EAST AFRICAN COMMUNITY

EAST AFRICAN SCIENCE AND TECHNOLOGY COMMISSION (EASTECO)
STRATEGIC PLAN 2017/18 – 2021/22

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Foreword

Science, Technology and Innovation (STI) is a key driver of socio-economic development. STI is essential for the growth and competitiveness of national economies in the 21st Century and helps to solve a range of economic and social problems faced by nations today.

The economic growth differences between developing and developed countries are accounted for by the relatively low investments in science and technology in developing countries compared to developed countries. For Africa, these low levels of investments bear themselves out in the following key statistics:

1. Africa's proportion of spending on research and development (R&D) as a share of GDP stands at a paltry 0.42%. A leap to 1% is necessary to foster economic growth.
2. While the continent accounts for 13.4% of the global population, it produces only 1.1% of the scientific knowledge.
3. Student enrolments in science, technology, engineering and mathematics (STEM) lags behind other fields of study such as economics, business, law and social sciences.
4. Only one-fifth of the Continent's population is using the internet compared with 30% in South East Asia, 40% in Latin America and the Caribbean and 80% in the Organisation for Economic Co-operation and Development (OECD) economies.

This low investment in research and development has resulted in the continent being uncompetitive at the global stage with its share of World trade remaining low and concentrated in natural resources exploitation and export. Agriculture employs over half the continent's population, but its share of value-added production has been falling over the past four decades since the 1960s, dropping from 34% in 1965 to just over 20% in 2010. In addition, Africa accounts for only 2% of the total global trade. The low contribution to global trade has led to the continent missing the rapid growth in incomes that the World has experienced in the last 100 years.

The Opportunity for East Africa

The East African Community (EAC) stands at a critical point in its history. The region's economic growth rate stood at an impressive 6.2% over the period 2004-2013. The Community's (unweighted) average growth rate in 2004-13 was in the top one-fifth of the distribution of ten-year growth episodes experienced by all countries Worldwide since 1960. Exports in the community have expanded in a wide range of goods and services outside the traditional agricultural sector. The share of agriculture in exports fell from four-fifths of all exports in the 1970s-90s to two-thirds in 2010, with mirroring gains in services and manufacturing. It is envisaged that by 2050, per capita incomes in the Community will grow ten-fold to US$ 10,000 thereby shifting the regional bloc into upper-middle income category. The Partner States that make up the East African Community have recognised Science, Technology and Innovation (STI) as an enabler of this vision.

The countries of the EAC have taken steps to integrate STI considerations into a range of policy frameworks. Furthermore, the Partner States undertook to establish the East African Science and Technology Commission (EASTECO) with the objective of promoting regional integration in the development, management and application of STI in the East African Community. It is the

expectation of the Partner States that EASTECO will be the main regional agency through which the Partner States will develop and implement common STI policies and programs.

The First EASTECO 5-year Strategic Plan has been informed by key challenges and opportunities in the East African Community member countries. It was developed through a multi-stakeholder process involving key stakeholders from the EAC Partner States. This involved consultations with stakeholders in all partner states and a regional stakeholder workshop held in Kigali on 22nd and 23rd August 2016 to discuss the draft Strategic Plan.

The Plan is cognisant of achievements made in member states in STI and aims to add value to already ongoing developments. It outlines the collective response actions needed to achieve the desired development goals and is intended to act as a framework for ensuring that the East African Science and Technology Commission (EASTECO) fulfils its mandate. The Plan presents a medium-term view of how Science Technology and Innovation will be developed in a sustainable manner for economic growth and regional integration. The Plan provides a tool that will facilitate the use of science, technology and innovation for the attainment of the global Sustainable Development Goals (SDGs). The Plan also outlines priority intervention areas of both cross-sectoral and sectoral nature, where efforts and resources will be placed to achieve region-wide impacts. In a practical sense, the Strategic Plan requires that all stakeholders work collaboratively (through networks and partnerships, joint delivery of projects among others) to ensure that synergies which will make us more effective for the benefit of the people of the East African Community are achieved.

Gertrude Ngabirano

Executive Secretary – East African Science and Technology Commission

Acronyms

Acronym	
ASTII	**African Science Technology and Innovation Indicators**
AT	**Appropriate Technologies**
CEN-SAD	**Communaute des Etats Sahelo-Sahariens**
CoE	**Centre of Excellence**
COMESA	**Common Market for Eastern & Southern Africa**
CPA	**Consolidated Plan of Action**
EAC	**East African Community**
EARF	**East African Research Fund**
EASTECO	**East African Science and Technology Commission**
ECCAS	**Economic Community of central African States**
FDI	**Foreign Direct Investment**
GDP	**Gross Domestic Product**
HIV	**Human Immunodeficiency Virus**
ICTs	**Information and Communications Technologies**
IGAD	**Intergovernmental Authority on Development**
IPR	**Intellectual Property Rights**
KAM	**Kenya Association of Manufacturers**
KEPSA	**Kenya Private Sector Alliance**
KPI	**Key Performance Indicator**
LLP	**Limited Liability Partnership**
LVAC	**Local Value Added Content**
NACOSTI	**National Commission for Science, Technology and Innovation (Kenya)**
NAEB	**National Agricultural Export Development Board**
NGO	**Non-Governmental Organisation**
R&D	**Research and Development**
RDB	**Rwanda Development Board**
RECs	**Regional Economic Communities**
SADC	**Southern African Development Community**
STEM	**Science, Technology, Engineering and Mathematics**
STI	**Science, Technology and Innovation**
S&T	**Science and Technology**
TVET	**Technical Vocational Education and Training**

Executive Summary

This Strategic Plan is intended to act as a framework for ensuring that the East African Science and Technology Commission (EASTECO) fulfils its mandate, with a long-term view of how STI may be developed in a sustainable manner for economic growth and regional integration. This Plan identifies priority intervention areas, of both cross-sectoral and sectoral nature, that are critical to the achievement of EASTECO's mandate, objectives and functions with clear indicators of achievement. This Strategy incorporates both strategic planning through analysis and strategic thinking through synthesis to create a vision of the direction that EASTECO should pursue.

Science, technology and innovation is important for the enhancement of the socio-economic status of individuals and communities and is key to the establishment of the competitiveness of regional economies. It will be altogether impossible, to create wealth and improve the living standards of the people of this region without applying and developing science and technology and strengthening systems to harness innovation at national and regional levels. Technological knowledge and skills are cumulative. First mover advantages have created an uneven global landscape, which the Partner States of the East African Community need to bridge urgently if they are to deliver on the EAC Vision 2050 of achieving upper-middle income status with a per capita income of US$ 10,000. The Partner States of the East African Community thus established the East African Science and Technology Commission to promote and coordinate the development, management and application of science and technology in the Partner States.

This Strategic Plan identifies four Strategic Priorities that support the attainment of EASTECO's objectives and vision. It further provides goals that will be achieved in the five-year period, 2017/18-2021/22.

The Strategic Plan comprises of a three-tiered strategic framework conceptualised in terms of: 1) Strategic Priorities/Pillars; 2) Strategic Objectives/ Key Initiatives and 3) medium term targets. In the first tier, the strategy identifies four high-level Strategic Priorities, which target outcomes and the impact of EASTECO's activities. Each Strategic Priority is further delineated into a number of strategic objectives in the second tier. Each of the strategic objectives is further broken down into medium-term targets in the third tier in order to operationalise the respective strategic objectives and direct implementation activities. The Strategic priorities contribute to the overall objective of EASTECO and represent what EASTECO must achieve in order to achieve its vision and fulfil its mandate. The proposed interventions in this Strategic Plan, take cognisance of EASTECO's mandate and its niche as a dedicated regional body formed with the strategic intent of driving regional cooperation in Science, Technology and innovation (STI). These Strategic Priorities will enable the Partner States to cooperate on a set of regional activities and interventions that transcend boundaries and that would be impossible for them to undertake separately. These are summarised below:

STRATEGIC PRIORITY 1: SUPPORT FOR EVIDENCE-BASED POLICIES

1. Development of regional STI policies and frameworks
2. Strengthening of the regional STI knowledge management

STRATEGIC PRIORITY 2: PROMOTION OF STI KNOWLEDGE AND INNOVATION

1. Enhancement of STEM education

2. Leveraging of scientific research
3. Support for innovation and commercialisation of technology

STRATEGIC PRIORITY 3 – APPLICATION OF STI FOR SOCIO-ECONOMIC DEVELOPMENT

1. Increasing value addition in agriculture
2. Promotion of technological solutions in energy and environment
3. Enhancement of bio-technological initiatives
4. Support for export-oriented industrial development and trade
5. Information and communication technology as a cross-cutting area

STRATEGIC PRIORITY 4: EASTECO FOUNDATIONAL COMMITMENTS

1. Strengthening of EASTECO's institutional framework
2. Improvement of collaboration and partnerships in STI

This Strategic Plan contains the situational analysis of EASTECO's internal and external operating environment and provides details of how this environment presents opportunities, challenges and risks. The document further lays out the implication of the identified strategic objectives and breaks them down into their component strategies, activities, key performance indicators, timelines and the identity of the entities responsible for the implementation of the strategies identified including a comprehensive five-year implementation plan with indicated implementation milestones.

The rest of the document is divided into six chapters

Chapter I: Introduction - which discusses the origins and mandates of EASTECO.
Chapter II: Situational Analysis – which takes a broader look at the political, economic, social, technological, environmental and legal operating environment of the region. The section also pays particular attention to the STI environment of the region as well as a stakeholder analyses.
Chapter III: Strategic Framework - which discusses the foundational mandate of EASTECO, the fifteen-year vision and mission as well as values. EASTECO's five-year strategic focus/pillars, as well as strategies.
Chapter IV: Detailed Implementation Plan - the detailed implementation plan is derived from the strategic imperatives and covers a detailed one-year implementation plan with the subsequent five year milestones.
Chapter V: Financial Projections and Resource Mobilisation Plans - this section matches the strategic pillars to their financial implications and suggests possible funding mechanisms that will be pursued in the next five years to assist in their implementation.
Chapter VI: Monitoring and Evaluation Framework - the implementation plan will be monitored continuously to identify adherence, positive deviations that should be enhanced or negative outcomes that need to be mitigated. This chapter contains a clear plan on how monitoring and evaluation will be conducted.

We urge that you read the document in its entirety to appreciate its full import and appreciate the significant role that STI will play in this region in the next fifteen years and how these initial five years will be instrumental in laying the foundation for a sustainable economic growth underpinned

by STI.

Chapter I: Introduction

1.1. Background

Kenya, Uganda and Tanzania have enjoyed a long history of co-operation under successive regional integration arrangements. These have included the Customs Union between Kenya and Uganda established in 1917 (which Tanganyika joined in 1927), The East African High Commission from 1948 to 1961, the East African Common Services Organisation lasting from 1961 to 1967, the East African Community existing from 1967 to 1977 and the East African Co-operation (1993-2000).

The East African Community (EAC) today is a regional inter-governmental organisation established under Article 2 of the Treaty for the Establishment of the East African Community that entered into force in July 2000. The membership of the Community is comprised of the Republics of Burundi, Kenya, Rwanda, Uganda and the United Republic of Tanzania. Pursuant to the provisions of paragraph 1 of Article 5 of the Treaty, the Partner States undertake to establish among themselves a Customs Union, a Common market, a Monetary Union and ultimately a Political Federation in order to strengthen and regulate the industrial, commercial, infrastructural, cultural, social and political relations. This is intended to enhance accelerated, harmonious, balanced development and sustained expansion of economic activities.

The Vision of the EAC is to attain a prosperous, competitive, secure and politically united East Africa. The mission is to widen and deepen economic, political, social and cultural integration in order to improve the quality of life of the people of East Africa through increased competitiveness, value added production and enhanced trade and investment.

Article 5 of the Treaty for the Establishment of the East African Community stipulates that the Community shall ensure the:

- Attainment of sustainable growth and development of the Partner States;
- Strengthening and consolidation of cooperation in agreed fields;
- Promotion of sustainable utilisation of the natural resource base in the region;
- Strengthening and consolidation of the long-standing political, economic, social, cultural and traditional ties;
- Promotion of people-centred mutual development;
- Promotion of peace, security and stability;
- Enhancement and strengthening of partnerships with the private sector and civil society;
- Mainstreaming of gender in all its endeavours among others.

Over the period between 2011 and 2020, the EAC has decided to focus on the improvement of its global competitiveness for faster and sustainable economic growth with the intention of becoming an industrialised region. The specific areas of focus will include:

Table 1: EAC Focus Areas

Focus Area	Actions
Legal	• Establishment of a robust legal and administrative framework that facilitates the regional economy to generate income and wealth.
Infrastructure and Energy	• Improvement and expansion of infrastructure and energy access.
Economy	• Improvement and sustained long-term stability in the macro-economic environment and development of financial markets.
Trade	• Increased efficiency in production, distribution and increased trade with other Regional Economic Communities (RECs) and globally through strengthened and continuous support to the on-going process of creating a COMESA-EAC-SADC Free Trade Area and identification of new international markets.
Health and Education	• Improvement of health, primary education and training. • Investment in higher education and training. • Development of policy measures that are focused on augmenting human capital by expanding and improving the quality of education, health and economic environment that supports higher job creation to absorb new entrants into the labour market.
Science and Technology	• Increased investments in development of technology and innovation. • Implementation of the EAC Agriculture and Food Security Action Plan to facilitate structural change as well as technological upgrading of agriculture in the face of adverse climatic changes.

Source: 4th EAC Development Strategy (2011/12-2015/16)

1.2. The imperative for STI in the East African Community

Science, Technology and Innovation (STI) are key drivers of economic and social progress. The experience of successful developing countries shows that STI policies that are properly integrated into national development strategies and combined with institutional and organisational changes can help raise productivity, improve global competitiveness, support enhanced economic growth and facilitate employment creation.

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. This is informed by the recognition of the fundamental importance of science and technology in economic development. In order to facilitate co-operation in the development of science and technology within the Community, the Partner States have agreed to:

a. Jointly establish and support scientific research and research institutions in the various disciplines of science and technology;
b. Create a conducive environment for the promotion of science and technology in the Community;
c. Encourage the use and development of indigenous science and technologies;
d. Mobilise technical and financial support from local and foreign sources and from international organisations or agencies for the development of science and technology in the Community;
e. Exchange scientific information, personnel and promote and publish research and scientific findings;
f. Collaborate in the training of personnel in the various scientific and technological disciplines at all levels using existing institutions and newly established ones;
g. Promote, develop and apply information technology and other new technologies throughout the Community;
h. Establish common ethical guidelines for research;
i. Harmonise policies on commercialisation of technologies and promotion and protection of intellectual property rights.

Co-operation in Science, Technology and Innovation has been further emphasised by other key documents of the Community. Article 42 of the Protocol on the Establishment of the East African Community Common Market commits the Partner States that make up the East African Community to the promotion of research and technological development through the implementation of market-led research, technological development and adaptation of technologies in the community. This is in order to facilitate the sustainable production of goods and services and enhance international competitiveness.

Article 42 more specifically requires the Partner States to:

a. Disseminate the results of activities in research, technological development and demonstration programs;
b. Facilitate access to their technological and research facilities by researchers and other experts;
c. Encourage private sector participation in activities relating to intra-regional research and transfer of technology;
d. Adopt measures to develop the human resource of the Community in Research and Development;
e. Establish and support research infrastructure facilities and institutions;
f. Collaborate with the East African Science and Technology Commission (EASTECO) and other institutions on research, science and technology;
g. Establish a mechanism for the co-ordination of Science, Technology and Innovation (STI) activities

Article 43 of the same Protocol makes it an imperative for the Partner States to cooperate in the field of intellectual property rights in order to promote and protect creativity and innovation for economic, technological, social and cultural development in the Community while enhancing the protection of intellectual property rights. This makes it necessary for the Partner States to:

a. Institute measures to prevent infringement, misuse and abuse of intellectual property rights;
b. Cooperate in fighting piracy and counterfeit activities;
c. Exchange information on matters relating to intellectual property rights;
d. Promote public awareness on intellectual property rights issues;
e. Enhance capacity in intellectual property;
f. Increase dissemination and use of patent documentation as a source of technological information;
g. Adopt common positions in regional and international norm setting in the field of intellectual property;
h. Put in place intellectual property policies that promote creativity, innovation and development of intellectual capital.

Article 44 of the Protocol on the Establishment of the East African Community Common Market provides a mechanism for the Partner States making up the East African Community to cooperate in industrial development activities related to the production of goods and services in the Common Market for the attainment of sustainable growth and development in the Community. In order to achieve this, the Partner States have undertaken to:

a. Promote linkages among industries and other economic sectors within the Community;
b. Promote value addition and product diversification to improve resource utilisation;
c. Promote industrial research and development, transfer, acquisitions, adaptation and development of modern technology;
d. Promote sustainable and balanced Industrialisation in the Community to cater for the least industrialised Partner States;
e. Facilitate the development of micro, small and medium industries and promote indigenous entrepreneurs;
f. Promote investment and employment opportunities in the Community;
g. Promote knowledge based industries;
h. Promote industrial productivity and competitiveness of industries at national, Community and international levels;
i. Promote sustainable industrial development that ensures environmental protection, management and efficient resource utilisation;
j. Disseminate and exchange industrial and technological information.

1.3. Sustainable Development Goals as a catalyst for progress in science

The eradication of poverty in all its forms, including extreme poverty is the greatest challenge the World faces today. The achievement of sustainable development for all people requires that nations adopt a multi-dimensional view that integrates economic, social and environmental factors in a balanced manner while building on the achievements they have made thus far. Science, provides numerous opportunities by which poverty, World hunger, income and gender inequalities can be addressed by laying the foundations for new approaches and technologies to identify, clarify and tackle global challenges for the future. Cooperation in science across borders helps

provide solutions necessary to enable a sustainable World by addressing key systemic barriers to sustainable development that include unsustainable consumption patterns, environmental degradation, inequality and weak institutional capacity.

The countries of the East African community face immense challenges to their development. While the community has witnessed impressive economic growth over the past decade, this growth has not been inclusive. A large proportion of the Community's people still live in abject poverty. Food insecurity continues to bedevil the region as a result of declining production and increasing food prices. Climate change and related extreme weather conditions have worsened water scarcity and precipitated losses in biodiversity. The prevalence of diseases especially HIV/AIDS has resulted in the deaths of many who would have constituted the most productive segment of the region's population and further engendered poverty.

The EAC Vision 2050 sets forth the East African Community's agenda for achieving the Sustainable Development Goals by 2030 in a systematic manner by articulating a managed change process that respects ownership, ensures sustained political commitment, honours good governance and accountability and promotes social cohesion. The Vision further recognises that sustained, inclusive and equitable economic growth in the region is a key requirement for eradicating poverty and hunger. The Vision therefore places emphasis on economic transformation through the judicious use of natural resources, value addition of raw materials and the expansion of development opportunities for the Community's citizens as key elements in this transformation process. The Vision identifies STI as key enabler to the Community's socio-economic aspirations.

1.4. The East African Science and Technology Commission

The East African Science and Technology Commission (EASTECO) is semi-autonomous institution of the East African Community (EAC) that was established by the fifth Extra-Ordinary Summit of the EAC Heads of State on June 18, 2007. This was in accordance with the relevant provisions of the Treaty on the Establishment of the East African Community as set out in Chapter 16, Article 103 (a), where the Partner States undertook to promote co-operation in the development of science and technology within the Community's member states.

EASTECO's overall objective is to promote and coordinate the development, management and application of science and technology to support regional integration and socio-economic development. The specific objectives of the Commission include:

a) The formulation of regional Science, Technology and Innovation (STI) policies;
b) The joint development and application of science and technology;
c) The promotion of regional research centres of excellence;
d) The exchange and utilisation of scientific information;
e) Promotion of public and private sector partnership in the development and application of STI;
f) Mobilisation of resources for STI in the community;
g) Fostering scientific and technological innovation in the Partner States (seeding for future growth);
h) Development, adoption and utilisation of ICT and the adaptation of new and emerging technologies

i) Supporting the dissemination of research and development findings in the Partner States.

In recognition of the need to set up an operationally viable organisation. The Commission also has specific functions. The functions outlined below will enable the commission to meet its mandate as well as engender its perpetual establishment within the Community.

Table 2: Functions of the East African Science and Technology Commission

Functions of the East African Science and Technology Commission
1. Formulate the policies of the Commission; 2. Approve the general framework for the programs of the Commission; 3. Approve the budget and audited accounts of the Commission; 4. Direct the Secretariat to undertake any tasks that are compatible with the aims and objectives of the Commission; 5. Receive and consider reports from the Executive Secretary on the activities of the Commission; 6. Elect the Chairperson of the Governing Board and the members of committees of the Governing Board; 7. Make decisions for the fulfilment of the objectives of the Commission; determine priorities for regional collaborative research; 8. Formulate policies that shall safeguard the region from hazards that might result from research activities and application of science and technology; 9. Monitor and evaluate the implementation of agreed regional science and technology policies; 10. Establish think tanks that shall evaluate trends and forecast in science and technology and give recommendations to Partner States; 11. Develop mechanisms for the identification, promotion and growth of special talents in science and technology, with particular emphasis on the youth and gender parity; 12. Promote the use and development of indigenous knowledge and technology; 13. Facilitate the dissemination and internalisation of new and emerging technology; 14. Promote and coordinate the public and private sector partnership in the development and application of science and technology; 15. Promote the development of regional research centres of excellence; 16. Promote the inculcation of a science and technology culture in the Partner States; 17. Establish and coordinate the implementation of common ethical guidelines for research and its application in the community; 18. Promote the exchange and utilisation of scientific information; 19. Support the dissemination of research and development findings in the Partner States; 20. Enhance collaboration in the training of personnel for various scientific and technological disciplines; 21. Perform any other function of the furtherance of the objectives of the Commission as may from time to time be directed by the Council.

Source: The Protocol on the Establishment of the East African Science and Technology Commission

The following section, Chapter II: Situational analysis examines the current state of the EAC based on the SWOT framework. The section also addresses the specific STI developments in the region identifying current successes and challenges as well as opportunities for improvement.

Chapter 2: Situational Analysis

2.1. Background and introduction

In the last three decades, there have been many steps to promote STI activities in support of the socio-economic transformation of Africa. The Lagos Plan of Action for Economic Development for example, elaborated the roles that STI would play in solving problems including energy deficiency, food insecurity, environmental degradation, disease and water scarcity as well as the need to boost industrial productivity. The Plan committed African countries to spend at least 1% of the GDP on research and development.

Subsequent decisions underscored the importance of investing in STI; these included the 1987 Kilimanjaro Declaration, the 1988 Khartoum Declaration and the 1989 Abuja Statement.

Table 3: List of Action Plans over the last thirty-five years relating to STI

Declaration/Plan of Action	Aim	Action Plan	Period
Lagos Plan of Action (1980)	To increase Africa's self-sufficiency	To take urgent action in providing the political support necessary for the success of the measures instituted to achieve the goals of rapid self-reliance, self-sustaining development and economic growth.	1980-2000
Kilimanjaro Declaration	To implement and promote science and technology policies	Developing science and technology, Centres of Excellence, educating personnel in the field of science and technology, promoting indigenous technologies and mobilising funds for STIs.	1987
Khartoum Declaration (1988)	To develop human capacities	To restore the economic status of African countries which were experiencing a period of economic crisis by developing human capacities.	1986-1990
Addis Ababa Declaration	To advance the development of the Continent by promoting research in all fields, in particular in science and technology	Increase funding for national, regional and continental programmes for science and technology and support the establishment of national and regional centres of excellence in science and technology.	
Abuja Declaration	Establishment of an African Economic Community (AEC) for	To signal the importance of regional integration as an important tool for accelerating the economic, social, cultural	

Declaration/Plan of Action	Aim	Action Plan	Period
	the economic integration of Africa	and political development of African countries	

Source: African Innovation Outlook II

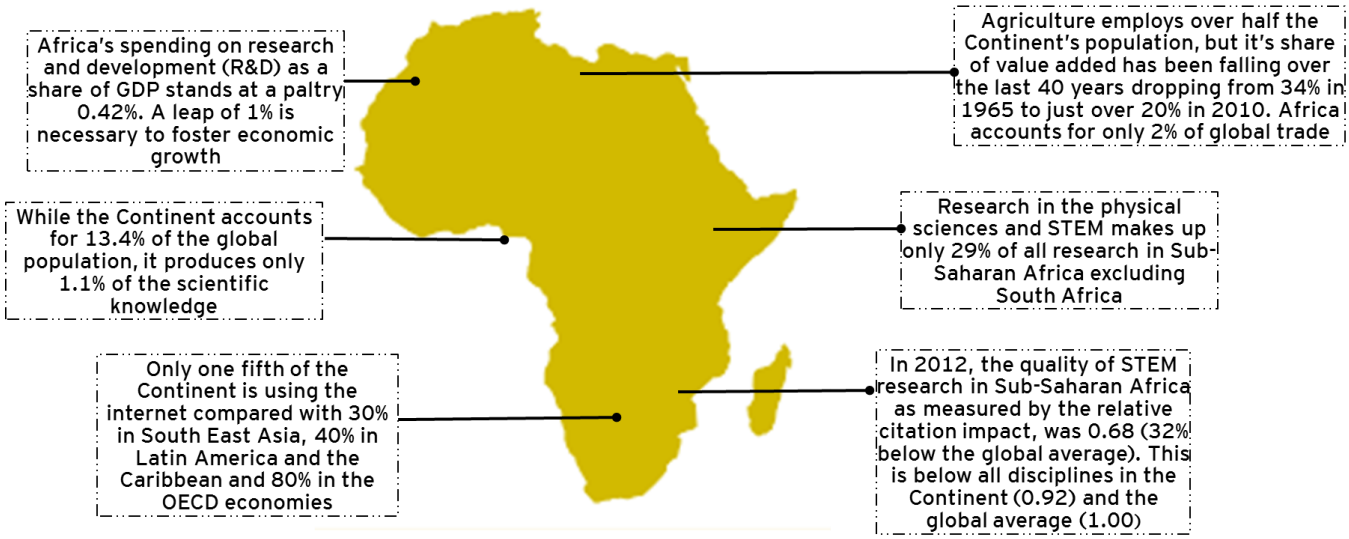
The current trajectory in STI activities on the continent is influenced by the Science and Technology Consolidated Plan of Action (CPA) endorsed by the African Ministerial Council on Science and Technology (AMCOST) and adopted in 2007 by the Heads of State and Government. The CPA was developed through a series of regional consultations on the needs of the African STI community and has three inter-related pillars. These are; capacity building; knowledge production and technological innovation.

The adoption of the Consolidated Plan of Action stimulated several developments in STI in the Continent. This included:

1) A re-emphasis on the investment of 1% of GDP in R&D;
2) The establishment of Centres of Excellence in S&T at country and regional levels;
3) The revitalisation of African Universities;
4) Adoption of STI indicators based on the Frascati & Oslo manuals which marked the launch of the African Science, Technology and Innovation Indicators Initiative (ASTII)
5) Development of a new strategy, the "Science, Technology and Innovation Strategy for Africa 2024 (STISA-2024) which was adopted in July 2014.

Despite these efforts, there are still significant challenges that beset STI and hamper its ability to catalyse Africa's economic growth. The figure below outlines some of the challenges that are then detailed in the section that follows:

Figure 1: Highlight of key STI developments after a decade



Source: A decade of development in sub-Saharan African Science, Technology, Engineering & Mathematics Research

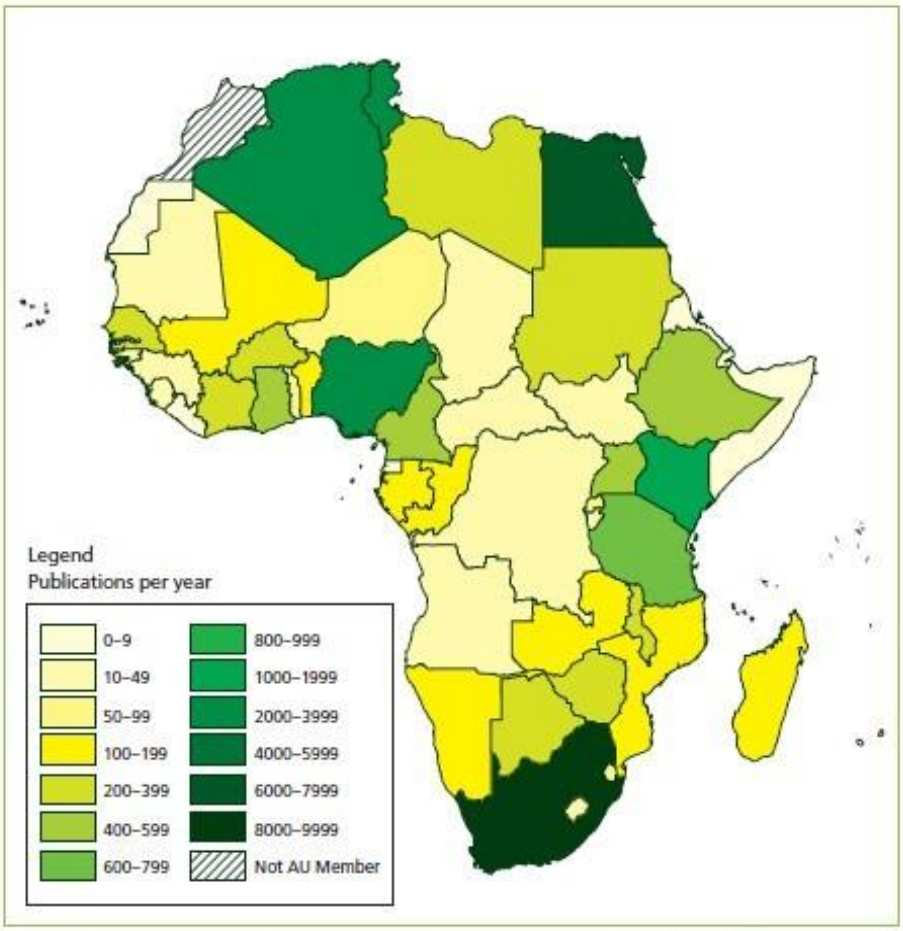
2.2. Characteristics of STI in Africa

a) Scientific activities in Africa are concentrated around a few countries, but are growing rapidly

The overall raw scientific output (number of scientific papers) reveals that scientific activities in Africa are concentrated in a few countries with South Africa and Egypt dominating the Continent's scientific output, followed by Nigeria, Tunisia and Algeria. When scientific production is normalised per capita (million inhabitants) Tunisia stands out as the top performer.

