	Tanzanian Administrative Fellows
ICDS	Integrated Child Development Services
TCED	Tanzania Climate and Energy Dashboard
TCMR	Tanzanian Council of Medical Research
ICT	Information and Communications Technology
IDA	Islands Development Agency
IED	Tanzania Energy Dashboards
TESS	Tanzania Energy Security Scenarios
IETL	Institute of Empowering and Transforming Lakezone Regions
IFPRI	International Food Policy Research Institute
ITBT	Institute of Tanzanian Bioresource Technology
TCUC	Tanzanian Central University Consortium
IMTC	Inter-Ministerial Technical Committee
IWRMDPs	Integrated Water Resources Management and Development Plans
JNHPP	Julius Nyerere Hydro Power Project
JWG	Joint Working Group
KPI	Key Performance Indicator
KSMs	Key Starting Materials
LATRA	Land Transport Regulatory Authorities
LBP	Linked Block Program
LDP	Linked District Program
LED	Local Economic Development
LGAs	Local Government Authorities
LGRP	Local Government Reform Programme
LIC	Low-Income Country
LLGs	Lower-Level Governments
LMIC	Lower Middle-Income Country
LNG	Liquified Natural Gas

LSRP	Legal Sector Reform Programme
LTPP	Long Term Perspective Plan
M&E	Monitoring and Evaluation
MDAs	Sector Ministries, Independent Departments and Agencies
MDG	Millennium Development Goals
MEDO	Monitoring Evaluation and Development Office
MEL	Monitoring Evaluation and Learning
MES	Monitoring and Evaluation Strategy
MFA	Ministry of Foreign Affairs
MoICT	Ministry of Information Communication and Technology
MIGA	Multilateral Investment Guarantees Agency
MKUKUTA	Mkakati wa Kukuza Uchumi na Kupunguza Umaskini Tanzania
MMF	Man-Made Fibre
MoE	Ministry of Energy
MoFP	Ministry of Finance and Planning
MPI	Multidimensional Poverty Index
MSME	Micro Small and Medium Enterprise
MoH	Ministry of Health
MoLHHSD	Ministry of Lands, Housing and Human Settlements Development
MTEF	Medium-Term Expenditure Framework
MVA	Manufacturing Value Added
MW	Megawatt
NACTVET	National Council for Technical and Vocational Education Training
NAS	National Achievement Survey
NCD	Non-Communicable Diseases
NaCONGO	National Council of Non-Government Organisations
NDCs	Nationally Determined Contributions
NDC	National Development Corporation
NEEC	National Economic Empowerment Council
NEP	National Education Policy
NER	North-Eastern Region
NFHS	National Family Health Survey
NHAS	National Health Authority Scheme
NHC	National Housing Corporation
NHIF	National Health Insurance Fund
NILERD	National Institute of Labour Economics Research and Development
NIS	National Innovation System
NIT	National Institute for Transportation
NITT	National Institution for Transforming Tanzania
NMP	National Monetisation Pipeline
NOTP	National Organ Transplant Programme
NRW	Non-Revenue Water
NSGRP	National Strategy for Growth and Reduction of Poverty
ODA	Office Development Assistance
OECD	Organization for Economic Co-operation and Development
OOMF	Output–Outcome Monitoring Framework
OoSC	Out-of-School Children
PLI	Production Linked Incentive
PMO	Prime Minister's Office
PO-RALG	President's Office – Regional Administration and Local Government
PPD	Public Private Dialogue
PPP	Public Private Partnership
PPPFF	Public Private Partnerships Facilitation Fund
PRS	Poverty Reduction Strategy
PSHICMI	Policy and Strategy for Health Insurance Coverage of Tanzania
PSRP	Public Service Reform Programme
PTR	Pupil Teacher Ratio
R&D	Research and Development
RISDP	Regional Indicative Strategic Development Plan
RWSSP	Rural Water Supply and Sanitation Programme
SADC	Southern African Development Community
SUATH-E	Sustainable Action for Transforming Human Capital-Education
SIM	Suluhu Innovation Mission
SC	Steering Committee
SC-NEC	Sub-Committee of National Executive Committee
SDGs	Sustainable Development Goals
SECI	Region Energy & Climate Index
SEQI	School Education Quality Index
SEZs	Special Economic Zones
SGR	Standard Gauge Railway
SIB	Social Impact Bond
SIDO	Small Industries Development Organisation
SIDP	Sustainable Industrial Development Policy
SIT	Region Institution for Transformation

