THE EAST AFRICAN REGIONAL SCIENCE, TECHNOLOGY AND INNOVATION POLICY 2022-2033

FOREWORD

The East African Community (EAC) lays emphasis on developing policies and programs aimed at widening and deepening co-operation among the Partner States. Specifically, Article 5 (1) of the Treaty states the objectives of the Community as: "to develop policies and programs aimed at widening and deepening co-operation among the Partner States in political, economic, social and cultural fields, research and technology, defense, security and legal and judicial affairs, for their mutual benefit." To attain these objectives, the Partner States committed themselves to establish a Customs Union, a Common Market, a Monetary Union and ultimately a Political Federation. These institutional arrangements are expected to promote balanced development and equitable distribution or sharing of economic benefits arising out of economic and political integration.

The East African region stands at a critical turning point in its socio-economic transformation and development. The improved performance of the GDP over the last decade has raised the aspirations of East Africans and sprouted renewed interest for investment in the region. The EAC Heads of State are determined to implement the necessary agenda as enshrined in EAC Vision 2050 to fulfil the rising aspirations and the continental and global expectations. However, such regional ambitions can only be attained on the wheels of a solid base of Science, Technology and Innovation (STI). This is because STI which is a key driver of socioeconomic development is essential for the growth and competitiveness of national economics in the 21st century and helps to solve a range of economic and social problems faced by nations today. This is the resounding lesson from the advancement of the industrialized and newly industrialized countries.

The EAC Treaty provides an elaborate legal framework for cooperation in the areas of science and technology. By so doing, the Treaty not only sets the agenda in this area, it also outlines a set of common principles and undertakings by the Partner States in designing their national science and technology policy priorities and programs. Chapter 16 of the EAC Treaty provides for cooperation by the Partner States in the areas of human resources, science and technology. Under article 102 dealing with human resources development, the Partner States commit to cooperate in a wide range of issues including coordination of human resources development policies and programs; establishing common research and training institutions; cooperation in industrial training, and harmonization of the education curriculum, among others. In article 103 of the Treaty, the Partner States restate their recognition of the fundamental importance of science and technology in economic development. The Treaty outlines a number of strategic actions that are relevant to STI. These are promotion of industrial research and development; the transfer, acquisition, adaptation and development of modern technologies; establishment of joint industrial institutions and other infrastructure facilities; and dissemination and exchange of industrial and technological information. The EAC identifies the widening and deepening of co-operation among Partner States in Science, Technology and Innovation (STI) as a key objective of the Community.

Therefore, the East African Regional STI Policy has been aligned with regional EAC priorities as outlined in the EAC Vision 2050, the national development objectives of Partner States, as well as with the Sustainable Development Goals and the Science, Technology and Innovation Strategy for Africa 2024 (STISA). In order to ensure the achievement of the EAC Vision 2050 objectives, the East African Regional STI Policy has provided for key long-term objectives and strategies in relation to EAC long-term development and integration pillars, as well as the Partner States' common areas of interest as per their respective Science, Technology and Innovation policies.

The EAC Regional STI policy will avail opportunities for coordination between national and regional level developments which will serve to avoid unexpected risks caused by uncoordinated activities and harness available synergies. The policy will also enable the harmonization of national policies and strategies and facilitate the various stakeholders in the region to work towards a common goal albeit within the context of their particular countries.

The East African Regional STI Policy is anchored on the following pillars: 1) STI Capacity Skills and STI Infrastructure; 2) Research, Innovation and Entrepreneurship; 3) Financing, partnerships and collaborations; and 4) Enabling environment

On the other hand, the policy provides for specific STI objectives and targets for Science, Technology and Innovation to support socio-economic development through 11 the priority sectors.

With the EAC Regional STI Policy, the private sector has been earmarked as a key stakeholder in enabling increased innovation and STI development and application.

Lastly, it is the deep conviction of the EAC Partner States that the East African Regional STI Policy shall contribute to the East Africa we want, through an effective and efficient exploitation of the innovative capacity of the sons and daughters of the East African Community to drive the sustainable development of our region.

Chairperson of the Council

EXECUTIVE SUMMARY

I. Background

The East African Community (EAC) is a regional inter-governmental organization comprising the Republics of Tanzania, Burundi, Kenya, Rwanda, Uganda, and South Sudan with the main objective of developing policies and programs aimed at widening and deepening co-operation among the Partner States. In particular, Article 5 (1) of the Treaty states the objectives of the Community as: "to develop policies and programs aimed at widening and deepening co-operation among the Partner States in political, economic, social and cultural fields, research and technology, defense, security and legal and judicial affairs, for their mutual benefit".

The EAC Treaty also provides an elaborate legal framework for cooperation in the areas of science and technology. In order to strengthen cooperation, coordination and promotion of Science and Technology in the EAC, the 5th Extra-ordinary Summit of the EAC Heads of State held on 18th June 2007 established the East African Science and Technology Commission (EASTECO) as an institution of the EAC, with an overall objective to coordinate and promote the development, management and application of Science and Technology in Partner States.

Furthermore, at Country level the EAC Partner States have enacted laws and/or developed national STI policies to support the development of research capacity, human resources and talent, develop and sustain a network of scientists, support the growth in the use of ICT, develop institutional capacity and improve linkages with the private sector. In addition to policies, the Partner States have established national commissions/councils for science, technology and innovation to undertake the promotion, regulation, assure the quality and advise the governments on matters of science, technology and innovation.

However, the implementation of national STI policies is at varying stages in the EAC Partner States. Some of the key challenges hampering the development and implementation of effective STI policies in EAC Partner States are among others weak human and institutional capacity for STI development; inadequate support mechanisms for innovation; inadequate funds; lack of up-to-date, reliable data and indicators on the current status of STI. This has resulted in weak and non-direct linkages for science, technology and innovation to support societal needs and economic growth.

Thus, this East African Regional Policy for Science, Technology and Innovation aims at setting policy objectives for the development, management and application of Science, Technology and Innovation to support socioeconomic development and regional integration in the EAC.

II. Vision for the EAC and Vision and Mission of STI

Vision of EAC- To become a globally competitive upper-middle income region with a high quality of life for its population based on the principles of inclusiveness and accountability

Vision of EAC STI Policy - An Integrated, advanced and competitive Community through knowledge based economy.

Mission of EAC STI Policy - To harness Science, Technology and Innovation for sustainable regional development, socio-economic transformation and global competitiveness.

III. EAC STI Pillars and Priorities

The East African Regional STI Policy is anchored on the following pillars: i) STI Capacity Skills and Infrastructure; ii) Research, Innovation and Entrepreneurship; iii) Financing, partnerships and collaborations; and iv) Enabling environment. On the other hand, the priority (sector) areas for the East African Regional Policy for Science, Technology and Innovation (STI) are: (1) Agriculture and Food; (2) Health and Life Sciences; (3) Human Capital Development; (4) Infrastructure; (5) Energy; (6) ICT and Big Data (7) Industrialization and Trade; (8) Environment, Natural Resources Management and Blue Economy management; (9) Climate Change; (10) Traditional Indigenous Knowledge and Cultural Expressions; and (11) Space Science and Technology.

IV. EAC STI Policy Layout

The EAC STI Policy document is divided into 5 chapters:

a. **Chapter 1: Introduction.** This covers the introduction, background, global and continental environment for STI, rationale, situation analysis, environmental scan, review of legal framework for STI, emerging issues and identified challenges.

b. **Chapter 2: Vision, Mission, Guiding Principles, STI Policy Objectives, Pillars and Development Priority Sectors.** The chapter covers the EAC vision and mission for STI, the EAC STI Policy objectives, guiding principles, Pillars and EAC priority sectors for STI and the corresponding strategic policy objectives.

c. **Chapter 3: East African Innovation Ecosystem.** This chapter covers the national innovation system, EAC innovation ecosystem, policy support measures/ priorities to improve S&T led innovation in EAC, 4th industrial revolution and management of intellectual; property rights.

d. **Chapter 4: Policy Implementation System.** This covers the regional harmonized STI platform, EAC decision making and implementing institutions for the EAC STI Policy; implementation mechanisms; regional, continental and international collaborations; strategies for implementation of the EAC STI Policy and promoting a culture for STI. The chapter also covers sections on Partner States efforts in financing STI, private sector financing for STI development and application, EAC Research and Innovation Fund, African STI Fund, Development Partners/ Donors contribution to STI development and application, and NGOs and other stakeholders' contribution to STI development and application. This chapter concludes with a section on communication and outreach tools for the EAC STI Policy and knowledge management for STI

e. **Chapter 5: Monitoring and Evaluation (M&E Framework).** This covers M&E implementation plan, measuring the performance of STI and STI indicators, Risk and Success Factors and Risk Mitigation Measures.

The EAC Heads of State committed themselves to implement the ***EAC Vision 2050*** for the mutual benefit of the Partner States and enhance the quality of life of the people of the East African Community. The East African Regional Policy for Science, Technology and Innovation has been developed to ensure that EAC harnesses science, technology and innovation (STI) for global competitiveness, socioeconomic transformation and sustainable regional development.

ACRONYMS

AERC	African Economic Research Consortium
AIDA	Accelerated Industrial Development of Africa
ASTII	African Science Technology and Innovation Indicators
AU	African Union
AUC	African Union Commission
CFTA	Continental Free Trade Area
CoE	Centres of Excellence
COMESA	Common Market for Eastern and Southern Africa
COSTECH	Commission for Science and Technology
CPA	Consolidated Plan of Action
DAAD	German Academic Exchange Service
EA	East Africa
EAC	East African Community
EADB	East African Development Bank
EAHRC	East African Health Research Commission
EAKC	East African Kiswahili Commission
EARF	East African Research Fund
EASTECO	East African Science and Technology Commission
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
EU	European Union
FDI	Foreign Direct Investment
GCI	Global Competitive Index
GDP	Gross Domestic Product
GKI	Global Knowledge Initiative
GERD	Gross Domestic Expenditure on Research and Development
HDI	Human Development Index
HEI	Higher Education Institution
ICT	Information and Communication Technology
ICTs	Information and Communications Technologies
IGAD	Intergovernmental Authority on Development
IP	Intellectual Property
IPR	Intellectual Property Rights
IUCEA	Inter-University Council for East Africa
KAM	Kenya Association of Manufacturers

KEPSA	Kenya Private Sector Alliance
KPI	Key Performance Indicator
LPAED	Lagos Plan of Action for Economic Development
LVBC	Lake Victoria Basin Commission
LVFO	Lake Victoria Fisheries Organization
MDA	Ministries, Departments and Agencies
MDG	Millennium Development Goals
M&E	Monitoring and Evaluation
NACOSTI	National Commission for Science, Technology and Innovation (Kenya)
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organization
PPP	Public Private Partnerships
R&D	Research and Development
RECs	Regional Economic Communities
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
SA	Stakeholder Analysis
SADC	South African Development Community
SDG	Sustainable Development Goals
SET	Science, Engineering and Technology
SETI	Science, Engineering, Technology and Innovation
SME	Small and Medium enterprises
STEI	Science, Technology, Engineering and Innovation
STEM	Science, Technology, Engineering and Mathematics
STI	Science, Technology and Innovation
STISA	Technology and Innovation Strategy for Africa
STS	Science and Technology Technical Services
SWOT	Strengths, Weaknesses, Opportunities and Threats
S&T	Science and Technology
TVET	Technical Vocational Education and Training
UNECA	United Nations Economic Commission for Africa
UNESCO	United Nations Educational, Scientific and Cultural Organization
US/USA	United States/ United States of America
USD	United States Dollars
USAID	United States Agency for International Development
WB	World Bank

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INTRODUCTION

The Treaty for the Establishment of the East African Community (EAC) recognizes the fundamental role of science and technology for the economic development and it encapsulates, in Chapter 16, article 103, provisions for the Partner States to promote cooperation in the development and application of science and technology within the Community, complemented by article 80 on industrial development. In accordance with the above- mentioned provisions of the Treaty, the 5th Extra-ordinary Summit of the EAC Heads of State held on 18th June 2007 established the East African Science and Technology Commission (EASTECO) as an institution of the EAC with the overall objective to coordinate and promote the development, management and application of Science and Technology in Partner States to support regional integration and socio-economic development. The Partner States also established the Common Market in 2010, through a protocol that identifies Scientific Research and Technological Advancement as one of the objectives of the Common Market and states relevant provisions for science, technology and research in relation with Intellectual Property, Scientific Research and technology Development, and industrial development in articles 42, 43 and 44 respectively.

The East African Science and Technology Commission (EASTECO) is mandated to provide support mechanisms to facilitate the harnessing and application of Science, Technology and Innovation at a regional level. In this regard, the Commission developed a five Year Strategic Plan 2017/18-2021/22, which was approved by the EAC Council of Ministers in April 2017. This EASTECO Strategic Plan is aligned with the 5th EAC Development Strategy, 2016-2021, and identifies 5 Priority Areas of Intervention: i) development of evidence-based policy frameworks for science, technology and innovation; promotion of scientific and technology knowledge and innovation; iii) application of STI for socio-economic development; iv) stakeholder engagement for STI; and v) strengthening of the institutional framework. The First Strategic Priority area on the development of regional evidence based policy frameworks for Science, Technology and Innovation, is focusing on the EAC Regional Policy on Science, Technology and Innovation which complies with the main EAC Science, Technology and Innovation objectives.

1.1. JUSTIFICATION/ RATIONALE

Historical experience has shown that policies that promote science and technological learning and innovation can stimulate structural change, improve economic competitiveness and create growth. Recognizing this from developed countries, there is a growing interest among developing countries in defining the STI policies within their overall strategic development policies and priorities. The success of a number of emerging countries in technological and economic catching-up has renewed interest in science, technology and innovation. It was observed that the rapid and sustained growth of the South-East Asian economies was primarily due to market-friendly economic policies, the good allocation of physical and human resources to highly productive investments, and the acquisition and mastering of technology.

The economic growth of the EAC region in the last ten years has been one of the fastest of Africa, with an average of 6.2%. The EAC however recognizes that for the Partner States to reach a status of upper middle income economies by 2050, the regional growth must accelerate to 8.5% between 2016 and 2030 and then increase further to grow at 10% per annum for the next 20 years to 2050. The EAC region is facing a challenge of producing and exporting low value added products, inadequacy of market incentives to produce innovative products and processes, shortage of skilled scientists, technologists, engineers and mathematicians though the region has potential to harness capacity to create, acquire, accumulate, disseminate and exploit scientific and technological know-how as an indispensable factor to industrial development.