The diagram below provides details of the scientific output on the continent between the years 2005-2010.

Figure 2: The distribution of publication per year per African country



Source: computed with data from the Scopus database

The EAC growth index is below the Average Growth Index for Africa in the number of papers and scientific production with the continent average being 1.22 times of the global growth index and EAC achieving only 1.17 times. The table below shows the number of papers and the growth in scientific production across the Regional Economic Communities (RECs) on the continent.

Table 4: The Growth Index of Academic Papers compared across African RECs

Country/Group	2005-2010 (Total)	2005-2007	2008-2010	% increase (2008-2010/2005-2007)	Growth Index
World	10,055,974	4,619,523	5,436,451	18%	1.00
Africa	181,454	74,629	106,825	43%	**1.22**
Community of Sahel-Saharan States	108,575	43,507	65,068	50%	1.27
Southern African Development Community	61,778	27,006	34,772	29%	1.09
Common Market for Eastern and Southern Africa	60,239	24,357	35,882	47%	1.25
Arab Maghreb Union	42,836	16,461	26,375	60%	1.36
Economic Community of West African States	32,456	13,117	19,339	47%	1.25
Intergovernmental Authority on Development	15,237	6,248	8,989	44%	1.22
East African Community	13,688	5,759	7,929	38%	1.17
Economic Community of Central African States	5,239	2,343	2,896	24%	1.05

Source: Assessment of Scientific Production in the African Union, 2005-2010

b) Africa's contribution to the World's scientific production remains small

Africa's contribution to the World's scientific production between the years 2005 to 2010 remained small, accounting for only 1.8 per cent of World production. However, the scientific production of African states grew 22% faster than that observed at the World level over the 2005-2010 period.

Table 5: Global average scientific papers production comparisons

Country/Group	2005-2007	2008-2010	% increase (2008-2010/2005-2007)	Growth index
World	4,619,523	5,436,451	18%	100
United States of America	1,328,365	1,408,715	6%	090
China	677,358	997,743	47%	125
United Kingdom	346,436	380,381	10%	093
Japan	351,229	344,729	-2%	083
Germany	322,682	357,208	11%	094
Canada	194,227	220,749	14%	'097
Italy	181,354	208,000	15%	'097

Country/Group	2005-2007	2008-2010	% increase (2008-2010/2005-2007)	Growth index
Africa	74,629	106,825	43%	122

Source: Assessment of Scientific Production in the African Union, 2005-2010

c) Limited collaboration in intra-African Science, Technology and Innovation (STI)

Collaboration among African countries on STI matters is infrequent. Only 4.1% of the Continent's scientific papers between the years 2005-2007 bore any evidence of collaboration. This figure improved to 4.3% in 2008-2010. Africa lacks strong collaboration frameworks in Science, Technology and Innovation (STI) to foster cooperative research among countries. Intra-African collaborations comprise just 2%, 0.9% and 2.9% of all East African, West &Central African and Southern African total research output.

d) Concentration of research effort and quality of research by field of science

African countries have concentrated their STI efforts on specific fields. These include:

- **Health sciences:** microbiology, virology, complementary and alternative medicine, general and internal medicine, tropical medicine, health and policy services.
- **Natural sciences:** The continent is specialised in most of the biology, chemistry, mathematical and statistical fields , but the sub fields where it achieves research quality above the World average is zoology and mathematical physics.
- **Applied sciences:** African countries are highly specialised in the fields of agriculture, fisheries and forestry however, their research efforts remain largely unpublished in higher impact factor journals.
- **Economic and social sciences:** The concentration of research effort is above the World average, but the impact is below the World average except in cultural studies and demography.
- **Arts and humanities:** The concentration of research effort is above the World average, but the impact is slightly below the World average except in anthropology and archaeology, where African countries are highly specialised with the research quality above the World average.

Research in the Physical Sciences and Science, Technology, Engineering and Mathematics (STEM) makes up only 29% of all research in Sub-Saharan Africa excluding South Africa. This is in contrast to Malaysia and Vietnam where STEM constitutes the largest share of scientific output standing at 68%. The share of STEM research in Sub-Saharan Africa has continued to decline annually by 0.2% since 2002. In 2012, the quality of STEM research in Sub-Saharan Africa, as measured by relative citation impact was 0.68. This was 32% below the global average.

The large STEM gap that is characteristic of the continent is linked to several factors. These include the low quality of basic education in science and math, a higher education system that is skewed to other disciplines other than STEM such as the humanities, social sciences and

international research funding (which makes up the greater bulk of Africa's research funding) that prioritises health and agricultural research.

e) Over reliance on international collaboration to drive STI

While African countries infrequently collaborate amongst themselves in STI, extra-African collaboration between African and non-African countries stood at 40%. While this may be interpreted as a positive aspect in scientific knowledge production, it may also be symbolic of a situation of over-reliance on external funding due to inadequate funding sources from within the continent, lack of internal research capacity and the critical mass necessary to produce international quality research.

A large share of Africa's research is because of international collaboration. In 2012 for instance, 79%, 70% and 45% of all research by Southern Africa, East Africa and West and Central Africa respectively was produced through international collaborations. A good percentage of African researchers are non-local and transitory, spending less than two years at African institutions. 39% and 48% of all East and Southern African researchers are non-local and transitory.

f) Impact of Africans in the diaspora

African researchers living in the diaspora contribute significantly to raising the citation impact of Africa's research especially in East and Southern Africa. While they comprise a small share of the total researcher base (3.6% and 2.1% respectively in those 2 regions), the relative citation impact of these researchers' publications is higher than that of the continent's researchers. This presents an opportunity for the continent with regard to the fact that a large and well-trained African diaspora can be tapped to raise the quantity and quality of the Continent's research.

2.3. Science, Technology and Innovation in the EAC Partner States

2.3.1. Analysis of STI policy objectives and priorities

The table below demonstrates the status of the STI policies of Partner States. Each of the Countries have developmental visions addressing overarching issues such as poverty reduction, employment generation, food security, social equality, structural transformation and industrial development, information and communication technology (ICT) and environmental sustainability.

Table 6: EAC member states STI policy objectives and priorities

Country	Development Vision	Strategic Vision	STI Policy	STI Policy Objectives and Priorities						STI Policy Ownership
				Research Capacity	Human Resources	Network of researchers	ICT	Institutional Capacity	Linkage with private sector	
Burundi	Vision 2025	Sustainable peace and stability and achievement of global development commitments in line with MDGs	National Policy on Scientific Research and Technological Innovation (2011)							Ministry of Education, Higher Education and Scientific Research
Kenya	Vision 2030	Globally competitive and prosperous Kenya with a high quality of life	Science, Technology and Innovation Act (2013), National Science,							Presidential Advisory, Parliamentary Committee on Education, Research and Technology, National Commission on Science, Technology and Innovation, Ministry of

Country	Development Vision	Strategic Vision	STI Policy	STI Policy Objectives and Priorities						STI Policy Ownership
				Research Capacity	Human Resources	Network of researchers	ICT	Institutional Capacity	Linkage with private sector	
			Technology and Innovation Policy							Education, Science and Technology
Rwanda	Vision 2020	Become a middle income country by 2020	National Science Technology and Innovation Policy							Ministry of Education, National Commission for Science and Technology
Tanzania	Vision 2025	High quality of life anchored on peace, stability, unity and good governance, rule of law, resilient economy and competitiveness	Tanzania Science, Technology and Innovation Policy Reform							Ministry of Education, Science, Technology and Vocational Training
Uganda	Vision 2040	Transform Ugandan society from a peasant to a modern prosperous country	National Science Technology and Innovation Policy (2009)							Uganda National Council for Science and Technology (operates under Ministry of Science, Technology and Innovation)

Source: Innovation for Development in Southern and Eastern Africa: Challenges for Promoting ST&I Policy

Colour convention – Achievement of Priorities in National STI Policy			
0%	25%	50%	75%

All the EAC nations have recognised the importance of STI and have enacted laws or developed national 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. This is a positive move in fostering a vibrant STI environment, which resonates strongly with the governments' decision to operationalise EASTECO.

The policies detailed above also enumerate the priorities of each Partner State with regard to STI. In addition to policies, the Partner States have established national commissions for science, technology and innovation through Acts of Parliament to undertake the promotion, regulation, assure the quality and advise the governments on matters of science, technology and innovation.

The policy priorities of each Partner State in the Community are analysed in the table below:

Table 7: Summary of national policy priorities

Country	National priorities and objectives outlined in policy	Priority areas/sectors
Burundi	• Coordinate research centred on the development of Burundi • Coordinate the valuation of available assets and fill existing gaps to promote STI in Burundi; • Focus STI in the solution of problems and challenges facing the people of Burundi; • Make STI a tool for development for the country and local communities	• Agri-food technology • Medical sciences • Energy, mines and transport • Water, desertification and environment • Biotechnology and indigenous knowledge • ICT, space science and mathematics • Social and human sciences
Kenya	• Seek more strategic investments of science and technology resources in order to obtain higher economic and social returns; • Strengthen science education and training at all levels of the national system; • Develop effective promotion of intellectual property rights protection and provide incentives to local researchers as well as foreign direct investment (FDI) as a means to secure technology;	• Transport • Communications • Health • Agriculture • Energy • Environment • Shelter • Trade and commerce • Education

Country	National priorities and objectives outlined in policy	Priority areas/sectors
	• Employ STI to spur economic growth while contributing to national challenges and providing a basis for marketing goods and services abroad; • Forge a closer working relationship with industry, NGOs, academia and other bodies for the promotion and effective use of available skills and technology in research and development and reduce overlap functions, thus improve efficiencies in the performance of R&D; • Facilitate assessment and implementation of new forms of transitional science and technology cooperation geared towards enhancing national growth and enhancing access to foreign sources of science and technology; • Promote a wide variety of funding and support mechanisms for national R&D including public-private partnerships, cost sharing arrangements, risk capital, tax-credit and incentives and standard contract research agreements.	
Rwanda	• To support the achievement of Vision 2020 targets of a steady growth in GDP-8% per year from 2010 to 2020; • Advance the quality of life for all the citizens, specifically to support the Vision 2020 target of a GDP per inhabitant of US$ 900 by 2020; • Improve skills and knowledge among the population, specifically to create a "knowledge-based economy", • Maintain viability and strategically choose to enhance opportunities for growth in rural areas; • Integrate technical education with commerce, industry and the private sector in general.	• Education • Health • Agriculture and animal husbandry • Biotechnology • Environment • Water and sanitation • Energy • Transport • ICT • Geo-information • Tourism • Industry • Private sector
Tanzania	• Promote science and technology as a tool for economic development, the improvement of human, physical and social well-being and for the protection of national sovereignty; • Promote scientific and technological self-reliance through the upgrading of R&D	• Food and agriculture • Industry • Energy • Natural resources • Environment

Country	National priorities and objectives outlined in policy	Priority areas/sectors
	capabilities by creating an environment conducive to scientific and technological creativity and improvement of relevant scientific infrastructure; • Stimulate generation of scientific and technological knowledge; • Inculcation of science and technology culture in the Tanzanian society; • Provide attractive terms and conditions of service in order to motivate and retain good scientists and technologists; • Establish an appropriate legal framework including intellectual property rights, monitoring and controlling of the choice and transfer of technology, as well as bio-safety; • Institute a mechanism for identification, promotion and development of special talents and aptitudes; • Promote rational utilisation of natural resources in order to maintain sustainable ecological and social balance; • Promote active participation of women; • Promote commercialisation of research results and technologies.	• Health, sanitation and population planning • Transport and communication • Education and manpower in science and technology
Uganda	• Assess, forecast and advise on issues regarding STI taking into account current and future trends in development, transfer and diffusion of both local and foreign STI outputs; • Provide a conducive environment for industrial development in Uganda; • Facilitate and encourage S&T innovation through protection and use of intellectual property rights; • Guide the judicious use and application of traditional, conventional and emerging technologies for sustainable development; • Mainstream and actively involve the special needs groups, men, women and children to ensure that the resultant impacts are evenly spread across all sections of society; • Provide financial support for STI activities to build capacity and put in place the necessary infrastructure; • Build an educational and training system that	• Economic growth • Employment creation • Export promotion • Human capital development • Environment and conservation • Tourism • Rural development

Country	National priorities and objectives outlined in policy	Priority areas/sectors
	produces human resources with capacity to generate and effectively apply STI based on contemporary and future needs of society; • Support basic, applied and development research for enriching the STI knowledge base and product development for enhancing indigenous knowledge and adaptation of imported technology; • Support development and growth of small and medium enterprises through provision of essential services and infrastructure; • Apply appropriate safety and health measures in the generation, development and application of STI in all its aspects; • Establish mechanisms to ensure development and application of STI in accordance with acceptable morals and national societal norms; • Promote the standardisation of Ugandan products and services in line with required international standards; • Develop an STI information management system to facilitate the production, storage and dissemination of accurate, timely and up-to-date information on STI activities; • Strengthen the Uganda National Council for Science and Technology (UNCST) to effectively provide a sector-wide framework for policy, planning and coordination; and establish support linkages with local, regional and international development partners.	

Source: Africa's Science, Technology and Innovation Policies – National, Regional and Continental

2.3.2. Mandates, goals, strategic issues and pillars of the Commissions/Councils of Science, Technology and Innovation

The table below summarises the mandates and goals/strategic issues and pillars of the various national councils and commissions for science, technology and innovation in the Partner States

Table 8: Mandates, goals, strategic issues and pillars of the Commissions/Councils of Science, Technology and Innovation

Country	Council/Commission	Mandate	Strategic issues/pillars
Burundi	National Commission of Science, Technology and Research (CNSTR)	To contribute to the socio-economic development of Burundians by coordinating science, technology, innovation and research efforts	1. Design, plan and implement the national policy on science, technology and research 2. Implement programmes designed to promote science, innovation and transfer of technologies 3. Identify national scientific capacity and establish an up to date database of scientific competencies 4. Actively participate in the dissemination of science and technical information among all sectors directly or indirectly involved in research 5. Organise forums bringing together key researchers and research beneficiaries 6. Monitor and evaluate activities funded through innovation and research resources 7. Organise stakeholders meetings bringing together policy makers, academia, national, regional and international STI organisations, Development Partners and beneficiaries
Kenya	National Commission for Science, Technology and Innovation (NACOSTI)	To regulate and assure quality in the science, technology and innovation sector and advise the government on matters related thereto	1. Regulation of research and development activities 2. Policy advice on matters of research, science, technology and innovation 3. Coordination of science, technology and research activities 4. Promotion and socialisation of science, technology and innovation 5. Institutional strengthening to ensure full implementation of the plan
Rwanda	National Commission of Science and Technology (NCST)	To provide informed and strategic policy advice to the Government on issues pertaining to the development of science, technology, innovation and research	1. Provide recommendations and strategic advice to the Government on all matters relating to policy, legislation and regulation in the fields of science, technology, research and innovation and monitor the implementation of such policies and legislation; 2. Provide advice to the Government in setting priorities for national science and technology innovation, research agenda as well as the

Country	Council/Commission	Mandate	Strategic issues/pillars
		including advising on human capacity building strategies to ensure the availability of a critical mass of skills in science and technology.	allocation of resources; 3. Identify and support new high-impact areas of technology innovation and research that may be useful for the country's development by providing strategic foresight; 4. Analyse the nature and effective use of natural resources and infrastructure in order to support science and technology as well as their innovative use in a sustainable manner; 5. Regulate national science and technology and innovation and research; 6. Mobilise funds and manage the National Research and Innovation Fund; 7. Promote science and technology community outreach; 8. Prepare and disseminate an annual report on the state of science, technology, research and innovation in the Country; 9. Cooperate and collaborate with other advanced regional and international institutions of excellence with similar missions.
Tanzania	Tanzania Commission for Science and Technology (COSTECH)	COSTECH is the principal advisory organ of the Government on all matters relating to scientific research and technology development in the country	1. Advice the Government on all matters relating to S&T including but not limited to the formulation of S&T policy, priority setting for R&D allocation and utilisation of resources 2. Promote, coordinate, monitor and evaluate scientific research and technology development and technology transfer activities 3. Facilitate national, regional and international cooperation in scientific research and technology development and transfer 4. Acquire, store and disseminate scientific and technological information and popularise S&T
Uganda	Uganda National Council for Science and Technology (UNCST)	To develop and implement ways of incorporating science and technology in the national development process by advising government on relevant policy matters and coordinating research and development activities in Uganda	1. Improve and streamline national science and technology policy environment to foster scientific and technological innovation 2. Strengthen national system for research, product development, technology transfer and intellectual property management 3. Increase public understanding and appreciation of science and technology 4. Strengthen the UNCST institutional research base and capacity

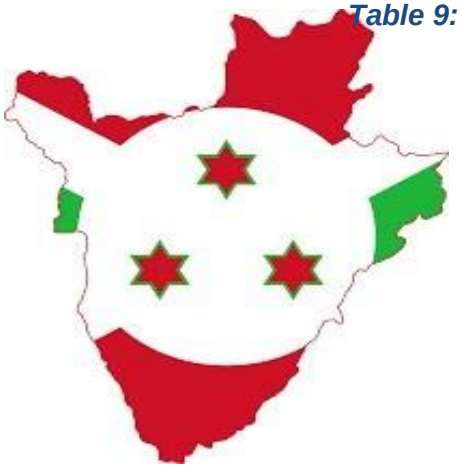
Source: The National Policies of Science, Technology and Innovation of each Partner State

2.3.3. Indicators of STI in the Partner States

The tables below provide a summary of the STI indicators in each of the countries of the East African Community. The tables provide details on the number of researchers per million inhabitants in each country, researchers in head counts and the percentage of female researchers and the gross expenditure on R&D as a percentage of GDP. Additionally, the tables provide sectoral analysis of researchers and expenditure on R&D. The availability of statistical indicators vary from country to country, with countries such as Kenya, Tanzania and Uganda providing detailed statistics while Burundi and Rwanda are still at the nascent stages of maintaining STI data and statistics.

BURUNDI

Table 9: Burundi STI statistical indicators



Researchers in full-time equivalents (FTE)	
Per million inhabitants	N/A
% female	N/A
Researchers in head counts	
Per million inhabitants	39
% female	14.5
Gross domestic expenditure on R&D as percentage of GDP (GERD)	0.14

	Researchers by sector of employment in full-time equivalents (%)	**Researchers by sector of employment in headcounts (%)**	**GERD by sector of performance (%)**	**GERD by source of funds (%)**
Business enterprise				
Government		17.9	87.2	59.9
Higher education		78.6	4.8	0.2
Private non-profit		3.4	8	0
Funds from abroad				39.9

Source: UNESCO Institute for Statistics, 201

KENYA

Table 10: Kenya STI statistical indicators

Researchers in full-time equivalents (FTE)	
Per million inhabitants	231
% female	20
Researchers in head counts	
Per million inhabitants	323
% female	25.7
Gross domestic expenditure on R&D as percentage of GDP (GERD)	0.79

	Researchers by sector of employment in full- time equivalents (%)	**Researchers by sector of employment in headcounts (%)**	**GERD by sector of performance (%)**	**GERD by source of funds (%)**
Business enterprise	11.4	9.4	8.7	4.3
Government	20.2	27.9	40.6	26
Higher education	60.7	56.6	39.1	19
Private non-profit	7.7	6.1	11.6	3.5
Funds from abroad				47.1

Source: UNESCO Institute for Statistics, 2014

RWANDA

Table 11: Rwanda STI statistical indicators

Researchers in full-time equivalents (FTE)	288.9 FTE
Per million inhabitants	26.5
% female	35
Researchers in head counts	721 HC
Per million inhabitants	66
% female	28.2
Gross domestic expenditure on R&D as percentage of GDP (GERD)	0.17

	Researchers by sector of employment in full- time equivalents (%)	**Researchers by sector of employment in headcounts (%)**	**GERD by sector of performance (%)**	**GERD by source of funds (%)**
Business enterprise	N/A (*)	N/A (*)	N/A (*)	1 (**)
Government	16.8	18.3	21	25.4
Higher education	31.1	45.1	49	18.5
Private non-profit	52.1	36.6	30	0.1 (**)
Funds from abroad				55

Source: MINEDUC-Rwanda, National R&D Survey Report, 2013-2014 (: Data of Business sector to be collected with Innovation Survey; **: Data from Business and Private non-Profit to be completed)*

TANZANIA

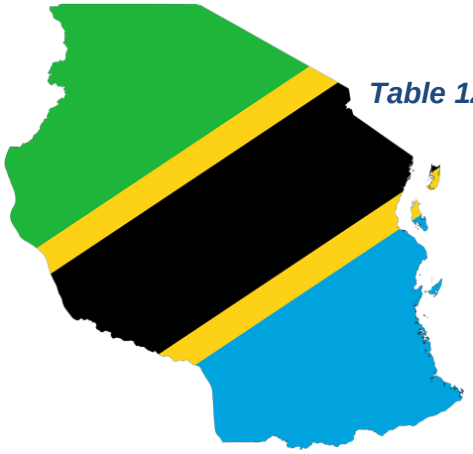


Table 12: Tanzania STI statistical indicators

Researchers in full-time equivalents (FTE)	
Per million inhabitants	35
% female	24.6
Researchers in head counts	
Per million inhabitants	68
% female	25.4
Gross domestic expenditure on R&D as percentage of GDP (GERD)	0.38

	Researchers by sector of employment in full-time equivalents (%)	Researchers by sector of employment in headcounts (%)	GERD by sector of performance (%)	GERD by source of funds (%)
Business enterprise				0.1
Government	64.4	33.9	13.7	57.5
Higher education	35.6	66.1	86.3	0.3
Private non-profit				0.1
Funds from abroad				42

Source: UNESCO Institute for Statistics, 2014

UGANDA

Table 13: Uganda STI statistical indicators

Researchers in full-time equivalents (FTE)	
Per million inhabitants	38
% female	26.3
Researchers in head counts	
Per million inhabitants	85
% female	24.3
Gross domestic expenditure on R&D as percentage of GDP (GERD)	0.48

	Researchers by sector of employment in full- time equivalents (%)	**Researchers by sector of employment in headcounts (%)**	**GERD by sector of performance (%)**	**GERD by source of funds (%)**
Business enterprise	50.6	50.7	34.8	13.7
Government	21	14.3	38.6	21.9
Higher education	25.7	31.2	25.4	1
Private non-profit	2.7	3.8	1.2	6
Funds from abroad				57.3

Source: UNESCO Institute for Statistics, 2014

An analysis of the country indicators above reveals the following salient characteristics of STI in the community:

1. **Lack of adequate data in relation to STI indicators**; only Kenya, Uganda and Tanzania have adequate data on all the indicators listed on the table, Burundi and Rwanda lack adequate data on STI. This can be explained by the fact that STI is still at its nascent stages in this countries following periods of conflict.

2. **Lack of adequate human resource**; the density of researchers per million inhabitants is highest in the Republic of Kenya at about 323 researchers per million inhabitants in 2014. This figure is below the World average, which stood at 1,081 researchers per million inhabitants in 2007 according to the UNESCO Science report 2010. Kenya is followed by Uganda, which has 85 researchers per million inhabitants; Tanzania comes third with 68, Rwanda with 56 and Burundi with 39.

3. **Participation of women in STI**; women are a minority in STI in the Community. Science, Technology and Innovation is a male dominated field. Women account for less than 25% of the total researchers in the regional economic bloc.

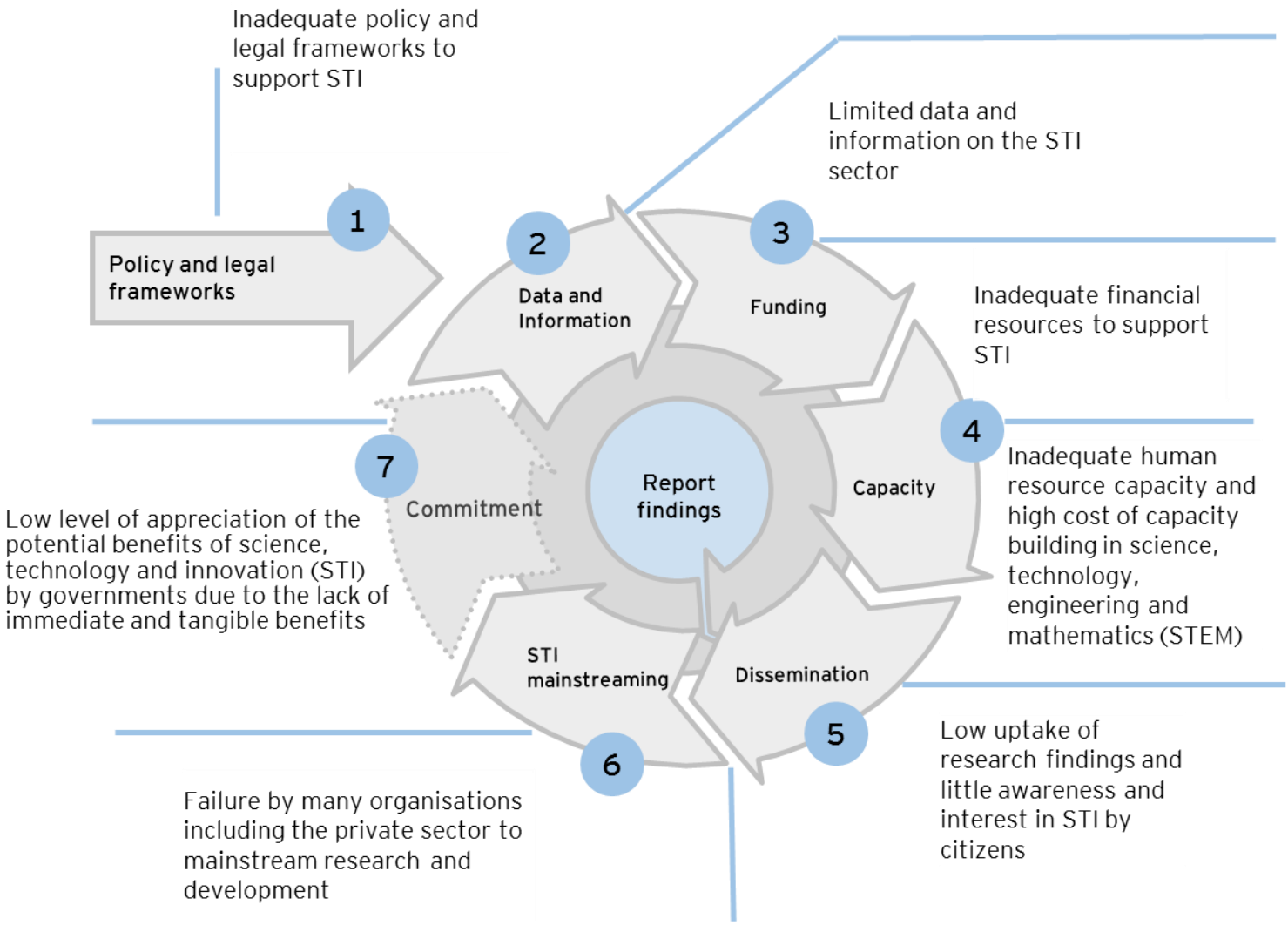
4. **Most researchers are found in Higher Education institutions**; with the exemption of Uganda, majority of researchers in the Community are found in institutions of higher learning. This portends of a situation in which other sectors do very little research, hence the disconnection between academia and industry. Only Kenya and Uganda have significant numbers of researchers in the business sector with the figures of other countries being negligible.

5. **Heavy reliance on funding from abroad;** an analysis of the GERD by source of funds reveals an over-reliance on external support for STI with over 40% of the funding for STI initiatives coming from Development Partners. This poses a threat to sustainability and the overall capacity of countries of the Community to drive their own research agenda.