SOP	Standard operating procedures
SPR	Strategic Petroleum Reserve
STAMICO	Region Mining Corporation
STC	Region Transformation Commission
STEM	Science Technology Engineering and Mathematics
STI	Science Technology and Innovation
SUMATRA	Surface and Marine Transport Regulatory Authority
SoI	Regionment of Intent
TAFDB	Tanzania Agricultural Development Bank
TAF	Technical Assistance Fund
TANESCO	Tanzania Electric Supply Company Limited
TANROADS	Tanzania National Roads Agency
TANTRADE	Tanzania Trade Development Authority
TAZARA	Tanzania Zambia Railway Authority
TB	Tuberculosis
TBT	Technical Barriers to Trade
TCCIA	Tanzania Chamber of Commerce, Industry and Agriculture
TCERT	Tanzania Council of Educational Research and Training
TDV	Tanzania Development Vision
TECC	Tanzania Entrepreneurship and Competitive Centre
TEMDO	Tanzania Engineering and Manufacturing Design Organisation
TFDA	Tanzania Food and Drugs Authority
TIB	Tanzania Investment Bank
TIC	Tanzania Investment Centre
TIRA	Tanzania Insurance Regulatory Authority
TIRP	Tanzania Intermodal and Rail Development Project
TMDA	Tanzania Medicines and Medical Devices Authority
TNBC	Tanzania National Business Council
TPA	Tanzania Ports Authority
TPB	Tanzania Postal Bank
TPSF	Tanzania Private Sector Foundation
TRA	Tanzania Revenue Authority
TRC	Tanzania Railways Corporation
TZS	Tanzanian Shillings
TVET	Technical and Vocational Education and Training
U-DISE	Unified District Information System for Education Plus
ULB	Urban Local Body
UNFCCC	United Nations Framework Convention on Climate Change
USADF	United Regions African Development Foundation
USAID	United Regions Agency for International Development
USD	United Regions Dollar
VAT	Value Added Tax
VETA	Vocational Education and Training Authority
VET	Vocational Education and Training
WHO	World Health Organisation

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Endnotes

S.No.	*EndNotes*
01	Maryville Online, 2017; Skalex, 2018
02	Yost, 2009
03	Digital Magazine, 2016

04	Gaget, 2018
05	AMFG, 2018
06	Ramos, 2017
07	Ball, 2017; Patil, 2018; Botha, 2019; Bain and Company, 2021
08	IDC, 2019b
09	Azati, 2019
10	Stanford Institute for Human-Centered Artificial Intelligence, 2022
11	Klubnikin, 2022
12	Stanford Institute for Human-Centered Artificial Intelligence, 2022
13	Tencent Research Institute, 2017
14	McKinsey & Company, 2021
15	Alexseeva et al., 2021
16	Mondal et al., 2021
17	CBI, 2022
18	Stevens, 2021
19	Singh, 2018
20	Chui et al., 2021
21	KPMG and GSA, 2022
22	Dahlqvist et al., 2019
23	Insider Intelligence, 2022
24	Hassan, 2022
25	Hiter, 2021
26	Emergen Research, 2022
27	IDC, 2021b
28	Ahmed, 2021
29	OECD, 2019; Byers, 2015; Claros and Davies,2016
30	Roser et al., 2015
31	Markow et al., 2017
32	McKinsey Global Institute, 2013
33	Malas, 2022
34	Bureau of Labor Statistics, U.S. Department of Labor, 2022
35	Blockchain-as-a-Service (BaaS) describes the practice whereby external service providers setup the necessary blockchain technology andinfrastructure for a customer for a fee. A client pays the BaaS provider to set up and maintain blockchain connected nodes on their behalf. The BaaS provider handles the complex back-end aspects for the client and their business.
36	Akilo, 2018; Patrizio, 2018; Anwar, 2019
37	IDC, 2021a
38	Hardy, 2022
39	Kandaswamy et al., 2018
40	MarketWatch, 2019
41	Deloitte, 2017
42	The Blockchain Academy, 2021
43	Gartner, 2022
44	McKinsey and Company, 2020
45	Cipriani, 2020
46	Campbell et al., 2019
47	PwC, 2021
48	Ericsson, 2022
49	Gergs et al., 2022
50	Maddox, 2018
51	Nokia, 2020; Forbes, 2021c
52	Mandel and Long, 2020
53	Campbell et al., 2017
54	Imarc Group, 2022
55	IDC, 2019a
56	PwC, 2020
57	Durbin, 2022
58	Lux Research, 2021
59	WEF, 2020; Horizon: The EU Research &Innovation Magazine, 2014; Forbes, 2022b
60	WEF, 2020
61	Bunger, 2018
62	Automate, 2020; Technavio, 2018b; Yuan, 2018;Mitrev, 2019
63	McKinsey & Company, 2019; Chakravorty, 2019
64	McKinsey & Company, 2019
65	Occupational Information Network, 2022
66	Grad School Hub, 2020
67	Technavio, 2018a; FPV Drone Reviews, 2019;Joshi, 2019
68	IDC, 2018
69	Feist, 2021; Ritsick, 2020
70	Cohn et al., 2017
71	PwC, 2017b