The STI Policy aims at enhancing economic growth, as well as social progress, in harmony with sustainability, through the development of an enabling environment in support of commercialization, promotion of innovation capacity, protecting the intellectual property rights, establishment of sustainable institutional and structural mechanisms for common regional programmes on science, technology and innovation, and the facilitation of science, technology and innovation cooperation among Partner States. The policy is expected to drive investments in science, technology and S&T-led innovation to support the transformation of the EAC Partner States from commodity-based towards knowledge-based economies.

The East African Regional Policy for STI will enable the Partner States to: review and harmonize their national STI policies; Have joint infrastructure and facilities for R&D; mobilize and share their scarce resources to conduct science and generate technological innovations thus minimizing duplication and wastage; jointly finance and undertake projects and programs of regional interest instead of each Partner State going it alone; jointly develop human skills base by increasing the number of scientists, technologists, engineers and mathematicians; improve the quality and intensity of regional cooperation; and enable the mainstreaming of S&T into regional sectoral programs and projects among others.

The EAC STI Policy will provide a platform for the EAC to harnesses science, technology and innovation for global competiveness, sustainable regional development and socio-economic transformation and enable the fast tracking of political integration.

1.2. STAKEHOLDER ANALYSIS

Noting the cross-cutting role of Science, Technology and Innovation in driving socio-economic development various sectoral stakeholders are critical due to their role in the development and the implementation of the regional and national policies for Science, Technology and Innovation. Key

stakeholders according to their high level of influence and interest in STI include among others: i) EAC Organs and Institutions; ii) Partner States Governments and National Science, Technology and Innovation Agencies and Institutions; iii) the Private Sector, Professional Bodies, Academia and Research Organisations; iv) International Organisations, Development Agencies and Partners. The relevant stakeholder for Science, Technology and Innovation are presented in figure 1.1 below according to their influence and interest in STI. The level of influence or power expresses the degree of ability, authority or involvement to help or guide the development and the implementation of STI policies, while the level of interest reflects the degree of support or opposition to STI policy objectives.

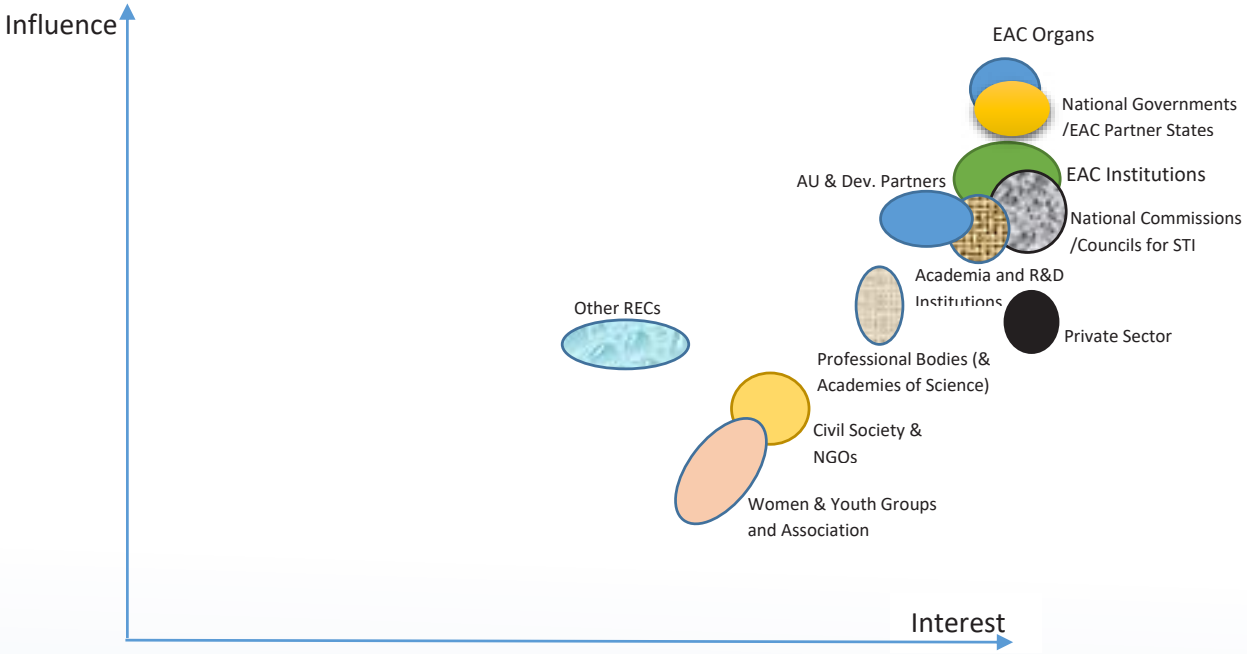

Figure 1.1: Stakeholders Level of Influence and Interest in the Development and implementation of the EAC STI Policy (High/Medium/Low)

1.3. THE STATE OF STI IN EAST AFRICA: A SITUATION ANALYSIS

In compliance with the EAC Treaty and the Common Market Protocol, the EAC Vision 2050 identifies Science, Technology and Innovation and Research and Development to be among the key enablers for the pillars areas that will underpin the transformation for growth and development and move the Community to an upper middle-income economy, subsequently achieving the Sustainable Development Goals (SDG). This requires the Gross Domestic Product of the EAC Partner States to sustainably grow at 10% annually.

However though most of the EAC countries experienced an average economic growth of 6% during the last decade this pattern is below the targets of the EAC vision 2050. Moreover the growth distribution is a high share from the agriculture sector (around 34%) and a low contribution of the manufacturing sector which is still below 14% in all EAC Partner States.

Though the GDP share of the agriculture sector decreased in recent years it still counts for more than 25% while the contribution of the service sectors increased beyond 45% of the GDP. In the current situation the GDP share of the manufacturing sector fell down to 8.5% in 2015 far below the level of 25% targeted by 2032, as demonstrated in the EAC Industrial Competitiveness Report, 2017. The acceleration of the economic growth of EAC Partner States shall stand from the increase of agriculture productivity and the exploitation of abundant natural resources leading to the improvement and diversification of the manufacturing sector through adoption and transfer of technologies for processing of agriculture products and other natural resources. The development and adaptation of new and emerging technologies and innovation are paramount to keep the service sector growing with a shift, on long term period, from resource-based and low-tech sectors to a larger share of medium and high-tech sectors.

Therefore, in line with the EAC industrialization Strategy, 2012-2032, there are various strategic and attractive domains requiring STI applications, with skilled human resource being a core factor to exploit research and technology development findings, adopt and absorb innovative solutions. Key strategic industrial sectors include agro-processing, fertilisers and agrochemicals, pharmaceuticals, iron-ore and mineral processing, energy and bio-fuels, petrochemicals and gas. Other reginal policy instruments where STI shall create impact include i) the Agriculture and Rural Development Strategy for the East African Community (2005-2030); ii) the Regional Strategy on Scaling-up Access to Modern Energy Services in the East African Community; iii) the EAC Climate Change Policy; iv) the Protocol on Environment and Natural Resource Management.

However a low level of appreciation of the role of Science, Technology and Innovation (STI) is observed in driving the socio-economic development of EAC Partner States due to the weak adequacy of policy and legal frameworks to support STI, and the lack of immediate and tangible benefits.

The following are key characteristics of the current operating environment in which the East African Regional STI Policy is being developed and implemented:

a. **Explicit recognition of the importance of STI in economic growth** – The leaders of the six Partner States have explicitly recognized the importance of STI in the EAC Treaty and the EAC Common Market Protocol. The Partner States have integrated STI considerations into a raft of policy frameworks and adopted a common market protocol that emphasizes STI development and application. They have also launched a number of regional STI initiatives including the establishment of the East African Science and Technology Commission (EASTECO), the Inter University Council of East Africa, the East African Health Research Commission and other EAC Institutions.

b. **Enabling environment and Implementation of the EAC Four Freedoms** – The Protocol on the Common Market provides for "Four Freedoms", namely the free movement of goods, labour, services, and capital, which will significantly boost trade and investments and make the region more productive and prosperous.

c. **Access to untapped natural resources** - The Community is endowed with a variety of natural resources such as minerals, oil, and natural gas. These resources have attracted significant investments (in the form of FDI) in the infrastructure required to extract, process and transport these resources.

d. **Diverse Economies and increasing private sector** - Unlike oil-based economies, the EAC has a relatively diverse economy with significant contributions from a number of sectors including agriculture, manufacturing, retail, services and tourism. This diverse economy has enabled the region to weather shocks occasioned from the global financial crisis, provide greater opportunities for entrepreneurship, private sector development and create a larger and growing middle class. Over the last decade there is commendable growth in the private sector. However, the local private sector uptake of STI is still low and the EAC lacks large local companies to support East African innovation activities.

e. **Increased trade volumes because of regional integration -** Deeper regional integration has increased trade volumes. EAC Partner States are also members of COMESA with exception of Tanzania that is a member of SADC. The Member States of these three Regional Economic Communities entered into an Agreement to establish the COMESA-SADC-EAC Tripartite Free Trade Area (TFTA) which offers an opportunity for industrial development, manufacturing and the movement of goods and services. More recently the African Union Member States established the Continental Free Trade Areas (CFTA), offering a larger space than the TFTA. East Africa will benefit from global trade under initiatives such as African Growth and Opportunity Act (AGOA) and world's leading emerging economies group, namely Brazil, Russia, India, China and South Africa (BRICS) if its products are high valued and competitive. Increased trade has the potential of increasing higher value-added activities by harnessing the potential of STI.

f. **Political stability and establishment of democratic institutions** - The Partner States of the EAC have enjoyed relative peace over the last two decades with only slight intervals of unrest. This period of stability has culminated in the establishment of democratic institutions and sustained economic growth. It has also enabled the Partner States to articulate national policies to facilitate the development of STI within their countries. Kenya, Uganda and Rwanda for example have laid out their national aspirations with regard to STI in their constitutions. Also, EAC Partner States have national visions that articulate the role of STI in their socioeconomic transformation.

g. **Population growth:** The East African Community population growth is one of the fastest in the world, standing at an annual rate of 3% for about 180 million people. This presents a large market for goods and services.

h. **Women Empowerment in the STI Space** - Women comprise more than 50% of the population of the East African Community; however, their participation in STI has been limited.

i. **Inclusion of the Youth in Economic Development through STI** - Article 120 (c) of the Treaty for the Establishment of the East African Community states that the Partner States shall undertake to co-operate amongst themselves in the field of social welfare by facilitating the development and adoption of a common approach towards disadvantaged and marginalized groups. This includes children, the youth, the elderly and persons with disabilities through rehabilitation and provision of among others, foster homes, healthcare, education and training.

j. **ICTs and Mobile Communications** - Sub-Saharan Africa (SSA) has been the fastest growing region over the last five years in terms of both unique subscribers and connections to mobile phone technology. As in other SSA countries, Consumers, governments and businesses across the EAC are rapidly adopting mobile, not only as a basic communication tool but also to access information and a growing range of new applications and services. EAC Partner States have deployed ICT infrastructure where broadband communications are supported by mobile communications and optical fibre networks. The internet penetration has increased many fold and became accessible to rural population. Feature phones and more recently the increasing adoption of smart phones, are bringing internet access to the masses across the region. Mobile communications will thus be the key access technology to enable unconnected populations bridge the digital divide.

k. **Education and Research system:** The number of higher education institutions have gone up in the EAC. However, most of these higher education institutions still lack adequate teaching and research infrastructure and qualified human resources. The number of purely research institutions has remained stagnant and most of them are characterized by inadequate laboratory equipment and infrastructure (there still exists old non-working piping systems, decaying greenhouses and labs), lack of sufficient researchers and other technical staff and inadequate research funds. As a result, the research output is still low in EAC Partner States and in some cases researchers are idle even though they constitute of highly educated population

Furthermore, the strength, weakness, opportunities and threats (SWOT) regarding STI in EAC are provided in Table 1.2 below.

Strength	Weaknesses
i. Regional STI Institutions established such EASTECO, IUCEA, etc. ii. Existing innovation ecosystem in partner states iii. Availability of National STI Institutions operating in different sectors iv. There are already established regional and international centres of excellence v. Availability of competent workforce in research, science and technology institutions vi. Some Partner States have approved national STI policies vii. Availability of investment opportunities in various sectors from agriculture to manufacturing, tourism, financial services, infrastructure, energy and ICT	i. Inadequate STI policy and legal framework within the partner states ii. Lack of harmonization in national and regional STI policies and strategies iii. Inadequate capacity for STI development iv. Limited academia industry partnership v. Low level of commercialization of research, science and technology outputs
Opportunities	**Threats**
i. High economic growth of EAC Partner States ii. Diverse economies iii. Advancement in regional integration and Free movement of persons, good and services in the region iv. Increased Intra-region trade volumes because of regional integration v. Commitment and Accountability of EAC Partner States in applying STI for socio-economic development vi. Natural resource endowment vii. Integration of potential new members to enlarge the market viii. There is increasing investment in education, skills development and jobs creation, which require more STI uptake ix. There is deliberate effort to enhance research and development x. There is a growing private sector across the EAC xi. There is increased focus on enhancing value addition in production, where STI is a key player xii. Increased effort in expanding trade and market access for manufactured products xiii. Increased attention to Technology Transfer and Innovation Function xiv. Promotion of Gender in industrial development is increasing participation of all genders in STI xv. Ample renewable energy sources (Hydro, Solar, Geo Thermal, wind etc.) xvi. Capacity building of STI public institutions in Partner States xvii. Development of a green economy xviii. Development partners willing to support R&D	i. Dynamic international political space and priorities ii. Social instability-global warming and environmental degradation iii. An unfavorable macroeconomic environment and economic down turn iv. Increasing international competitiveness v. Increasing brain drain

1.4. REVIEW OF LEGAL FRAMEWORKS FOR STI

Legal frameworks comprise of sets of documents that include constitutions, treaties, protocols, acts, legislation, policies and legally binding regulations. Legal frameworks that will influence the implementation of the EAC STI Policy go beyond the EAC to continental and global levels.

The national constitutions of most of the six EAC Partner States have clear provisions on science, technology and innovation (STI). The national STI policies of these states are in conformity with the national constitutions. This shows that the importance of STI is enshrined in the fundamental principles on which these States are governed.