2.3.4. Challenges in STI in the EAC Partner States

An analysis of the commissions and councils of Science, Technology and Innovation in the Partner States reveals the following challenges

Figure 3: Challenges in STI in the Partner States



2.4. Snapshot of key stakeholders in science, technology and innovation in the Community

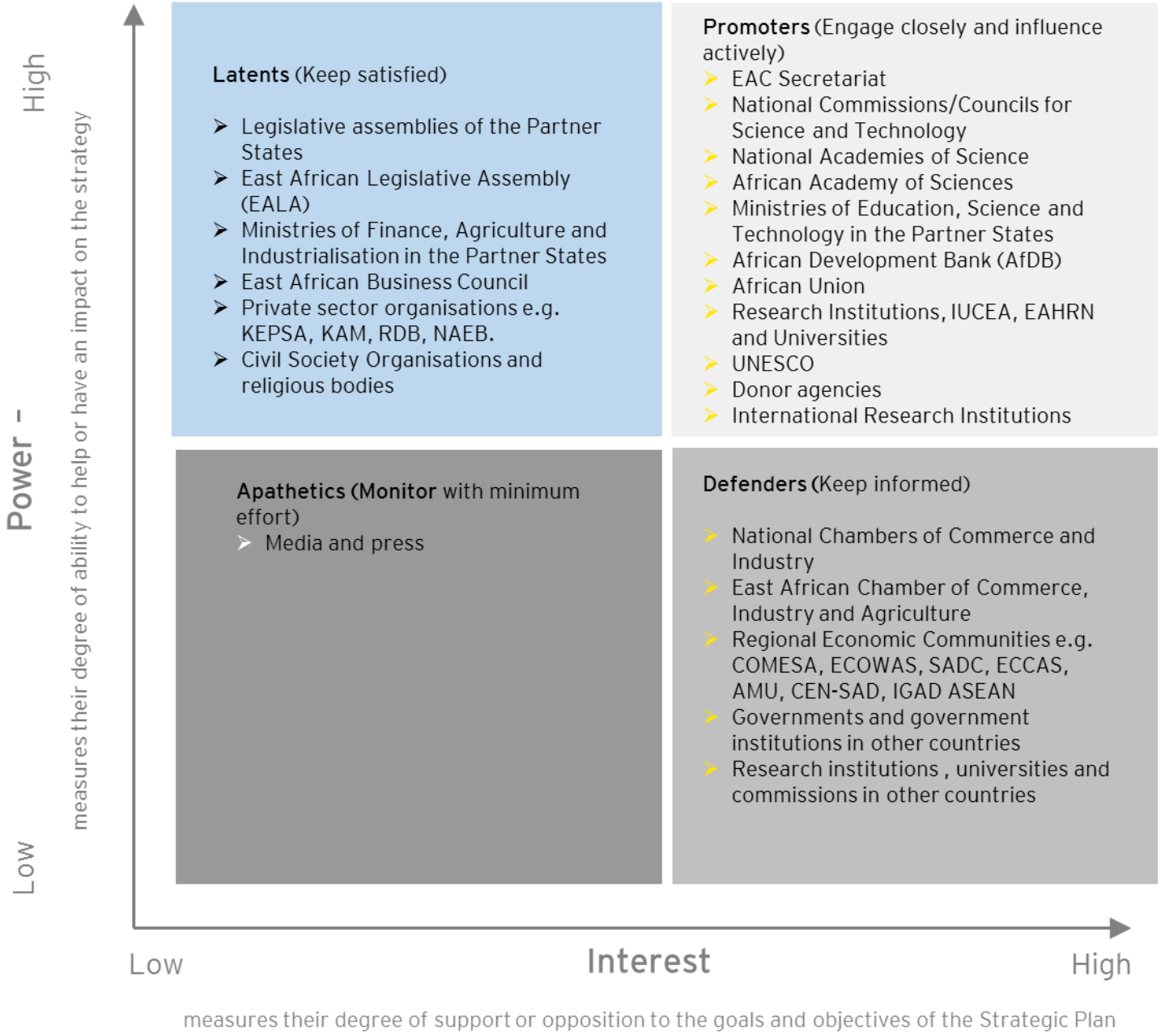
A number of stakeholders exist within the STI space in the Community. These stakeholders include the private sector, which operates as the locus of production, governments, which are the source of contractual relations that guarantee stable interactions and exchanges, academia and research institutions, which act as sources of new knowledge and technology and the civil society. The Community is also characterised by a number of national institutions including national government ministries for science, technology and innovation, national commissions for science and technology, research institutes, academies of science and civil service organisations that play a role in the development of science and technology. These stakeholders vary in the level of interest and power they wield.

Stakeholders with high power and interests aligned with the purpose of EASTECO are critical to the achievement of the Commission's mandate and will form the Commission's primary audience. This group of stakeholders mainly consists of immediate decision makers and opinion leaders. Stakeholders with high interest but low power, or high power but low interest will be kept informed and satisfied since they provide support for the implementation of the Strategic Plan.

An analysis of EASTECO's stakeholders based on their level of interest and power is provided in the matrix below:

- **Latents –** stakeholders whose actions can affect the implementation of EASTECO's Strategic Plan but who attach low priority to it.
- **Promoters** – stakeholders who attach a high priority to the Strategic Plan and whose actions can have an impact on the implementation of the Strategic Plan.
- **Defenders** – Stakeholders who attach a high priority to the Strategic Plan but whose actions cannot have an impact on the implementation of the Strategic Plan.
- **Apathetic**s – Stakeholders whose actions cannot affect the implementation of the Strategic Plan and who attach low priority to the Strategic Plan

Figure 4: Stakeholder analysis



A good number of stakeholders are active in the EAC region in various fields of STI. EASTECO is the main regional body with the mandate to provide a coordinating and an enabling environment for the effective development and application of STI in the EAC region. A summary of the stakeholders, their roles and expectations is provided in table 14 below:

Table 14: Stakeholders, their roles and expectations

Stakeholder	Stakeholder's Role	Stakeholder Expectation
EAC Organs including Secretariat	► Facilitate interactions with development partners, cooperation with other EAC organs and institutions ► Facilitate acquisition and training of staffing necessary to enable EASTECO discharge its mandate ► Provide advisory and oversight role	► EASTECO should promote and facilitate cooperation in the development of science and technology as per Article 103 of the Treaty for the Establishment of the East African Community and the Protocol on the Establishment of the East African Science and Technology Commission ► Advise the Secretariat on matters pertaining to STI
National Governments of the EAC Partner States	► Provide funding to enable EASTECO discharge its mandate ► Facilitate formulation, harmonisation and adoption and legislation that will support STI, ► Support capacity building for STI at national level ► Comply with the Treaty for the Establishment of the East African Community ► Promote the Protocol on the Establishment of the East African Science and Technology Commission	► EASTECO should promote and facilitate cooperation in the development of science and technology among the Partner States ► EASTECO should support national priorities in STI that are in line with its strategy ► EASTECO should promote the development of regional research centres of excellence ► EASTECO should provide recommendations to Partners States ► EASTECO should promote the inculcation of a science and technology culture in the Partner States
National Commissions/Councils for Science and Technology,	► Spearhead identification of national priorities in STI ► Provision of technical support and cooperation to EASTECO ► Promotion of EASTECO's mandate in	► Facilitate regional coordination and collaboration, ► Facilitate design and implementation of regional programmes ► EASTECO should promote the exchange and utilisation of scientific information

Stakeholder	Stakeholder's Role	Stakeholder Expectation
	the various countries ► Support the dissemination of research findings/outputs ► Participate in identification of research priorities ► Support commercialisation of viable innovations ► Support technological innovation	► EASTECO should support the dissemination of research and development findings in the Partner States ► Policy formulation at a regional level that will safeguard the region from hazards that might result from research activities and application of science and technology ► EASTECO should promote the use and development of indigenous knowledge ► Support regional centres of excellence in research and innovation
Academies of Science, Academia and Research Institutions	► Provide evidence based research to inform policy ► Conduct R&D to provide solutions through research ► Design and deliver appropriate training in STI & related fields ► Participate in public awareness of STI ► Participate in identification of research priorities	► Provide support in regional coordination of research agencies ► Support in dissemination of research findings ► Develop relevant policies ► Provide relevant regional partnerships and links for benchmarking with other relevant bodies outside the region
African Union	► Provision of a continental strategy to guide STI on the Continent ► Facilitate collaboration between RECs in STI	► Promote the implementation of the Science, Technology and Innovation Strategy for Africa 2024 (STISA-2024)
Development Agencies and Partners	► Provide funding to enable EASTECO discharge its mandate ► Facilitate partnerships with other likeminded organisations	► Accountability for funding in line with EASTECO's goals and objectives
Civil Society	► Hold EASTECO accountable for the protection and improvement of the lives of the citizens of the EAST African Community ► Drive ownership by the Community's	► Policy formulation at a regional level that will safeguard the region from hazards that might result from research activities and application of science and technology ► EASTECO should ensure that its initiatives are

Stakeholder	Stakeholder's Role	Stakeholder Expectation
	citizens of EASTECO's programmes and projects ► Participate in identification of national priorities in STI ►	people centred and people-driven ► EASTECO should promote gender and youth parity in STI
Private Sector	► Support R&D by providing financing and partnerships to enable for utilisation of science and technology in the Community ► Be receptive to innovations and solutions provided through research ► Participate in the identification of capacity building needs for industry	► EASTECO should provide accountability for funds ► EASTECO should promote and coordinate public and private sector partnership in the development and application of science and technology ► EASTECO should develop mechanisms for the identification, promotion and growth of special talents in science and technology
Other governments and Regional Economic Communities	► Exchange of scientific information ► Sharing of best practices ► Partnerships in STI across countries and communities	► EASTECO should promote the exchange and utilisation of scientific information ► EASTECO should facilitate the dissemination and internalisation of new and emerging technology
Media and Press	► Coverage of EASTECO's programmes, initiatives and impacts ► Promotion of a science culture in the Community by highlighting positive stories of STI ► Hold EASTECO accountable to the citizens of the Community by facilitating debate and engagement on priorities, challenges, achievements and projects	► EASTECO should promote a culture of science, technology and innovation in the Community ► EASTECO should seek to reach a wider audience by involving and using different forms of media.

2.5. The EAC Operating Environment:

The operationalisation of EASTECO is in the context of an ambitious EAC Vision 2050, which aims to achieve a per capita income of US$ 10,000 by 2050. The community has recognised that this target can only be achieved if STI plays a significant role in catalysing innovation and development to meet the current challenges facing the region.

The table below summarises the Community's Vision 2050 targets in areas where Science, Technology and Innovation (STI) will have a direct impact and provides a comparison with the situation as at 2014.

Table 15: The underlying EAC Targets for 2050 that will drive the role of STI in the region

Indicators		2014	2030	2050
1. Socio-economic indicators				
GDP per capita (US$)		1,014	3,000	10,000
Average regional economic growth		5.8	10	9.9
Unemployment rate		14	10	5
Gross capital formation (as a % of total export)		24.3	32.2	40.5
Raising local value addition (%)		8.2	40	60
2. Human Capital				
Ratio of engineers to total population		1:5500	1:3000	1:1500
Technical and vocational and education training (%)		6.7	20	63.4
TVET enrolment in numbers		450	780	960
Centres of Excellence	Research and innovation centres	0	5	8
	Industrial development think tanks	2	5	10
	Medicine and human health	2	4	8
	Veterinary medicine	0	3	6
	Electronics and space science	0	4	10
	Technology for development	2	10	20
3. Productive sectors				
Contribution to GDP (%)	Agriculture	24	18	10
	Industry	16	27	40
	Services	36	43	50

Indicators		2014	2030	2050
4. Regional inter connectivity				
ICT (internet penetration and mobile networks) %		65	80	95
Percentage of individuals using internet		40	52	67
5. Energy				
Electrification rate (%)		19.1	58	74
Urban population with access to electricity (%)		28	63	94
Rural population with access to electricity (%)		9.5	37	62

Source: EAC Vision 2050

The region has been growing rapidly with Rwanda, Tanzania and Uganda being named amongst the top ten fastest growing economies in the world. The growth of the region in the last ten years has also averaged at 6.2%, which is above the global average of 4.1%. The EAC however recognises that for the member states to achieve the US$ 10,000 per capita income 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 following are key characteristics of the current operating environment for EASTECO within the EAC:

a) **Explicit recognition of the importance of the STI in economic growth** – The leaders of the five Partner States have explicitly recognised the importance of STI in the EAC Treaty. The Partner States have integrated STI considerations into a raft of policy frameworks and adopted a Protocol on STI. 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 and the East African Health Research Commission. Under the EAC Common Market Protocol, STI has been accorded significant prominence as a driver for economic growth with Article 42 speaking of the cooperation of Partner States in Research and Development, Article 43 speaking of cooperation in intellectual property rights and Article 44 espousing the modalities for cooperation in industrial development.

b) **Political stability and establishment of democratic institutions -** The Countries 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, which emanated from a period of conflict in those countries. Most of the countries in the region also have national visions that articulate the role of STI in their socio-economic transformation.

c) **Enabling environment for EASTECO functions –** 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. However, national interests continue to hinder the free movement of labour within the East African Community. This has the overall effect of undermining the effective implementation of decisions agreed upon as per the Protocol. Currently, only Rwanda, Kenya and Uganda have abolished the requirement for work permits to facilitate movement of labour. This hinders the capacity of East African countries to share skills across sectors and borders.

d) **Growth in GDP -** Increased GDP enables the countries of the East African Community to allocate more funds to STI as a share of that GDP. The Lagos Plan of Action called upon African countries to allocate 1% of their respective gross domestic product to research and development. Almost 30 years later, most Countries on the continent have not reached the target thus hindering their ability to achieve sustainable economic development.

e) **Diverse Economies** - 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 and create a larger and growing middle class. This has resulted in a vibrant private sector that can be tapped into to provide financing for STI initiatives. Aside from this, STI can play a significant role in improving the value of goods produced in agriculture and manufacturing, improving the technology in retail and services and enhancing conservation efforts that ensure that tourism is sustainable.

f) **Access to untapped natural resources -** The Community is endowed with a variety of natural resources such as gold, oil, natural gas, copper, cobalt and tin. These resources have attracted significant investments (in the form of FDI) in the infrastructure required to extract these resources and transport them to where they can be processed. These resources also provide opportunities for investing in STI to enhance the human as well as technological capabilities necessary for their extraction.

g) **Increased trade volumes because of regional integration -** Deeper regional integration has increased trade volumes. Increased trade has the potential of increasing higher value-added activities by harnessing the potential of STI.

h) **Improved business climate -** The EAC needs an investment climate, including a business regulatory environment and protection of intellectual property rights that is well suited to scaling up trade and investment and can act as a catalyst to modernise the regional economy. The countries of the EAC are steadily working to achieve the “four freedoms” – free movement of people, goods, services and capital within the common market. The sharing of best practices amongst member States could improve the competitiveness of the member States as well as that of the EAC. The Doing Business Report 2011 estimated that the EAC’s average global rank of 117 could move to 18 if best practices were successfully shared.

i) **Inadequate Economic Growth** – Although the economic growth rate of the EAC region is reported as among the highest in sub Saharan Africa, there exist underlying challenges

that curtail the economic growth of the EAC region. A 50 year comparative analysis of South Korea and Mauritius with the EAC reveals that; over that period of time South Korea's GDP per capita increased from about USD 140 (similar to that of East Africa) to USD 21,000 and that of Mauritius to USD 7,885 while EAC's increased to only USD 790. This has been mainly due to:

- High inflationary environments and huge fiscal deficits
- Low productivity and little Foreign Direct Investments (FDI)
- Low level of domestic savings and private sector credit

Uncompetitive external sectors, low value primary exports and undiversified products. While this situation may be because of low investments in Science, Technology and Innovation within the EAC region, it also creates a cycle in which the countries of the EAC will never have surpluses to invest in STI.

j) **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.

A number of factors have led to this situation.

- Limited participation of gender-oriented stakeholders to articulate gender issues in science and technology policy review and formulation processes; hence most policies developed are not gender responsive;
- The gender mainstreaming of science and technology policy formulation and review processes have not been sufficient to reflect the level of gender disparity or develop programmes that drive gender mainstreaming.
- Lack of gender disaggregated data in science and technology at national and sub-regional levels in East Africa to help policy makers, programme implementers make informed decisions on resolving gender disparities in science and technology;
- Cultural and health issues disadvantage the girl-child in continuing with education and especially pursuing careers in STI which have been caricatured as men-only domains
- Lack of coordinated mechanism for effective dissemination, networking and sharing of experiences in gender issues in science and technology education.

k) **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 marginalised 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.

East Africa's 109 million children and youth accounted for 80% of the total population in 2010. Youth unemployment remains a major issue in the region. The rate of unemployment in the Community in the year 2014 has averaged 7.32% with Kenya and Tanzania recording an above average rate of 12.7% and 10.3% respectively.

Education is a necessary condition to equip the youth with the right skills to enter the workforce. If constructive economic and educational policies are set up and more jobs created, the energy and talent of the EAC's youth can be harnessed to sustain high levels of economic growth. Within the African continent, East and West Africa will be the youngest regions by 2040. Such a large youth bulge presents opportunities for change, progress and social dynamism if properly utilised.

l) **ICTs and Mobile Telephony -** 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. Consumers, governments and businesses across SSA 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. Feature phones and more recently the increasing adoption of smart phones, are bringing internet access to the masses across the region. Mobile technology will thus be the key access technology to enable unconnected populations bridge the digital divide.

Mobile broadband has the potential to transform access to jobs and education across the region. Studies have shown that broadband access is a key driver of job creation and economic growth. Research indicates that if access to the internet achieves an impact on the same scale as mobile telephony has already achieved in Africa, then it could account for as much as 10% of total GDP by 2025, up from only 1% today. This would be equivalent to over USD 300 billion, due to the internet's transformational effects on sectors such as retail, agriculture, education and healthcare. Tech innovations have gained momentum over the last five years. Nairobi, Kenya often referred to as the Silicon Savannah has been the epicentre of this development and has been leading innovations in areas such as mobile money (M-Pesa) and crowdsourcing (Ushahidi).

m) Reliable energy to drive industrialisation – the EAC has begun implementing its power wheeling agreements to allow for load balancing of electric power across the region. Efficient and cost-effective provision of power for industrialisation in the region will be a key to rapid economic development. STI will play a crucial role in ensuring that the power provided is clean, renewable and affordable by developing different sources and innovating around efficiency.

n) **Intellectual Property rights -** Cooperation in intellectual property rights among the East African Community Partner States is expressed in Article 43 of the Protocol Establishing the East African Community Common Market. Article 43 states that the Partner States shall take steps to cooperate in the field of intellectual property rights in order to promote and protect creativity and innovation for economic, technological, social and cultural development in the Community by cooperating in the following areas:

a) Copyright and related rights;
b) Patents;
c) Layout designs of integrated circuits;
d) Industrial designs;
e) New plant varieties;

f) Geographical indications;
g) Trade and service marks;
h) Trade secrets;
i) Utility models;
j) Traditional knowledge;
k) Genetic resources;
l) Traditional cultural expressions and folklore

The Partner States shall institute:

- Measures to prevent the infringement, misuse and abuse of intellectual property rights;
- Cooperate in fighting piracy and counterfeit activities;
- Exchange information on matters relating to intellectual property rights;
- Promote public awareness on intellectual property rights issues;
- Enhance capacity in intellectual property;
- Increase dissemination and use of patent documentation as a source of technological information;
- Adopt common positions in regional and international norm setting in the field of intellectual property;
- Put in place intellectual property policies that promote creativity, innovation and development of intellectual capital.

All partner countries have developed laws and policies that govern IPR. However, a common framework will be essential in ensuring that a common protection of these rights is afforded innovators across the region. To this end, the East African Community recently adopted a Regional Intellectual Property Policy on the Utilisation of Public Health-Related WTO-TRIPS Flexibilities and the Approximation of National Intellectual Property Legislation. The policy focuses on the full use of specific TRIPS flexibilities for optimising access to health products and medical devices in the East African Community (EAC) in order to address public health problems. Among the areas it covers are protection, parallel importation of medicines from cheaper countries and mechanisms for compulsory licensing by allowing governments to bypass the rights of patent holders during emergencies in order to enable the manufacture of essential medicines.

o) **Quality Assurance and Standards –** for the region to become competitive clear expectations and guidelines must be developed to ensure that the required quality standards are attained and maintained. Whereas each country has bodies charged with this responsibility poor quality production stifled the growth of the export-oriented trade as products manufactured locally cannot compete globally. EASTECO will therefore be instrumental in ensuring that a common framework governing quality in the region is developed.

2.6. Priority intervention areas for the EAC

The East African Community Vision 2050 articulates vital development concerns that plague the regional economic bloc. These include persistent poverty, unbalanced distribution of economic and social infrastructure, inadequate social cohesion, and lack of human capital. The sub-optimal utilisation of natural resources, inadequate exploitation of mineral resources and poor infrastructure also hampers development. Other developmental concerns include increasing unemployment especially among the youth, unplanned urban development, low investment in research and development, low levels of industrialisation and lack of competitiveness. The region is also plagued with insufficient energy supplies, which are vital to support further economic growth.

In the EAC vision 2050, the Partner States have identified a set of initiatives that will underpin the transformation for growth and development and move the Community to a higher income cohort, subsequently achieving upper middle-income status. Additionally, an analysis of the common priorities as outlined in the individual partner states' STI policies coupled with the views expressed by relevant stakeholders solicited during the preparation of this Strategic Plan yielded a few priority intervention areas where science, technology and innovation can be leveraged to maximise socio-economic impact and transformation and contribute to the attainment of the Sustainable Development Goals (SDGs).

The priority areas identified include:

- Agriculture
- Energy and environment
- Bio-sciences
- Export-oriented industrial development and trade facilitation
- Information and communication technology
- Health (innovative technologies)

Each of these sectors/areas is analysed in the following section:

a) Agriculture

Agriculture is a key sector in the economies of the East African Community. It is estimated that over 70% of the labour force in the EAC member states is involved in agricultural activities. Between 24% and 48% of the GDP of the member countries is attributed to the agricultural sector. Despite this high resource involvement, the EAC region is frequently affected by food shortages and pockets of hunger. The region also has significant potential and capacity to produce enough food for local consumption and a large surplus for export to the World market.

Many factors have led to this state of affairs but key among them is the inadequate exchange and trade between times and places of abundant harvest on one hand and those with a deficit on the other and the high variability in production caused by variability in weather conditions. Reliance of

rain-fed agriculture renders large swathes of land unproductive due to a changing and erratic weather system.

The East African Community is endowed with a wide diversity of agro-ecological zones ranging from the heavy rain-forest vegetation with bi-annual rainfall to relatively sparse, dry and arid vegetation with low uni-modal agricultural development. On the one hand, it creates vast potential in regards to the mix of agricultural commodities and products that can be produced and marketed domestically and externally while on the other hand this wide diversity implies that there are no universal solutions to the problems that bedevil agricultural development in the region. Consequently, programs and interventions in the agricultural sector must be tailored to the particular conditions of the different agro-ecological zones and to prevailing socio-economic conditions of households, especially those living in rural areas that comprise the vast majority of the Community's population.

Furthermore, despite its importance, agricultural productivity in the region remains dismal thus undermining the Community's overall productivity and food security. Agricultural productivity in the region considerably lags behind that of other developing regions and unlike other developing regions of the World, the Community has not benefitted from the green revolution. There are still incidences of undernourishment in some parts of the Community mainly because food production, supply and consumption systems are not functioning optimally. The level of value addition and crop processing of agricultural commodities is low and post-harvest losses are currently estimated to be as high as 30% in cereals, 50% in roots and tubers and up to 70% in fruits and vegetables.

The constraints for achieving food security in the East African Community are listed below:

- Low and unstable production and productivity occasioned by over-reliance on rain-fed agricultural production systems;
- Low surface water storage per capita in the EAC region;
- Inefficient utilisation of water resources for agricultural production;
- Low capacity on rain water harvesting;
- Poor or no access to affordable agricultural credit by resource poor producers;
- Low producer prices making agriculture less remunerative;
- Uncertainty in income flows due to price volatility in agricultural commodities;
- Inadequate and weak farmer's institutions incapable of supporting a vibrant agricultural sector;
- Inadequate infrastructure such as transport, communications, storage and processing facilities that hinders access to factor and product markets between the Partner States and beyond;
- Low usage of agriculture production enhancing inputs such as fertiliser, improved seeds, agro-chemicals and veterinary drugs;
- Inadequate institutional support to livestock production systems in arid and semi-arid areas;
- Inadequate institutional support to fishing industry including capture and aquaculture fisheries;
- Increased frequency and severity of extreme weather such as floods and droughts as a result of climate changes which have an adverse effect on food production;

- Inadequate flow of information on the adverse climate change impacts and actions to farmers and producers;
- Prevalence of HIV/AIDS and other tropical human and animal transboundary diseases that not only divert the already constrained resources form agricultural production but waste the labour force;
- Increased pressure on natural resources and degradation of environment due to rapid population growth, poor soil management practices and overgrazing;
- High post-harvest losses due to inadequate food storage and processing facilities;
- Disruption of food production and distribution due to social unrest and political instability;
- Inappropriate and low adoption of production technologies by farmers due to weak research-extension-farmers linkages;
- Inadequate food access particularly among the vulnerable and resource poor segments of the population;
- Gender imbalances in access to opportunities in production, marketing, consumption and access and control of productive resources.
- Substantial research done but low dissemination of findings

- *Majority of the region's populace are low-income subsistence farmers who live in rural areas.*
- *The region and Sub-Saharan Africa in general has gradually been marginalised in international agricultural export markets. Even though SSA possesses 12 per cent of the World's arable land, the region's share of global agricultural exports has declined gradually from 10 per cent four decades ago to around 2 per cent.*
- *Beyond agricultural production, value chains are underdeveloped*
- *Many R&D institutions at national level but not coordinated regionally*
- *Weaknesses in technological processing of agricultural products*
- *The EAC strategy for agricultural and rural development identifies promotion of agro-based development to increase supply of semi – and processed goods as a key intervention.*
- *Goal should be to increase export share (at least 30%) of processed agricultural products*

The Comprehensive Africa Agriculture Development Programme (CAADP) is Africa's policy framework for agricultural transformation, wealth creation, food security and nutrition, economic growth and prosperity for all. It is guided by a set of principles and values including: African ownership and leadership; accountability and transparency; inclusiveness; evidence-based planning and decision making and harnessing regional complementarities.

EASTECO can complement ongoing national and continental level gains and achievements in areas where STI can deliver maximum impact through improvements in technological capacity, encouragement of innovation and incorporation of greater benefit into production all of which are expected to contribute to making agriculture in the region more productive, competitive and sustainable. In this regard, EASTECO has identified particular interventions where STI can be best positioned to deliver the greatest impact. These include:

- Coordination of research efforts in general but with emphasis in agricultural value addition including increasing access to research findings and improving R&D economies of scale;

- Promotion of innovation and support to commercialisation of innovative solutions in value addition;
- Development of regional policies and strategies regarding the use of STI in agriculture including the promotion of regional collaborative programs;
- Facilitation of regional linkages and partnerships between various stakeholders in the agricultural value chain and building access to other regions' networks;
- Provision of support for the development of technological solutions for improved storage and processing of agricultural products;
- Facilitation of the development and coordination of joint regional programmes in selected areas.

b) Energy and Environment

Modern energy is a pre-requisite for socio-economic development. Lack of access to modern forms of energy is a major constraint to development and economic progress. Access to energy is a pre-requisite for economic and social development since virtually any productive activity needs energy as an input. Unless affordable and reliable access to and supply of modern energy is provided, the countries of the EAC will struggle to reduce poverty since lack of energy inhibits access to among other things clean water, education, health care, lighting, mechanical power for food production, clean cooking fuels and refrigeration. These in turn serve to embed poverty, limits the delivery of social services and constrains opportunities for women and children. Majority of the people in the Community still lack clean cooking and heating options and have no access to grid-based electricity. A holistic approach that balances environmental concerns with socio-economic realities and commercial opportunities is therefore necessary. The Community faces numerous challenges in regards to access to energy. Some of these challenges include:

- **Limited access to electricity** – Inefficient access to electricity is a huge barrier to investments and economic growth of the EAC region and this is directly linked to the underdeveloped energy infrastructure in the region. The World Bank estimates that only 6.5% of the population of Burundi have access to electricity, in Kenya only 23.0%, in Rwanda only 18%, in Tanzania only 15.3% and Uganda only 18.2% of the population have access to electricity. Low electrification rates due to limited coverage of the power grid, coupled with low electricity consumption rates has resulted in electricity currently contributing less than 10% to the region's energy balance. The region's electricity sector is based primarily on hydropower. In 2015, renewable electricity accounted for approximately 65% of the region's total installed grid-connected power generation capacity. The remaining 35% was from thermal based generation. Although hydropower is the predominant source of energy in the region, it is being adversely affected by unreliable rainfall caused by changes in climate as well as the alteration of river flows due to the deforestation of catchment areas.

- **Over dependence on biomass –** majority of the people living in rural areas have no access to electricity and therefore have to rely heavily on the use of biomass for their energy needs. Solid biomass accounts for about 80% of final energy consumption in the region. Household cooking represents the largest share of final energy consumption in the Community. As population growth continues, the region's biomass consumption is set to

double every 20 to 25 years. Science, Technology and Innovation can play a crucial role in increasing the efficiency in both fuel production and consumption and facilitating the development of economically viable fuel alternatives.

- **Oil and gas:** There have been recent oil and gas discoveries in 3 of the five partner states (Kenya, Tanzania and Uganda) and commencement of exploitation of methane gas in L. Kivu in Rwanda. This will provide some relief to the region's urgent energy needs to accelerate development as reliable energy is needed for industrial development. There is however insufficient capacity in this field in the region.

- **Climate Change:** The effects of climate change such as rising temperature and changes in precipitation are undeniably clear and affect the environment and the socio-economic stability of the EAC region. Due to the lack of economic, development, and institutional capacity, African countries are likely among the most vulnerable to the impacts of climate change. Climate change impacts have the potential to undermine and even undo the progress made in improving the socio-economic well-being of East Africans. The negative impacts associated with climate change are also compounded by many factors, including widespread poverty, human diseases, and high population density, which is estimated to double the demand for food, water, and livestock forage within the next 30 years. The region needs to develop strategies to adapt to the effects of climate change. Renewable energy is a feasible option for the region and the technological and innovative advances in solar, geothermal and wind power make it a smart choice in terms climate change mitigation and adaptation. The region can be at the forefront of promoting and developing low carbon options while putting in place the policies needed to reduce its vulnerability to the effects of climate change. A regional Centre of Excellence for Renewable Energy and Energy Efficiency (EACREEE) to complement and strengthen the ongoing EAC Partner States' initiatives in the areas of policy and capacity development, knowledge management and raising awareness as well as investment and business promotion is now operational at the Makerere University College of Engineering, Design, Art and Technology (CEDAT) in Kampala, Uganda. The Centre will develop and implement a coherent regional Renewable Energy and Energy Efficiency (RE&EE) policy framework for the EAC and facilitate its implementation at national levels. The centre will also develop and execute regional programs and coordinate implementation of international funding to mitigate climate change in the energy sector.