72	Mazur and Wisniewski, 2016
73	Australian Government, Department of Infrastructure, Transport, Regional Development and Communications, 2020
74	Schroth, 2021
75	Schmidt, 2017; Philippidis, 2018; Acharya, 2019
76	UNCTAD, 2017; World Health Organization,2021; Fajardo-Ortiz et al., 2022
77	Muigai, 2022; Loo, 2014
78	*Forbes*, 2021a; Zhang et al., 2020
79	Plumer et al., 2018; World Health Organization,2021
80	Bureau of Labor Statistics, U.S. Department ofLabor, 2019a, 2019b; Thompson, 2017b
81	Cox, 2019; Nano.gov, 2020
82	Brooks, 2022
83	Aithal and Aithal, 2016: Osman, 2019
84	CareerExplorer, 2020b
85	Peterson's, 2017
86	Reiff, 2020
87	Doshi, 2017
88	Sendy, 2022; Solar Industry Research Data, 2022
89	International Energy Agency, 2022a
90	Zhang et al., 2021
91	IRENA, 2021a
92	Solar Industry Research Data, 2022
93	IRENA, 2021a
94	International Energy Agency, 2020a
95	IRENA, 2021c
96	IEA, 2021; Bravo and Friedrich, 2018; Alnaimat and Rashid, 2019; International Energy Agency,2022a
97	IRENA, 2021a
98	IRENA, 2021a
99	United Regions Energy Information Administration,2022
100	Witcover and Williams, 2020
101	International Energy Agency, 2021
102	OECD-FAO, 2020
103	United Regions Environmental Protection Agency,2022
104	IRENA, 2021a
105	United Regions Department of Energy, 2021
106	United Regions Energy Information Administration,2022b
107	IEA, 2020
108	IRENA, 2022b
109	International Energy Agency, 2020c
110	Luo eat al., 2018; IRENA, 2022c
111	IRENA, 2021a
112	Ravillard et al., 2021
113	IRENA, 2021b
114	International Energy Agency, 202b
115	International Energy Agency, 2020b
116	IRENA, 2019b
117	IRENA, 2021a
118	Global Wind Energy Council, 2021
119	The Business Research Company, 2021
120	IRENA, 2020
121	KPMG, 2020
122	IRENA, 2020
123	Global Programme on Green Hydrogen inIndustry, 2022
124	IRENA, 2021a
125	Business Upturn, 2021
126	Nixon, 2022
127	Wall Street Journal, 2022
128	IEA, 2022b
129	Hamilton eat al., 2020
130	IEA, 2022b
131	Business Today, 2022
132	Pek et al., 2018
133	UC Berkeley and GridLab, 2021