Furthermore, the Partner States have long term visions and national development plans which can be realized if the potential of STI is fully exploited. A review of the Partner States' national development plans indicates that the countries' national priorities are rather similar and all countries have strategies and plans to address various identified challenges as far as the priorities are concerned. The following documents were reviewed to identify the Partner States' national priorities: Burundi Vision 2025, Rwanda Vision 2030, Kenya Vision 2030, South Sudan Vision 2040, Tanzania Vision 2025, and Uganda Vision 2040. The following priorities were identified among the EAC Partner States: Agriculture, Animal husbandry and rural development; Energy; ICT; Health; Human Capacity Development/Education; Infrastructure development; Peace, security and good governance; and Sanitation, Climate Change, Environment and Natural Resources Management. Unlike other EAC Partner States, Rwanda and Kenya also prioritize Space Science, Technology and Mathematical Sciences as well as Traditional and Indigenous Knowledge.

While STI is not single handedly mentioned as a priority area in the Partner States' national development plans, it can be viewed as a cross cutting enabler of all priority areas mentioned above. This underscores the need for strategic implementation of STI in the Partner States and at the level of the East African Community.

It is important to note that the individual Partner States already have STI policies and national councils/commissions for STI specially for spearheading STI policy implementation. STI in the Partner States is managed by relevant government ministries and implementation of STI related objectives is handled by the national councils/commissions for STI.

1.4.1. EAC Regional Legal Frameworks for STI

Besides the national policies for STI, the East African Community has regional statutory bodies and instruments put in place to regulate and govern STI in the region.

The Treaty for the Establishment of the East African Community (EAC) identifies the widening and deepening of co-operation among Partner States in Science, Technology and Innovation (STI) as a key objective of the Community.

Article 5 (1) of the Treaty states the objectives of the Community as: "to develop policies and programs aimed at widening and deepening co-operation among the Partner States in political, economic, social and cultural fields, research and technology, defense, security and legal and judicial affairs, for their mutual benefit." To attain these objectives, the Partner States committed themselves to establish a Customs Union, a Common Market, a Monetary Union and ultimately a Political Federation. These institutional arrangements are expected to promote balanced development and equitable distribution or sharing of economic benefits arising out of economic and political integration.

Chapter 16 of the East African Treaty establishing the East African Community provides for cooperation by the Partner States in the areas of human resources, science and technology. Under article 102 dealing with human resources development, the Partner States commit to cooperate in a wide range

of issues including coordination of human resources development policies and programs; establishing common research and training institutions; industrial training, and harmonization of the education curriculum, among others. In article 103, the Partner States restate their recognition of the fundamental importance of science and technology in economic development. The EAC Treaty provides an elaborate legal framework for cooperation in the areas of science and technology. It outlines a number of strategic actions that are relevant to STI. These are promotion of industrial research and development; the transfer, acquisition, adaptation and development of modern technology; establishment of joint industrial institutions and other infrastructure facilities; and dissemination and exchange of industrial and technological information.

Main Provisions on Science, Technology and Innovation under the EAC Common Market Protocol include Article 42 on research and technological development; Article 43 on Cooperation in intellectual property rights and Article 44 on cooperation in industrial development:

In alignment with the EAC Treaty and EAC Common Market Protocol, the EAC Vision 2050 identifies STI as key enabler to the Community's socio-economic aspirations and was developed within the long-term strategic frameworks and visions of the Partner States and its achievement is supported by various EAC policies. While there is no direct policy guiding STI implementation currently, the EAC Industrialization strategy and policy spells out the importance of strengthening Research and Development (R&D), technology and innovation capabilities to facilitate structural transformation of the manufacturing sector and upgrading of production systems in the East African region.

1.4.2. Establishment of EASTECO

The 5th Extra-ordinary Summit of the EAC Heads of State held on 18th June 2007 established the East African Science and Technology Commission (EASTECO) as an institution of the EAC.

As per the Protocol establishing EASTECO, the overall objective of the Commission is to *coordinate and promote the development, management and application of Science and Technology in Partner States to support regional integration & socio-economic development.*

The specific objectives of EASTECO include among others i) cooperation in the development of regional science and technology policies; ii) the joint mobilization, utilization, management and development of resources, both material and human, for the development of science and technology in the Community; iii) cooperation in the joint research and development in science and technology; iv) promotion of scientific and technological innovation and invention within the Partner States; v) the development, adoption and utilization of information and communication technology, as well as the adoption of new and emerging technologies; and vi) cooperation with organizations with similar objectives.

1.4.3. The Continental Frameworks for STI

African national governments and regional economic communities recognize the central role of science, technology and innovation in integrating the continent. They also recognize that a wider economic space—free of entry barriers—can spur innovation, development and creativity.

At the third Africa Science, Technology and Innovation forum held in Cairo in February 2018, African ministers underscored the critical role of education, science, technology and innovation in socio-economic development of the continent and the need to accelerate investment in these sectors and boost implementation at national, regional and continental levels; and took into consideration the African Union's vision and strategies for Africa's development as embodied in agenda 2063 "the Africa we want", the continental education strategy for Africa 2016-2025 (CESA), the science, technology

and innovation strategy for Africa 2024 (STISA-2024), as well as the continental technical, vocational and educational training (TVET) strategy. They also recalled the commitment of Heads of State and Government of African countries to invest in education, STI and allocate at least 1% of GDP to research and development (R&D). The forum was co-organized by the African Development Bank and the Egyptian government. The event was also supported by the Republic of South Korea, Japan and other partners.

These initiatives underscore the fact that effective STI policies have been recognized to occur in tandem with collaboration of key stakeholders such as governments, research institutions, industry and firms. These collaborations are required not only in policy formulation but also in ensuring implementation.

In the Goals and Priority Areas for the Agenda 2063, under the Aspiration of "A Prosperous Africa, based on Inclusive Growth and Sustainable Development", the associated goals from the second up to sixth goals with their priority areas, all need development of STI and the related policies.

1.4.3.1. Science, Technology and Innovation Strategy for Africa 2024 (STISA 2024)

Science, Technology and Innovation Strategy for Africa 2024 (STISA-2024), is one of the continental frameworks to support Member States of the Union in their development efforts. The Mission of STISA-2024 is to *"Accelerate Africa's transition to an innovation-led, Knowledge-based Economy".*

STISA-2024 is a ten-year strategy aiming to respond to the demand for Science, Technology and Innovation (STI) to impact across critical sectors such as: i) Eradication of Hunger and Achieving Food Security; ii) Prevention and Control of Diseases; iii) Communication (Physical and Intellectual Mobility); iv) Protection of AU Space; v) Live Together- Build the Society; and vi) Wealth Creation.

The strategy further defines four mutually reinforcing pillars, which are prerequisite conditions for its success. These pillars are i) building and/or upgrading research infrastructures; ii) enhancing professional and technical competencies; iii) promoting entrepreneurship and innovation; and iv) providing an enabling environment for STI development in the African continent.

The implementation of STISA-2024 takes place at three levels: i) at national level where Member States incorporate this strategy into their National Development Plans; ii) at regional level where Regional Economic Communities (RECs), regional research institutions, networks and partners are required to leverage the strategy in designing and coordinating initiatives; iii) at continental level where the African Union Commission (AUC), the NEPAD Agency and their partners advocate and create awareness, mobilize necessary institutional, human and financial resources, track progress and monitor implementation.

1.4.4. Global Frameworks for Science, Technology and Innovation (STI)

1.4.4.1. The Sustainable Development Goals

Science, technology and innovation (STI) are universally recognized as key drivers for poverty eradication and essential components for achieving the Sustainable Development Goals (SDGs). STI features strongly both in Goal 17 on Means of Implementation, as well as a cross-cutting one to achieve several sectoral Goals and Targets. Fostering research, technology development and innovation is also explicitly part of most of the SDGs, such as: i) SGD-2(a) related to ending hunger, achieving food security and improved nutrition, and promoting sustainable agriculture; ii) SDGS-3(b) related to R&D of vaccines and medicines to Ensure healthy lives and promote well-being for all at all ages; iii) SDG-7 to ensure access to affordable, reliable, sustainable and modern energy for all; iv) SDG-8 related to promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work; SDG-9 related to resilient infrastructure and inclusive, sustainable industrialization; v) SDG-12 ensuring

sustainable consumption and production patterns; vi) SDG-14 on the conservation and sustainable use of the oceans, seas and marine resources for sustainable development. In particular, SDG 17 elevates the role of technology and innovation as one of the means of implementation of the SDGs. The set of SDGs offers a comprehensive view on short- and long-term issues, not only for growth, but also for other social and environmental dimensions. The interconnected nature of the SDGs requires effective and comprehensive policy response in STI to entail a coherent and integrated approach to sectoral policies and national and regional development strategies.

1.4.4.2. The Role of Development Partners in STI

Considering the strategic positioning of achieving STI, development partners at a continental and global level have come up with strategies for STI policy implementation specifically for developing countries. Africa Development Bank, World Bank, United Nations Industrial Development Organisation (UNIDO), United Nations Educational, Scientific and Cultural Organisation (UNESCO) and United Nations Conference on Trade and Development (UNCTAD) all have frameworks for STI targeting developing countries like the EAC Partner States. A review of these brings out three key issues addressed by the organisations which are relevant to the EAC STI Policy: a) Achieving the Sustainable Development Goals (SDGs); b) Adding value to natural resource exports; and c) Upgrading technology and capturing the latecomer's advantage in technology adoption.

1.5. EMERGING ISSUES

EAC Partner States have made efforts to integrate STI considerations from global, continental, regional and national perspectives into a range of policy frameworks.

The STI Policies have created impact in their countries such as the allocation of earmarked funding for STI through establishment of Research and Innovation Funds in Kenya, Rwanda and Tanzania. In Uganda, a Ministry of Science, Technology and Innovation was formed in 2016, which was based on the Uganda STI Policy of 2009. The ministry is changing the STI landscape in Uganda resulting into increased funding for STI through establishment of a National Research and Innovation Fund. Rwanda has also launched Research and Innovation Fund under the National Council of Science and Technology that will support the growth and development of innovative businesses that are poised to disrupt traditional markets and drive economic growth in the region.. The EAC STI Policy must harness such positive impacts.

Understandably, EAC Partner States are a heterogeneous group with different social economic status as reflected in the varying GDP as well as different ecosystems and strengths and capacities in various STI endeavors. Consequently, their STI systems and associated R&D systems exhibit wide variety both internally by institution, sector and by region. This is further exacerbated by lack of harmonization of (STI) policies and ineffective coordination between the various Partner States, actors/stakeholders leading to duplication of efforts. This calls for harmonization of STI Policies, coordination and collaboration both at national and regional levels spearheaded by EASTECO. Harmonization of STI Policies and collaboration will remove barriers and inherent limitations to STI development and application in the region. EASTECO basing on East African Regional STI Policy, shall work with national councils/commissions for STI to review the National STI policies to ensure that they are harmonized and aligned to the East African Regional STI Policy. This will ease monitoring, evaluation and coordination of regional STI initiatives/ activities by EASTECO and other EAC Institutions and as well as cooperation and collaboration in areas of common interest by the Partner States.

1.6. THE DEVELOPMENT PROCESS OF THE EAC STI POLICY

Following the above challenges, EASTECO embarked on a rigorous process of developing an EAC STI Policy to address and mitigate the above challenges and fit in the relevant legal frameworks at national, regional, continental and global levels. The development process started off with a review of Partner States' national STI policies with a focus of addressing gaps in these policies. The Review process also covered a legal framework governing STI at national, regional, continental and global levels. The legal frameworks reviewed include sets of documents that include Constitutions, Treaties, Protocols, Acts, Legislation, Policies, Strategies and other legally binding regulations at all levels.

To ensure Partner States' buy in of the EAC STI Policy, the development process included consultations with key stakeholders across the EAC Partner States to collect their views of what should be included in the policy. Stakeholder consultation workshops were held in the six EAC Partner States where at least 295 stakeholders from governments, private sector, academia and research institutions, professional association and the civil society were engaged in discussions on what the EAC STI Policy ought to address and how. Furthermore, several other stakeholders were engaged virtually on an online portal created specifically to collect stakeholder views on the EAC STI Policy. Throughout the development process, various reports (i.e. inception report, interim report, draft report and final report) were prepared and presented to a cross section of stakeholders from the EAC Partner States at validation workshops/meetings where views previously collected and documented in the development process were further analyzed and refined.

It was from this rigorous process that an EAC STI Policy was developed to:

a. Address EAC's mandate to contribute to achieving the Sustainable Development Goals;

b. Tackle the EAC Partner States' development priorities using Science, Technology and Innovation;

c. Address the demands of relevant legal frameworks at national and regional levels;

d. Inspire prioritizing of funding for STI projects by Partner States' governments;

e. Provoke private sector participation in development and application of STI in East Africa; and most importantly

f. Meet the needs of the EAC citizens across the Partner States through implementation of the EAC STI Policy which was developed in partnership with stakeholders across the Partner States.

2.

VISION, MISSION, OBECTIVES,GUIDING PRINCIPLES, PILLARS AND PRIORITIES

2.1. VISION:

An Integrated, advanced and competitive Community through knowledge-based economy.

2.2. MISSION:

The mission of the policy is to harness Science, Technology and Innovation for sustainable regional development, socio-economic transformation and global competitiveness.