- *The EAC has massive potential for renewable energy yet has the smallest per capita power generation and electricity access rates in the continent. This significantly contributes to the 622.6 million people on the continent who do not have access to electricity and the over 700 million Africans who do not have access to clean cooking energy and rely on charcoal, fuel, wood and kerosene.*
- *The EAC has lagged behind in developing a regionally integrated vision for a power pool thus putting brakes on the region's industrialisation initiatives.*
- *Reliable energy needed for industrialisation*
- *87.6% of the EAC's population depend on biomass (firewood and charcoal) for their energy needs*

- *Low emphasis on renewable energy (solar, wind biofuels) e.g. for biofuels - Mckinsey has estimated that the regional biofuel market could reach USD 11bn by 2030*
- *Low capacity in oil and gas*

The possible interventions in which application of STI can make a difference have been identified as:

- Support and collaborate with the regional centre of excellence in renewable energy (EACREE);
- Coordinate planning, development and deployment of climate smart technologies, including coordination of R&D and supporting the development of an integrated, prioritised portfolio of climate change-related technology investments in the region;
- Support capacity building efforts in the oil and gas industry.

c) Biosciences

Biotechnology provides a tool to address emerging challenges in agriculture and health. It holds the potential to facilitate significant improvements along the agriculture value chain. Smallholder farmers in the region produce most of the agricultural output, but are largely unable to increase their productivity. Connecting these farmers to markets, value chains and agro-processing opportunities is an important step to increasing agricultural productivity, decreasing poverty and improving rural livelihoods. Advances in the field of biotechnology affords the region the opportunity to fully exploit the genetic potential and improve crop productivity. Additionally, biotechnology presents new agro-processing opportunities to diversify smallholder production, increasing demand for local crops, thereby improving rural livelihoods. Biotechnology can also enable agro processing industries to be more efficient and competitive by converting agro-waste into value added products such as feed and bio-energy.

The Partner States of the East African Community are at varied stages of advancement and specialisation in biotechnology. A regional initiative was established in 2010 to support broad-based bioscience research and innovation activities in eastern Africa. This was the Bio-resources Innovations Network for Eastern Africa Development (Bio-Innovate) Program. The Programme comprises of a regional competitive bioscience innovation fund that assembles critical players along the bio-innovation value chain to apply and promote bioscience innovations in the six eastern Africa countries including Burundi, Ethiopia, Kenya, Rwanda, Tanzania and Uganda. Bio-Innovate was established to augment existing work in bioscience in the region and more specifically to catalyse the translation of bioscience research outputs into innovations and take them closer to the end-users. The programme has established innovation platforms around specific technologies in an attempt to ensure faster generation and delivery of bioscience innovations to the market place. The Bio-Innovate Programme builds on previous investments, achievements, and experiences from the Eastern Africa Regional Program and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development (BIO-EARN) and other regional initiatives. The programme implemented nine consortia projects under three thematic focus areas. These were improving crop productivity and resilience to climate change, agro-

industrial waste management and value addition, innovation incubation and promotion of targeted value chain, innovation policy analysis. Bio-Innovate applies an integrated approach linking sustainable agriculture with agro-processing and value addition including agro-industrial waste management, as well as innovation policy analysis. The first phase of the Bio-innovate program ended in 2015.

EASTECO can promote and support the achievements of the regional Bio innovate program. In order to drive advances in bioscience, there is need for public awareness and a stronger emphasis on collaboration through the quadruple helix. This means that public agencies, research institutions and academia have to come together with the private sector and civil society organisations to build human capacity, undertake research, and facilitate access to knowledge and relevant technologies through regional and international linkages. Additionally, bioscience technologies and knowledge need to be adapted to local demands.

Continuous collaboration in bioscience will facilitate the establishment of relevant regional policy frameworks and legislation to promote regional biotechnology activity with adequate provisions to address transboundary issues, establishment of conditions for businesses and markets and provide a mechanism for biotechnology dissemination and feedback across the region. The Partner states also have different strengths in specific biotechnology research areas and these will be brought together for the collective good – regional collaboration will build on and enable individual strengths. Most of the Partner states physical biotechnology and biosafety infrastructure like laboratories (including GMO testing laboratories) require upgrading to be able to handle modern biotechnology.

The recently acquired ability to manipulate the genetic makeup of both plant and animal life has produced a host of ethical and legal problems. Partner states are concerned about the transboundary movement of GMOs bearing in mind the different levels of biotechnology adoption in the different countries. There is therefore a need to develop a regional biosafety regulatory framework (including standards and ethical guidelines).

d) Export-oriented industrial development and trade facilitation

The quest for the EAC Partner States to be industrialised economies with high sustainable growth rates and development has been the preoccupation of every administration since independence. Impediments to industrialisation have hindered the Community from growth. Article 79 of the Treaty for the Establishment of the East African Community states that the Partner States shall take steps in the field of industrial development that will promote self-sustaining and balanced economic growth. The Article further states that the Partner States shall improve the competitiveness of the industrial sector so as to enhance the expansion of trade in industrial goods within and outside the Community in order to achieve the structural transformation of the economy that would foster the overall socio-economic development in the member countries and encourage the development of indigenous entrepreneurs. Technological innovation is a key factor in the development and competitiveness of the regional economic bloc, which leads to wealth creation and the improvement of living standards. Capacity enhancement in STI is an integral part in facilitating the growth of export-oriented industrialisation.

Some of the benefits expected from the EAC Common Market include sustainable and equitable regional economic expansion, integration of economic activities within the Community and enhancement of research and technological advancement to accelerate economic and social development. The transformation of the industrial sector is poised to act as a growth driver over the period of the EAC Vision 2050. This transformation needs to be based upon strong forward and backward linkages with other important sectors such as agriculture. Export-oriented industrialisation further offers high prospects for employment creation especially in labour-intensive industries while enabling the EAC integrate further into the global economy. It is projected that by 2032, the manufacturing sector's contribution to GDP will rise to an average of 25% from the current 8.7%. It is also projected that the local value added content (LVAC) of manufactured exports will be at least 40% from the currently estimated value of 8.62% and that the share of manufactured exports to the region relative to imports will move from the current 5% to 25%. This will be achieved through high value-addition and product diversification based on the comparative and competitive advantages of the region.

- *The region has developed an East African Industrialisation Policy and Strategy (2012-2032) whose overall objective is to enhance industrial production and productivity and to accelerate the structural transformation of the economies of the EAC in order to enable sustainable wealth creation, improved incomes and a higher standard of living for the community.*
- *The Industrialisation Policy identifies six priority sectors with regional comparative advantages: agro-processing, fertilizers and agro-chemicals, iron-ore and other mineral processing, pharmaceuticals, petro-chemicals and gas processing and energy and bio-fuels*
- *The current contribution of the manufacturing sector to regional GDP is 8.7%, this is expected to rise to 25% by 2032.*
- *Local value added content (LVAC) of manufactured exports currently stands at 8.62%, this is expected to increase to at least 40% by 2032;*
- *The share of manufactured exports to the region relative to imports currently stands at 5%, it is expected that this will rise to 25% by 2032;*
- *Many small and medium companies involved in S&T enterprises*
- *Low diversification of manufacturing sector in the region*

During the period of this Strategic Plan, EASTECO will concentrate efforts on

- Support to and coordination of technology transfer institutions to provide relevant and appropriate Technological solutions to improve the manufacturing potential and efficiency of regional industry;
- Support regional R&D, Technology and Innovation capabilities to support the manufacturing sector with emphasis on priority sectors identified regionally and the promotion of 'home grown solutions';
- Support linkages between the research institutions, academia, industry and business;
- Supporting the establishment of regional centres of excellence in technology transfer and innovation
- Coordinate and facilitate regional collaboration in industrial research and technology

development initiatives;

- Strengthening intellectual property rights (IPR) regimes as well as IPR protection infrastructure and capabilities in the region;
- Promotion of technology enabled trade e.g. use of ICT to increase regional and international trade

e) Information and communication technology

The strategic application of ICT is a vital tool that will contribute to the economic transformation of the region's economy. ICTs provide the basis for building a knowledge based society and provide an opportunity for facilitating technology driven entrepreneurship across the EAC. ICTs deliver growth and prosperity based on greater inclusion and social cohesion. Technological infrastructure will steadily evolve into social infrastructure as new opportunities emerge for people in the region to collaborate, innovate and participate in ways that positively affect their lives. ICTs today enable people to access financial services, knowledge and information and health care thus enabling them to create new business opportunities, live better lives and have more choices. Partnerships with the private sector need to be fostered to create the right type of ecosystem. Regional policies must be inclusive and visionary in order to position the Community as a global player.

2.7. Analysis of achievements and challenges of STI in the region

The preparation of this Strategic Plan involved the collection of views from a number of STI players and stakeholders in the region. These views are summarised in the tables below:

Table 16: The achievements of STI in the region

Achievements in innovation, infrastructure and environment	Achievements in human resource
► Establishment of centres of excellence in the region; ► Value adding innovations that can be expanded across the region; ► Development Partners such as the World Bank and the African Development Bank (AfDB) are supporting Centres of Excellence in the region; ► Breakthrough innovations such as Mpesa in mobile technology, health, finance and agriculture; ► Incubation hubs have been established to support the development of STI within the Community; ► The region has undertaken ground breaking research in HIIV AIDS, malaria, drought resistant crops, irrigation and green cars; ► Increased willingness by private sector players to participate in corporate social responsibility, some of which can be channelled into STI and R&D; ► Establishment of National Research Funds to provide financing for STI.	► Highly level of capacity in terms of human resources; ► Population dominated by youth who are aware, engaged and innovative; ► The Partner States have taken steps towards mainstreaming gender in the education system especially in STEM.
Political, legal and regulatory achievements	**Operational achievements**
► Political willingness to participate in STI; ► The enactment of the Protocol for the Establishment of the East African Science and Technology Commission (EASTECO); ► The development of national visions and national STI policies across the countries of the East African Community;	► The establishment of the Secretariat for EASTECO; ► Existence of a variety of regional institutions that are similar to EASTECO and which will provide benchmarks and enhance EASTECO's capacity to collaborate effectively e.g. Inter-University Council of East Africa (IUCEA), East Africa Business Council (EABC) and

► The passage of the Common Market Protocol means that businesses have to innovate to remain relevant in the market as other businesses expand; ► Legislation that is friendly to STI is being passed thus highlighting the increased the increasing appreciation of STI as a tool for socio-economic transformation.	the East African Health Research Commission (EAHRC); ► Scientific commissions in the region have a degree of autonomy that is useful in enabling them to carry out their mandate.

EASTECO's stakeholders noted a number of challenges as summarised in the table below:

Table 17: The challenges of STI in the region

Challenges in STI in the region
Policy harmonisation ► National bodies and stakeholders only articulate national priorities, the EAC has no mechanism through which national bodies in the STI sector can speak to each other; ► There are no clear and harmonised targets to measure the attainment of STI in the region; ► Governments have no long term view of STI since they operate on short five-year cycles; ► Decisions made by governments are not always supported by scientific evidence. **Regional collaboration in STI** ► Currently STI works in isolation, no consideration is placed on what the Community's value systems are; ► The EAC member states experience common problems but they do not work together to solve these problems through collaborative research. This situation ultimately leads to uncoordinated research, research duplication across research institutions and failure to implement research work; ► Most of the research work done in the region remains in bookshelves and is not developed further as it is not well funded or the researchers are interested in research for its own sake; ► There are not enough Centres of Excellence (CoEs) and Incubation Centres in the region; ► No clear collaboration mechanisms between non-educational research organisations and universities in the Community. ► There is very little collaboration and sharing between Centres of Excellence that possess state of the art technologies. **Funding and awareness** ► Lack of financial resources to fund research programmes due to fragmented research funding and competition between researchers in different countries and institutions; ► EAC member states are not meeting their commitments to funding R&D, the share of R&D as a percentage of GDP still remains below 1% due to competing priorities in national development; ► There is lack of ownership of STI work as most of the work is Development Partner

Challenges in STI in the region
funded and driven by Development Partner needs and objectives; ► Investments in STI do not yield immediate returns, STI is therefore not considered a priority for most countries and political backing for STI initiatives is sorely lacking; **Linkages between R&D institutions and the private sector** ► There are no linkages between STI and industry; ► The private sector is currently excluded from participation in STI, membership in STI is not all inclusive; ► Science, technology and innovation in the region is still being conducted in silos thus hindering the mobility of ideas and researchers; ► The private sector sees borrowing technology from outside the region as an easier and cheaper way of doing things, not much effort is put into developing our own products. **Human capital** ► The current staff establishment in research institutions is not at optimum and mainly consists of bottom heavy skills that are not useful for transformational research; ► The region is characterised by brain-drain largely brought about by inadequate equipment and facilities; ► There is no critical mass in R&D, therefore the research efforts in partner states are small and unsustainable; ► There are no clear policies and established mechanisms of harnessing human resources from within the region that are located in foreign lands to participate in the EAC's STI revolution. **Training in STEM** ► Many universities have come up in the region but most are not offering STEM courses. Majority of the universities focus on humanities rather than sciences; ► The EAC's education systems are theoretical and there is need to enhance the practical application of knowledge in STEM; ► There are few Centres of Excellence in the region; STI work requires equipment and facilities such as laboratories which are expensive. Resource constraints have led to Universities preferring humanities over STEM. **Gender Parity** ► The girl child has traditionally been excluded from STEM. Girls make up the greater proportion of the population however they have often been left out of education opportunities; **Intellectual Property Rights** ► Patent protection in the region is still at infancy; ► Scientists in the region are ignorant of intellectual property rights. **Capacity building for EASTECO** ► Limited budget in the EAC thus forcing EASTECO to look externally for financing; ► Inadequate numbers of staff due to financial constraints; ► Lack of knowledge about EASTECO's existence, even from players in the STI sector.

2.8. The envisaged role of EASTECO in Regional STI priorities

Based on the situational analysis and the stakeholder review specific issues and opportunities that need to be prioritised were identified. These identified issues and opportunities form the basis for the strategic plan:-

Table 18: Priorities and role that EASTECO can play in developing STI in the region

Issue 1: Policy development and harmonisation	
Priorities	**Role of EASTECO**
► Development of a regional STI coordination and harmonisation structure and policy frameworks across the EAC; ► Policies and legislation need to be backed by research findings e.g. policies on Genetically Modified Organisms (GMOs); ► Need to create strong legislation to facilitate intellectual property (IP) protection; ► Identification of regional priorities in areas of science and technology including renewable energy, ICT, bio and natural sciences, food security and climate change; ► Identification of strengths in STI that exist within each Partner State; ► Articulation of regional value systems that can guide STI; ► Creation of a clear strategic plan in STI that supersedes nationalistic tendencies and competition among the EAC states which hinders collaboration in STI.	► EASTECO shall be a central co-ordinating body that will harmonise views, build synergies and guide the development of policy frameworks for STI in the region. ► EASTECO shall bring together Governments, the private sector, academia and research institutions and civil society to articulate and prioritise common challenges in the region, identify gaps and mechanisms to address the gaps and challenges; ► EASTECO shall facilitate an annual regional scientific conference that brings together all the STI stakeholders to prioritise on areas of intervention; ► EASTECO shall facilitate the development of STI indicators and standards within the region.
Issue 2: Resource mobilisation and funding	
Priorities	**Role of EASTECO**
► Obtaining financing for STI initiatives in the Community which involves the pooling of funds from Partner States as well as Development Partners; ► Engagement of the private sector in STI so as to ensure ownership and local funding for STI; ► Enhancement of political will and commitment for STI; ► Generating critical mass in R&D through investments and	► EASTECO shall track STI funding across the region and harmonise government, private sector, Development Partner funding to meet the challenges identified.

development of a challenge mapping approach (the more challenges the EAC has, the more interested people get).	
Issue 3: Capacity building	
Priorities	**Role of EASTECO**
► Realignment of training to take into consideration regional priorities and challenges as opposed to just national priorities and challenges; ► Reduction of brain-drain within the region while facilitating the tapping of talent held by East African scientists living and working abroad ; ► Development of the education curricula in order to provide a good foundation in STEM; ► Provision of equal educational opportunities for both girls and boys; ► Inclusion of youth, girls, marginalised and disadvantaged groups and communities into STI; ► Encourage more youth to participate in STEM	► EASTECO shall work in partnership with the education ministries of the Partner States, the Inter-University Council of East Africa (IUCEA), private sector and other stakeholders to develop a regional policy framework on STEM education; ► EASTECO shall support training in STEM subjects at the elementary level in order to provide a good foundation for future scientists and innovators in the region ► EASTECO shall track regional data on the number of women and disadvantaged persons participating in STEM related fields; ► EASTECO shall provide recommendations to governments on mechanisms to address equalities that exist in the provision of STEM education.
Issue 4: Diffusion, dissemination and commercialisation of STI findings	
Priorities	**Role of EASTECO**
► Facilitation of exchange of ideas and mobility of labour within the region	► EASTECO shall champion the implementation of the Protocol on the Establishment of the East African Community (EAC) Common Market to facilitate the movement of talent across the region; ► EASTECO shall facilitate the commercialisation of products in the region by facilitating partnerships with private stakeholders, protection of research products and patent protection at a regional level; ► EASTECO shall create and manage a knowledge platform that collates the regional talent pool, on-going programmes, impacts and challenges in order to allow for seamless networking within the “Quadruple Helix”.
Issue 5: Indigenous technologies	

Priorities	Role of EASTECO
► Preservation of indigenous technologies in the Community	► EASTECO shall facilitate the identification, compilation, preservation and protection of indigenous technologies within the region.
Issue 6: Recognition and support to talented scientists and innovators	
Priorities	**Role of EASTECO**
► Recognition, promotion and rewarding of creativity and innovation in the region	► EASTECO should recognise and reward creativity within the region through awards e.g. through an annual science excellence award and a lifetime achievement in science award
Issue 7: Partnerships and collaboration in STI	
Priorities	**Role of EASTECO**
► The EAC shall link STI to manufacturing in order to facilitate the creation of wealth through the generation of globally competitive products; ► Connection of academia and the informal sector	► EASTECO should be able to bring various regional and international partners and players together under common identified programmes that cut across boundaries (based on a bird's eye view of the region); ► EASTECO needs to facilitate the development of synergies by identifying and bringing strengths and capacities together (EAC Partner States share common climatic issues, economic challenges, issues in health and shared natural resources)

2.9. SWOT Analysis

A SWOT analysis of EASTECO reveals the following strengths, weaknesses, opportunities and threats

Table 19: EASTECO SWOT analysis

Strengths	Weaknesses
❖ Establishment of EASTECO by the East African Community Partner States; ❖ EASTECO's mandate, functions and objectives have been clearly spelt out in the Protocol for the Establishment of the East African Science and Technology Commission; ❖ Development of a five-year Strategic Plan that provides a roadmap for the enhancement of STI in the region; ❖ Documentation on rules, regulations and guidance on staff and financial resources is available for customisation from the EAC Rules and Regulations ❖ Ability to reach out to a diverse set of regional and international stakeholders that transcend borders.	❖ EASTECO's Governing Board is yet to be constituted ❖ Inadequate funding from the EAC to finance the activities of EASTECO; ❖ EASTECO lacks adequate infrastructure and equipment to enable its full operationalisation e.g. ICT systems and tools; ❖ EASTECO resource mobilisation strategy not yet developed; ❖ EASTECO currently has poor institutional visibility at a regional, continental and international level. No partnerships have been established with other regional and international Science, Technology and Innovation institutions; ❖ Inadequate personnel to perform functions that will enable the achievement of EASTECO's mandate; ❖ No harmonised regional priorities and policy on Science, Technology and Innovation; ❖ Inexistence of regionally coordinated training programmes in STEM and scientific research. The Community lacks mechanisms to facilitate technology acquisition, transfer and innovation; ❖ There are no mechanisms to channel great ideas informally, quickly and cheaply (over-reliance on conferences, workshops and seminars). EASTECO needs informal, active and quicker ways to obtain great ideas; ❖ Inadequate data on STI in the

	region and continent.
Opportunities	**Threats**
❖ Existence of national commissions/councils of science, technology and innovation and industrial research institutes in Partner States; ❖ Existence of stand-alone Ministries focusing on science, technology and innovation; ❖ Existence of science and technology institutions in Partner States e.g. Universities, R&D centres, innovation parks and incubation labs; ❖ Involvement of civil society organisations in STI, such as National Academies of Science; ❖ Growing number of scientists and researchers in various fields of science and technology; ❖ Existing regional strategies identifying links with science, technology and innovation. These include Agriculture and Rural Development Strategy for the East African Community (2005-2030), the EAC Industrialisation Strategy, Regional Strategy on Scaling-up Access to Modern Energy Services in the East African Community, EAC Climate Change Policy, Protocol on Environment and Natural Resource Management and the 4th EAC development Strategy. ❖ Increasing awareness by the political leadership of the importance of STI in socio-economic development; ❖ Development and harmonisation of national, regional and continent-wide policies, frameworks and laws in STI; ❖ The region has an educated diaspora many of whom are willing to return home; ❖ Development of infrastructure e.g. internet broadband access and laboratories; ❖ Indigenous knowledge which provides a basis for launching the pharmaceutical industry; ❖ Jua-kali sector (SME's across the region)	❖ Funding for STI is not treated as a priority by the EAC Partner States due to competing interests for funding; ❖ Competition and suspicion among EAC member states which undermines collaboration; ❖ Lack of harmonised regional policies governing the transfer of technologies, national innovation systems, national standards and meteorology bodies; ❖ Inadequate laws and policies to incentivise and spur STI e.g. intellectual property and trademark protection and awards; ❖ Inability by the region to bring in an adequate number of women and girls into STI, which poses a threat to development since they make up the greater majority of the population; ❖ Non-articulated relationships between EASTECO and other institutions and departments of the East African Community working in related fields e.g. EAC Secretariat, IUCEA and EAHRC; ❖ Isolated research projects and funding mechanisms in Partner States; ❖ Research projects funded by Development partners are not harmonised to regional priority needs; ❖ Inadequate training programmes for certain fields and skill sets particularly in industry and infrastructure; ❖ Low rate of student enrolment in science, mathematics, engineering and technology (STEM) in universities and higher learning institutions.

that provides a mechanism for innovation, all it requires is scale and connection to academia; ❖ Demand for STI solutions from the private, industrial and business sectors ❖ A big market with more than 150m People in the EAC region for products. ❖ Extensive natural resources including arable land, oil and gas, biodiversity, etc.	

It is evident that the STI space in the region is teeming with scientific activity. The national science commissions and councils have been working to identify national needs and drive innovation as well as support the implementation of national scientific priorities. In keeping with the spirit of the EAC, EASTECO has come in at the cusp where the exploitation and building up of national investments and regional needs and challenges meet. The interventions by EASTECO **will mainly cover crosscutting transboundary issues to coordinate and harmonise STI activity in the region,** gain support from governments by dealing in an efficient and cost-effective manner with the specific regional challenges and contributing to the development of an export - oriented manufacturing sector by engaging with academia, governments, private sector, research and development institutions and the 'informal' (Jua-kali) sector. The Jua-Kali sector is a significant contributor to the EAC economies. This sector would greatly benefit from a connection with academia to support research and development. The governments can offer further support by underwriting the initial risk of research and development while the private sector undertakes to finance commercialisation and repay initial underwriting costs of successful innovations.

The following chapter, Chapter III discusses the strategic imperatives and foundations for a five – year strategy to support these outcomes.

Chapter 3: EASTECO's Strategic Framework

STI contributes towards economic and social progress through the flow of technology and information in an innovation system. The development of innovation and technology is the result of a complex set of relationships among actors in the system and includes enterprises, universities, commissions, governments, civil society and research institutes. EASTECO needs to work within this system and identify opportunities for enhancing innovative performance and overall competitiveness while addressing mismatches between the players and the regional policies. EASTECO will also aim to improve networking and collaboration among the actors and institutions within the system.

3.1. EASTECO's Mandate

The overall objective of EASTECO as defined in the Protocol on the Establishment of the East African Science and Technology Commission ***is to promote and coordinate the development, management and application of science and technology for regional integration and socio-economic development.*** The protocol defines the following key objectives for EASTECO.

a) The formulation of regional Science, Technology and Innovation (STI) policies;

b) The joint development and application of science and technology;

c) The promotion of regional research centres of excellence;

d) The exchange and utilisation of scientific information;

e) Promotion of public and private sector partnership in the development and application of STI;

f) Mobilisation of resources for STI in the community;

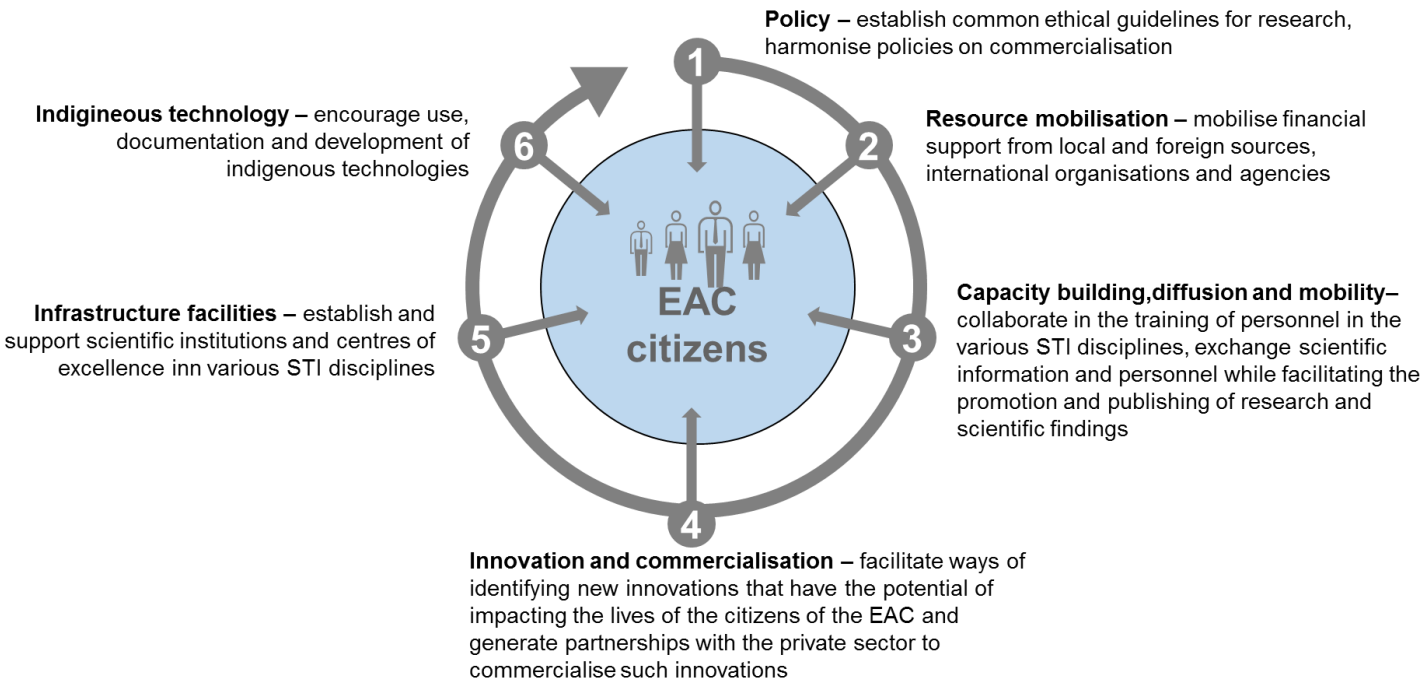
g) Fostering scientific and technological innovation in the Partner States;

h) Development, adoption and utilisation of ICT and the adoption of new and emerging technologies;

i) Supporting the dissemination of research and development findings in the Partner States

These objectives when considered in their entirety provide the following areas of cooperation in STI between the EAC member states

Figure 5: Areas of cooperation in the STI space



3.2. Vision, Mission and Values

The vision, mission and values of EASTECO stem from the spirit contained in the Protocol establishing the Commission and the Treaty on the Establishment of the East African Community. These are highlighted below:

Vision: - To contribute to a prosperous, competitive, secure and united East Africa through collaboration in science, technology and innovation

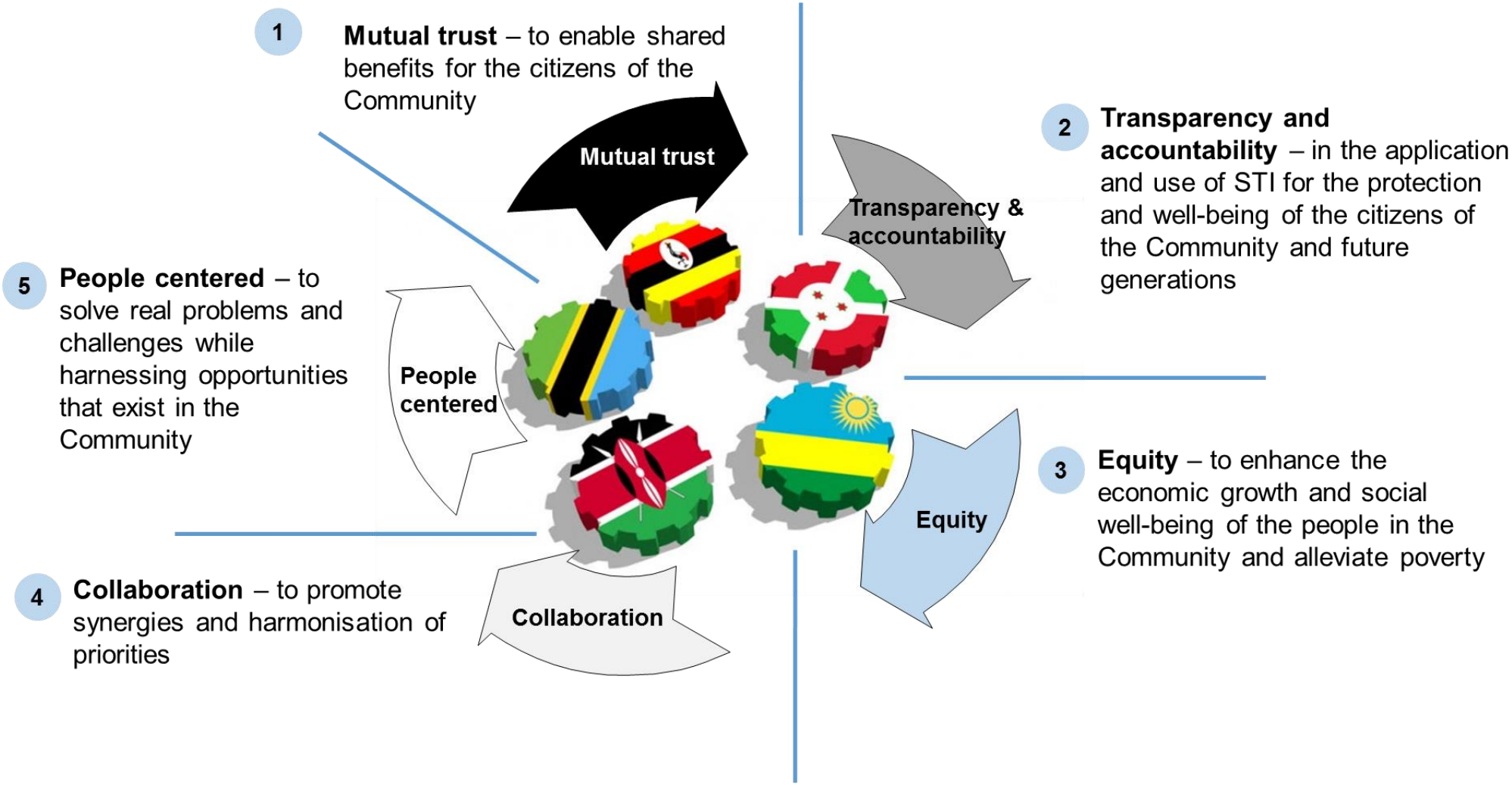
Mission: - To enhance the economic and social development of the peoples of the East African Community through the promotion and application of science, technology and innovation.