2.3. GUIDING PRINCIPLES

The Partner States commit themselves to act in common pursuit of the objectives of this policy, which shall be implemented in accordance with the following guiding principles:

i. STI initiatives be relevant to EAC development;

ii. Equitable participation of all Partner States and shared benefit in joint STI initiates (including projects and programmes) across the Community;

iii. Efficiency in the deployment of resources in STI;

iv. Strengthening partnerships and collaboration at national, regional and international levels;

v. Promotion of gender equity and empowerment of women, youth, persons with disabilities and vulnerable groups in all STI initiatives;

vi. Promotion and protection of intellectual property rights and rewarding excellence;

vii. Promotion of ethical application of STI in accordance with international standards, regional laws and norms;

viii. Commitment to achieve the Sustainable Development Goals;

2.4. EAST AFRICAN REGIONAL STI POLICY PILLARS

For the East African Community to realize structural and socio-economic transformation towards an emerging economy status, there is need to foster technology absorption, adaptation and innovation by investing in inclusive development of skilled human resources, assimilating the available knowledge and generating new cutting-edge knowledge. Linkages and partnerships between academia, research and development organisations, SMEs and manufacturing industrial firms, and STI financing will be set up and strengthened. This calls for prioritizing the following key factors as Pillars for the East African Policy for STI:

(i) STI Capacity Skills and Infrastructure

The development of Science, Technology and Innovation in the East African Community requires the increased attention for the development of human resources expertise by increasing the enrollment for Science, Technology, Engineering and Mathematics (STEM) disciplines in higher learning and ensuring quality education. The EAC Partner States shall cooperate to build adequate human capacity in key regional priority Science, Technology, Engineering and Mathematics (STEM) disciplines, in investing in programmes leading to doctoral qualifications and technical and professional competencies (including Technical, Vocational Education, Secondary education and Training -TVET) and in upgrading and sharing science laboratories and the establishment of world class STI infrastructure. These include training and research facilities, equipment and infrastructure, Innovation hubs and incubators and regional structures including Regional Centres of Excellence for Training and Research, and Regional Networks of Research and Technology Development Organizations (RTOs). Existing physical and digital infrastructure and resources will be leveraged and shared to increase utilization efficiency at national and regional level and reduce maintenance and operating costs through Shared Services. Research and Education Facilities will be networked to facilitate coordinated collaboration, and build global leadership and competitiveness in selected regional priority sectors. Furthermore, the Community will encourage the development of human resources in the social sciences and humanities disciplines to ensure full development and application of STI. This is because of the need for multidisciplinary research, cooperation between the social and natural sciences to draw lessons from the humanities, local and traditional knowledge systems and support the application of research findings.

Partner States will improve national and regional institutional mechanisms to coordinate and manage the development and application of science and technology, being key players for the implementation of the policy.

(ii) Research, Innovation and Entrepreneurship

To unlock the development potential of the EAC Partner States for their structural and social transformation from resource-led economies to knowledge-based economies, the innovation and entrepreneurial capacity will be strengthened to enable the business and industrial sectors better support societal needs and global competition and transformation. The regional and national innovation systems shall be enhanced through partnerships and collaboration initiatives linking education institutions and research organisations, private and public sector actors (at both national and regional level) to facilitate development, adaptation and commercialization of research findings and technological innovation

while fostering entrepreneurship for a strong and globally competitive business sector. The national and regional coordination of research and innovation programmes including technology adaptation and transfer, will ensure an effective and efficient utilization of available resources in alignment with manufacturing and industrial development objectives.

Also since the informal sector (including Jua kali) is still huge, viable relationships will be established between the informal –Jua Kali SMEs and traditional knowledge actors to partner with the academia and R&D institutions for the enhancement of entrepreneurship and market-led research.

(iii) Financing, Partnerships and Collaborations

One of the characteristics of the STI environment in the EAC is the inadequate funding of science, technology, research and innovation activities. This poses a threat on EAC Partner States capacity to face the intensification of the global competition. The EAC Partner States shall allocate increased financial resources for national and regional STI projects and programmes. **The EASTECO Protocol and Act shall include provisions for funding STI at Regional and National levels, with allocation of at least 1% of GDP by Partner States towards Research and Technology Development.** The EAC shall encourage private sector participation in financing STI. The EAC shall leverage the development partners and regional and international organisations to support STI development and application in regional priority areas of the EAC. The EAC shall work towards achieving sustainable funding for STI development and application in addition to ensuring optimal use of resources. Strong advocacy programs shall be in place to inform the political class of the opportunity cost of mainstreaming STI within economic development.

STI development and application requires strong partnerships and collaborations within the EAC and beyond. Partnerships and collaborations with other African Regional Economic Communities (RECs) and the African Union shall be supported as prerequisite for EAC economic and political integration. Furthermore, international partnerships and collaborations shall be encouraged and supported as they will optimize the use of physical, human and financial resources.

The development of STI capacity requires investment in basic science, adequate funding for R&D and availability of financing and early stage risk capital to turn research and ideas into business ventures. As important is the need of a culture that encourages and rewards entrepreneurs and innovators, and accepts failure so that STI activities become more productive. Therefore, the goals for investments and incentives shall be to: i) provide adequate Partner States and EAC funding for basic scientific research; ii) increase industry funding of R&D activities; iii) ensure availability of risk capital to support entrepreneurial activity; and iv) encourage and support the growth of SME's in the fields of science and technology.

Jua-Kali/ informal sector is a major contributor to the economy. The funding from Partner States to researchers and innovators shall be conditioned to having the Jua-Kali as part of the project implementation team. The project design shall also ensure that Jua-Kali are linked to SMEs, researchers and innovators. Technology and knowledge transfer will grow the Jua-Kali sector into SMEs.

(iv) Enabling Environment

The EAC Treaty and protocols, policies and other legal frameworks are creating an enabling environment for STI to thrive within the Community. The East African Policy for STI will fill in the gaps in the legal and policy frameworks. However, the Community shall continue to aspire for political integration. Thus, an inclusive enabling environment for STI must be created by Partner States and EAC to achieve the priorities identified in the East African Regional Policy for Science, Technology and Innovation. The creation of such an environment involves Partner States and EAC having evidence-based policies and programmes that encourage STI development and application. For this to take place national development strategies and sectoral policies shall be linked to the application of science, technology and innovation. Every Partner State requires a coherent national framework for actions that directly affect the promotion of STI. National STI programmes shall be developed by governments in consultation with all national and regional research and innovation stakeholders from the public, private, education and research, societal, international development and funding sectors.

A scientific research, technology development and innovation culture will be promoted through legal and regulatory systems supporting careers and status for researchers, facilitating the implementation of mutual recognition agreements for free movement of professionals including engineers in EAC Partner States, and harmonizing the management of Intellectual Property at Regional and National level.

As part of creating an enabling environment, an EAC research agenda will be developed and adopted by EAC and its Partner States, specifying the priority and thematic areas, management and financing procedures. Thus, creating a functional system that promotes STI will involve creating an enabling environment for all stakeholders, including incentives to attract the East African Diaspora and reduce brain drain of scientists and skilled human resources.

Developing National and Regional STI Indicators and strengthening the Partner States capacity to collect and aggregate national science, technology and innovation data will enable the EAC use those data and indicators to undertake evidence-based decisions.

2.5. MAIN OBJECTIVE

The main objective of the policy is to create an enabling environment that supports sustainable regional development and socio-economic transformation.

2.6. POLICY SPECIFIC OBJECTIVES

The Table 1.3 below shows the specific policy objectives and corresponding strategies and targets:

Table 1.3: Specific policy objectives and corresponding strategies and targets

Pillar	Specific Policy Objective	Strategies to implement the objective	Policy targets, 2020/21 -2028/2029
Building Capacity in Human Resource skills and STI Infrastructure	1. To strengthen human capacity for STI development within the EAC region and ensure attraction and retention of scientists, engineers and technologists	i) Promotion of STEM, including involvement of women and youth, through a regional STEM Strategy; ii) Design and implement mechanisms for attraction and retention of STI human resources; iii) Facilitate free movement and sharing of researchers, engineers, scientists, technologists and innovators across Partner States; iv) Support TVET and Jua-kali for labour market; v) Build global leadership and competitiveness in selected priority areas of Science and Technology; vi) Strengthen capacity for STI within private sector (SMEs/Start-ups)	(i) National and Regional STEM Strategies developed; Educational/ training institutions admission policies reviewed to increase enrolment for STEM and ensure 50% female enrolment; 50% of STI funds for research and innovation awarded to research teams involving female researchers and innovators; (ii) Attraction and retention mechanisms developed and implemented; Ratio of Number of Scientists, Engineers and Technologists per total population doubled within 10 years; (iii) Regional mechanisms supporting free movement of STI professionals in place; MRAs Signed and disseminated to STI related Professional Associations in the Partner States, incl. Engineers, (to support Implementation of Free movement of researchers, engineers, scientists, technologists and innovators); (iv) Regional program developed for TVET; Enrolment in TVET doubled; (v) Regional scholarship programme developed for excellence in selected region al priority areas of Science, Technology, Engineering and Mathematics; Capacity building programmes for researchers and innovators conducted; Ratio of Researchers per total population tripled; (vi) Regional Programme developed for capacity building in Technology and Innovation application for SMEs and start-ups (with training and mentorship)

	2. To establish STI infrastructure for the development and application of Science, Technology and Innovation	i) Establish and support Regional centers of Excellence in STI priority areas ii) Establish support mechanisms for sharing STI facilities, including new and existing Regional Centres of Excellence and Regional networks of Training and research institutions; iii) Establish world class Research and Tertiary Education institutions in EAC Partner States, with cutting-edge equipment and facilities in priority sectors;	i) Regional Centres of Excellence established in STI priority areas, taking into account regional balance; ii) Regional Network established and operational linking Centres of Excellence, High education and R&D institutions; Regional Network of STI and Industrial Parks established with specialization in regional priority development sectors iii) Benchmarking system developed to upgrade STEM training and R&D facilities in the region; Profiles of research institutions published with regular updates
	3. To promote Inculcation of STI Culture in the Community	i) Raise awareness for STI through conferences, fairs, exhibition and mass-media; ii) Support the development of market-relevant curricula in STEM within the educational system iii) Institute mechanisms for identification, recognition, promotion and development of special talent and aptitudes in STI with special focus on women and the youth.	i) Annual awareness programmes for STEM organised, with conferences/ fairs/exhibition and mass-media; ii) Market-led curricula developed for STEM Education and TVETs; iii) Awards and recognition mechanisms established for best students in STEM and STI talented youth and women at national and regional levels (with competitions and awards); career guidance structures established and annual placements conducted for students in STEM within the private and public sector for practical engagements and/or internships to enable them unlock their potential

Research, Innovation and entrepreneurship	4. To promote and strengthen the scientific research and technology development	i) Strengthen the national and regional R&D systems; ii) Develop regional R&D programmes in the 11 priority sectors of high impact potential (East African Regional Collaborative Research Initiative). iii) Develop regional strategy on open science	i) Harmonized regional and national research Agenda developed with a fully operational management framework; ii) Regional Collaborative research programme established and supported, covering the selected regional priority development sectors; iii) Regional Strategy on open science developed and implemented in EAC region
	5. Promote technology transfer and commercialization of research outputs, technology and innovation;	i) Strengthen national and regional Innovation Systems with a view to promote inclusive economic competitiveness; ii) Strengthen the management of Intellectual Property; iii) Facilitate and support conversion of R&D outputs and innovation into business ventures through technology transfer offices and incubation Centres; iv) Leverage indigenous knowledge, processes and technologies to find solutions to regional and national challenges (Promoting documentation, scientific authentication, protection and commercialization of indigenous knowledge and technologies)	i) Regional forum and Network established to support linkages and collaboration between academia, R&D organisations and private business sector; ii) National and regional IP Offices established and accessible to the STI and business communities; iii) Technology Transfer Offices at EAC, national and institutions levels established; Regional Network of incubation centres established iv) Calls for research on indigenous knowledge carried out annually; IP documentation carried out and annually updated for indigenous knowledge and technologies; IP Awareness activities conducted annually among indigenous knowledge and technology communities
	6. To increase the EAC share of global trade in high tech products	i) Develop regional strategy for developing innovative technological products; ii) Develop STI-led Trade policies/strategies at regional and national levels	i) Regional strategy developed and implemented for innovative technological products (including support mechanisms for products out of EAC innovations); ii) Trade policy frameworks reviewed with STI considerations included to promote STI application for trade;

Financing, Partnerships & collaboration	7. To develop and implement gender responsive mechanisms for sustainable funding of STI initiatives	i) Establish regional and national legal instruments with provisions for funding STI at regional and national levels, including allocation of at least 1% of GDP towards Research and Technology Development; ii) Establish the EAC Research and innovation fund; iii) Secure commitments from Partner States to make annual contributions towards STI initiatives	i) EASTECO Protocol and Act adopted which include provisions for funding STI; National legal and policy instruments adopted by Partner States including provisions for funding STI, with allocation of at least 1% of GDP towards R&D; ii) EAC Research and Innovation fund established and operational; iii) Annual direct contributions to the East African Research and Innovation Fund by Partner States realised
	8. To establish effective mechanism for Private sector participation in STI, including PPPs	i) Develop a regional framework for PPP in STI. ii) develop mechanisms for enhanced participation of private sector in STI and R&D, including incentive regimes for private sector investment in R&D.	i) A Regional Partnership framework and programmes developed for private sector investment in STI; Enabling framework for venture capital development developed ii) Private Sector contribution for R&D doubled; List of incentives for private sector investment in R&D approved and implemented at both regional and national levels.
	9. To strengthen regional and international collaboration and partnerships in STI	i) Establish and strengthen regional collaborative programmes in STI with international partners; ii) Encourage and facilitate participation in international STI networks and fora	i) Regional dialogue mechanism established for mobilisation and partnerships with development partners; - Regional Programmes in STI developed and supported by contributions from development partners, for priority sectors; ii) EAC institutions and national STI agencies supported to participate in international STI networks and fora

Enabling environment for STI with adequate legal, regulation and institutional framework	10. Promote and guide the development, integration and harmonization of STI policies, laws and regulations in EAC Partner States	i) Development of the guidelines to facilitate harmonized policies and programmes that support STI development and application; ii) Develop and maintain STI data system to monitor STI indicators at national and regional level; iii) Develop STI-led Sectoral policies at regional and national levels. iv) Strengthen institutional capacity for NCSTs and Ministries responsible for STI (for enhanced regional and national institutional arrangement to coordinate and support STI development and application)	i) National STI Policies reviewed /developed; Mid Term review for the EAC STI policy conducted; ii) EAC STI Indicators developed and monitored; Annual EAC STI policy briefs developed to support development and application of STI iii) STI-led Sectoral policies in place for priority development sectors at regional and national levels iv) Harmonized institutional framework for STI fully operational in each Partner State, including National Commission/Council of Science and Technology; Regional programme conducted to support capacity building for NCSTs in STI, research management, innovation promotion

2.7 PRIORITY SECTORS POLICY STATEMENTS AND SECTORAL OBJECTIVES

As stated in the EAC Vision 2050 and the 6th EAC development Strategy 2016-2021, Science, Technology and Innovation constitute a driver for the achievement of regional development priorities. Therefore the STI specific policy objectives shall support the realization of the EAC development objectives through regional priority sectors.