Values: - A number of principles contained in the Treaty for the Establishment of the East African Community are crucial to the achievement of EASTECO''s mandate. These include:

- Good governance including adherence to the principles of democracy, the rule of law, accountability, transparency, equal opportunities, gender equality as well as the recognition, promotion and protection of human and people's rights in the application of STI;
- Equitable distribution of benefits; and
- Co-operation for mutual benefit.

These principles inform the set of values that EASTECO will uphold in the discharge of its mandate. They are shown in the diagram below:

Figure 6: East African Science and Technology Commission Values



3.3. Strategic Framework

The East African Science and Technology Commission Strategic Plan comprises of a three-tiered strategic framework that is conceptualised into:

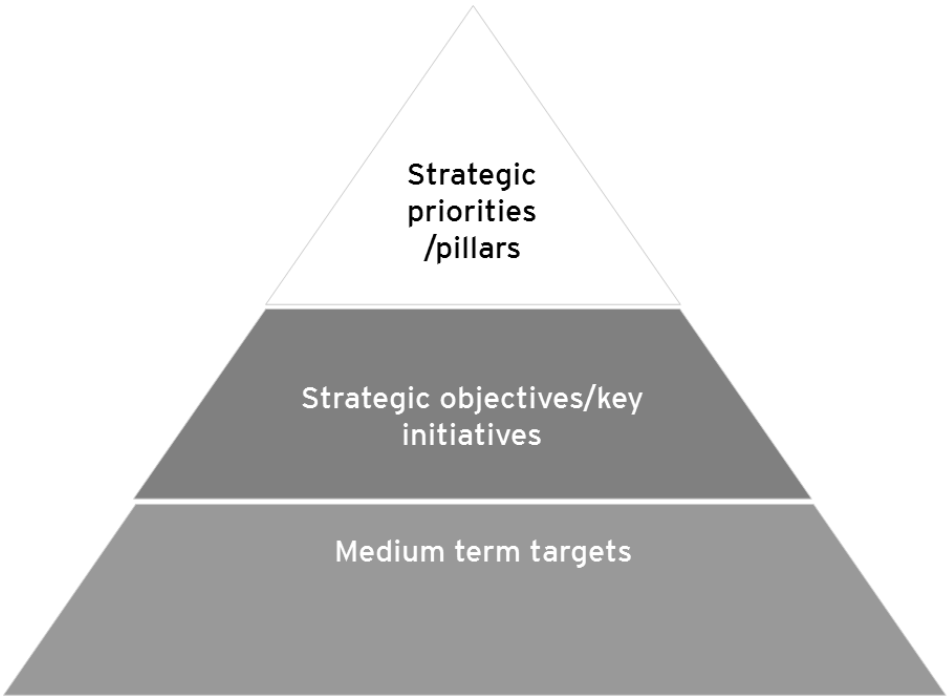
i) Strategic priorities/pillars;
ii) Strategic objectives/ key initiatives and
iii) Medium term targets.

In the first tier, the strategy identifies four high-level strategic priorities/pillars that target outcomes and the overall impact of EASTECO's activities. Each strategic priority/pillar is then broken down in the second tier into a number of strategic objectives. EASTECO's strategic objectives are then delineated in the third tier into medium-term targets that will facilitate the operationalisation of the respective strategic objectives and direct implementation activities. The strategic priorities/pillars contribute to the achievement of EASTECO's overall objective and represent what EASTECO must do in order to achieve its vision and fulfil its mandate. The proposed interventions take into consideration EASTECO's mandate and its envisaged role as a dedicated regional body with the responsibility for driving regional cooperation in Science, Technology and Innovation.

The proposed framework will help strengthen strategic scientific and technological cooperation at a regional level and create synergies between the various actors in STI including governments, academia, industry and scientific institutions. The intention is to make the Community's actions in STI more effective, facilitate access to knowledge, resources and markets and positively impact the regional and global science and technology agenda by pooling resources and facilities thus making it easier for the region's researchers and universities to work together.

These are summarised in the figure below:

Figure 7: EASTECO Strategic Framework



3.3.1. STRATEGIC PRIORITY 1: Support for evidence-based policies

As a regional body, it is imperative that EASTECO provides support mechanisms to facilitate the harnessing and application of STI at a regional level and at scale. These strategic priorities enable the Partner States to cooperate on a set of regional activities and interventions that transcend boundaries and that would be impossible for them to undertake separately. These are outlined below:

a) Regional STI policies and frameworks developed

The following areas are considered crucial for the development of regional policies and regulatory frameworks in the next five years and are in line with EASTECO's priority intervention areas:

- Regional science and technology policy framework
- Innovation policy framework
- Quality and standards policy framework
- Intellectual property rights policy framework
- Sustainable agriculture policy framework
- Bio-technology policy framework
- Recognition of indigenous knowledge and technologies policy framework

EASTECO will also promote effective engagement with policy makers in order to ensure that STI components are considered in other relevant policies for example trade, industrialisation, agriculture, energy, education, health and environment.

b) Regional STI knowledge management strengthened by developing a database and monitoring and evaluation framework

Intangibles like knowledge, intellectual capital and patents are important strategic assets in the accumulation of capital at a regional level as advances in technology lead to the widespread diffusion of knowledge and products from a variety of sources. The ability to use information and knowledge is a source of competitive advantage for countries. This makes it necessary for the Community to develop competencies in the management of information and knowledge as well as their direct application in the production process. EASTECO will:

- **Facilitate the development of a regional knowledge management (electronic) database.** This will be developed to enhance tracking, collaboration, sharing and dissemination of information and knowledge within the Community to facilitate science and technology research.

- **Development of a regional monitoring and evaluation framework.** This will involve the development of a well-functioning system of monitoring and evaluation, with a set of indicators that have been universally agreed across the region and that best capture relevant STI metrics. Greater comparability of data will improve the management capacity of STI resources including funds at the regional level. A proper M&E framework will also

improve and encourage regular communication among actors in the STI ecosystem. This will in turn contribute to the systematic learning and continuous improvement of STI policies and programmes.

3.3.2. STRATEGIC PRIORITY 2: Promotion of STI knowledge and innovation

A well-functioning Science, Technology and Innovation (STI) system needs to have among other things political stability and well-functioning institutions, an educated work force, sound research and education infrastructure and linkages between public and private innovation actors. Additionally, such a system requires enterprises that are committed to research and development as well as a balanced intellectual property rights (IPRs) framework.

a) Regional strategy for the enhancement of STEM training and education developed

A well-educated, enlightened and STEM literate work force is a requisite for efficient production, knowledge transfer, technological adaptation and innovation and is crucial for the region's economic growth.

The countries of the EAC lack a collective strategy on Science, Technology, Engineering and Mathematics (STEM) training. There is limited capacity to respond to opportunities such as the discovery and exploitation of natural resources that require specialised skills or engage in developmental and innovative activities that require analytical skills. The Community's ability to respond to challenges such as epidemics within the region and the development of infrastructure is also low with most of the STEM jobs being outsourced to multinationals. While the region's governments sign infrastructure contracts with developed nations, there is no systematic requirement within most contracts that the workforce be trained for future development needs. In order to reduce the region's dependence on industrialised nations, it is necessary that the Community develop a STEM literate society that will actively participate in the acceleration of the region's growth and development. This region will struggle to attain the Sustainable Development Goals (SDGs) unless there is a substantial investment in STEM education with the concomitant promotion of scientific research. Regional cooperation in STEM education will yield multiple benefits including impelling the productive sectors to be competitive in a knowledge-based global economy, generating better paid jobs, raising living standards, reducing poverty and promoting a strategy of growth and commercial diversification.

The implementation of STEM in the region's education systems is below par thus compounding the skills shortages that exist in these subjects. Women are underrepresented in STEM yet they make up the larger proportion of the population in the Community. Through interactions with the IUCEA and other national, regional and international institutions, EASTECO can play a role in the promotion of STEM education. EASTECO will primarily focus its efforts on the following interventions (in close collaboration with the Inter-University Council for East Africa - IUCEA):

- Development of regional strategies for the enhancement of STEM training which will also seek to address gender imbalances;
- Establishment of regional centres of excellence in areas that are of strategic importance to the region e.g. mechatronics, nuclear energy, oil and gas;

- Promotion of STEM education through various means including fairs, competitions and scholarships;
- Development of a regional programme for nurturing women in STEM.

b) Regional collaborative programmes and partnerships developed and supported to leverage scientific research

Africa (and East Africa in particular) performs dismally in the standard research metrics of refereed publications and patents. This can only change if African research productivity is much higher and if the limited resources available were concentrated on fewer well-identified topics. The Community needs to take advantage of the 'critical mass' for research that it has by harnessing the capacity of the region's research institutions and researchers in a number of focus areas including agriculture, health, social sciences among others.

Research can support the identification and growth of market based science and technology products. In addition the private sector can be coordinated to encourage research that provides direct economic benefits to the region. There is significant opportunity to build partnerships within the research community and with other stakeholders including government, civil society and the private sector. The high cost of research including the modernisation of facilities can be reduced by utilising the collective ability of research institutions (both infrastructure and intellectual capacity), having collaborative regional research programmes and promoting forums that disseminate research findings at regional level.

EASTECO will undertake the following activities in relation to the promotion and leveraging of research in regional focus areas, in collaboration with relevant national and EAC institutions:

- Provide support for collaborative linkages: EASTECO will facilitate agreements on cooperation in Science, Technology and Innovation (STI) between the East African Community and other governments, regional, continental and international institutions;
- Develop and support for regional collaborative programmes in STI;
- Facilitate the establishment of regional centres of excellence;
- Support the establishment of networks of R&D institutions to facilitate data sharing and exchanges, collaborations, improved infrastructure facilities including the development of mechanisms for shared governance and utilisation models for selected research facilities;
- Establish the East African Journal of Scientific Research.

c) Regional support for commercialisation of innovation and technology by establishing conducive environments for technology innovation and uptake through innovation centres and funding

Support for the commercialisation of innovation and technology will be two pronged. EASTECO will build upon advances made by the national innovation systems of the EAC Partner States while facilitating the identification of areas for innovation where the region has comparative advantages.

The many steps involved in the innovation process from prototyping and refining products including the stages between the first attempt and the generation of a marketable product are

essential but costly and time consuming. Private companies are often unwilling and incapable of investing in such time consuming, risky and costly processes that might not yield adequate returns on sums invested. Additionally, the availability of cheap, low quality imports stifles the need to innovate. It is therefore necessary to invest public resources in innovation to overcome the obstacles that inhibit highly productive and quality research, design, production and operations.

EASTECO will support the commercialisation of innovation and technology through:

- **Establishment of regional centres of innovation** that are devoted to the development and diffusion of simple, affordable and efficient technologies that address the basic needs of communities.
- **Establishment of a regional technology and innovation fund** to provide merit-based and competitive funding for promising innovations initiated by the innovation centres and other institutions. The Community's innovation hubs and Centres of Excellence will be encouraged to consider the advancement of innovation in emerging technologies.
- **Provision of support for innovative technology solutions in the health sector** in collaboration with the East African Health Research Commission (EAHRC).
- **Initiatives to enhance the Community's innovation capacity** including:
    - **Awards and Recognition** - EASTECO will host an annual award ceremony to recognise regional scientific excellence specifically for innovations and research that contribute to the uplifting of the socio-economic status of the people of the East African Community. EASTECO will also have the East African Presidents' Award and a Lifetime Contribution to Science Award that will recognise distinguished scientists and researchers in the region.
    - **Commercialisation -** EASTECO will facilitate the commercialisation of promising innovations by collaborating with private sector and government institutions to undertake the following:

Table 20: EASTECO commercialisation of innovation

Method	Content
Spin-offs and incubation	Commercialisation of research results through spin-offs and support to businesses in the early stages of development through the establishment of regional incubators within research institutes, Universities and Centres of Excellence.
Cluster development and management	Cluster-based cooperation between industry and academia to create synergies that benefit the whole region
Venture capital	Identification of venture capitalists who will enable the transformation of research into new products and services
SME and informal sector (Jua-kali/Nguvu-kazi) and academia links	By creating avenues for business and higher education institutions to meet and work together for their mutual benefit.
Patenting and intellectual property rights	EASTECO will provide training and forums at a regional level to disseminate creative approaches to IPR further stimulating cooperation between higher education and business. Furthermore EASTECO will provide information on available patents

3.3.3. STRATEGIC PRIORITY 3: Application of STI for socio-economic development

This Strategic Priority specifically deals with the core thematic areas that EASTECO will focus on in the next five years to deliver the biggest impact while ensuring resources are used optimally and effectively. The Partner States that make up the East African Community face common developmental challenges with many of these being regional in nature thus requiring innovative solutions to be applied across boundaries. EASTECO in collaboration with its stakeholders has identified five priority intervention areas for the next five years. These areas hold great potential to contribute significantly, through science, technology and innovation to the socio-economic development of the Community's people.

a) Increased value addition in agriculture by harnessing and disseminating technological solutions

With most of the Community's people living in rural areas and being dependent on agriculture, livestock and fisheries, these forms of production remain fundamental to economic growth, poverty alleviation and environmental sustainability. The World Bank estimates that for the poorest people, GDP growth originating in agriculture is about four times more effective in raising their incomes than GDP growth originating outside the sector. New frameworks for designing and evaluating investments in commercial agriculture are thus necessary to increase the productivity and performance of the Community's agriculture.

Despite the success of the EAC partner states in selling to new markets, if there are no further improvements to their business environments and to the competitiveness of their agricultural commodities, the EAC states will still be trapped in producing low-skill, low-value products while struggling to obtain a significant value-added share in global trade. There is great potential in expanding high-value food and agricultural exports. The private sector can be supported to be more involved in high-tech processing. Processing would reduce waste and reduce the import bill, it is also labour intensive and would create employment. EASTECO is in a good position to address the necessary policy frameworks to manage the development and use of biotechnology in the region. EASTECO will therefore play a major role in unlocking the benefits associated with agriculture through:

- **Coordination of regional science, technology and innovation initiatives in agricultural value addition -** EASTECO will coordinate efforts in research and development at a regional level aimed at enhancing value addition in agriculture, improving economies of scale in research and development and promoting collaborative programmes in science, technology and innovation at a regional level.
- **Dissemination of innovative and appropriate technological solutions and approaches for improved storage and agro-processing –** to spur rural development and enhance food security by promoting employment in agro-industries, providing market access to agricultural small-holders, enhancing food security by reducing post-harvest losses and extending the shelf-life of food stuffs for the rapidly increasing urban population.

b) Promotion of technological solutions in energy and environment by facilitating the development of renewable energy products and climate change adaptation tools

The contribution of STI in the development of ecologically sound approaches to energy sourcing is fundamental. EASTECO will play a key role in the promotion of access to energy through the development of a regional collaborative research agenda thus making available opportunities emerging from research including promoting the production of innovative products using oil and gas. EASTECO will enhance linkages between researchers and industry and conduct advocacy for STI at high political and policy levels that will result in the development and implementation of robust policies and favourable, transparent and stable frameworks to stimulate investments in and the adoption and use of environmentally friendly energy technologies. Furthermore, EASTECO will be involved in the creation of public awareness on the contemporary issues relating to scientific advancements and technological developments that affect the environment to facilitate informed choices and decisions.

EASTECO will support the implementation of the EAC Regional Strategy for Scaling Up Access to Modern Energy Services and Biofuels in East Africa with the following prioritised interventions.

- Promoting the development of renewable energy technology solutions and products using STI including the facilitation of collaborative programmes among the region's Centres of Excellence.
- Development of a portfolio of technology tools for adaptation to climate change among priority sectors
- Enhancing regional collaboration in climate change research and development

c) Regional cooperation in the enhancement of innovative bio-technology solutions including support for centres of excellence in bio-technology, development of bio-safety guidelines and support for the development of indigenous knowledge and technologies

Biosciences represent the next frontier in human and environmental health, medicine and food security. With the impacts of climate change being more discernible, the region needs to rethink its agricultural strategies by intensifying the use of science and technology and transferring the effects of science and technology to poor farmers who cannot participate in commercial farming. Biosciences hold the key to increasing yields per unit area and yields per unit thereby creating enormous potential gains in food production and food security and creating a more equitable and economically inclusive society.

EASTECO will support the strengthening of an already existent regional biosciences platform building on the already gained momentum. This is expected to increase access to affordable, world-class research facilities through collaboration with other institutions. EASTECO will also participate in the publishing of a regional bio-sciences journal and participate in capacity building initiatives at a regional level. Additionally, EASTECO will coordinate the production of a regional bioscience policy framework to govern the application of biosciences in the Community.

More specifically EASTECO will participate in the:

- Coordination of regional bio-technological initiatives including the regional Bio-Innovate Programme
- Provision of support to the Community's Centres of excellence in biotechnology
- Development of regional biosafety guidelines

- Provision of support for indigenous knowledge and technologies

d) Regional support for export-oriented industrial development and trade by facilitating access to institutions and technologies

Manufacturing is an important remedy for unemployment. A strong manufacturing base spurs economic growth through enhanced productivity, leading to higher incomes and therefore higher living standards. Few countries have been able to escape poverty without employing a significant amount of their people in manufacturing activity. The history of economic development reveals that countries need to first start by producing basic household goods. Over time, they move to higher value goods. The informal sector plays a major role in the economies of the East African Community Partner States; however, its contribution to innovation systems has been very low with the sector being largely excluded from national support and investment. EASTECO will play a key role in enhancing technological capability building in micro and small enterprises by developing policy frameworks that safeguard the use of available intellectual property rights, ensure high quality standards and recognise the value of science and technology in driving innovation.

EASTECO will also be instrumental in instituting mechanisms to enhance private sector participation in industrial research and development and coordinate the identification of strategic areas that provide competitive advantages for the region where investments are currently inadequate.

EASTECO will facilitate:

- The networking of technology transfer institutions including the establishment of Centres of Excellence
- The promotion of linkages between research institutions, academia, industry and business
- Support for technology enabled trade including the use of ICT to increase the levels of national, regional and international trade and standards and testing.

e) Development of regional capacity in ICT for the promotion of efficient productive and social sectors

ICTs have the power to transform communities, businesses and governments in the region thus driving innovation, entrepreneurship and economic growth. The explosive growth of mobile phones demonstrates the capacity for change across the region with mobile phones now being used as a platform to access unlimited knowledge and information as well as applications that drive access to convenient services including previously inaccessible government services. The region's mobile phones have become substitutes for many other types of service such as financial credit, banking, education and information. ICT tools are helping the region's citizens' face up to new challenges like climate change and deal with old challenges such as HIV/AIDS. The wider use of ICTs in government is bringing more transparency and openness. Mobile phones and the internet are helping to unlock the dynamism of the people of the Community and a thriving regional ICT sector is harnessing the ingenuity of East Africans. With cheap data packages and Wi-Fi, East Africans are not only finding jobs but also creating them. Intra-regional trade is increasing on the back of national internet backbone networks. EASTECO will participate in the promotion of ICTs by facilitating the harmonisation of national ICT strategies and policies building upon consultative stakeholder processes and adapted to regional circumstances. EASTECO will also promote the provision of online services by the Region's governments in order to drive demand for broadband communications and stimulate further investments in national networks. EASTECO will also participate in the creation of an environment that encourages skills development, R&D and innovation in ICT and collaboration between technologists, entrepreneurs and development practitioners to use ICT as a tool for driving economic growth.

ICT is seen as a channel through which the EAC will improve global access of her people and competitiveness of goods and services across the region. The overall EAC internet use increased from about 2.1 million in 2005 to 6.75 million in 2008 while mobile subscription increased from 9.7 million to 39.7 million from 2005 to 2008. The EAC-World share of internet use and mobile subscription moved from 0.2 to 0.4 per cent and 0.4 to 1 per cent respectively from 2005 to 2008.

Over the next five years, EASTECO intends to pursue the following targets:

- Establishment of a Regional Youth ICT Programme
- Provide support for innovations in and using ICT at a regional level including dissemination of ICT to rural communities
- Utilise ICT as a tool for driving economic growth by enhancing partnerships between technologists, entrepreneurs and researchers
- Coordinating STI initiatives and programmes in ICT at a regional level

3.3.4. Strategic Priority 4: EASTECO foundational commitments

These priorities underline the areas that EASTECO is committed to strengthening because of their broad impacts across all aspects of its mandate

a) Strengthening of EASTECO's institutional capacity, governance and visibility

Operational viability is crucial to EASTECO's survival. Operational viability refers to EASTECO's sustainability and ability to deliver on its mandate both now and in the future. In order for EASTECO to deliver on the objectives of coordinating and facilitating the activities of the Partner States and national science and technology institutions in promoting the development of STI in all its aspects, EASTECO needs to operate efficiently and effectively. This will involve focussing on the following goals:

- **Enhancing EASTECO's institutional capacity**:
  - **Human resource capacity building** - EASTECO needs to attract, develop and retain talent in order to deliver on its mandate. This will involve identifying the required talent, providing adequate compensation for such talent, providing an appropriate environment for talent to thrive and find its optimal use in enhancing the socio-economic welfare of the EAC citizens through STI and regularly evaluating if such talent is being used effectively and efficiently to fulfil EASTECO's objectives.
  - **Governance** – Article 8 of the Protocol on the Establishment of the East African Science and Technology Commission provides for a Governing Board. During the period of this Strategic Plan, robust foundations will be laid on how subsequent boards and specialised committees of the Board in the years to come will conduct their business; it is therefore imperative that from the onset, the governance of EASTECO is robust. EASTECO therefore needs to invest in the training of its board on issues of governance while benchmarking against similar regional institutions and borrowing from their successes.

- **Improvement of EASTECO's visibility**

Without publicity there can be no public support and without public support, every institution will decay. EASTECO will therefore develop mechanisms to facilitate substantive dialogue with key stakeholders and the public at large in order to raise awareness and increase the level of engagement on regional STI initiatives. This will necessitate the use of tools such as social networks, an accessible and interactive website, seminars, workshops, science fairs and exhibitions, surveys, enumeration and evaluation programmes.

- **Acquisition and employment of appropriate technology for increased efficiency**:

EASTECO will embrace technology as a tool for the delivery of high impact programmes effectively and efficiently while at the same time enhancing accountability. This will include the use of state of the art accounting, communication, security systems and other forms of technology deemed appropriate.

b) Enhancement of collaboration and partnerships to enable sustainable funding and enhancement of partnerships in the STI community

- **Enhancement of stakeholder engagement and partnerships in the STI community**

In order to transform STI, the EAC needs to go beyond the development of isolated national and sectoral policies. Aside from championing the increase in spending on R&D and the provision of support to SMEs, integrated approaches based on the characteristics of the different countries within the Community need to be instituted. EASTECO will therefore establish networks of institutions and stakeholders, creating the space for them to engage in constructive dialogue. This will involve governments, knowledge creators, business and the civil society coming together to strengthen the capacity of universities and science institutions in the region as knowledge creators, participate in the management of clusters, determine how businesses can cooperate more effectively and facilitate the exchange of ideas, people and resources between knowledge creators and business.

- **Establish sustainable funding mechanisms for STI initiatives**

The opportunity for reform in the steering and funding of science research institutions by providing incentives that focus on excellence and relevance and that serve to concentrate expertise in particular fields of science and technology through the creation of regional centres and networks is significant. EASTECO will develop mechanisms to obtain funding from other sources apart from the East African Community member states. This will involve reaching out to partners and stakeholders. EASTECO will thus have a specialised fund raising function that sources for financing. In this regard, EASTECO will:

  - **Establish a fund** for initiatives that have a regional impact through the provision of grants/low interest loans awarded through an East African Research Fund (EARF). This fund will pool resources from a variety of stakeholders including governments, NGOs, private sector players, bi-lateral and multi-lateral agencies

including multilateral finance corporations, philanthropists and the East African Development Bank (EADB);

- **Advocate to increase Partner States funding** towards STI to 1% of GDP and above.

3.4. Logical framework

The goals, purposes and outputs of EASTECO's strategy across the four Strategic Priorities are detailed below:

Table 21: Logical framework

STRATEGIC PRIORITY 1: Support for evidence based policies					
STRATEGIC GOALS	**Development of regional STI policies and frameworks**	**Strengthening of regional STI knowledge management**			
PURPOSE	Development of policy frameworks governing regional science and technology, innovation, quality and standards, intellectual property rights, biosciences/biotechnology and indigenous knowledge.	Management of information and knowledge to enhance evidence-based policy decisions Achievement of M&E at scale and standardisation and unification of M&E data			
STRATEGIES	► Assess (and Identify), develop and harmonise regional policy frameworks in STI, quality and standards, intellectual property rights, bio-sciences/biotechnology and indigenous knowledge.	► Identify and develop region-wide programmes and projects ► Invest in a regional knowledge management database ► Establish a regional mechanism to collect and collate STI data (baselining, tracking,			

		reporting and analyses) ► Develop monitoring and evaluation standards at a regional level ► Disseminate findings of M&E activities to stakeholders to promote a culture of transparency and accountability ► Recommend corrective measures across the region ► Hold regional conferences and seminars to enable sharing of information and knowledge			
Mean term TARGETS /OUTPUTS	1. Regional policies developed (including science, technology & innovation; Intellectual property rights; Bio-technology) 2. Policy makers engaged to promote STI and to ensure that STI contributes to other relevant policies (e.g. trade, procurement, industrial, etc.) 3. Recognition of	1. Regional STI knowledge and information management database developed 2. Regional Monitoring and Evaluation framework developed			

	indigenous knowledge and technologies policy framework				
ASSUMPTIONS	✓ Commitment to the goals of the East African Community by the Partner States including cooperation on STI	✓ Availability of STI data in the region ✓ Willingness to collaborate in the development of STI indicators ✓ Adequate funding ✓ Adequate talent and expertise to run a knowledge management system			
RISKS	► Rejection by Governments and policy makers in the Partner States ► Lack of adequate data to support the development of policy frameworks	► The diversity of the region presents challenges in collection of data ► Inadequate funding for M&E ► Lack of data across the region ► Inadequate funding to establish a knowledge management system ► Lack of adequate talent to manage the knowledge management system			
STRATEGIC PRIORITY 2 : Promotion of STI knowledge and innovation					

STRATEGIC GOALS	**Enhancement of STEM training and education**	**Leveraging of scientific research**	**Support for the commercialisation of innovation and technology**		
PURPOSE	Development of a regional strategy for the enhancement of STEM training, equitable provision of STEM education for all and promotion of STEM by, but not limited to, holding fairs, exhibitions, regional competitions and facilitation of faculty mobility	Promote cooperation in scientific research and experimental development in the Community by facilitating collaboration, engaging in partnerships, supporting the development of research infrastructure and facilities for productive and quality R&D.	Establishment of a regional environment conducive to technological innovation and uptake		
STRATEGIES	► Track data on access to STEM education based on variables including gender, economic ability and minority status ► Promote mobility of faculty across the Community and exchange programmes both regionally and internationally ► Provide scholarships to talented/promising students in STEM subjects ► Hold fairs, exhibitions	► Assess the progress achieved in regional scientific research and develop a regional R&D roadmap (with strategic areas of common interest to Partner States and outside the Community including the determination of regional flagship priorities) ► Develop mechanisms for	► Facilitate the establishment of incubators at a regional level ► Establish an award program for excellence in R&D and Innovation ► Develop a regional strategy for the Dissemination and Commercialisation of Scientific and Technological Findings and facilitate commercialisation		

	and competitions in STEM at a regional level e.g. an East African Science Olympiad	engagement and collaboration in identified areas e.g. establishment of Centres of Excellence in R&D; ► Establish linkages between R&D institutions, researchers; and support dissemination of scientific information; ► Facilitate the signing of agreements on cooperation in STI between the EAC, other governments, regional, continental and international institutions	of innovations by developing partnerships between R&D actors and the private sector. ► Establish mechanisms to identify and promote the utilisation of innovative technologies ► Strengthen intellectual property rights (IPR) regimes, increase patent applications and use of available patents		
Mean term TARGETS /OUTPUTS	1. Regional strategy for enhancement of STEM training developed (*including gender balance addressed*) 2. Regional Centres of Excellence established for training in areas of strategic importance for the region (nuclear energy, mechatronics, oil and gas) 3. STEM education promoted through	1. Regional collaborative programmes developed and supported 2. Centres of Excellence in R&D established *(to promote excellence quality and relevance)* 3. Network of R&D institutions supported *(data sharing and*	1. Regional centres of Innovation established (including Networks of Innovation hubs and incubators) 2. Technology and Innovation Fund established 3. Innovative technology solutions in Health supported 4. Innovation Capacity enhanced		

	various means including fairs, competitions & scholarships 4. Programme for women in STEM education established	*exchange, collaborations, coordinated research, sharing of research facilities, mobility of researchers)* 4. Regional collaborative linkages supported (including cooperation with other regions) 5. EA journal of Scientific Research	(including awards & recognition; commercialisation)		
ASSUMPTIONS	✓ Appreciation of the role of women in socio-economic development ✓ Understanding of STI's contribution to the Region's economic development ✓ Commitment to the empowerment of minorities and disadvantaged groups	✓ Shared research priorities across the Community ✓ Willingness to cooperate in research ✓ Availability of funds and partners to provide funding for research	✓ Existence of good relationships between academia, R&D institutions, governments and the private sector		
RISKS	▸ Traditional beliefs acting as an inhibitor to enabling girls, women and the disabled from accessing STEM education ▸ Underinvestment by Partner State governments in STEM as a result of other	▸ Differing priorities in scientific research ▸ Inadequate funding due to competition and misalignment of priorities with institutions/entities providing the funds ▸ Distrust amongst Partner States thus	▸ Inadequate funding due to competition and misalignment of priorities; ▸ Competition from foreign technology solutions available for the private sector		

	priorities and the long-term nature of investments in STI ► Lack of adequate data to track initiatives to promote STEM	curtailing scientific cooperation ► Unequal sharing of the benefits of research which engenders mistrust ► Disengaged public who are not interested in science			
STRATEGIC PRIORITY 3 : Application of STI for socio-economic development					
STRATEGIC GOALS	**Increased Value addition in Agriculture**	**Promotion of technological solutions in energy and environment**	**Enhancement of bio-technology initiatives**	**Support for export-oriented industrial development and trade**	**Information and Communication Technology (ICT)**
PURPOSE	Use of technological solutions to increase value addition in the agricultural sector	Use of technological processes and products to increase access to clean and modern energy and enhance climate change adaptation.	Cooperation in the generation of innovative solutions to resolve the region's challenges in bio-technology	Generation of innovative solutions to support industrial development and trade	Development of regional capacity in ICT for the promotion of efficient productive and social sectors
STRATEGIES	► Identify and evaluate regional initiatives in agricultural value addition for collaboration and support ► Assess technology needs and promote generation and utilisation of technological solutions ► Identify and disseminate available technological processes and	► Identify and evaluate regional initiatives on clean energy for collaboration and support ► Assess technology needs and promote generation of affordable technology solutions for clean energy ► Identify available energy,	► Identify and evaluate regional initiatives on biotechnology for collaboration and support ► Assess Institutions undertaking R&D activities on biotechnology to identify potential Centres of Excellence ► Develop Regional guidelines on	► Assess technology transfer institutions in Partners States for the establishment of linkages and Centres of Excellence ► Evaluate technology needs in trade and promote generation of technology solutions ► Promote and support the	► Assess and identify sectoral ICT needs in order to promote the generation of ICT solutions; ► Assess and establish a regional catalogue and record on ICT capacity (needs, available Institutions and human capital); ► Establish a forum

	products	technological processes and products for dissemination ► Promote and support the development of technological solutions for climate change adaptation	biosafety ► Assess and establish a regional catalogue and record of indigenous technology processes and products	development of innovative technological solutions for trade (logistics services and systems)	for linkages between technologists, researchers and entrepreneurs.
Mean term TARGETS /OUTPUTS	1. Regional initiatives in agriculture value addition coordinated (*including collaborative programmes and R&D);* 2. Innovative and appropriate technology solutions/approaches in storage and agro-processing disseminated	1. Development of renewable energy technology solutions and products supported (including *support and collaboration with the Regional Centre Of Excellence In Renewable Energy (EACREE))* 2. Portfolio of technology tools for Climate Change adaptation for priority sectors developed (*including coordination of R&D)*	1. Biotechnology initiatives in the region Coordinated (including Bio innovate programme) 2. Regional Centres of Excellence in Biotechnology supported 3. Regional biosafety guidelines developed 4. Support for the development of indigenous knowledge & technologies.	1. Technology transfer institutions networked including Centres of Excellence for technology transfer established 2. Linkages between the research institutions, academia, industry and business supported; 3. Trade enabled with Technology (including ICT to increase regional and international trade, standards and testing)	1. A regional Youth ICT program established (for training and support to R&D in software development and innovative ICT applications in productive and social sectors); 2. Innovation in ICT supported (including dissemination) 3. Partnerships between technologists, entrepreneurs and researchers to use ICT as a tool for driving economic growth. 4. ICT initiatives coordinated to

					enhance access to ICT
ASSUMPTIONS	✓Shared challenges and priorities in the agriculture sector ✓Willingness to cooperate in the resolution of common problems in the region by harnessing STI ✓Willingness to share benefits	✓ Shared challenges and priorities in the energy sector ✓ EAC Climate change policy disseminated and owned by Partner States ✓ Willingness to cooperate in the resolution of common problems in Climate Change	✓ Shared challenges and priorities in biotechnology ✓ Willingness to cooperate in the resolution of common problems in the region by harnessing STI	✓ Willingness to share benefits ✓ EAC Common Market Protocol operationalised in its provisions of free movement of goods, capital, services and labour,	✓ Shared challenges and priorities in the ICT sector ✓ Willingness to cooperate in the resolution of common problems in ICT
RISKS	► Lack of ownership and involvement of local communities and the informal sector ► Lack of collaboration between scientists, researchers and participants in the STI Community	► Lack of ownership and involvement of local communities and the informal sector	► Rejection by policy makers and governments of the Partner States	► Lack of ownership and involvement of manufacturing and business sector ► Inadequate funding to enable creation of regional centres of excellence	► Lack of ownership and involvement of technologists and enterprises sector ► Competition from foreign technology solutions available for the private sector
STRATEGIC PRIORITY 4 – EASTECO foundational commitments					
STRATEGIC GOALS	**Strengthening of EASTECO's institutional capacity, governance and visibility**	**Enhancement of collaboration and partnerships**			
PURPOSE	Strengthened Institutional framework of EASTECO for effective and efficient governance and operations	Generation of pool funding geared toward regional excellence and relevance and that serves to concentrate expertise in specified			

		fields			
STRATEGIES	► Hire and retain appropriate staff to deliver on EASTECO's mandate ► Establishment of a Governing Board as per Article 8 of the Protocol ► Establish and operationalise Specialised Technical Committees ► Customise Staff Rules and Regulations, Financial Rules and Regulations; ► Enact EASTECO Act ► Develop a communication strategy ► Develop and an informative and interactive website and use tools such as social media and other forms of media including print and audio-visual ► Acquire accounting software, records management and archiving software ► Acquire teleconferencing facilities to harness cost savings by reducing travel to attend	► Host an annual forum of institutions in Science, Technology and Innovation ► Establish and launch an annual youth innovation forum; ► Establish Parliamentary Forum on STI for the SDGs; ► Facilitate the establishment of a network of civil societies for STI advocacy ► Hold regional conferences and seminars to enable sharing of information and knowledge (Provision of fora for constructive dialogue between stakeholders in the STI Community, Governments, business and the civil society) ► Establish and operationalise Working Groups/Think Tanks			

	meetings with stakeholders ► Improve EASTECO Working environment (acquire permanent Offices)	on scientific research, technological development and innovation			
Mean term TARGETS /OUTPUTS	1. EASTECO's Institutional Capacity /Human Resource capacity improved 2. EASTECO governance enhanced; 3. EASTECO visibility improved 4. Requisite technology employed for increased efficiency	1. Sustainable funding mechanisms for STI initiatives established (including a sustainable funding mechanism and advocacy to increase Partner States funding); 2. Stakeholder engagement and partnership in the STI community enhanced			
ASSUMPTIONS	✓ Adequate human resource capacity in the region ✓ Ability to establish a Governing Board with members envisaged by Article 8 of the Protocol ✓ Curious, enthusiastic and engaged public ✓ Availability of funding ✓ Availability of appropriate technology	✓ Adequate funding sources ✓ Robust accounting systems ✓ Willingness to collaborate and cooperate in STI			
RISKS	► Inadequate funding ► Lack of appropriate talent ► Competition for talent	► Inadequate funding to establish the fund ► Lack of proper fund management			

	from other institutions ► Lack of interest from the public ► Use of tools that do not reach the intended audience and misplaced communication strategy ► Misunderstanding of EASTECO's role resulting in expectations not tied to EASTECO's mandate ► Investment in unsuitable/ incompatible technology	function ► Lack of cooperation across governments, knowledge creators, businesses and the civil service ► Exclusion of some stakeholders			

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Chapter 4: Detailed implementation plan

4.1. Identified activities

During the financial year 2015-16, the following activities were carried out by the East African Science and Technology Commission:

1) Strengthening the Commission by constituting the EASTECO Governing Board in accordance with the Protocol for the Establishment of the Commission;
2) Undertaking of consultative visits to Partner States' Councils/Commissions for Science and Technology, Industrial Research Institutes and some of the Partner States' Ministries in charge of Science and Technology;
3) Initiation of Strategic Planning process and identification of relevant projects to enable the development of the EASTECO Five Year Strategic Plan 2017-2021;
4) Mobilisation of partnerships with relevant inter-regional and international organisations.

The priority activities planned for in the year 2016-17 as outlined in the East African Community Budget Speech include:

1) Implementation of a regional Science, Technology and Innovation Policy whose activities will focus on the assessment and identification of regional Science, Technology and Innovation priorities for a regional consensus and a regional workshop on EASTECO action plan;
2) Technology acquisition and development, whose main activities will include assessment and evaluation of technology choices for public and private sector investment in processing, conservation and distribution of agricultural products and assessment of the existing research and development and technology transfer institutions in the EAC region to identify potential regional Centres of Excellence;
3) Establishment of partnerships with regional and international technology transfer institutions and on developing collaboration and coordination arrangements with relevant international institutions interested in Science, Technology and Innovation.

4.2. Strategy implementation plan

Strategic Plan Implementation Arrangements

A governing board comprised of representatives from key STI and related institutions from the partner states (including National Science and Technology Commission/Councils, Ministries responsible for Science and Technology, Private Sector, Public and Private Universities, Civil Society and eminent Scientists) will provide leadership and vision to EASTECO in fulfilling its objectives. Specialised technical committees of the Governing Board will also be constituted to provide insight into strategies adopted to solve regional issues The Sectoral Council composed of ministers from ministries responsible for STI and the Council of Ministers responsible for EAC

affairs in the partner states will continue to give strategic policy direction and guidance to EASTECO.

EASTECO will be responsible for the implementation, coordination and monitoring of the Strategic plan. Relevant partner states institutions will be instrumental in the implementation of the Plan. The implementation will take due cognisance of other key aspects such as the individual strengths of partner states, emerging opportunities, as well as the inherent risks that could jeopardize the attainment of Strategic Plan targets. As a strategy, EASTECO will build a structure of networks, partnerships and collaborations with the view of ensuring that maximum synergy is attained.

Over the next five-years EASTECO will be guided by the objectives and perform the activities outlined in the table below:

Table 22: EASTECO strategy implementation plan

Strategic Priority	Strategic Goal	Strategies	Mean term Targets /Outputs	Measure/ Performance Indicators	Actions	Targets					Start	Finish
						2017/18	2018/19	2019/20	2020/21	2021/22		
Support for evidence based policies	Development of regional policies and frameworks	Assess, identify, develop and harmonise regional policy frameworks in STI, quality and standards, intellectual property rights, bio-sciences/biotechnology and indigenous knowledge	1. Regional policies developed (including science, technology & innovation; Intellectual property rights; Bio-technology) 2. Policy makers engaged to promote STI and to ensure that STI contributes to other relevant policies (e.g. trade, procurement, industrial, etc.)	Baseline data on STI policies in EAC Region in place by December 2018	Carry out a baseline review of all identified policies and establish their status within EAC Partner States (seeking similarities to define areas of convergence between nations) and at EAC Regional Level	30%	100%	100%	100%	100%	December 2017	December 2018
				Regional Policy of Science, Technology and Innovation in place by June 2019 Regional Policy on Intellectual Property Rights in place by December 2019 Regional Biotechnology	Develop regional policy frameworks in STI, quality and standards, intellectual property rights, and biotechnology and indigenous knowledge; and	20%	40%	75%	100%	100%	July 2017	June 2020

			3. Recognition of indigenous knowledge and technologies policy framework	Policy Framework in place by June 2020 Regional Framework on the Recognition of Indigenous Knowledge in place by June 2020	disseminate policies for ratification by the Partner States							
	Strengthening of regional STI knowledge management	- Invest in a regional knowledge management database; - Develop monitoring and evaluation system for STI at regional level; - Hold regional conferences and seminars to enable sharing of information and knowledge	1. Regional STI knowledge and information management database developed; 2. Regional Monitoring and Evaluation framework developed	Regional STI data base in place by June 2018; - Regional STI knowledge management system in place; STI Indicators developed by December 2018; data collected and processed; Report of dissemination; record of actors involved	Establish Regional STI knowledge management with STI data base Develop and monitor STI Indicators in the EAC region Develop a dissemination mechanism to ensure that findings are quickly shared with relevant parties and used to inform STI development	50% 30% 20%	100% 100% 60%	100% 100% 100%	100% 100% 100%	100% 100% 100%	July 2017 July 2017 January 2017	June 2018 December 2018 June 2022
Promotion of STI	Enhancement of	-Track data on access to	1. Regional strategy for enhanceme	- Regional data in STEM skills	Track and document data on STEM	25%	30%	50%	80%	100%	January 2017	June 2022

knowledge and innovation	STEM education	STEM education based on variables including gender, economic ability and minority status; - Hold fairs, exhibitions and competitions in STEM on a regional level e.g. an East African Science Olympiad - Provide scholarships to talented/promising students in STEM subjects - Promote faculty mobility	nt of STEM training developed (*including gender balance addressed*); 2. Regional Centres of Excellence established for training in areas of strategic importance for the region (nuclear energy, mechatronics, oil and gas); 3. STEM education promoted through various means including fairs, competitions & scholarships; 4. Programme for women	and capacity in place - Regional strategy to enhance STEM training, in place by December 2018 - 5 Centres of Excellence in STEM disciplines, in place by June 2020 - % of females participating in STEM (e.g. PhD holders, Masters and women/girls pursuing STEM undergraduate courses) -Reports of Forums/campaigns for awareness raising for STEM education	capacity and education with variables including gender equality in STEM Develop regional strategy to enhance STEM training (including gender equity, incentives, faculty mobility) and a program for women in STEM Establish Regional Centres of Excellence in STEM training for strategic disciplines (including nuclear energy, mechatronics & robotics, petrochemicals and gas Hold forums to determine solutions to the challenges and advocate for gender equity							

			in STEM education established									
	Leveraging of scientific research (with focus in R&D in strategic areas, infrastructure, facilities and Centres of Excellence)	- Assess the progress achieved in regional scientific research; - Develop a Regional R&D roadmap; - Establish linkages between R&D institutions, Researchers; and support dissemination of scientific information; - Establish and support	1. Regional collaborative programs developed and supported; 2. Centres of Excellence in R&D established *(to promote excellence quality and relevance);* *3.* Network of R&D institutions supported; 4. Regional collaborative linkages supported (including cooperation with other regions); 5. EA journal of Scientific Research	At least 1 Program for collaborative research in place by December 2020; Number of projects funded	Develop and support Regional Collaborative Research Programs	0%	30%	50%	80%	100%	July 2018	June 2022
				Regional Network of R&D institutions, university-led research centres in place by December 2019	Establish and Support a Network of R&D Institutions for sharing of research information, facilities, mobility of researchers	25%	60%	100%	100%	100%	July 2017	June 2022
				Linkage and mobility program for research in place and operational by December 2021; Number of agreements signed	Facilitate linkages of R&D institutions, centres and researchers with research networks of other regions	0%	0%	30%	50%	100%	January 2021	June 2022

		Centres of Excellence in R&D		5 Regional Centres of Excellence in R&D in place by December 2021	Establish Centres of Excellence for R&D	0%	0%	30%	60%	100%	July 2017	December 2021
				Region Journal on Scientific Research in place by June 2019; Number of peer reviewed papers published	Establish a Regional Journal on Scientific Research	30%	100%	100%	100%	100%	July 2017	June 2018
	Support for the commercialisation of innovation and technology	-Facilitate the establishment of incubators on a regional level -Provision of awards and recognitions	- Regional centres of Innovation established (including Networks of Innovation hubs & incubators); - Technology and Innovation Fund Established	-A network of innovation hubs and incubators in place	Establish and support regional networks of innovation hubs and incubators	200	300	400	500	600	December 2019	June 2022
		-Develop a strategy for dissemination and commercialisation of scientific and technological	Innovative technology solutions in health supported Innovation capacity enhanced:	-Number of entries submitted for award purposes -Strategy for dissemination and commercialisation of scientific	Hold an annual award recognising excellence in STI in the region Develop regional Strategy for dissemination	0%	40% complete	60% complete	100% complete	100% complete	December 2017	June 2021

		findings, with focus on PPP inn research & technology development; - Strengthening intellectual property rights (IPR) regimes, increase patent applications and use of available patents -Facilitate the commercialisation of innovations	-award and recognition; - commercialisation of R&D findings and innovation	and technological findings, with focus on PPP inn research & technology development -Number of technology innovations for health -Number of training sessions on IPR -Number of successful innovations that have become marketable products and services	and commercialisation of R&D findings Support development and commercialisation of innovative technology solutions including for Health Establish networks and collaboration with National IPR institutions for training in patent information for researchers and R&D institutions to increase patent applications and use of available patents							
					Sign partnership agreements with private sector players	20%	30%	40%	50%	60%	January 2018	June 2022

					Develop systems of identifying viable innovations from the grassroots							
					Provide funding through the East African Research Fund							
Application of STI for socio-economic development	Increased value addition in agriculture	-Facilitate the development of Technology solutions to increase value addition in the agricultural sector, for industrial development;	Regional initiatives in agriculture value addition coordinated (*including collaborative programs, and R&D)*	Number of initiatives coordinated and supported	Identify and facilitate regional initiatives on agriculture value addition	20%	50%	80%	100%	100%	July 2017	June 2022
		-Assess technology needs and promote generation of technology solutions	Innovative and appropriate technology solutions/approaches in storage and agro-processing	-Reports of evaluation; - Number of technology solutions disseminated; -Record of available	Identify, evaluate and disseminate technology solutions (processes and products) in processing and	30%	80%	100%	100%	100%	January 2017	June 2022

		-Identify and disseminate available technological processes and products	disseminated	technology solutions	conservation of agricultural products							
	Promotion of technological solutions in energy and environment	-Assess technology needs and promote generation of affordable technology solutions for clean energy; - Identify and evaluate regional initiatives on clean energy for collaboration and support;	development of renewable energy technology solutions and products supported	Report of assessment of energy technology needs and choices Directory on clean and renewable energy initiatives and capacity, in place by June 2018 Number technology solutions of identified and disseminated	Evaluate, support and disseminate technology solutions (processes and products) in clean and renewable energy (including *Support to the Regional Centre Of Excellence In Renewable Energy (EACREE))*	0%	30%	60%	100%	100%	July 2018	June 2022
		Promote and support the development of technological	portfolio of technology tools for Climate Change adaptation for priority sectors	Number of technology tools supported for climate change adaptation	Develop a portfolio of technology tools for climate change adaptation in priority areas (*including*	0%	30%	60%	100%	100%	July 2018	June 2022

		solutions for Climate change adaptation	developed (*including coordination of R&D)*		*deployment of smart technologies, and support to R&D*)							
	Enhancement of bio-technology initiatives (support for the generation of innovative bio-technology solutions to resolve the Region's challenges)	-Identify and evaluate regional initiatives on biotechnology for collaboration and support	Biotechnology initiatives in the region Coordinated (including Bio innovate programme)	Record and number of initiatives involved	Identify and coordinate regional initiatives on biotechnology (including bio innovate)	0%	30%	100%	100%	100%	July 2018	June 2022
		-Assess Institutions with R&D activities on biotechnology to identify potential Centres of Excellence	Regional Centres of excellence in Biotechnology supported	Number of Centres of Excellence in place and supported	Establish and support Regional Centres of Excellence in biotechnology	0%	0%	30%	50%	60%	July 2019	June 2022
		-Develop Regional guidelines on biosafety	Regional biosafety guidelines developed	Regional guidelines on biosafety in place by June 2021	Develop and disseminate regional guidelines on biosafety	0%	0%	40%	100%	100%	July 2019	June 2022
		Assess and	Development of	Report on the assessment	Carry out an assessment of	0%	20%	50%	100%	100%	July 2018	June 2020

		establish a regional catalogue and record of indigenous technology processes and products	indigenous knowledge & technologies supported		indigenous knowledge and technologies for promotion and support							
	Support for export-oriented industrial development and trade (generation of innovative solutions to support industrial development and trade)	- Assess technology transfer institutions in Partners States for the establishment of linkages and Centres of Excellence; - Evaluate technology needs in trade and promote generation of technology solutions; - Promote and support	Technology transfer institutions networked including Centres of Excellence for tech transfer established	Number of institutions networked Record of shared information and tools	Establish a network of technology transfer institutions including Centres of Excellence for good practice harmonisation	30%	80%	100%	100%	100%	January 2017	June 2022
			Linkages between the research institutions, academia, industry and business supported	Record of the number and categories of institutions involved	Support linkages between R&D institutions, academia, industry and business actors	0%	30%	60%	100%	100%	July 2018	June 2022
			Trade enabled with Technology (including ICT to increase regional and international	Number of technology tools identified and disseminated	Identify, evaluate and disseminate technology solutions (processes and products) for trade (including use of ICT to	0%	30%	60%	100%	100%	July 2018	June 2022

		the development of innovative technological solutions for trade (logistics services and systems)	trade, standards and testing)		increase regional and international trade, standards and testing)							
	Information and Communication Technology (Capacity in ICT enhanced for efficient productive and social sectors in the region)	-Assess and establish a regional catalogue and record on ICT capacity (needs, available Institutions and human ;capital); - Support development of ICT solutions; -Establish a forum for linkages between technologists, researchers and	- A regional Youth ICT program established (for training and support to R&D in software development and innovative ICT applications in productive and social sectors)	- Youth ICT Program in place by December 2018; - Number of trainees supported	Establish and support a Regional Youth ICT Program (for training and support to R&D in software development and innovative ICT applications in productive and social sectors)	0%	0%	30%	60%	100%	July 2019	June 2022
			Innovation in ICT supported (including Dissemination)	- Number of ICT tools identified and disseminated	Identify, evaluate and disseminate innovative ICT tools	0%	0%	30%	60%	100%	July 2019	June 2022
			- Partnerships improved; - ICT initiatives	- Number and categories of actors involved	Establish and support linkages between technologists,							

		entrepreneurs	coordinated to enhance access to ICT		entrepreneurs and researchers for use of ICT as a tool driving economic growth							
EASTECO Foundational Commitments	Strengthening of EASTECO's institutional framework for effective and efficient governance and operations	- Hire and retain appropriate staff to deliver on EASTECO's mandate - Constitute the Governing Board as per Article 8 of the Protocol - Establish and operationalise Specialised Technical Committees - Establish legal instruments, rules and	- EASTECO's Institutional Capacity enhanced (human Resource capacity building) - Governance improved	- Job description manual in place by September 2017 - Recruitment policy and staff manual - Staff in place as per the approved EASTECO organogram - Report and Record of training - Governing Board in place (members gazetted) by June 2017 - Reports of the meeting of the governing Board - Specialized Technical Committees in place by June 2018; - Communication Strategy in place by	Develop appropriate job descriptions and job profiles for recruitment	100%	100%	100%	100%	100%	January 2017	December 2017
					Develop a recruitment strategy/plan	30%	100%	100%	100%	100%	July 2017	June 2018
					Recruit new staff to undertake EASTECO's mandate	30%	50%	60%	80%	100%	January 2017	June 2022
					Conduct training & induction of staff	100%	100%	100%	100%	100%	January 2017	June 2022
					Hold meeting of the Governing Board	30%	100%	100%	100%	100%	January 2017	June 2022
					Establish and operationalize SP. Technical Committees	0%	30%	60%	100%	100%	July 2018	June 2021
					- develop EASTECO Bill; - Customize EAC Rules and Regulations	30%	100%	100%	100%	100%	January 2017	December 2017

		regulations		December 2018;								
		Develop a communication strategy	EASTECO visibility improved	- Number of hits on the website and likes, followers, shares & re-tweets on social networks	- Develop communication strategy - Develop and maintain an informative and interactive website and use tools such as social media and other forms of media including print and audio-visual	30%	100%	100%	100%	100%	January 2017	June 2022
		Acquire accounting software and records management and archiving software;	-Requisite technology employed for increased efficiency	Accounting system in place and maintained	Acquire and maintain accounting system and records management, and archiving software	100%	100%	100%	100%	100%	January 2017	June 2022
		-Acquire teleconferencing facilities to harness cost savings by reducing travel to attend meetings with		Video-conference in place by June 2021	Acquire Video-conference facilities	0%	0%	20%	100%	100%	July 2019	June 2021

		stakeholders										
		-Improve EASTECO Working environment (acquire permanent Offices)		Report of Feasibility studies in place by June 2020	Conduct feasibility studies for the construction of the EASTECO Headquarters	0%	20%	100%	100%	100%	July 2018	June 2020
	Enhancement of collaboration and partnerships (Enhancement of stakeholder engagement and partnerships in the STI community)	- Establish Working Groups/Think Tanks on scientific research, technological development and innovation	Stakeholder engagement and partnership in the STI community enhanced	- Number of think tank in place; - Advisory reports, policy briefs by the Working Groups;	Establish and operationalize Working Groups on priority issues in STI	0%	0%	40%	100%	100%	July 2019	June 2022
		-Hold Annual STI Stakeholder Workshop; - STI Parliamentarian Forum; - Annual Youth Innovation Forum;		- Number and reports of forums, conferences, exhibitions & seminars held	Hold Annual Stakeholder Workshop on STI Hold Parliamentarian Forum for STI Hold Annual Youth Innovation Forum	40%	70%	100%	100%	100%	July 2017	June 2022

		- Develop guidelines and harmonise fundraising from government, Development Partners and partners to build common solutions ; - establish and operationalise the East African Research Fund (EARF)	-Sustainable funding mechanism for STI initiatives developed; -Advocacy to increase Partner States funding conducted; -Research Fund established and operational	-Strategy of funds utilisation in place by June 2019; -East African Research Fund in place by June 2021; -Number of Research project funded;	- Develop a strategy for fund mobilization and utilization Establish and operationalise the East African Research Fund (EARF) Administer funding through Research management Function and Program	0%	25%	40%	70%	100%	July 2018	June 2022

4.3. Critical success factors

In order for EASTECO to achieve the goals laid out in this Strategic Plan, the following factors are critical:

- Involvement of a wide range of stakeholders drawn from the Government, private sector, academia and the civil society;
- Provision of adequate funding for EASTECO's programmes and the institution of adequate controls to ensure accountability;
- The creation of awareness and publicity about EASTECO's mandate, objectives and initiatives to ensure that there is public acceptance and appreciation of EASTECO's role;
- The creation of partnerships across all layers: nationally, regionally, continentally and globally;
- Political commitment from the Partner States for EASTECO's objectives;
- The establishment of a robust, active and intelligent governance structure headed by the Governing Board;
- The employment of adequate numbers of talented and dynamic staff;
- The definition of operating processes and procedures from early on that will form the foundation of EASTECO in the coming years;
- The identification and focus on strategic areas as identified by this Strategic Plan, EASTECO has neither the capacity nor the resources to focus on everything. The determination of strategic priorities is therefore crucial.

Chapter 5: Financial projection and resource mobilisation plan

This financial projection and resource mobilisation plan not only aids efforts to raise the profile of the Commission but also enables EASTECO to focus on priority programmes that will form the foundation of sustainable initiatives in the future. The resource mobilisation plan will therefore complement and support the implementation of EASTECO's Strategy.

The objectives of the financial projection and resource mobilisation plan are to:

- Increase EASTECO's core funding in order to strengthen the institution and provide the means to achieve its mandate over the five year Strategic plan horizon and beyond;
- To increase EASTECO's extra-budgetary funding aside from the East African Community to further undertake projects to support the development of STI in Partner States within the framework of the EAC's priorities;
- To institutionalise resource mobilisation as a key function in EASTECO.