In alignment with the EAC vision 2050 and the global Sustainable Development Goals, the priority sectors for the East African Regional Policy for Science, Technology and Innovation (STI) are: (1) Agriculture and Food Systems; (2) Health and Life Sciences; (3) Human Capital Development/ Education; (4) Infrastructure; (5) Energy; (6) ICT and Big Data; (7) Industrialization and Trade; (8) Environment and Natural Resources Management; (9) Climate Change; (10) Traditional and Indigenous Knowledge; and (11) Space Science and Technology.

Sectoral policy objectives are provided below under each priority sector as a tool that will facilitate the use of science, technology and innovation for the relevant priority development sector. The regional and national sectoral policies shall be harmonized to incorporate these sectoral policy objectives. Also regional sectoral policies/strategies and initiatives shall be developed and implemented by mandated EAC Institutions, incorporating these sectoral policy objectives.

2.7.1 Agriculture and Food Systems

Agriculture is one of the EAC's most important sectors, with about 80 percent of the population living in rural areas and depending on agriculture for their livelihood. On 23rd June 2017, in Arusha, Tanzania, The EAC Partner States marked a major milestone in their aspiration of placing agriculture as the engine of social and economic growth in the integration process with the signing of the EAC Comprehensive Africa Agriculture Development Programme (CAADP) Compact. The agricultural sector is dominated by smallholder mixed farming of livestock, food crops, cash crops, fishing and aquaculture, forestry products include fruits, honey, herbal medicine, timber and wood for fuel. Agricultural productivity at every level of the chain of production, processing, packaging and marketing will be made to benefit from quality relevant research and development. This calls for increasing the value of agricultural products through agro□business related processes, agro processing, agricultural research with special reference to bio□technology and drought management, addressing biotic and abiotic stresses that lead to losses due to pests and diseases. The focus areas for agriculture include biosciences, biotechnology, food technology, food security, crop production, livestock production, agricultural information, and human resources. Application of STI will be effected in production of fertilizers, plant varieties, animal breeds, mechanization and irrigation technologies to reduce the cost of farming and improve land use to increase productivity. STI will create more value in the regional market by removing inefficiencies in the supply chain by enhancing the quality and quantity of storage facilities, market access and pricing mechanisms.

The Sectoral policy actions for STI in Agriculture and Food Systems are:

i. To use STI to improve agricultural productivity and value chain competitiveness;

ii. Enhance research innovation and technology transfer in the agricultural sector;

iii. To promote STI application for regional and international trade for agricultural products;

iv. To develop human resources for agricultural development.

2.7.2. Health and Life Sciences

A good health system promotes activities and programmes that prevent, control and treat diseases affecting the citizenry. Health will encompass health research and surveillance; Health information systems; Health promotion and education; HIV and AIDS and sexually transmitted diseases; Communicable and non-communicable diseases control; Disabilities; Reproductive health; Health human resources development; Nutrition and food safety; and Violence and substance abuse. Preventive and public health measures to improve sanitation, hygiene and supply of good drinking water and also improved nutrition will be more vigorously pursued with increased use of STI.

The application of biological sciences and technology shall be undertaken for health improvement including, companies in the fields of biotechnology, pharmaceuticals, biomedical technologies, life systems technologies, nutraceuticals, diagnostics and digital health and organizations and institutions that devote the majority of their efforts in the various stages of research, development, technology transfer and commercialization.

The Sectoral policy actions for STI in Health and Life Sciences are:

i. To provide affordable and quality healthcare to the citizenry though the use of technology;

ii. To undertake research for development of efficacious drugs and medicines;

iii. To use STI to improve quality of health care;

iv. To develop the pharmaceutical industry through STI.

2.7.3. Human Capital Development

The strength of EAC STI base depends on the quality of education and training in STEM at all levels of education. There is need to develop adequate and competent human resources necessary for rapid and sustained economic development. Partner States shall take a systematic and coordinated approach to human capital development and popularizing STI as potential career paths at both secondary and higher education levels including TVETs. Human resources development in respect of STI aims at skills development and management. The emphasis shall be on high quality, relevant, equitable and accessible education and training. The priority is the creation of a critical mass of human resources to support technology capture, adaptation and diffusion for all priority development sectors.

The Sectoral policy actions for STI in Human Capital Development are:

i. Develop a harmonized STEM education system (ensure that appropriate content of STEM skills are integrated at the various levels of education and training);

ii. Incentivize STEM career and profession development, put in place mechanism for STEM promotion, public awareness and building of scientific culture;

iii. Promote the the teaching and learning of science, technology and innovation at all levels in the region's educational systems through various platforms including distance learning.

iv. Promote professional development for the work force within science technology and innovation sectors To promote the use of inclusive technology to create interactivepersonalized learning environments, for students with special learning needs at school as well as in Higher Education.

2.7.4. Infrastructure

The EAC Vision 2050 aims at having Infrastructure Systems that facilitate the reduction of costs and hence increase the competitiveness of the region in attracting investments and doing business both within the region and beyond. Infrastructure to be prioritized by the EAC Partner States includes regional transport (road, rail, air transport, maritime and ports), communications systems and energy which are fundamental to cooperation in the EAC region. Housing infrastructure is also key. Thus, the sectoral policy objectives shall focus on application of STI in the transport system, housing, building and construction.

The policy strategies shall rely on STI technologies and S&T innovations in addressing infrastructure sectoral objectives.

The Sectoral policy actions for STI to support Infrastructure development are:

i. To enhance application of conventional and new technologies in the development, maintenance and management of the transport system (road, rail, water, automotive and aviation transportation system, including efficient solar powered cars/ vehicles);

ii. To apply STI in housing, building, construction and urban development initiatives;

iii. Establish STI infrastructures such as STI parks, incubation hubs and centers, and innovation hubs.

2.7.5. Energy

Every economic bloc must have a supply of sustainable, affordable, reliable, safe and clean energy for domestic and industrial use. Energy must be safely produced, distributed and utilized. Well trained engineers, scientists, technologists and technicians are required in adequate numbers to do this. In this regard the sector priorities shall be on the improvement of energy sources for electricity generation (mainly for domestic use in heating, food preparation, industrial production and lighting), improved energy use efficiency and alternative and renewable energy with special emphasis on development of clean energy sources. The other priorities shall be research and development for efficient energy generation, use and conservation practices; research and analysis of waste management and utilization of the same for energy production; exploration to establish the availability and use of alternative energy sources; as well as capacity building and human resource development in energy related to all forms of energy disciplines(fossil fuel, geothermal, biomass and renewable energy).

The region shall invest in the acquisition and deployment of peaceful, safe and appropriate nuclear technologies and other emerging energy sources, including developing the necessary institutional and human capacities to manage safe exploitation of nuclear energy.

The Sectoral policy objectives for STI in energy are:

i. To generate a supply of sustainable, affordable, reliable, safe and clean energy for domestic and industrial use in all forms of energy

ii. To facilitate capacity development for an integrated petrochemical industry to respond to the oil and gas industry

iii. To develop, promote, support, enhance, sustain, and monitor the nuclear energy sector in EAC;

iv. Facilitate capacity building in all forms of energy.

2.7.6. ICT and Big Data

The Information and Communication Technology (ICT) sector offers new opportunities for fast economic growth. Training efforts to build capacity in ICT shall be intensified, there shall be facilitation for the development and growth of a robust ICT software and infrastructure to stimulate and support regional ICT industry growth and improvement of service delivery to both the private and public sectors. ICT will be also applied for e-trade facilitation and the transformation towards a digital economy. Registration and licensing shall be streamlined through e□government and a stable umbrella for public□private sector growth shall be provided. ICT shall be deployed, integrated and popularized in all sectors of the economy including learning institutions, workplaces and rural communities. Also a network of STI information centres, which will be linked to other centres nationally, regionally and internationally shall be developed.

Smart institutions use vast quantities and various types of data to better understand their customers, track inventory, improve logistics and operational processes and make informed business decisions. Successful organizations also understand the importance of managing the burgeoning amounts of big data they are creating, and of finding reliable ways to extract value from them. Having a big data strategy to effectively and efficiently store, manage, process and apply all that data is critical.

A well-defined and comprehensive big data strategy lays out what's needed to become a more data-driven -- and thus successful - organization. It should incorporate guidelines to help accomplish the data-driven vision and direct the organization to specific business goals for big data applications.

The combination of big data, internet of things and artificial intelligence will be promoted for the digital revolution to support the modernization of traditional activities.

The Sectoral policy objectives for STI in ICT are:

i) To establish efficient ICT infrastructure and promote its use to ensure speedy, cost effective and secure access to information, and apply STI in the development and maintenance of communications systems;

ii) To establish a data center and ensure information and communication technologies are available and utilized in all sectors and at all levels of society;

iii) To promote the development and commercialization of innovative software solutions;

iv) To support and facilitate the development and application of artificial intelligence, big data and innovative technologies to ensure technology leapfrogging;

v) To develop a monitoring and evaluation system to be used regularly to support ICT integration in education;

vi) To facilitate the deployment, use and exploitation of ICT

vii) To develop Cyber security aspect of protecting institution, employees and assets against cyber threats.

viii) To provide a clear roadmap for the ways in which the data will be used to support and improve how business is done and the approaches that will be used to manage the big data environment in all sectors.

2.7.7. Industrialization and Trade

Manufacturing, industry and trade are the key sectors for sustainable socio-economic development and regional integration in the EAC. The STI support for the sector will focus on linkage between research findings and industry, technology adaptation and diffusion, diversification and upgrading of productive capacity of industries within EAC. There shall be increase in promotion of utilization of IPR and standards, promotion of the growth of SMEs, increase in utilization of reverse engineering and increase in utilization of cleaner production techniques. Technology transfer offices and science and technology parks shall be supported to enhance and incubate business startups. A more developed STI capacity shall enhance production and processing to increase value addition of products and services in the region.

Technology solutions for customs and border structures shall be promoted to support consistency, predictability, simplicity and transparency of the sector procedures so as to avoid unnecessary burdens on the flow of goods, services and business people.

The Sectoral policy objectives for STI in industrial development and trade are:

i) To increase capacity for industrial production and value addition for strategic manufacturing sub-sectors;

ii) To promote STI applications in commercial activities to ensure quality, reliability and efficiency in the delivery of goods and services in conformity with appropriate regional and international standards;

iii) To support the establishment of specialized industries focusing on electronics, telecommunications and computing devices nanotechnology, materials science and new production technologies;

iv) To promote the development and use of innovative technologies to improve the efficiency of customs administration within EAC.

2.7.8. Environment, Natural Resources Management and Blue Economy management

The environment is a source of natural resources, food, medicines and some of the basic necessities of life. The environment and natural resources sector comprises natural resources (land, water, marine/oceans, mining, minerals, oil, gas etc.), forest, and wildlife. Furthermore, the East Africa's Blue economy is made of vast lakes and rivers and an extensive ocean resource base. The Blue Economy can play a major role in EAC's structural transformation, sustainable economic progress, and social development. The largest sectors of the current EAC aquatic and ocean based economy are fisheries, aquaculture, tourism, transport, ports, coastal mining, and energy. Bioeconomy plays a bid role in achieving economic growth and job creation, making use of the region's bioresources to develop products and services, while contributing to an improved environment and climate change mitigation.

Application of STI to all aspects of the management of the environment shall be promoted to enhance sustainability, including strengthening the development and extension of technologies and innovations for sustainable exploitation of natural resource exploitation and management. Knowledge□based technologies will be used to reinforce the current efforts designed for the management of environment and natural resources.

The Sectoral policy objectives for STI in Environment and Natural Resources management are:

i) To explore and apply alternative technologies to conserve and manage EAC's natural resources

comprising water, marine/oceans, forest, mining, minerals, and wildlife in order to harness maximum benefits from environment and natural resources sustainability.

ii) To apply STI for natural resource exploitation and management and strengthen the development and extension of technologies and innovations that form the basis for sustainable use of natural resources;

iii) To apply STI to all aspects of the management of the environment and enhance sustainability.

iv) To catalyse and support innovative and sustainable use of bioresources as the major driver of inclusive economic growth and job creation in East Africa.

2.7.9. Climate Change and Disaster Risk Reduction

Climate change is a real threat that must be addressed locally and globally. The EAC shall increase the resilience of the region to climate change with the aim of achieving the UN's sustainable development goals in particular Goal 13 in order to reduce poverty and promote sustainable development.

Chapter 19, Article 112 (f) and (m) of the EAC Treaty calls for co-operation in the management of the environment, disaster preparedness and management, protection and mitigation measures especially for the control of natural and man-made disasters. Under this provision, the Partner States are required to develop and adopt an integrated approach to address the effects of climate change in the region. In addition, Articles 23 and 24 of the EAC Protocol on Environment and Natural Resources Management also provide for joint actions to address climate change in the region.

EAC shall promote knowledge development and use of adequate technologies to advance the climate change agenda and also ensure that regional and national climate change strategies and priorities that contribute to the implementation of the Paris Agreement are strengthened and supported in their implementation. Thus, EAC shall work with governments, private sector, civil society, and other partners to champion the adoption of new technologies for building inclusive, resilient, and sustainable cities and communities for all EAC Partner States as well as help to create competitive economies that provide new kinds of jobs, especially for the urban poor.

The Sectoral policy objectives for STI to address the Climate Change are:

i) To develop and effectively use EAC scientific research and technological capacity for forecasting, early warning, prevention and mitigation of climate change and natural hazards, particularly floods, earthquakes, landslides, droughts, security threats, epidemics and emerging infections;

ii) To institute and implement gender responsive STI measures which will improve the adaptive capacity and resilience of the East African region to the negative impacts of climate change;

iii) Develop technological tools for climate change adaptation in the EAC region.

2.7.10. Traditional Indigenous Knowledge and Cultural Expressions

Indigenous knowledge is the cumulative body of knowledge and beliefs handed down through generations by cultural transmissions about the relationship of living beings with one another and with their environment. It is the local knowledge that is unique to our culture and society and has been the basis for agriculture, food preparation, health-care, education, conservation and management of natural phenomena. The EAC and its Partner States shall tap into the indigenous scientific and technological

viability and create awareness of the value of indigenous knowledge and technologies particularly their potential contribution to sustainable development at a time when such knowledge and technologies are being threatened like never before. The EAC and its Partner States shall exploit the full potential of STI through generation, protection, preservation, evaluation, updating, adding value to, and utilizing the extensive indigenous resources and traditional knowledge, as applicable to national and regional development.

The Sectoral policy objectives for STI to support indigenous knowledge and technologies are:

i) To exploit the full potential of STI to generate, protect, preserve, evaluate, update, add value to and utilize the extensive traditional indigenous knowledge for EAC development;

ii) To contribute to the harnessing of a vibrant natural products industry by generating intellectual property and prototype products borne out of the interplay between indigenous knowledge / technologies, on the one hand, and modern science, research and technological innovation, on the other.

2.7.11. Space Science and Technology

Space Science and Technology shall help the EAC to develop the key core technologies of satellite communications and broadcasting regarding space/ground segments, transmission, Global Navigation Satellite System and its application technologies, integration with wireless networks for applications to productive and social sectors. The EAC shall promote the use of Space Science technologies in accomplishing the following: remote sensing for natural resource monitoring and management; climate change and drought monitoring; timely natural disaster prediction and mitigation; rural and urban planning; land, sea and air navigation positioning applications and safety; telemedicine; e-learning; space weather monitoring and mitigation of potential threats; and Regional surveillance.

The Sectoral policy objectives for STI in space science and technology are:

i) Establish EAC Space programme;

ii) Build human capacity and capability in space science and technology;

iii) To provide improved product and service delivery in monitoring and protection of the natural resource management and environment; land administration, management and control; regional security services; communications and navigation; disaster monitoring and relief; hazards forecasting and early warning systems; transport monitoring, food security, and mineral exploration and prospecting.

2.7.12 Emerging Technologies

EAC countries are amongst the leaders in the region on exploitation of emerging technologies including blockchain, Artificial Intelligent, machine learning and internet of things and nanotechnology. These technologies are finding applications in all sectors of the economy including education, agriculture, health, and manufacturing. In education AI is already being used in personalized learning. In agriculture, emerging technologies are being used to gather soil health insights, provide fertilizer recommendations, monitor the weather, and track the readiness of produce. All of these enable farmers to make better decisions at every stage of the crop cultivation process. In health, the resulting benefits include earlier detection of diseases; more consistent analysis of medical data; and increased access to care, particularly for underserved populations. In manufacturing, Machine learning enables predictive

maintenance by predicting equipment failures before they occur, scheduling timely maintenance, and reducing unnecessary downtime. Manufacturers spend far too much time fixing breakdowns instead of allocating resources for planned maintenance.

Despite the benefits, job losses, data security, and privacy remains major concerns and fears that must be address through evidence and appropriate policy framework. In addition, lack of data, inadequate skills and talents, inadequate investment in R&D, lack of policy framework, lack of infrastructure, gender equality and inclusivity, language and relevant local contents, are some of the challenges that need to be addressed for the region to fully exploit the potential of emerging technologies.

The Sectoral policy objectives for STI in emerging technologies (blockchain, Artificial Intelligence, machine learning and internet of things) are:

i. Promote emerging technologies in all sectors in the following areas: personalized learning, improve students' progress, intelligent tutor, support teachers and improve quality of education, improve course contents, reduce cost of education, and promote accessibility and inclusivity in education.

ii. Promote agriculture emerging technologies to provide advisory, financial and procurement services.

iii. Promote emerging technology applications in health sector for health monitoring benefit/risk assessment, disease prevention and management, medication management, early detection, prediction and diagnostic tools, surgical procedures, as well as health administration.

iv. Promote emerging technologies in manufacturing, for design customization, product development, shop floor performance improvement, Logistics optimization, Predictive maintenance, generative design, price forecasting of raw material, robotics, quality assurance, inventory management and process optimization.

v. Promote digital financial services that deliver significant financial inclusion benefits for poverty reduction and economic growth. Access to and use of basic digital financial services improve incomes, increase resilience and improve lives.

2.7.13 Open Science

Users of scientific research production within the EAC region are challenged in access to scientific information and date within the knowledge management system. A number of interventions including promotion of open access principles and practices have been adopted by institutions and publishing houses. However, the region does not have a regulatory framework to guide implementation of the Open Science. Open Science is a movement aimed at making science more open, accessible, efficient, democratic, and transparent. The transition to Open Science allows scientific information, data, and scientific outputs to be more widely accessible (Open Access) and more reliably harnessed (Open Data) with the active engagement of all relevant stakeholders (Open to Society). Open Science is beneficial in promoting efficiency by guaranteeing greater access to scientific inputs and outputs, thereby improving the effectiveness and productivity of the research system, through 1) reducing duplication and the costs of creating, transferring, and reusing data; 2) allowing more research from the same data; and 3) multiplying opportunities for domestic and global participation in the research process. In addition, the use of open search tools can help increase the efficiency of research and its diffusion . Further, Open Science increases research rigor, accountability, and reproducibility. It is based on the

principles of inclusion, fairness, equity, and sharing, and ultimately seeks to change the way research is done, who is involved, and how it is valued.

Considering the benefits of Open Science, EAC Partner States shall develop and encourage policy environments that support operationalization of open science and effective implementation of open science principles and practices

The sectoral policy objectives for STI in open science are:

i. Promote the development of effective institutional, national and regional open science policies and legal frameworks that are consistent with existing international and regional law and are in line with the Open Science definition, values, and principles as well as actions outlined by the UNESCO Recommendation.

ii. Align Open Science policies, strategies, and actions from individual institutions to local and international levels, while respecting the diversity of open science approaches.

iii. Encourage research-performing institutions, particularly those in receipt of public funds, to implement policies and strategies for Open Science.

iv. Encourage research-performing institutions, universities, university commissions, scientific unions and associations, and learned societies to adopt statements of principle in line with the Open Science policy.

v. Recommend shared values and principles for Open Science, identifies measures on Open Access and Open Data from partner states, and brings citizens closer to science and commitments to facilitate the production and dissemination of scientific knowledge in the East African region.

vi. Develop Open Science and Open Access values and measures through a regionally balanced, multistakeholder, inclusive, and transparent consultative process. The proposed policy initiatives should promote Open Scholarship, Open Source, and Open Standards for interoperability purposes.

vii. Recommend economic investment in Open Science and Open Access which will be consistent with their benefit to societies in the East African region and African continent. Therefore, institutions and governments in Africa provide the enabling environment, infrastructure, and capacity building required to support Open Access.

viii. Recommend that academic research and knowledge from the East African region be freely available to all who wish to access, use, or reuse them while at the same time being protected from misuse and misappropriation. It is necessary to respect the diverse dynamics of knowledge generation and circulation by discipline and geographical area.

ix. Promote STI enabling environments through the committed provision of quality open-access digital research materials.

x. Emphasize recognition, respect, and acknowledgment of the regional diversity of East African (and African) scientific journals, institutional repositories, and academic systems and, conversely, that researchers and corporations in the East African region should benefit from being able to access research.

3.

EAST AFRICAN INNOVATION ECOSYSTEM

3.1. EAC INNOVATION ECOSYSTEM

Being members of the same regional integration zone, the EAC Partner States present many similarities in their national innovation systems. They mainly differ in the capacity of the business sector and the governance system i.e. how they are governed, coordinated and managed. The Government or public sector acts as an enabler of the innovation environment, while the academia, the universities and other knowledge intensive institutions create skilled human resource, new know-how and build up the knowledge space, and finally the industry and business utilize the available or new knowledge and develop innovation for the market space. Therefore, generic components of the National Innovation Systems of the EAC Partner States are based on the tree main objectives (as classified by the UNCTAD):

(i) The creative capacity of the innovation system, which involves the aspects of the system related to production and development of knowledge; this objective is supported by the Education/Training and Research institutions (TVET, Higher Education and Research organisations) responding to the demand constituted by consumers and producers;

(ii) The transfer capacity, linked to knowledge exchanges and networking between the actors of the innovation process; this objective is mainly supported by political system formed with Governmental institutions (ministries, National Council/Commissions for STI and other specialized agencies), STI policies, frameworks and governance (financial, taxation incentives, entrepreneurship, ...) as well as established infrastructure (banking, IPR and information, standards and norms, business and innovation support) to facilitate the linkages between knowledge creators and users;

(iii) The absorptive capacity, describing the ability of firms to acquire, develop and implement new knowledge at the internal level; this objective is concerning the industrial system (foreign and large companies; local SMEs, new technology-based firms, ...) to absorb technologies and innovation responding to the market demand.

To effectively and efficiently play the governance and regulation role in building conductive environment for innovation, the national Councils/Commissions for Science, Technology and Innovation shall be overseen by a Board composed of representatives from the key sectors appearing in the innovation system: Government departments including finance and STI, the private business and manufacturing sector, and representatives of the R&D community and academia.

The EAC Innovation Ecosystem as presented in the diagram of Figure 3.1 is based on the triple helix model of Partner State Governments, the EAC organs and Institutions, Private business and manufacturing sector, the Academia and Research and Development Institutions. Functionary, the regional innovation ecosystem will have institutions responsible for regional and national policies, institutions for innovation regulations, innovation resources/enablers, knowledge generation and technology adaptation and transfer.

Expected regional outcomes shall include but not limited to the enhancement of regional competitiveness, growth in innovative products, growth in employment, growth in new innovative companies and strategic centers.

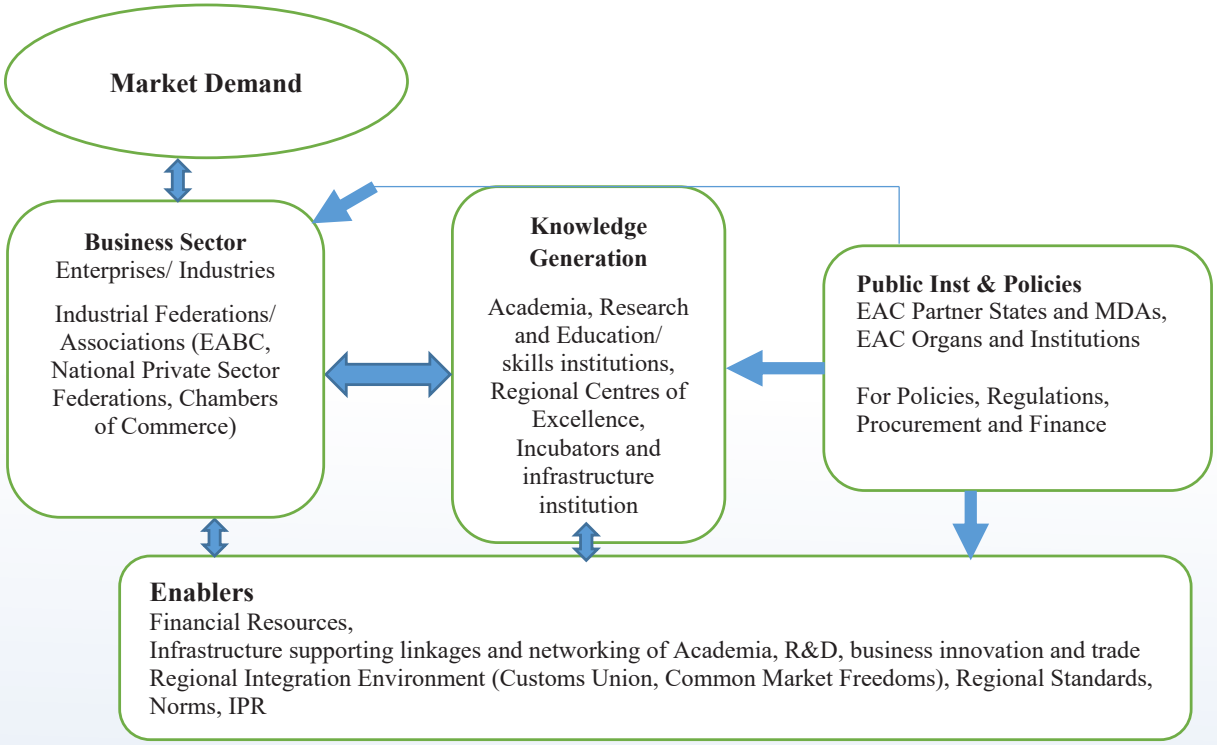

Figure 3.1: EAC Innovation Ecosystem

The governance system of the EAC Innovation system shall include the cabinet ministers/secretaries responsible for STI in Partner States and the National Council/Commission for Science, Technology and Innovation from the Partner States, the EASTECO Secretariat and IUCEA as lead-EAC Institutions for STI, the Regional Network of National Industrial Research and Technology Development Organisations, the East African Business Council, the federation of national association of engineers and NGOs.

3.2. REGIONAL POLICY MEASURES/PRIORITIES TO IMPROVE TECHNOLOGICAL INNOVATION IN EAC

Innovation policy objectives shall target increasing access to technology, including improving the abilities of firms and other users of technology to identify, acquire, adapt and use knowledge and technology. Measures will be put in place to support improving domestic absorptive capacities and stimulate local innovation. There will be regional and national technology transfer offices to support knowledge and technology transfer among all sectors with particular focus to SMEs. This will be strengthened through collaborations among the various actors at national, regional and international levels.

The EAC and its Partner States shall support the implementation of following policy measures at regional and national levels to foster Technology-led Innovation:

(i) Fostering innovation and R&D capacity through education and training:

a) Ensure sufficient human capacity to carry out innovation and R&D, with development of qualified scientists, engineers, and other technical workers;

b) Promote interdisciplinary approach to R&D and Innovation

c) Enhance the capacity of Science, Technology and Innovation Centres of Excellence in the region

(ii) Mobilize resources for Research & Technology Development and Commercialization of Research and Development products. This shall be done through:

a) Direct financial support to Universities, Research institutions and innovators;

b) Prioritizing research agenda and aligning it with the regional and national development plans and development sectors with high economic impact and regional comparative advantages.

(iii) Enhancing STI and Quality assurance infrastructure. This policy measure shall be achieved by:

a) Constructing Science and technology parks which are another mechanism to enable collaboration between industry, academia, and governments.

b) Establishing institutions of metrology, standards, testing, and quality assurance to promote regional markets and export oriented businesses;

c) Supporting the metrology, standards, testing, and quality assurance laboratories to become accredited to enhance exports

(iv) Supporting private business institutions, entrepreneurship and SMEs:

a) Promoting and supporting regional innovation clusters, industry associations, entrepreneurs, the start-ups and SMEs

b) Promoting the culture of innovation through capacity building in entrepreneurship and job creation for SMEs, researchers and faculty;

c) Supporting information and specialized infrastructure, including access to broadband communications system, preclinical facilities, pilot plants, production facilities on contract, testing labs, materials labs; and promote and support development, access and use of ICT and Internet ;

d) Participating in a regional, national, annual effort to collect and publish data on science and technology in industry, beginning with the labor market and including data on research and development, and innovation

(v) Providing policy, legal and regulatory frameworks to enable innovation:

a) Supporting innovators through protecting their intellectual property rights to encourage innovation;

b) Facilitating the application of key policy instruments such as tax policy, safeguards, procurement and competition Policy;

c) Enhancing public procurement practices: Partner States shall create markets through enhancing public procurement practices and strengthen local content policies;

d) Strengthening the institutional capacity for regional and national institutions for Science, technology and innovation.