5.1. Resource mobilisation principles

The vision, mission, goals and strategic priorities of EASTECO inform the financial projection and resource mobilisation plan. EASTECO will ensure that its values, principles, identity and integrity are always respected in the resource mobilisation process. The essential principles of the resource mobilisation plan are:

- EASTECO will seek funding from national, regional and global sources to conduct work that is in line with its mandate and with this Strategic Plan. As far as is possible EASTECO will determine its priorities and develop mechanisms to attract funding that is in line with these priorities;
- EASTECO will cooperate with Partner States to ask support and will keep the Partner States informed of its progress in the implementation of this Strategic Plan and the performance of its mandate;
- EASTECO will develop an advocacy and communication strategy. Time will also be spent in planning, preparing, identifying and building relationships with new prospective financiers and the effectiveness of the resource mobilisation approach reviewed periodically;
- When negotiating with Development Partners, EASTECO will ensure that the terms and conditions of funding agreements, procedures and reporting schedule are mutually acceptable and that the terms conform to EASTECO's values and priorities;
- EASTECO will not discourage Development Partner-sponsored programmes as long as they fit in with EASTECO's overall mission and there is adequate institutional capacity to support the implementation of such programmes. EASTECO will however scrupulously avoid Development Partner driven initiatives that are not in line with its priorities.

5.2. Objectives for science, technology and innovation funding

The countries that make up the East African Community share common values, goals and challenges, therefore from EASTECO's perspective, common funding objectives are key to achieving its mandate. The Community's shared vision is to attain a prosperous, competitive, secure and politically united East Africa. The shared mission is to widen and deepen economic, political, social and cultural integration in order to improve the quality of life of the people of East Africa through increased competitiveness, value added production and enhanced trade and investment. The standard minimum objectives of STI funding therefore include the promotion of:

- **Regionalisation** – STI funding should be dedicated to promoting contacts over national borders. This usually consists of a blend of strategic-oriented funding aimed at specific types of regional goals, historical and foreign policy linkages and harmonisation of policy goals. This type of financing can have huge strategic impact when connected to issues such as access to large-scale research infrastructure.

- **Advancement of youth –** Funding should be aimed at young scholars in order to promote careers in STEM. Special funding should also be provided to promote the inclusion of disadvantaged groups.

- **Capacity building (science driven blue-sky research) –** Some funding should be directed at basic science research that is curiosity driven or is intended to promote the development of a specific field or competence (e.g. nanotechnology and ICT). Funding should also be provided to build capacities in specific areas of generic research such as biotechnology and particular niches such as agriculture related biosciences.

- **Strategic research –** funding that is aimed at stimulating the research and innovation community in the region to address specific pre-defined areas of focus identified as regional priorities should be provided.

- **Collaboration with industry/public sector –** STI funding should promote joint ventures between researchers, industry and the public sector in order to upgrade skills in industry, promote specific technological foci and address strategic priorities and challenges.

- **Commercialisation of academic research –** funding should promote science based entrepreneurship in the region including infrastructural support for entities such as technology transfer units, entrepreneurship courses, incubators and venture capital for university-based start-ups as well as research and education.

5.3. EASTECO's budget structure

EASTECO's budget structure includes:

1. The East African Community's allocation from its annual budget;
2. Governments' contributions
3. Private sector contributions;
4. Development Partner contributions;

5.3.1. EAC's Annual Contribution

The East African Science and Technology Commission was allocated USD 1,161,438 in 2016-17 compared to USD 726,755 for the financial year 2015-16. This amount was pegged on the continued and consolidated political support for EAC integration, availability of financial resources and timely remittances, continued financial support from development partners, political stability and good governance, safe and stable security across the region and a conducive macro-economic and business environment in the region.

5.3.2. Development Partner contributions

Overall R&D dependence on Development Partners is expected to decrease over time. However, finding reliable sources of funding has been a perennial problem for researchers in the region. A lack of long term interest by Governments in research means that most of the East African Community countries have little to offer in terms of research grants. International support from development agencies and international research funders is therefore necessary. EASTECO will pool such finances and distribute them according to priorities while respecting the principles of equity as espoused in the Treaty for the Establishment of the East African Community.

5.3.3. Governments' contributions

The Governments' of the EAC have laid out STI financing arrangements, a portion of which can be channelled to EASTECO directly to support regional collaboration in STI as part of the overall objective of promoting national interests in STI. One of the most significant developments in research funding has been the heightened importance of international collaboration. International collaboration in STI has moved from being an optional issue to an imperative for achieving national science, technology and innovation policy goals.

The commitments of the various countries in the Community are highlighted in the table below:

Table 23: Funding commitments of the EAC Partner States

Country	Financing arrangement or goal
Burundi	Reach gross expenditure on research and development of at least 1% of GDP through the government budget
Kenya	Reach gross expenditure on research and development of 2% of GDP from the

Country	Financing arrangement or goal
	national budget
Rwanda	At least 1% of the government budget to facilitate research and development efforts
Uganda	Reach gross expenditure on research and development of 1% of GDP funded by private actors, public-private partnerships and the government budget
Tanzania	Achieve gross expenditure on research and development of at least 1% of GDP through the government budget

Source: Science, Technology and Innovation Act, Kenya and Consolidated Plan of Action

5.3.4. Private sector contributions

The main opportunity for the private sector is in growing entrepreneurship and innovation by harnessing science, technology and innovation. The private sector would be a crucial investor in applied research. Studies indicate that in order to enhance private sector funding in STI, institutions need to establish and maintain commercial relationships and agree on commercial terms and conditions. Private firms invest in R&D for profit therefore, so long as the expected revenues outweigh the expected costs private firms will invest.

5.4. Funding instruments for science, technology and innovation

A variety of funding instruments can be implemented by EASTECO to facilitate STI initiatives in the region. These include:

Table 24: Funding instruments for Science, Technology and Innovation

Instrument	Mechanism
Project funding	Project funding will be provided in the short to medium term and allocated competitively. They will have well defined target groups and require the recipients to give detailed descriptions of objectives, potential results, beneficiaries and timelines.
Programme funding	This will be based on a portfolio of projects grouped under one theme and conducted by a regional collaboration of actors. Programme funding will not be allocated to researchers operating in only one country and thus proof will need to be provided to ascertain that regional collaboration is a key component of the programme.
Stipends	Stipends will be used to allocate small sums of money to enable small and medium sized firms in STI in the various countries access small-scale equipment and pay for scientific trips. Stipends will be non-renewable.
Grants	Grants will be used to finance unique and specific individuals and firms to enable them commercialise their innovations. Unlike project funding, grants will enable recipients have a greater level of freedom and will fund specific innovations as opposed to research trajectories. These grants will be administered through an East African Research Fund (EARF)
Awards	An annual award will be given to reward and promote breakthrough technologies and innovations. A committee of eminent scientists, business people and public sector practitioners will be instituted to evaluate submissions and select the best submissions in various STI categories.

5.5. Projected resource requirements

A summary of strategic priorities and the level of financing required to attain the strategic objectives for the next five years is provided in the table below: This has been set at US$ 22,085,000 for the first five years as EASTECO seeks to develop adequate capacity to manage finances. It is estimated that EASTECO will seek to raise US$ 10,000,000 over the Strategic Period for the East African Research Fund (EARF).

Table 25: EASTECO financial projections for the implementation of the Strategic Plan

Strategic Priority	Strategic Goal	Sub-component	Strategies	Measure/ Performance Indicators	Actions	Amounts (USD)
Support for evidence based policies	Development of regional policies and frameworks in STI		Assess (and Identify), develop and harmonise regional policy frameworks in STI, quality and standards, intellectual property rights, bio-sciences/biotechnology and indigenous knowledge	Baseline data on STI policies in EAC Region in place by December 2018	Carry out a baseline review of all identified policies and establish their status within EAC Partner States (seeking similarities to define areas of convergence between nations) and at EAC Regional Level	50,000
				Regional Policy of Science, Technology and Innovation in place by June 2019	Develop regional policy frameworks in STI, quality and standards, intellectual property rights, bio-sciences/biotechnology and indigenous knowledge; and disseminate policies for ratification by the Partner States	360,000
				Regional Policy of Intellectual Property Right in place by December 2019		
				Regional Biotechnology Policy Framework in place by June 2020		
				Regional Framework on the Recognition of Indigenous Knowledge in place by June 2020		

	Strengthening of regional STI knowledge management		- Invest in a regional knowledge management database	- Regional STI data base in place by June 2018; - Regional STI knowledge management system (database) in place;	Establish Regional STI knowledge management with STI data base	77,000
			- Develop monitoring and evaluation system for STI at regional level	-STI Indicators developed by December 2018; data collected and processed;	Develop and monitor STI Indicators in the EAC region	150,000
			- Hold regional conferences and seminars to enable sharing of information and knowledge	- Report of dissemination; record of actors involved	Develop a dissemination mechanism to ensure that findings are quickly shared with relevant parties and used to inform STI development	30,000
SUB-TOTAL 1						667,000
Promotion of STI knowledge and innovation	Enhancement of STEM education	Promotion of STEM education	-Track data on access to STEM education based on variables including gender, economic ability and minority status; - Hold fairs, exhibitions and competitions in STEM on a regional level e.g. an East African Science Olympiad - Provide scholarships to	- Regional data in STEM skills and capacity in place - Regional strategy to enhance STEM training, in place by December 2018 - 5 Centres of Excellence in STEM disciplines, in place by June 2020 - % of females participating in STEM	Track and document data on STEM capacity and education with variables including gender equality in STEM	73,000
					Develop regional strategy to enhance STEM training (including gender equity, incentives, faculty mobility) and a program for women in STEM	70,000
					Establish Regional Centres of Excellence in STEM training for strategic disciplines (including	500,000

			talented/promising students in STEM subjects - Promote faculty mobility of across the Community and exchange programmes both regionally and internationally	(e.g. PhD holders, Masters and women/girls pursuing STEM undergraduate courses) -Reports of Forums/campaigns for awareness raising for STEM education	nuclear energy, mechatronics & robotics, petrochemicals and gas	
					Hold forums to determine solutions to the challenges and advocate for gender equity	55,000
	Leveraging of scientific research (with focus in R&D in strategic areas, infrastructure, facilities and Centres of Excellence)	Promotion of scientific research in regional strategic areas	- Assess the progress achieved in regional scientific research - Develop a Regional R&D roadmap - Establish linkages between R&D institutions, Researchers; and support dissemination of scientific information - Establish and support Centres of Excellence in R&D	At least 1 Program for collaborative research in place by December 2020; Number of projects funded	Develop and support Regional Collaborative Research Programs	66,000
					Provide funds to selected and approved research projects through the EARF	8,000,000
				Regional Network of R&D institutions, university-led research centres in place by December 2019	Establish and Support a Network of R&D Institutions for sharing of research information, facilities, mobility of researchers	100,000
				Linkage and mobility program for research in place and operational by December 2021; Number of agreements signed	Facilitate linkages of R&D institutions, centres and researchers with research networks of other regions	55,000
				5 Regional Centres of Excellence in R&D in place by December 2021	Establish Centres of Excellence for R&D	500,000
				Region Journal on Scientific Research in place by June 2019;	Establish a Regional Journal on Scientific Research	300,000

				Number of peer reviewed papers published		
	Support for the commercialisation of innovation and technology	Promotion of an STI culture through excellence, awards & recognition	-Facilitate the establishment of incubators on a regional level -Provision of awards and recognitions	-A network of innovation hubs and incubators in place -Number of entries submitted for award purposes	Establish and support regional networks of innovation hubs and incubators	300,000
					Hold an annual award recognising excellence in STI in the region	250,000
		Commercialisation	-Develop a strategy for dissemination and commercialisation of scientific and technological findings, with focus on PPP inn research & technology development -Strengthening intellectual property rights (IPR) regimes, increase patent applications and use of available patents	-Strategy for dissemination and commercialisation of scientific and technological findings, with focus on PPP inn research & technology development -Number of technology innovations for health -Number of training sessions on IPR	Develop regional Strategy for dissemination and commercialisation of R&D findings	75,000
					Support development and commercialisation of innovative technology solutions including for Health	200,000
					Establish networks and collaboration with National IPR institutions for training in patent information for researchers and R&D institutions to increase patent applications and use of available patents	200,000
			Facilitate the commercialisation of innovations	Number of successful innovations that have become marketable products and services	Sign partnership agreements with private sector players	-
					Develop systems of identifying viable innovations from the grassroots	45,000

					Provide funding through the East African Research/Innovation Fund (EARF)	2,000,000
SUB-TOTAL 2						12,789,000
Application of STI for socio-economic development	Increased value addition in agriculture	Facilitate the development of Technology solutions to increase value addition in the agricultural sector, for industrial development	Identify and evaluate regional initiatives on agriculture value addition for collaboration and support	Number of initiatives coordinated and supported	Identify and facilitate regional initiatives on agriculture value addition	30,000
			Assess technology needs and promote generation of technology solutions	-Reports of evaluation; - Number of technology solutions disseminated; -Record of available technology solutions	Identify, evaluate and disseminate technology solutions (processes and products) in processing and conservation of agricultural products	276,000
			Identify and disseminate available technological processes and products			
	Promotion of technological solutions in energy and environment	technology processes and products promoted to increase access to clean and modern energy and enhance climate	Assess technology needs and promote generation of affordable technology solutions for clean energy	Report of assessment of energy technology needs and choices	Evaluate, support and disseminate technology solutions (processes and products) in clean and renewable energy (including *Support to the Regional Centre Of Excellence In Renewable Energy (EACREE))*	200,000
			Identify and evaluate regional initiatives on clean energy for collaboration and support	Directory on clean and renewable energy initiatives and capacity, in place by June 2018		

		change adaptation	Identify available energy technological processes and products for dissemination	Number technology solutions of identified and disseminated		
		Technological solutions for Climate Change adaptation promoted and disseminated	Promote and support the development of technological solutions for Climate change adaptation	Number of technology tools supported for climate change adaptation	Develop a portfolio of technology tools for climate change adaptation in priority areas (*including deployment of smart technologies, and support to R&D*)	200,000
	Enhancement of bio-technology initiatives	Generation of innovative bio-technology solutions to resolve the Region's challenges supported	Identify and evaluate regional initiatives on biotechnology for collaboration and support	Record and number of initiatives involved	Identify and coordinate regional initiatives on biotechnology (including bio innovate)	30,000
			Assess Institutions with R&D activities on biotechnology to identify potential Centers of Excellence	Number of Centres of Excellence in place and supported	Establish and support Regional Centres of Excellence in biotechnology	200,000
			Develop Regional guidelines on biosafety	Regional guidelines on biosafety in place by June 2021	Develop and disseminate regional guidelines on biosafety	100,000
			Assess and establish a regional catalogue and record of indigenous technology processes and products	Report on the assessment	Carry out an assessment of indigenous knowledge and technologies for promotion and support	100,000

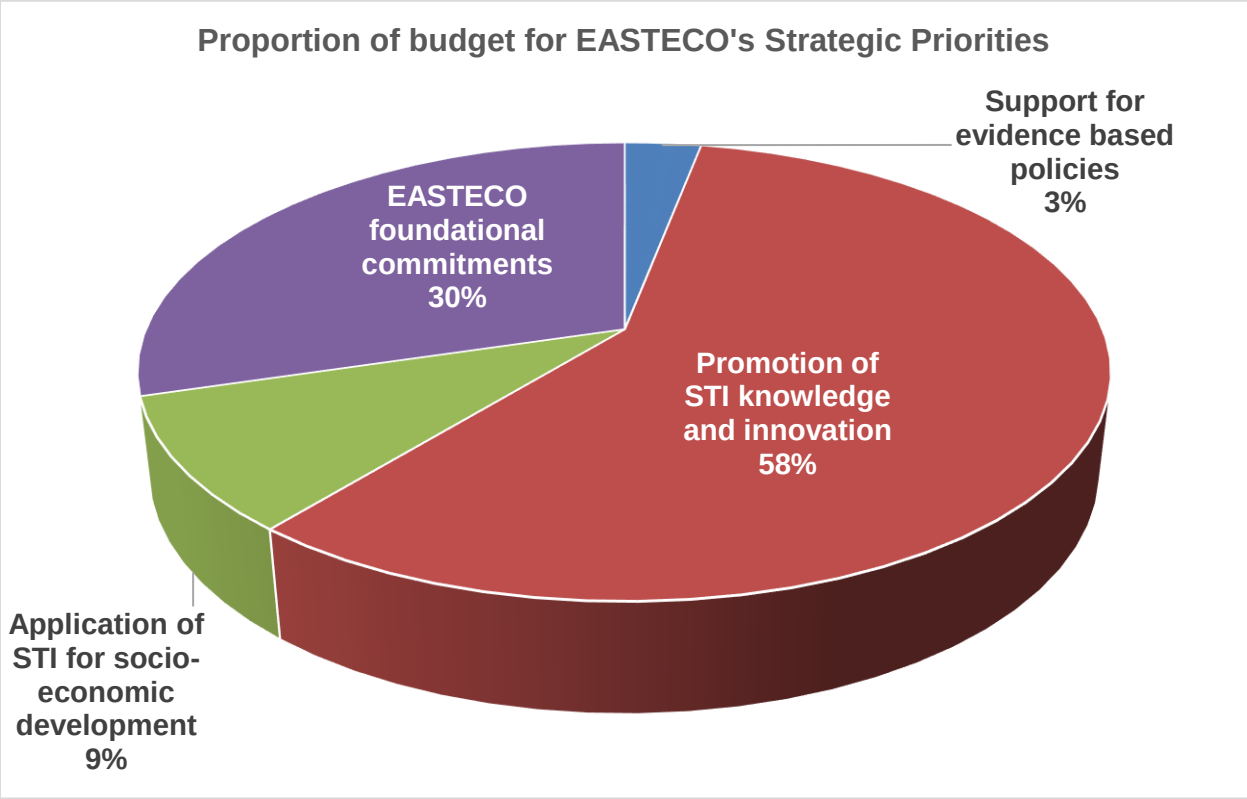
	Support for export-oriented industrial developmen t and trade	Supporting generation of innovative solutions to support industrial developmen t and trade	Assess technology transfer institutions in Partners States for the establishment of linkages and Centers of Excellence	Number of institutions networked Record of shared information and tools	Establish a network of technology transfer institutions including Centres of Excellence for good practice harmonisation	150,000
			Evaluate technology needs in trade and promote generation of technology solutions	Record of the number and categories of institutions involved	Support linkages between R&D institutions, academia, industry and business actors	50,000
			Promote and support the development of innovative technological solutions for trade (logistics services and systems)	Number of technology tools identified and disseminated	Identify, evaluate and disseminate technology solutions (processes and products) for trade (including use of ICT to increase regional and international trade, standards and testing)	200,000
	Information and Communica tion Technology	Capacity in ICT enhanced for efficient productive and social sectors in the region	Assess and establish a regional catalogue and record on ICT capacity (needs, available Institutions and human capital)	- Youth ICT Program in place by December 2018; - Number of trainees supported	Establish and support a Regional Youth ICT Program (for training and support to R&D in software development and innovative ICT applications in productive and social sectors)	300,000
			Support development of ICT solutions	- Number of ICT tools identified and disseminated	Identify, evaluate and disseminate innovative ICT tools	200,000
			Establish a forum for linkages between technologists, researchers and entrepreneurs	- Number and categories of actors involved	Establish and support linkages between technologists, entrepreneurs and researchers for use of ICT as a tool driving economic growth	50,000

SUB-TOTAL 3						2,086,000
EASTECO foundational commitments	Strengthening of EASTECO's institutional frameworks for effective and efficient governance and operations	Institutional Capacity enhanced	- Hire and retain appropriate staff to deliver on EASTECO's mandate - Constitute the Governing Board as per Article 8 of the Protocol - Establish and operationalise Specialised Technical Committees	- Job description manual in place by September 2017 - Recruitment policy and staff manual - Staff in place as per the approved EASTECO organogram - Report and Record of training - Governing Board in place (members gazetted) by June 2017 - Reports of the meeting of the governing Board - Specialized Technical Committees in place by June 2018; - Communication Strategy in place by December 2018; - Number of hits on the website and likes, followers, shares & re-tweets on social networks	Develop appropriate job descriptions and job profiles for recruitment	10,000
					Develop a recruitment strategy/plan	10,000
					Recruit new staff to undertake EASTECO's mandate	5,000,000
					Conduct training & induction of staff	75,000
					Hold meeting of the Governing Board	600,000
					Establish and operationalize SP. Technical Committees	35,000
			Establish legal instruments, rules and regulations		- develop EASTECO Bill; - Customize EAC Rules and Regulations	0.00
		EASTECO visibility enhanced	Develop a communication strategy		- Develop communication strategy - Develop and maintain an informative and interactive website and use tools such as social media and other forms of media including print and audio-visual	25,000
			Acquire accounting software and records management and archiving software	Accounting system in place and maintained	Acquire and maintain accounting system and records management, and archiving software	38,000
			Acquire teleconferencing facilities to harness	Video-conference in place by June 2021	Acquire Video-conference facilities	50,000

			cost savings by reducing travel to attend meetings with stakeholders			
			Improve EASTECO Working environment (acquire permanent Offices)	Report of Feasibility studies in place by June 2020	Conduct feasibility studies for the construction of the EASTECO Headquarters	200,000
	Enhancement of collaboration and partnerships	Enhancement of stakeholder engagement and partnerships in the STI community	- Establish Working Groups/Think Tanks on scientific research, technological development and innovation	- Number of think tank in place; - Advisory reports, policy briefs by the Working Groups;	Establish and operationalize Working Groups on priority issues in STI	35,000
			- Hold Annual STI Stakeholder Workshop; - STI Parliamentarian Forum; - Annual Youth Innovation Forum;	- Number and reports of forums, conferences, exhibitions & seminars held	Hold Annual Stakeholder Workshop on STI Hold Parliamentarian Forum for STI Hold Annual Youth Innovation Forum	200,000
		Sustainable funding for STI initiatives through the	- Develop guidelines and harmonise fundraising from government, donors and partners to build common solutions ; - establish and operationalise the East African Research Fund (EARF)	-Strategy of funds utilisation in place by June 2019; -East African Research Fund in place by June 2021; -Number of Research project funded;	- Develop a strategy for fund mobilization and utilization	65,000
					Establish and operationalize the East African Research Fund (EARF)	100,000
					Administer funding through Research management Function and Program	100,000

SUB-TOTAL 4		6,543,000
		22,085,000

Figure 8: EASTECO distribution of funding for the Strategic Plan



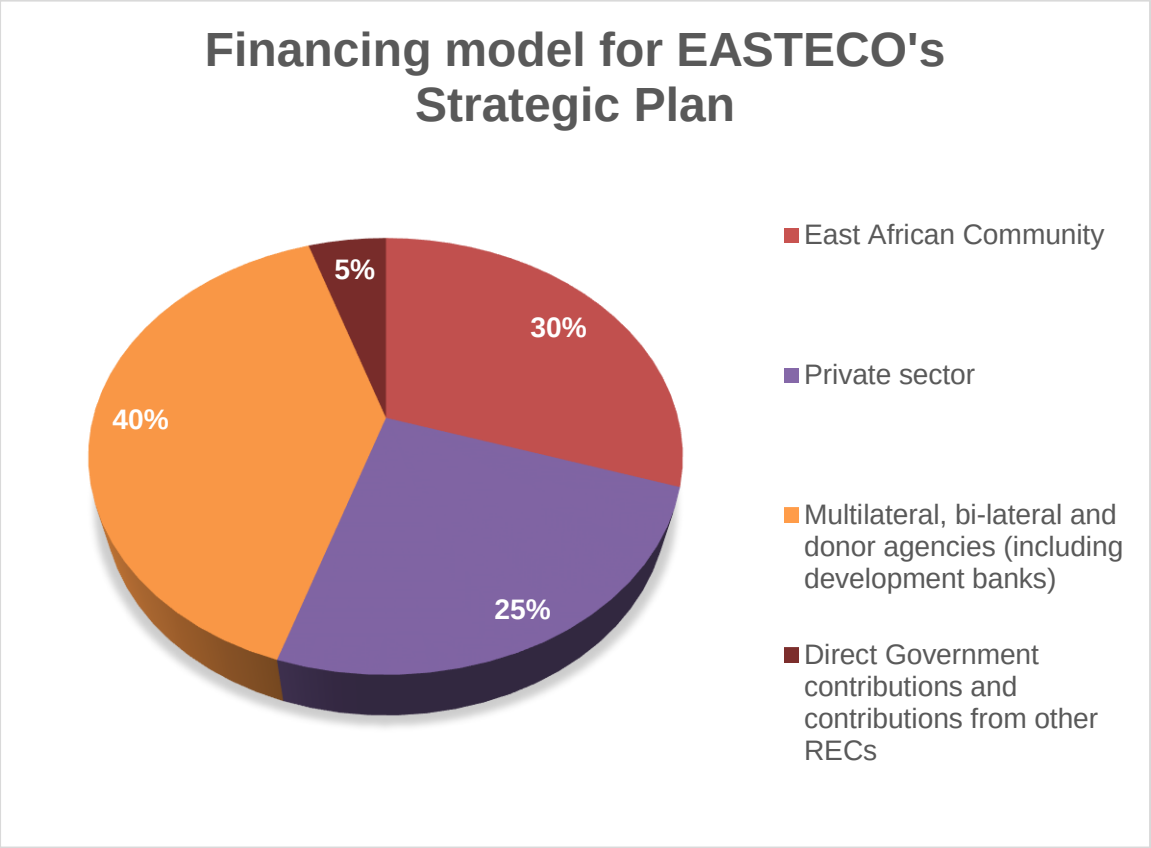
Promotion of STI knowledge and innovation accounts for the greatest share of financing at 58% due to the envisaged provision of funds to selected and approved projects through the East African Research Fund (EARF)

This is followed by EASTECO foundational commitments at 30%. This is because the first five-years of this Strategic Plan are important for EASTECO to develop operational structures and mechanisms that

5.6. Prospective sources and allocation of funding

Funding to support EASTECO may be sought from national, regional, continental and international sources of funding. National sources include the public budget while regional, continental and international financing includes the East African Community, global and regional development banks and funds, multilateral and bilateral donor agencies, NGOs and foundations. The greater bulk of financing received from the EAC will be used to finance recurrent expenditure such as salaries and other operating expenses. It is therefore expected that the EAC's contribution to the financing of this Strategic Plan will make up only 30% of the budget while the remaining 70% will be from other sources. Within the five-year period, private sector financing is targeted at only 25% as EASETCO seeks to define itself and develop a value proposition. The financing model is illustrated in the figure below:

Figure 9: Financing model for EASTECO's Strategic Plan



Chapter 6: Monitoring and evaluation framework

Monitoring is an important management tool that helps management to make decisions aimed at improving performance by determining whether the actions undertaken are enabling the organisation achieve its objectives while ensuring accountability to all parties involved. Monitoring and evaluation facilitates the assessment of the use and delivery of resources in accordance with the implementation plan and enhances the monitoring of achievement of intended outputs in a timely manner. Monitoring and evaluation is both a culture and a demanding exercise involving routine data collection and analysis of the success of the implementation of this Strategic Plan. The objectives of the Strategic Plan will be reinforced through corrective actions when and if necessary. This will be achieved by:

- Developing monitoring and evaluation indicators at all levels of implementation
- Conducting continuous data collection, analysis and monthly reporting to EASTECO's Governing Board
- Conducting specially designed surveys
- Carrying out participatory monitoring and evaluation through stakeholder fora
- Facilitating independent assessments and reviews of the programmes, projects and initiatives being implemented by EASTECO.