3.3. FOURTH INDUSTRIAL REVOLUTION: LEAPFROGGING AS A KEY FACTOR TO EAC'S DEVELOPMENT

Learning from economic history, the types of transformational and high-impact solutions that are needed to unlock EAC's potential for accelerated, sustained, and inclusive growth shall be driven by innovative technology capture. Building the momentum for technology leapfrogging will be critical for EAC to achieve technology capture.

EAC shall build capacity for leapfrogging into the 4th industrial revolution by mainly supporting the adoption of cutting-edge technologies, development of value added manufacturing and in all sectors. The EAC shall take the opportunity of the current technology revolution by facilitating young innovators in i) big data; ii) Internet of Things; iii) artificial intelligence and robotics. EAC shall take advantage of greener, more productive technologies without being burdened by out-of-date energy and labour intensive methods.

In accordance with the regional STI policy objectives, the EAC will focus on the following priority actions for technology leapfrogging and capture:

1. Public and Private investment prioritizing skill acquisition: Education, especially skills acquisition as well as science, technology, engineering, and mathematics shall be focusing to triggering technological innovation capacity that enables leapfrogging.
2. Scaling up Technological innovation to trigger leapfrogging: National and regional innovation agencies shall establish mechanisms to identify and support technological innovations that are accessible in cost and skills required to use it, show to be available, and meeting a widespread need. For instance, mobile money scaled rapidly because it filled the gap in formal banking, was simple to use, worked on inexpensive basic cell phones, and answered the need for a cheap and safe way for urban East Africans to transfer money to families in rural areas.
3. R&D for adapting technology to local contexts. Investments in R&D shall focus to support rapid technological adoption and adaptation in all sectors.

3.4. MANAGEMENT OF INTELLECTUAL PROPERTY RIGHTS

The EAC regional IP management system will be developed based on Article 43 of the EAC Common market protocol, TRIPS, WTO rules and other relevant treats. It will be strengthened with the establishment of Regional and National IP offices to support the Innovation system. One of the objectives of Intellectual Property (IP) management will be to protect the intellectual wealth generated through research. Protection of IP creates incentive for more knowledge and technology generation as scientists and other creators are recognized and rewarded.

The regional IP management system shall also establish an in-built incentive for scientists/innovators to engage in knowledge creation. This shall not only advance them professionally but shall also bring income from licensing and royalty fees resulting from commercialization of research results and lead to further innovations and technological progress.

IPR shall be mainly covered by patents, trade/ service marks, and copyright. Legal and Regulatory frameworks supporting the protection of IPR include those that protect Patents, Trademarks, Industrial designs, protection of plant varieties, Copyright and Related Rights and Traditional Knowledge.

The commercialization of IPR enabled technologies and other know-how through public-private partnership shall lead to their accelerated and efficient transfer. Technology transfer through commercialization of research findings shall be supported by relevant offices established within the national Agencies for industrial Research and Technology Development.

4. POLICY IMPLEMENTATION SYSTEM

For successful implementation of this regional policy for Science, Technology and Innovation there is need to have a proper implementation system that ensures effective coordination and management of regional and national programmes related to the adopted regional STI specific policy objectives.

4.1. REGIONAL HARMONIZED STI PLATFORM

The harmonization of governance, management and operational frameworks (including processes, systems, procedures, laws, policies, and strategies) is a precondition for successful implementation, coordination and management of regional and national STI activities. An EAC Regional Harmonization STI Platform will enable the development and application of STI in the Community to spur socioeconomic development. It will therefore support economic integration and common market efficiency and lead to regional integration.

A harmonized STI platform will foster cooperation and promote the development, transfer, adoption, adaption and mastery of science, technology and innovation in the Partner States. The seamless transfer of knowledge and technology, adoption and adaptation of technologies is critical to the development of the EAC. Since STI infrastructure is very costly and unaffordable by each Partner State, a harmonized STI platform will lead to joint development of STI infrastructure and sharing of resources including human resources that is likely to lead to quick economic gains.

Furthermore, a harmonized STI platform will create a common STI investment area and investors will easily get information on all STI investments in the EAC and lead to rapid direct investments that shall lead to job creation and socioeconomic development of the Partner States.

The STI harmonized system will include the following components:

a. a harmonized legal framework (including laws, policies, strategies etc.);

b. harmonized standards and regulations;

c. a harmonized data base and shared information portal, as well as integrated information systems that support decision making across the region;

d. support for pooling resources (both technical and financial), sharing information, and increasing collaboration across countries to ensure the efficient utilization of STI

e. joint and shared STI infrastructure;

f. joint programmes and projects across the regional

g. Support for mobility of engineers, scientists and technologists and Innovators within the region

h. mutual recognition of assessments and inspections conducted and decisions made by any regulatory authority within the region.

4.2. DECISION MAKING AND IMPLEMENTING INSTITUTIONS

4.2.1. EAC Decision Making Organs

The EAC decision making organs comprising of the EAC Heads of State Summit, the EAC Council of Ministers, the EAC Coordinating Committee, The EAC Sectoral Committee responsible for Science and Technology, the East African Legislative Assembly, the EAC Secretariat, and the East African Court of Justice will undertake their roles in regard to the implementation of the East African Policy for STI as provided for under the EAC Treaty and Protocols and other legislation.

(i) Heads of State Summit. The Summit comprising of Heads of Government of Partner States shall give strategic direction towards the realization of the goal and objectives of the Community. The EAC Heads of State Summit will champion the integration of STI in national and EAC development priorities.

(ii) The EAC Council of Ministers. The Council of Ministers is the central decision-making and governing Organ of the EAC. Its membership constitutes of Ministers or Cabinet Secretaries from the Partner States whose dockets are responsible for EAC Affairs. Regulations, directives and decisions taken or given by the Council are binding to the Partner States and to all EAC Organs and Institutions other than the Summit, the Court and the Assembly. Therefore, the Council of Ministers shall approve the EAC STI policy and shall also play a key in championing, popularizing, and integrating the EAC STI Policy in national and EAC development policies, programmes and frameworks and monitoring and evaluating its implementation.

(iii) Sectoral Councils of Ministers. The Sectoral Council of Ministers responsible for Science, Technology conceptualize programmes and monitor their implementation. It shall be responsible for the oversight of the STI initiatives and it shall also monitor and evaluate their implementation.

(iv) The East African Legislative Assembly. The East African Legislative Assembly (EALA) is the Legislative Organ of the Community and has a cardinal function to further EAC objectives, through its

Legislative, Representative and Oversight mandate. The Assembly draws the authority to establish its Standing Committees from its Rules of Procedure. It currently has 6 Standing Committees to execute its mandate: The Accounts Committee; the Committee on Legal, Rules, and Privileges; the Committee on Agriculture, Tourism and Natural Resources; the Committee on Regional Affairs and Conflict Resolution; the Committee on Communication, Trade and Investment, and the Committee on General Purpose. A standing Committee on Science, Technology and Innovation (STI) shall be created to be responsible for STI matters in the Community.

(v) The EAC Secretariat. The EAC Secretariat is the executive Organ of the Community. As the guardian of the EAC Treaty, it ensures that regulations and directives adopted by the Council of Ministers are properly implemented. The Secretariat shall coordinate with EASTECO to report to the Council of Ministers on the implementation of the East African Regional STI policy including budgetary allocations, projects and programmes for implementation of the policy. The Secretariat shall also present monitoring and evaluation reports and progress reports from EASTECO on the implementation of the policy to the Council of Ministers for guidance and directives.

(vi) The East African Court of Justice. The East African Court of Justice is the Principal Judicial Organ of the Community and ensures adherence to the law in the interpretation and application of compliance with the EAC Treaty. The East African Court of Justice shall contribute to ensuring a good enabling environment for the implementation of the EAC STI policy at both national and EAC levels.

4.2.2. Implementing Institutions and Partners

The implementing institutions and partners comprise of the Partner States, the East African Science and Technology Commission (EASTECO), Inter-University Council of East Africa (IUCEA), East African Health Research Commission (EAHRC), East African Development Bank (EADB), other EAC institutions, EAC Regional Centres of Excellence in STI, the National Commissions/Councils for Science and Technology in Partner States, National and Regional Research Institutions and the private sector. The implementation mandates of EAC institutions are provided for in the legislations establishing them.

(i) Partner States. The Partner States shall integrate EAC STI Policy in their national STI policies, programmes and frameworks. Partner States shall also mobilize funds, active participation and contributions from public, private, education and research, societal, international development and funding sector stakeholders to implement the various initiatives emanating from this policy. The National Councils and Commissions for STI have pivotal roles in coordination, management, development and application of STI as per the Acts setting them up. This is further enabled by the National STI policies and strategies. The cabinet in each Partner State is responsible for approval of STI national policies and oversees their implementation. The National Parliaments approve budgets and provide oversight roles. Thus, the cabinet and national parliaments shall play key roles in STI policy development/review, approval and implementation.

(ii) East African Science and Technology Commission. The East African Science and Technology Commission (EASTECO) facilitates the Partner States co-operation in the development and implementation of Science, Technology and Innovation. Its mandate is to coordinate and facilitate the activities of the Partner States and national science and technology institutions (including the relevant national Commissions/Councils) to promote the development and application of science, technology and innovation in all its aspects including: policy development; research and development; knowledge and skills development; technology acquisition, adaptation and utilization; resource mobilization and utilization; program, product and project development and implementation. Specifically, in regard to the implementation of the East African STI Policy,

EASTECO's role shall include but not limited to:

a) Develop and implement regional strategies, projects and programmes;

b) Undertake resource mobilization and fund raising;

c) Produce data on STI indicators and statistics;

d) Monitor and evaluate the implementation of the policy;

e) Spearhead ranking of research institutions and other critical institutions like S&T parks, incubation hubs, and innovation hubs;

f) Coordinate communication and outreach for the policy;

g) Present reports to the EAC Council of Ministers on the progress, trends, challenges in STI; and

h) Make recommendations to the Council of Ministers on the appropriate actions for the implementation of the policy.

EASTECO will be the lead institution to coordinate and facilitate the implementation of the EAC Regional Policy for STI at regional level and will therefore closely collaborate with the National Commissions/Councils for Science, Technology and Innovation in Partner States for the implementation of the STI policy at national level.

(iii) Inter-University Council of East Africa. The Inter-University Council for East Africa (IUCEA) coordinates harmonization of higher education and training systems in East Africa, facilitates their strategic development and promotes internationally comparable standards and systems. It will also spearhead ranking of higher education institutions and support STEM training in tertiary education.

(iv) East African Health Research Commission. The East African Health Research Commission coordinates and maps out a regional agenda on health research as well as the translation of its results into policy and practice within the Partner States.

(v) East African Development Bank. The East African Development Bank offers structured financial products and services to organizations in the health, education, hospitality and tourism, infrastructure development, energy and utilities, and agriculture sectors. The bank shall support the implementation of the STI policy with focus on supporting the commercialization of technology and innovation towards the manufacturing and business private sector.

(vi) Other Institutions of the East African Community. The other EAC institutions such as Lake Victoria Basin Commission and Lake Victoria Fisheries Organization shall play their respective mandate as regards the East African Regional STI policy implementation.

(vii) EAC Regional Centres of Excellence on STI and Regional Research Institutions. The regional centres of excellence and research institutions shall contribute to building technical competencies, research output and innovations. In some instances, they will contribute to products development and provision of specialized services. They shall therefore be encouraged to align their priorities to the EAC STI priorities.

(viii) The Private Sector. The private sector shall work closely with public, education and research, societal, funding and national, regional and international development agencies to facilitate technology transfer, collaborate in commercializing and exploiting research and innovation and support building the necessary capacities and technical competencies required to achieve the objectives of the East African Regional STI policy.

4.2.3. Implementation Mechanisms

The East African Regional STI Policy will lead to the development of strategies that will be implemented at EAC/regional and national levels. The East African Science and Technology Commission (EASTECO) will coordinate with the National Commissions/Councils for Science and Technology of Partner States in implementing the EAC STI Policy and submitting implementation status reports to the EAC Council of Ministers through the Sectoral Council of Ministers responsible for Science and Technology. In addition a Regional Steering Committee for STI shall be established to support EASTECO to monitor the EAC STI policy implementation and relevant STI indicators, through the following mechanisms:

i) The implementation process of this policy will be managed by the EASTECO, under the overall guidance of the EAC Council of Ministers. A Regional Steering Committee for STI and relevant subcommittees and Working Groups will be set up for policy implementation. The Regional Steering Committee for STI will comprise representatives from national public and private sector institutions, including National Commissions/Councils of Science and Technology, Ministries responsible for science and Technology and the business private sector. In addition to overseeing the implementation of the STI policy and identified strategies, the Regional Steering Committee for STI will also monitor the progress of the STI indicators in relation with the STI policy targets, coordinate the range of activities to be implemented by other EAC institutions, regional and national stakeholders in alignment with the STI Policy Implementation Plan.

   Based on the recommendations made by the Regional Steering Committee for STI, the EAC Sectoral Council of Ministers responsible for STI shall advise the EAC Council of Ministers on key policy and financial measures for STI development and application. In this regards, the EAC Sectoral Council of Ministers responsible for Science and Technology shall provide oversight on implementation of the East African Regional STI Policy, in order to submit recommendations to the EAC Council of Ministers and the Heads of State Summit to consider STI matters including considering an annual report on the status of implementation of the East African Regional STI Policy.

ii) EASTECO and the EAC Secretariat will create awareness amongst the public about the policy, in order to build up Partner States' ownership and active participation of all stakeholder organizations for the implementation of the policy.

iii) At national level, coordination among governmental departments and other public sector agencies, private sector and academia is necessary. National STI Committees lead by National Commissions/ Councils for Science and Technology will be established to support the implementation of the policy at national level.

The Ministries responsible for STI will provide the needed leadership to link with other MDAs and other stakeholders within the Science/Technology System and National Innovation System (NIS) in the implementation of the EAC STI policy at national level.

Thus the implementation mechanism will include the following:

- formulation of action plans on the basis of the implementation plan;
- establishment of a Regional Steering Committee to guide the implementation process;
- establishment of sectoral sub-committees to the Regional Steering Committee;
- establishment of National STI Committees by Partner States; and
- formulation of STI policy briefs and STI impact guidelines.

4.3. STRATEGIES FOR IMPLEMENTATION OF THE POLICY

At regional level, EAC STI policy implementation shall be aligned with the EAC development strategies and work plans for relevant EAC organs and institutions such as EAC Secretariat, EASTECO, EAHRC and IUCEA.

The EAC shall ensure political will and commitment at all levels, ownership of the Policy by all, an integrated M&E framework, effective use and management of information for decision making, increased private sector capacity, behaviour change, patriotism and progressive reduction of corruption, effective monitoring and evaluation to support implementation, human resource capacity and conducive working environment, a fair and transparent pay system, effective and efficient resource mobilization and utilization and effective partnership with non-state actors.

Implementation of STI policy shall require clear strategies that are reflective of the conditions in the operational/ implementation environment. The strategies for implementing EAC STI policy include:

(i) **Undertake proper planning of all activities and initiatives.** There shall be good planning, which includes consideration of time, costs and resources required in the implementation plan; having manageable steps and milestones; change management issues; and early planning for reviews and evaluation. The linkage between planning and budgeting and implementation will be aligned with the EAC planning and budgeting system.

(ii) **Put in place a monitoring and evaluation framework.** Monitoring, review and evaluation shall be undertaken as a basis of the implementation plan. Also Key STI target indicators shall be put in place, stakeholders shall be actively engaged, STI data collected, quality and reliability of information shall be checked, and information shall be shared and utilized efficiently.

(iii) **Actively engage stakeholders, create awareness and mainstream gender.** There shall be engagement of stakeholders that shall include managing their interactions, expectations, influence and interests. There shall be mechanisms in place that ensure full participation of women and youth in policy implementation. Also awareness about the EAC STI policy shall be created in order to improve public acceptance.

(iv) **Put in place and manage collaborations, partnerships, and networks.** Policy coordination, networking and linkages between public institutions, academia and private sector shall be promoted; and creating a stimulating and supportive environment for innovation and excellence in scientific research to foster inclusive community development and production of new knowledge. Regional and international collaborations and partnerships will be mobilized to support the regional programmes for the achievement of the adopted STI policy objectives. Development Partners shall be expected to undertake specific programmes on STI, synergy and complementarity between Partners shall be best achieved when their programmes are informed by and aligned with the East African STI Policy and related strategies.

(v) **Ensure efficient resource mobilization and utilization.** An inclusive approach, sound processes and funding mechanisms to ensure sustainable funding shall be put in place. Also a resources analysis, which includes consideration of staffing and skills, financial, system and other resources required to implement the policy shall be undertaken.

(vi) **Attract private sector participation.** To attract private sector in STI development and application, innovative enterprises and entrepreneurs shall be identified and supported through provision of supporting environment including the following: technology transfer offices; Business incubators, science and technology parks; Business accelerators to help fast growing entrepreneurs through skills development and mentoring services; Investment funds to foster innovative start-ups;

Entrepreneurship support programmes targeting specific populations (youth, and women) through a combination of financial assistance and business advice; Expansion of public-supported research institutes network, and incentives for businesses willing to support start-ups.

(vii) **Promoting and leveraging S&T to support women's development ("Science for Women").** Promoting gender equality in science, technology and engineering education, workforce and leadership ("Women in Science"), encouraging and supporting the role of women in innovation systems at national and grassroots levels. Women play a central role in all the main sectors that particularly affect human wellbeing, namely, food production and agriculture; water and sanitation; energy; and conservation of biodiversity. Appropriate gender-responsive approaches targeting in particular these sectors would help support women's development and optimize their contribution to growth and sustainable development. Through their participation in science, technology and engineering education, workforce and leadership, women can contribute to shaping the STI agenda to make it more gender-responsive.

4.4. MECHANISMS FOR FINANCING STI DEVELOPMENT

The implementation of the East African policy for STI will be at two levels, namely EAC and Partner State levels. Partner States will appropriate funds within the budget to implement the policy. At EAC level, EAC institutions shall prioritise objectives and strategies for funding from their budgetary allocations and seek more funding from other sources including development partners. It is the role of EASTECO to monitor the implementation of the policy and advise the EAC and its institutions on where to focus the resources.

4.4.1. Partner States Efforts in Financing Science, Technology and Innovation

Partner States shall make annual contributions to EAC including EAC institutions. Part of these funds will be appropriated for STI initiatives/ activities. The Lagos Plan of Action for Economic Development committed African countries to spend at least 1% of the GDP on research and development. Also African governments committed to AU declaration of allocating at least 1% of the GDP to Science and Technology. EAC shall ensure that these declarations are honoured by the Partner States. The Partner States shall put in place Research and/ or Innovation Funds to support research/ innovation. Also Partner States will establish/ designate a ministry responsible for STI through which additional STI funding will appropriated. STI cuts across several ministries and there will need to take stock of all existing funding lines established to support development in STI with the aim of streamlining them to achieve efficient utilisation of resources and minimize duplication of STI activities.

The Partner States shall encourage public procurement of products and services from S&T institutions and industries within the EAC as a means of facilitating their promotion.

For optimal evolution of the percentage of GDP allocated to STI to be at least 2% by 2030 and at least 4% by 2050, the following strategies shall be implemented:

(i) Utilize indicators to demonstrate how STI has driven productivity, industrial output and employment so that the Partner States can be convinced;

(ii) Develop the private sector to fund research within its priority areas;

(iii) Create sensitization on the role of STI in socioeconomic development and transformation; and

(iv) Get a win-win dialogue with external partners.

4.4.2. EAC Research and Innovation Fund

The East African Community shall put in place an EAC Research and Innovation Fund that shall be managed by EASTECO. The role of this fund shall be to support research and innovation initiatives within the Community and drive private sector growth. Its objectives shall include: to generate high-quality relevant research; to support regional relevant research which addresses key challenges in the EAC region; to strengthen research capacity and systems in EAC; to provide seed funding for commercialisation of innovations; and to support technology-led entrepreneurship and innovation hubs. Each Partner State shall allocate at least 1% of GDP to Research and Technology Development, part of which shall constitute an annual contribution to the EAC Research and Innovation Fund. At least 5% of the proceeds from commercialisation of research output and IP will be paid into the EAC Research and Innovation Fund. The other sources of funds for the EAC Research and Innovation Fund will be contributions from development partners, foundations, the private sector, NGOs and other stakeholders.

4.4.3. Private Sector

The private sector shall be encouraged to support the funding for R&D activities, especially to cater for the needs of the micro, small and medium enterprises (MSMEs) which can be nurtured to become the cutting edge for the commercialization of novel products or processes (that is, products of innovation). Mechanisms will be put in place to link the private sector with relevant education and research institutions. Importation of innovations locally available in the Partner States from outside the EAC will be discouraged through implementation of relevant legal frameworks. The Partner States shall institute an attractive tax incentive mechanism for the private sector to contribute to the STI funds or directly to R&D activities, but in such a way as not to erode the national tax base. The Partner States shall undertake Public-Private Partnerships (PPPs) in the application and development of STI. The private sector shall be engaged as interested partners in STI initiatives. This is particularly feasible in the commercialization of R&D activities. Where there are substantial innovations, independent companies will be floated to fully commercialize the R&D outputs. The Partner States will under a PPP arrange encourage the formation/ operation of venture capital funds for the commercialization of new technologies from scientific and technological institutions.

4.4.4. Development Partners

As of 2018, a high level of the research and innovation funds in the Partner States came from development partners. The pattern of STI indicators on R&D funding shows that development partners are still an important source of funding for STI. The EAC shall engage with the African Union Commission to mobilize the global partnership for the SDGs to support regional STI programmes in the Community. However, in the long run the Partner States will raise more than 70% of the research and innovation funds from the public and private sectors to encourage local ownership and sustainability.

4.4.5. NGOs and other Stakeholders Contribution

There are NGOs that are already providing funding to STI within the EAC and more will be encouraged to do so.

The research institutions are also important sources for generating resources for STI development and application. These institutions shall be encouraged to enhance their respective Internally-Generated Funds (IGFs). The sector ministries shall institute matching grant schemes to provide incentives for those R&D institutions showing high performance in this regard.

4.5. COMMUNICATION AND OUTREACH

The communication and outreach plan has been designed to guide the East African Community and the Partner States in effectively communicating and informing the general public in the EAC region about STI, uptake of STI and implementing the initiatives in the EAC STI policy. The plan also aims to increase awareness of the EAC STI policy among the people of the East Africa Community.

The EAC STI policy is a policy instrument whose ownership is a requisite in all the six Partner States. It is therefore prudent that an appropriate communication and outreach plan is instituted to adequately relay the objectives and goals of the policy, and subsequently, allow for adequate implementation of the EAC STI policy across the EAC Partner States. The communication and outreach plan aims at creating a framework for the continuous flow of information among EASTECO, collaborative institutions at regional and national levels and the general public and also acts as a feedback mechanism to identify issues impeding uptake of science, technology and innovation in East Africa, and ways on how they can be dealt with.

Specifically, the plan will:

a. Guide EASTECO, Ministries responsible for STI and the National Councils and Commissions of STI in the Partner States on effective communication mechanisms with various stakeholders, including promoting public awareness on the STI industrial programmes and implementation status across the EAC Partner States;

b. Advocate for STI uptake through policy reforms across the EAC Partner States; and

c. Provide avenues on how to stimulate a culture of innovation in the EAC region.

The communication and outreach plan will apply various tools to disseminate information on STI in the region. Also for the EAC STI Policy, it is recommended that a strategy for its implementation be developed and publicized using various communication tools. The tools are: Websites (EAC, EASTECO, National Councils/Commissions STI, Partner States government websites e.tc.); Print media/press releases; Broadcast media; Newsletters; Social media (YouTube, Facebook, Twitter, LinkedIn, etc.); Innovation hubs and science and technology parks; Endorsements from key personalities; STI Awards and Recognition; STEM Competitions; Champions/ STI Ambassadors; Integration of STI in curricula; Conferences and workshops; Journals; Books; and Trade Affairs.

Knowledge management is the systematic management of an organization's knowledge assets for the purpose of creating value and meeting tactical & strategic requirements; it consists of the initiatives, processes, strategies, and systems that sustain and enhance the storage, assessment, sharing, refinement, and creation of knowledge. For successful implementation of the EAC STI policy, EASTECO will formulate a Knowledge Management Strategy to ensure that knowledge about STI in the region is properly created, stored, and used. The strategy must start from implementation of the internal processes within EASTECO and the National Councils and Commissions for STI in the Partner States.

5. MONITORING AND EVALUATION (M&E) FRAMEWORK

5.1. M&E IMPLEMENTATION PLAN

The progress of the EAC STI Policy will be monitored and reviewed periodically, after every three years. In this respect, an information and dataset system will be established and an STI implementation scorecard will be monitored at yearly basis in line with the implementation and M&E framework, including key indicators, implementation timeline and responsible actors/ institutions for each target in relation to the STI policy objectives and strategies. Partner States shall use established STI indicators to ensure the continuous monitoring and evaluation of the progress status and to strengthen the development of the policy as well as to ensure the harmonization of the implementation of this policy.

5.2. MEASURING THE PERFORMANCE OF STI

The EAC STI Indicators Database will facilitate the process of generation of STI Indicators at EAC and national level. The following will be the targets of the EAC STI Policy, as quantitative targets:

(i) Raise R&D expenditures to at least 1% of GDP annually

(ii) Raise the number of researchers to 45 out of every 10,000 employees

(iii) Imported Know-How: Technology Payments- expenditure for the right to use intellectual property from other countries (disembodied technologies)

(iv) Raise Gender equality in career progression for technologists, scientists and engineers

A baseline survey will be conducted to assess the institutional and human capacity development levels within the Partner States.

5.3. RISK AND SUCCESS FACTORS AND MITIGATION MEASURES

5.3.1. Risks and Success Factors

Successful implementation of this policy is, to a large extent, dependent on the commitment from Partner States and support from EAC organs and institutions.

If not properly identified and addressed, risks will seriously impede efforts towards the implementation of this policy. There are several risks which have been identified that may be associated with this policy. The key risks are as follows:

(a) Inadequate buy-in by key policy –makers and other key stakeholders at national and regional levels

(b) Lack of awareness from the general public

(c) Inadequate funding, facilities and equipment

(d) Inadequate human capacity in terms of numbers at critical levels

(e) High staff turnover of key players at various levels

(f) Lack of critical inputs to achieve research excellence (e.g., the absence of critical mass of researchers in relevant fields, inadequate research infrastructure, wrong incentive systems, etc.).

5.3.2. Risk Mitigation Measures

This policy is anchored in the EAC Integration policy and legal instruments in general and in particular, the relevant provisions of the Treaty establishing the EAC and the EAC Protocol for the Common Market where STI is recognised among regional integration objectives.

Therefore, the strong political will and the intellectual capacity, attitude and institutions will enhance implementation performance and consequently sustainability:

a) Involve all stakeholders during the implementation of the policy;

b) Disseminate information to the public through print and visual media, social networks, website and public fora, to increase awareness on the availability of research and innovation fund schemes;

c) Resource mobilisation shall be a focus of all key stakeholders, and the institutions at national and regional level will engage staff on contract basis, tied to certain funding; Flexible funding schemes to be considered that are geared to the stage of starting up a company, with mechanisms to learn from failure, recognizing that entrepreneurship is high risk by definition;

d) There will be continuous capacity building of various stakeholders at various levels from national to regional level;

e) Review of existing laws, policies and strategies concerning science, technology and innovation;

f) The application processes of various government funding shall be simplified;

g) Improvements in human capacity in STEM will be pursued by:

(i) Raising interest in and awareness of STEM among youth;

(ii) Revising academic curricula to make STEM more attractive to students (e.g., by expanding interdisciplinary training in science education);

(iii) Improving teaching in mathematics and science, including through the use of ICT in teaching content and delivery;

(iv) Reducing gender and ethnic minority gaps in STEM education;

(v) Installing Monitoring and Evaluation Procedures and mechanisms.

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