6.1. International benchmarking instruments

Three major surveys are used to create R&D and innovation indicators. These surveys lead to the creation of a set of indicators and include:

- R&D survey based on the "Frascati Manual" which gives an overview of the research inputs and selected outputs in a country. The survey will then be used to produce a time series that demonstrates both national trends and comparisons within the East African Community.
- Innovation Survey based on the Oslo Manual will be addressed to players in the private sector.
- PhD holders survey which is crucial for human resources and is important for obtaining information of human resources and migration

6.2. Indicators for Science, Technology and Innovation

Indicators will be used for monitoring, benchmarking and as part of the foresight exercises to be used in developing policy in STI. Indicators will also enhance public accountability and support the evaluation of expenditure programmes undertaken by EASTECO. The indicators applied by EASTECO will cover the activities, linkages, outcomes and impacts of STI in the region. These are summarised in the table below:

Table 26: Indicators for Science, Technology and Innovation

Area	Activity	Definition	Indicators
Activities	R&D and regionalisation	The formal creation of knowledge is a crucial input to the activity of innovation. The requirement is to collect data on the performance of R&D in the Partner States.	➢ R&D spending by sector and source of funds ➢ Basic, applied and development R&D by sector and source of funds ➢ R&D personnel by level of formal qualification and occupation, gender head count and full-time equivalent ➢ Researchers by field of science
	Invention	Invention leads to intellectual property which may be protected by an intellectual property instrument such as a patent, copyright, trademark or trade secrecy	➢ Number of patent applications ➢ Number of trademark applications ➢ Amount of grants awarded to facilitate commercialisation
	Innovation	New ways of innovating including open innovation across the region and the democratization of innovation, design and sustainability of innovation	➢ Number of on-going or abandoned innovation activities ➢ Amount of expenditure on innovation activities
	Diffusion of knowledge	Knowledge is diffused in codified form through books, journals and through transfer of tacit knowledge from person to person	➢ Number of papers published per year (PPY) ➢ Field Weighted Citation Impact (FWCI) ➢ Number of publications per capita
Linkages	Spatial distribution	The measuring of linkages is	➢ Bibliometric data

Area	Activity	Definition	Indicators
	(linkages between researchers, institutions and networks)	fundamental to the understanding of the dynamics of the STI system e.g. bibliometric analysis of publications with more than one author representing different institutions	with more than one author across institutions and countries ➢ Number of collaborative projects
	Commercialisation	This is the creation of market value from knowledge e.g. through the sale of intellectual property, its licensing to the private sector or the spinning off of a new firm to bring the new knowledge to the market	➢ Exports and imports of high-tech goods by each country and by each sector ➢ Value add of knowledge intensive, ICT, high-tech and other industries by country ➢ Value add of education, health, business, financial services by country ➢ Volume of trade in high-tech goods by country and sector ➢ Number of patent applications and trademark applications
Outcomes		The outcomes of an activity such as R&D, innovation or the diffusion of knowledge, technologies and practices provides direct evidence of the consequence of engaging in the activity such as increased revenue, market share or employment as a result of the innovation	➢ Number of doctorate holders within the region in STEM related fields ➢ Number of STEM degrees awarded by type and field ➢ Number and amount of spending on tertiary institutions
Impact		While the impact of an activity is difficult to	➢ Degree of public interest in STI

Area	Activity	Definition	Indicators
		determine as the STI system in non-linear an analysis of productivity and economic growth can provide a means of getting to some of the causes	issues ➢ Number of visits to institutions undertaking STI ➢ Assessment of spending of East African governments on R&D ➢ Assessment of quality of STEM education within the Community ➢ Average math and science scores across the region ➢ Growth, impact factor

6.3. Risks in implementing the strategy

A number of risks may affect the successful implementation of this strategy; these are highlighted in the table below:

Table 27: Risks in implementing the Strategic Plan

Type of risk	Definition of risk	Description of risk	Level of risk (high, medium, low)	Impact	Mitigation of risk
Strategic risk	Strategic risks are risks that affect or are created by an organization's business strategy and strategic objectives	Lack of acceptance by stakeholders of EASTECO's mandate	Medium	Medium	Involve all stakeholders during the implementation of EASTECO's mandate
		Lack of awareness from the general public	Medium	Medium	Disseminate information to the public through print and visual media, social networks, website and

Type of risk	Definition of risk	Description of risk	Level of risk (high, medium, low)	Impact	Mitigation of risk
					public for a at Universities and institutions
		Inability to constitute a Governing Board	Low	High	The process of constituting a Governing Board is currently underway
Operational risk	These are major risks that affect an organisation's ability to execute its strategic plan emanating from a failure in the organisation's day to day operations	Inability to acquire the required talent and human resource capacity	Low	High	Competitive recruitment will take place with candidates from all across the region invited to apply
		Lack of facilities and equipment	Low	Medium	EASTECO currently has offices in Rwanda and is in the process of making these offices inhabitable as a working space. EASTECO will also form partnerships with national commissions and councils as appropriate
Financial risk	This is the risk associated with financing stemming from EASTECO's inability to raise the required amounts of money to effectively undertake its mandate	Inadequate financing based on the inability to obtain funding from the EAC and partners	High	High	EASTECO will develop mechanisms to secure funding and develop partnerships with partners and the private-sector
		Lack of accountability	Low	Medium	EASTECO will put in place

Type of risk	Definition of risk	Description of risk	Level of risk (high, medium, low)	Impact	Mitigation of risk
		for funding provides			measures to ensure accountability for funding and procure an appropriate accounting system. Furthermore, EASTECO will adopt International Public Sector Accounting Standards
Compliance risk	This risk occurs as a result of laws and regulations, conflicting national laws can affect the ability of EASTECO to discharge its mandate effectively	Institution of conflicting national laws with EASTECO's mandate	Medium	Medium	EASTECO will undertake activities to involve the Members of Parliament from each Partner States
		Overlap of EASTECO's mandate with national commissions/councils	Medium	High	EASTECO will identify regional priorities and identify stakeholders in the determination of regional priorities

References

Africa Union Commission. *Science, Technology and Innovation Strategy for Africa 2024,* Addis Ababa, Ethiopia: Africa Union

AOSTI, (2014). *Assessment of Scientific Production in the African Union, 2005-2010,* Malabo, Equatorial Guinea: African Observatory of Science, Technology and Innovation (AOSTI).

AOSTI/NEPAD, (2013). *ASTII policy brief series July 2013-No 02, monitoring Africa's progress in research and experimental development (R&D) investments*, Johannesburg, South Africa: NEPAD Planning & Coordinating Agency (NPCA) and the African Observatory for Science, Technology and Innovation (AOSTI).

EAC, (2007). *The protocol on the establishment of the East African Science and Technology Commission*.

EAC Secretariat, (2016). *East African Community vision 2050, regional vision for socio-economic transformation and development*, Arusha, Tanzania: EAC.

EAC Secretariat, (2015*). East African Community facts and figures 2015*, Arusha, Tanzania: EAC.

EAC Secretariat, (2007). *The treaty for the establishment of the East African Community*, Arusha, Tanzania: EAC.

Michiko, I., Mawoko, P., and Gault, F. (2015). *Innovation for Development in Southern and Eastern Africa: Challenges for Promoting ST&I Policy,* Maastricht, The Netherlands: United Nations University – Maastricht Economic and Social Research institute on Innovation and Technology.

Ministry of Finance, Planning and Economic Development, (2009). *National science, technology and innovation policy*, Kampala, Uganda: Ministry of Finance, Planning and Economic Development.

Ministry in the President's Office in Charge of Science, Technology and Scientific Research, (2006). *The Republic of Rwanda policy on science, technology and innovation,* Kigali, Rwanda: United Nations University and the Republic of Rwanda Ministry of Science, Technology and Scientific Research.

Ministry of Science, Technology and Higher Education, (1996). *The national science and technology policy for Tanzania*, Dar es Salaam, Tanzania.

National Commission for Science, Technology and Innovation (NACOSTI). National Commission for Science, Technology and Innovation Strategic Plan 2014-2018, Nairobi, Kenya:

NACOSTI.

NEPAD, (2014). *African Innovation Outlook II,* Pretoria, South Africa: NEPAD Planning and Coordinating Agency (NPCA).

OECD, (2002). *Frascati manual, proposed standard practice for surveys on research and experimental development*, Paris, France: OECD.

OECD/Eurostat, (2005). *Oslo Manual, guidelines for collecting and interpreting innovation data*, Paris, France: OECD.

Webber, C. and Labaste, P., (2010). *Building competitiveness in Africa's agriculture a guide to value chain concepts and applications.* The International Bank for Reconstruction and Development/the World Bank

World Bank/Elsevier (2014). *A decade of development in Sub-Saharan African science, technology, engineering and mathematics research,* Elsevier.

Appendix A – Economic indicators

The East African Community is one of the fastest growing regions in Africa. Economic growth in the region has outpaced that of the rest of Sub-Saharan Africa since 2000. The total GDP of the five EAC Partner States grew from USD 93 billion in 2009 to USD 147.5 billion in 2014. Average GDP per capita in the Community has moved from USD 598 in 2007 to USD 1,014 in 2014. This data is analysed in the table below:

Table 28: EAC economic indicators

	2007	2008	2009	2010	2011	2012	2013	2014
GDP at market prices								
At current prices (USD Millions)	72,316	86,589	93,635	100,790	112,518	130,565	142,730	147,491
At constant 2009 prices (USD Millions)		87,913	91,674	97,989	101,309	107,046	112,006	118,497
Quantity index (2009=100)		95.9	100.0	106.9	110.5	116.8	122.2	129.3
Constant price growth rates (%)			4.3%	6.9%	3.4%	5.7%	4.6%	5.8%
Implied deflators (2009/10=100)		98.5	102.1	102.9	111.1	122.0	127.4	124.5
GDP per capita								
At current prices (USD)	598	697	733	768	834	941	1,001	1,014
At constant 2009 prices (USD)	-	708	718	747	751	772	786	814

Source: East African Community Facts and Figures 2015

Economic growth in the EAC region has been faster than the rest of Sub-Saharan Africa since 2005. The average GDP growth rate in the region in the year 2015 stood at 6.2%. Tanzania, Rwanda and Uganda have been ranked among the top 20 fastest growing economies in the World for the past five years. An analysis of the GDP growth rates in the five EAC Partner States is provided below.

Table 29: EAC GDP growth

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Burundi	0.9	5.5	3.6	4.5	3.5	3.9	4.2	4.2	4.6	5.2	6.7
Kenya	5.7	6.1	7.0	1.5	2.7	5.8	4.4	4.6	4.9	5.7	5.9
Rwanda	9.4	9.2	7.6	11.2	6.3	7.3	7.9	8.8	5.6	7.0	6.5
Tanzania	7.4	6.7	7.1	7.4	6.0	7.0	6.4	6.9	7.0	7.2	7.0
Uganda	10.0	7.0	8.1	10.4	4.1	6.2	6.4	2.8	5.2	6.6	7.0
EAC						**7.1**	**6.0**	**5.1**	**5.6**	**6.0**	**6.2**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
World Economic Growth	**4.9**	**4.9**	**4.9**	**4.9**	**0.0**	**5.4**	**4.1**	**3.3**	**6.2**	**6.0**	**6.2**

Source: East African Community Facts and Figures 2015

Appendix B – Scientific output indicators (Africa)

The table below illustrates the papers and growth in scientific production by World-leading countries in comparison to Africa.

Table 30: Africa scientific production in comparison to the developed nations

Country/Group	2005-2007	2008-2010	% increase (2008-2010/2005-2007)	Growth index
World	4,619,523	5,436,451	18%	100
United States of America	1,328,365	1,408,715	6%	090
China	677,358	997,743	47%	125
United Kingdom	346,436	380,381	10%	093
Japan	351,229	344,729	-2%	083
Germany	322,682	357,208	11%	094
France	237,593	267,957	13%	096
Canada	194,227	220,749	14%	'097
Italy	181,354	208,000	15%	'097
Africa	**74,629**	**106,825**	43%	**122**

Source: Assessment of Scientific Production in the African Union, 2005-2010

The table below illustrates the number of papers and papers per capita by African countries between the years 2005-2010.

Table 31: Papers and papers per capita by African countries

Country	Output	Output/capita
South Africa	51,500	177.1
Egypt	37,582	81.9
Nigeria	21,737	25.0
Tunisia	18,982	306.2
Algeria	12,584	62.5
Kenya	6,877	30.6
United Republic of Tanzania	3,719	15.6
Cameroon	3,553	32.4
Ethiopia	3,508	7.2
Uganda	3,399	18.4
Ghana	2,948	21.2
Senegal	2,045	29.5
Sudan	1,745	7.1
Zimbabwe	1,723	25.0

Country	Output	Output/capita
Botswana	1,532	132.1
Cote d'Ivoire	1,523	12.7
Malawi	1,497	17.3
Burkina Faso	1,481	16.4
Libya	1,399	38.1
Benin	1,143	22.6
Zambia	1,100	14.6
Madagascar	994	8.4
Congo	916	39.6
Mali	800	10.3
Mozambique	669	5.3
Gambia	626	61.0
Gabon	622	70.5
Namibia	619	49.6
Mauritius	600	78.8
Niger	493	5.7
Rwanda	391	6.3
Togo	365	9.9
Swaziland	330	42.0
Angola	186	2.5
Eritrea	170	5.2
Guinea	166	2.8
Seychelles	153	296.1
Central African Republic	149	5.4
Lesotho	145	12.6
Chad	142	2.4
Democratic Republic of the Congo	139	0.4
Mauritania	135	7.5
Sierra Leone	133	4.5
Guinea-Bissau	128	14.3
Burundi	94	1.7
Djibouti	57	13.5
Equatorial Guinea	51	14.0
Cape Verde	47	16.0
South Sudan	40	0.8
Liberia	38	1.9
Comoros	23	5.3
Somalia	20	0.4
Sao Tome and Principe	15	15.0
Western Sahara	14	5.1

Source: Assessment of Scientific Production in the African Union, 2005-2010

Appendix C – East Africa Community (EAC) statistics on science, technology and innovation

The statistics below provide indications of the state of Science, Technology and Innovation as analysed by the UNESCO Institute for Statistics as of 2010.

Kenya

Table 32: Kenya statistics on STI

Researchers in full-time equivalents (FTE)	
Per million inhabitants	231
% female	20
Researchers in headcounts (HC)	
Per million inhabitants	323
% female	25.7
Researchers by sector of employment in full-time equivalents (%)	
Business enterprise	11.4
Government	20.2
Higher education	60.7
Private non-profit	7.7
Researchers by sector of employment in headcounts (%)	
Business enterprise	9.4
Government	27.9
Higher education	56.6
Private non-profit	6.1
Gross domestic expenditure on R&D (GERD)	
GERD as a percentage of GDP	0.79
GERD by sector of performance (%)	
Business enterprise	8.7
Government	40.6
Higher education	39.1
Private non-profit	11.6
GERD by source of funds (%)	
Business enterprise	4.3
Government	26
Higher education	19
Private non profit	3.5
Funds from abroad	47.1
GERD by field of science (%)	
Natural sciences	4.2
Engineering and technology	13.3
Medical sciences	27.5
Agricultural sciences	44.8

Social sciences	6.2
Humanities	3.9
Not specified	3.1

Source: UNESCO Institute for Statistics

Uganda

Table 33: Uganda statistics on STI

Researchers in full-time equivalents (FTE)	
Per million inhabitants	38
% female	26.3
Researchers in headcounts (HC)	
Per million inhabitants	85
% female	24.3
Researchers by sector of employment in full-time equivalents (%)	
Business enterprise	50.6
Government	21
Higher education	25.7
Private non-profit	2.7
Researchers by sector of employment in headcounts (%)	
Business enterprise	50.7
Government	14.3
Higher education	31.2
Private non-profit	3.8
Gross domestic expenditure on R&D (GERD)	
GERD as a percentage of GDP	0.48
GERD by sector of performance (%)	
Business enterprise	34.8
Government	38.6
Higher education	25.4
Private non-profit	1.2
GERD by source of funds (%)	
Business enterprise	13.7
Government	21.9
Higher education	1
Private non profit	6
Funds from abroad	57.3
GERD by field of science (%)	
Natural sciences	9
Engineering and technology	12.2
Medical sciences	18.1
Agricultural sciences	16.7
Social sciences	29.8
Humanities	14.1

Not specified	0

Source: UNESCO Institute for Statistics

Rwanda

Table 34: Rwanda statistics on STI

Researchers in full-time equivalents (FTE)	
Per million inhabitants	12
% female	34.2
Researchers in headcounts (HC)	
Per million inhabitants	56
% female	21.8
Researchers by sector of employment in full-time equivalents (%)	
Business enterprise	
Government	
Higher education	100
Private non-profit	
Researchers by sector of employment in headcounts (%)	
Business enterprise	
Government	
Higher education	100
Private non-profit	
Gross domestic expenditure on R&D (GERD)	
GERD as a percentage of GDP	
GERD by sector of performance (%)	
Business enterprise	
Government	
Higher education	
Private non-profit	
GERD by source of funds (%)	
Business enterprise	
Government	
Higher education	
Private non profit	
Funds from abroad	
GERD by field of science (%)	
Natural sciences	
Engineering and technology	
Medical sciences	
Agricultural sciences	
Social sciences	
Humanities	
Not specified	

Source: UNESCO Institute for Statistics

Tanzania

Table 35: Tanzania statistics on STI

Researchers in full-time equivalents (FTE)	
Per million inhabitants	35
% female	24.6
Researchers in headcounts (HC)	
Per million inhabitants	68
% female	25.4
Researchers by sector of employment in full-time equivalents (%)	
Business enterprise	
Government	64.4
Higher education	35.6
Private non-profit	
Researchers by sector of employment in headcounts (%)	
Business enterprise	
Government	33.9
Higher education	66.1
Private non-profit	
Gross domestic expenditure on R&D (GERD)	
GERD as a percentage of GDP	0.38
GERD by sector of performance (%)	
Business enterprise	
Government	13.7
Higher education	86.3
Private non-profit	
GERD by source of funds (%)	
Business enterprise	0.1
Government	57.5
Higher education	0.3
Private non profit	0.1
Funds from abroad	42
GERD by field of science (%)	
Natural sciences	
Engineering and technology	
Medical sciences	
Agricultural sciences	
Social sciences	
Humanities	
Not specified	

Source: UNESCO Institute for Statistics

Burundi

Table 36: Burundi statistics on STI

Researchers in full-time equivalents (FTE)	
Per million inhabitants	
% female	
Researchers in headcounts (HC)	
Per million inhabitants	39
% female	14.5
Researchers by sector of employment in full-time equivalents (%)	
Business enterprise	
Government	
Higher education	
Private non-profit	
Researchers by sector of employment in headcounts (%)	
Business enterprise	
Government	17.9
Higher education	78.6
Private non-profit	3.4
Gross domestic expenditure on R&D (GERD)	
GERD as a percentage of GDP	0.14
GERD by sector of performance (%)	
Business enterprise	
Government	87.2
Higher education	4.8
Private non-profit	8
GERD by source of funds (%)	
Business enterprise	
Government	59.9
Higher education	0.2
Private non profit	0
Funds from abroad	39.9
GERD by field of science (%)	
Natural sciences	
Engineering and technology	
Medical sciences	
Agricultural sciences	95.2
Social sciences	
Humanities	
Not specified	4.8

Source: UNESCO Institute for Statistics

Appendix D – Analysis of stakeholder expectations

The preparation of this Strategic Plan involved the collection of views from a number of STI players and stakeholders in the region. These views are summarised in the table below:

Table 37: Analysis of stakeholder expectations

Stakeholder	Achievements in STI in the region	Challenges	Priorities	Role of EASTECO
Uganda National Council for Science and Technology	► Establishment of centres of Excellence in the region ► A high level of capacity in terms of human resources ► Political willingness to participate in STI ► Value adding innovations that can be expanded across the region	► EAC countries experience common problems but they do not work together to deal with these problems through collaborative research leading to uncoordinated research, research duplication across research institutions and failure to implement research work ► Lack of financial resources to fund research programmes ► Young people are not taking courses in STEM leading to low numbers of aggressive	► Development of a regional STI coordination structure ► Development and harmonisation of common policies in STI across the East African Community ► Identification of priorities in areas science, technology and innovation these include: renewable energy, ICT, bio and natural sciences, food security and climate change ► Obtaining	► EASTECO should be a central co-ordinating body that will provide synergies and policy frameworks to guide STI in the region ► EASTECO should also facilitate the commercialisation of products in the region by facilitating partnerships with private stakeholders, regional patent protection, protection of EAAC research products and indigenous technologies

Stakeholder	Achievements in STI in the region	Challenges	Priorities	Role of EASTECO
		researchers ► Many universities have come up in the region but most are not offering STEM, majority of the Universities focus on humanities rather than sciences ► Poor infrastructure in the region is an impediment to research and development ► Most research work done in the region remains in book shelves and is not developed further ► EAC member states are not meeting their commitments to funding R&D, the share of R&D as a percentage of GDP still remains below 1% ► There are very few Centres of Excellence in the region	financing for STI initiatives in the Community	► EASTECO should be able to bring various regional and international partners and players together

Stakeholder	Achievements in STI in the region	Challenges	Priorities	Role of EASTECO
Inter-University Council for East Africa (IUCEA)	► Governments are beginning to commit funds towards STI in the region ► Development Partners such as the World Bank and the African Development Bank (AfDB) are supporting Centres of Excellence within the region ► Incubation hubs have been established to support the development of STI within the community ► Centres of Excellence have been created in the region ► Breakthrough innovations such as Mpesa in mobile technology, health, finance and agriculture	► STI work requires equipment and facilities such as laboratories which are expensive. This has led to Universities in the region focusing on humanities instead of STEM ► Centres of Excellence with state of the art technologies have been collaborating very little ► Patent protection in the region is still at infancy ► STI has unsustainable funding. Lack of need/demand based STIs and lack of ownership of STI work as most of this is Development Partner funded with specific Development Partner objectives.	► Partner States ought to commit to investing more in STI ► Engagement of the private sector in STI so as to ensure that STI is localised and funded locally ► Policies and legislation need to be backed by research findings e.g. policies against Genetically Modified Organisms (GMOs) ► Need to create strong legislation to facilitate intellectual property (IP) protection	► EASTECO should aim at creating uniform policies on STIs in the region ► EASTECO should articulate and prioritise common problems in the region ► EASTECO can publish a regional scientific journal highlighting strides in local research efforts ► EASTECO should work with governments, industry and the private sector in order to identify gaps and then work with researchers to fill these gaps ► EASTECO should facilitate efforts in applied research as opposed too theoretical

Stakeholder	Achievements in STI in the region	Challenges	Priorities	Role of EASTECO
		► Lack of linkages between STI and industry		research
Uganda National Academy of Sciences	► The region has undertaken ground breaking research in HIV AIDS, malaria, drought resistant crops, irrigation and green cars	► STI is still not considered a priority for most countries in the Community. Political backing for STI initiatives is still lacking ► Borrowing technologies from outside the region has been viewed as an easy way of doing things, not much effort has been put into developing our own products ► There is minimal funding for STI in the region. For this reason, researchers tend to compete with one another rather than working collaboratively	► Winning political support for the Science, Technology and Innovation sector ► Working towards impact driven and people centred innovations ► Provision of funding for STI	► EASTECO should emphasize on the harmonisation of policies and priorities within the East Africa region ► EASTECO can bring together political players such as legislators and researchers together to enable the formulation of STI backed laws and policies and the formulation of laws and policies that support research and development in the Community ► EASTECO can assist in obtaining financing for STI initiatives in the

Stakeholder	Achievements in STI in the region	Challenges	Priorities	Role of EASTECO
				region
Kenya National Academy of Sciences	► The enactment of the Protocol for the Establishment of the East African Science and Technology Commission (EASTECO) ► The establishment of the Secretariat for EASTECO ► The development of national development visions and national STI policies across the countries of the East African Community	► National bodies only articulate national policies, the EAC has no mechanism through which national bodies in the STI sector can speak to each other ► The private sector is currently excluded from STI, membership in STI is not all-inclusive ► There are not enough Centres of Excellence and Incubation Centres in the region ► Currently STI works in isolation, no consideration is placed on what our regional value systems are ► There are no clear and harmonised targets to measure the attainment of STI in the region	► Preservation of indigenous technologies within the community ► Inclusion of youth, girls, marginalised communities and the disabled into STI ► Expansion of the membership of STI to include private sector players ► Identification of strengths in STI that exist in each Partner State ► Enhancement of training to take into consideration regional priorities as opposed to just national priorities ► Articulation of regional value	► EASTECO needs to facilitate the development of synergies by identifying and bringing strengths and capacities together (EAC Partner States share common climatic issues, economic challenges, issues in health and shared natural resources ► EASTECO should be able to identify training needs based on the needs that exist in the Community, currently, training within the region only reflects national priorities ► EASTECO should facilitate an annual regional scientific

Stakeholder	Achievements in STI in the region	Challenges	Priorities	Role of EASTECO
			systems that can guide STI ► Recognition, promotion and reward of creativity and innovation in the region	conference that brings together all the STI stakeholders ► EASTECO needs to facilitate the development of STI indicators and standards within the region ► EASTECO should facilitate the compilation and preservation of indigenous technologies within the region ► EASTECO should recognise and reward creativity within the region e.g. through an annual competition for the youth, an annual scientific excellence award and a lifetime achievement in science award
National	► Scientific commissions	► Science,	► Nationalistic	► EASTECO should

Stakeholder	Achievements in STI in the region	Challenges	Priorities	Role of EASTECO
Science and Technology Commission (Rwanda)	in the region have a degree of autonomy that is useful in enabling them carry out their mandate ► Legislation that is friendly to STI is being passed thus highlighting the increased appreciation of STI as a tool for socio-economic transformation ► The establishment of National Research Funds to provide financing for STI	Technology and Innovation in the region is still being conducted in silos thus hindering the mobility of ideas and researchers ► There is no critical mass in R&D, therefore the research efforts in the Partner States are small and unsustainable	tendencies and competition among East African Community States are hindering collaboration in STI ► Critical mass in R&D investment is low. The EAC needs to institute a challenge mapping approach. The more challenges we have, the more interested people get ► The EAC needs to tie STI to manufacturing in order to facilitate the creation of wealth through globally competitive products	put forth incentives and mechanisms that will stimulate collaboration between academia and the private sector ► EASTECO should identify regional priorities and specialities in STI (we cannot compete at a global level if we think we can compete everywhere in everything) ► EASTECO needs to develop a set of harmonised standards so that the region can have tools to measure performance
Ministry of Education	► By harnessing indigenous and	► The girl child has been discouraged	► Development of the education	► EASTECO should facilitate the

Stakeholder	Achievements in STI in the region	Challenges	Priorities	Role of EASTECO
Rwanda	traditional knowledge, the region has the potential to create a pharmaceutical industry ► The Partner States have taken steps towards mainstreaming gender in the education system especially in STEM	from STEM. Girls make up the greater proportion of the population however they are mostly left out of education opportunities ► Our education systems are theoretical, we need to enhance the practical application of knowledge in STEM ► Our education system is not harmonised and therefore hinders the effective mobility of labour ► Lack of infrastructure to support STI ► There is no mentorship mechanism in STI ► Our informal sector e.g. Jua kali is shunned by academia, we need to enhance	curricula in order to provide a good foundation in STEM ► Provision of equal opportunities in education for both girls and boys ► Facilitation of mobility of labour in research in order to enable diffusion of ideas ► Recognition of Science, Technology and Innovation as an enabler to socio-economic transformation ► Connection of academia and the informal sector	mobilisation of resources to enhance collaboration in research ► EASTECO should promote the use of indigenous technologies within the region

Stakeholder	Achievements in STI in the region	Challenges	Priorities	Role of EASTECO
		collaboration between academia and the informal sector		
East African Community	► The development of a structure for EASTECO to enable it perform its mandate ► Development of a Strategic Plan ► Existence of a variety of institutions within the EAC that provide benchmarks for EASTECO and also enhance its ability to collaborate effectively e.g. Inter-University Council of East Africa (IUCEA), East Africa Business Council (EABC) and the East African Health Research Commission (EAHRC)	► Limited budget in the EAC and therefore EASTECO has to look externally for financing ► Inadequate staff due to financing constraints ► Lack of knowledge about EASTECO's existence, even from players in the STI sector	► Creation of awareness on EASTECO's mandate ► Provision of an adequate level of staffing to enable EASTECO perform its mandate ► Identification of a set of priorities within the first five years of EASTECO's inception	► EASTECO should facilitate the mobilisation of finances at a regional level ► EASTECO should organise science and technology conferences and projects at a regional level ► EASTECO should cooperate with other bodies and regional economic communities such as the AU, African Development Bank, IMF, World Bank, EU, ASEAN, COMESA, SADC, ECOWAS etc. to drive STI initiatives
Tanzania	► A number of Centres of	► Scientists in the	►	► EASTECO should

Stakeholder	Achievements in STI in the region	Challenges	Priorities	Role of EASTECO
Commission for Science and Technology	Excellence have been established in the Community ►	region are ignorant of intellectual property rights ► Governments have no long term view of STI since they operate on short five-year cycles ► Decisions made by Governments are not always supported by scientific evidence		facilitate the harmonisation of intellectual property rights across the region ► EASTECO should promote the establishment of Centres of Excellence in the region by focussing on the specific comparative advantages of the Partner States ► EASTECO should facilitate the pooling of scientists across the region ► EASTECO should promote the establishment of an East African database ► EASTECO should promote exchange programmes between

Stakeholder	Achievements in STI in the region	Challenges	Priorities	Role of EASTECO
				Universities in the region to enable the development of skills and transfer of knowledge
Tanzania Academy of Sciences	► Countries are beginning to realise the importance of STI ► The youth are coming up with brilliant ideas	► Governments in the region are not adequately funding STI. Funding for STI as a percentage of GDP is still below 1% ► There are challenges in human capacity in some areas of STEM	► Partner States need to address human resource challenges in STEM ► Governments in the region need to adequately fund STI in line with the commitments they made with regard to the Consolidated Plan of Action	► EASTECO needs to track STI funding across the region and develop a mechanism to advocate for greater government funding for STI
East Africa Business Council	► Increased willingness by private sector players to participate in Corporate Social Responsibility, some of which can be channelled into STI and R&D ► Expansion of businesses across the	► Political interference in STI ► Over reliance on Development Partner funding to undertake research ► Gender imbalance in STEM	► Development of human capital in STI ► Equitable development within the EAC region ► Facilitation of a generational change in STI by	► EASTECO should coordinate the efforts of institutions in member states

Stakeholder	Achievements in STI in the region	Challenges	Priorities	Role of EASTECO
	region as a result of the Common Market Protocol means that businesses have to innovate in order to be relevant in different markets		enabling more youth to participate in STEM ► Enhancement of political will and political commitment for STI	
Ministry of Education, Higher Education and Scientific Research (Burundi), Universities, Civil Society, Private Sector Associations and Scientists and Researchers from Burundi	► National policy for STI is in place ► Commission for Science, Technology and Innovation (STI) has been established ► Bill on Science, Technology and Innovation in preparation ► University research and research institutions are operational ► R&D activities in place through academic and public institutions with findings and outputs ► Law on IPR in place	► The commission for Science, Technology and Innovation has not yet been operationalised ► Less than 1% of GDP spent on STI, leading to underfunding ► Inadequate training in STEM ► Gender imbalance in STEM subjects in higher education ► Low scientific research production ► Inadequate coordination of R&D ► Inadequate mechanism for collecting data on	► National STI Act ► Build mechanisms for the private sector to contribute to STI funding ► Government to establish a target for investment in R&D ► Establish Centres of Excellence in STEM from the Secondary level of education at the national and regional levels ► Establish Centres of Excellence in R&D and	► Provide support to assist the finalisation of the STI bill ► EASTECO to develop and facilitate implementation of regional mechanism for private sector funding for STI ► Support STEM training at all levels ► EASTECO to promote gender balance in STEM ► Support linkages between R&D institutions and mobility of

Stakeholder	Achievements in STI in the region	Challenges	Priorities	Role of EASTECO
		STI including STI indicators ► Lack of linkages between R&D institutions, academia and private sector ► Inadequate dissemination of R&D findings ► Inadequate dissemination of information on IPR to R&D actors	Innovation	researchers ► Support establishment of Centres of Excellence for R&D and innovation ► EASTECO to facilitate linkages for translating products from labs to the market.

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