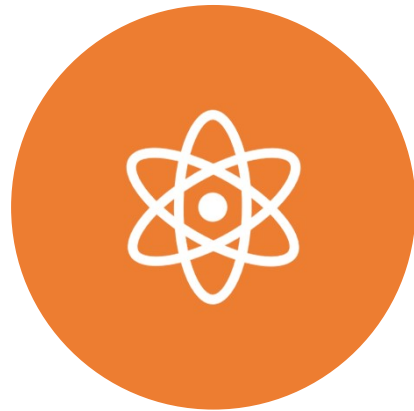


The role of applied sciences as drivers for local, regional, and international innovation

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Introduction



SCIENCE IS FUNDAMENTAL.



SCIENCE NEEDS TO BE
APPLIED FOR IMPACT



Science - **What is it?**

- ❑ A systematic and organized approach to acquiring knowledge about the natural world through observation, experimentation, and the formulation of testable explanations or theories.
- ❑ A disciplined method of studying and understanding the physical and natural phenomena that surround us and encompasses various disciplines, including physics, chemistry, biology, geology, astronomy, psychology, sociology, and many more.



Branches of Science

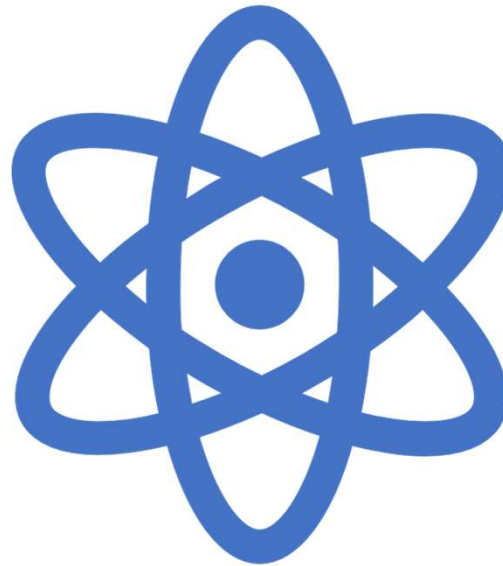
- Natural and Life Sciences:
- Physical Sciences
- Social Sciences,
- Interdisciplinary Sciences
- Applied Sciences.

Applied Science

- Field of study that translates scientific knowledge and principles to solve specific problems or create practical solutions.
- The practical application of scientific knowledge and principles to solve real-world problems, develop useful technologies, and make advancements in various fields.
- Application of scientific theories, concepts, and findings from Basic sciences to specific contexts, industries, or situations, in order to address practical needs and challenges.

For Impact

Translate Science to Applied Science



Contrast

SCIENCE	APPLIED SCIENCE
focuses on expanding knowledge and understanding fundamental principles without necessarily aiming for immediate practical applications	aims to utilize scientific knowledge to develop solutions, improve processes, and create tangible outcomes that have practical benefits.
Focused on specific discipline of knowledge	Spans various disciplines and sectors, including engineering, technology, agriculture, healthcare, environmental management, manufacturing, and many more.
Primary goal is information and knowledge.	Primary goal is to address practical challenges, improve processes, and create innovations that have real-world impact

Roles of Applied Science in Africa

Agriculture and Food Security

Health and Disease Management

Renewable Energy and Sustainability:

Information and Communication Technology (ICT):

Infrastructure and Engineering:

Natural Resource Management

Challenges facing Applied Sciences in Africa



**LIMITED RESEARCH
FUNDING:**



**INFRASTR
UCTUR
E AND
TECHNO
LOGICAL
ONSTR
AINTS**



**LIMITED
SCIENCE
COMMUNI
CATION**



**BRAIN
DRAIN
AND
LIMITED
HUMAN
CAPITAL:**



**WEAK
INSTITUTION
AL SUPPORT:**



LOW INNOVATIONS



**COLLABORAT
ION AND
NETWORKIN
G GAPS**



**CONTEXTU
AL
RELEVANCE
AND LOCAL
PRIORITIES**

Innovation

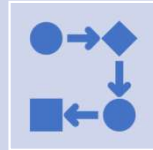
What is it?

Innovation

Activities that results to new ways of doing things better. Innovation involves the introduction of new ideas, methods, products, or processes that result in positive change and create value.

- The process of transforming knowledge and technology into practical applications or solutions that address societal needs and bring about improvement, fuels technological advancements, promotes entrepreneurship, and fosters social and environmental solutions

Innovation



Process of creating and implementing new ideas, processes, products, or services that bring about significant positive change or improvement.

What is it?



Involves the application of creativity, problem-solving, and critical thinking to address challenges, seize opportunities, and generate value



Forms of Innovation

- (a) Product innovation** (creating new or improved products),
- (b) Process innovation** (enhancing operational efficiencies),
- (c) Business model innovation** (reinventing how value is created and delivered),
- (d) Social innovation** (addressing social challenges), or
- (e) Technological innovation** (advancements in technology).

Key characteristics of innovation

- ❑ **Novelty**: involves introducing something new or significantly different compared to existing solutions, methods, or practices
- ❑ **Value Creation** - involves introducing something new or significantly different compared to existing solutions, methods, or practices
- ❑ **Value Creation**: Innovation aims to create value by improving efficiency, effectiveness, quality, user experience, or addressing unmet needs.



Key characteristics of innovation

- ❑ **Practical Implementation** - requires translating ideas into tangible outcomes, such as products, services, processes, or systems that deliver the intended benefits.
- ❑ **Continuous Improvement:** Innovation often involves a process of continuous improvement and refinement
- ❑ **Risk and Uncertainty:** requires taking calculated risks, challenging existing assumptions, and navigating uncertainties to explore new territories and realize the potential for positive change.
- ❑ **Collaboration:** Innovation often thrives in collaborative environments that bring together diverse perspectives, expertise, and resources



1. Innovations emanating from Africa

Health Innovations



Telemedicine platforms :- connect patients with healthcare professionals remotely



Mobile health applications :- In Kenya, a mobile-based platform called Flare connects patients with ambulance services, improving emergency healthcare response and saving lives. provide vital health information, enable remote consultations, and facilitate the tracking and management of diseases such as HIV/AIDS and malaria.

2. Innovations emanating from Africa

2. Agricultural Innovations

In Nigeria, the Babban Gona program uses technology and data-driven approaches to provide smallholder farmers with training, financing, and support, improving their agricultural productivity and income..

The African Agricultural Technology Foundation (AATF) facilitates the development and dissemination of drought-tolerant and disease-resistant crop varieties, benefiting farmers across multiple African countries

3. Innovations emanating from Africa

3. Technological Innovation

. Pay-as-you-go solar models, where households pay for solar energy through mobile payments, have emerged, making renewable energy accessible to low-income populations.

In South Africa, the Zipline drone delivery system provides on-demand delivery of medical supplies, including blood, vaccines, and medications, to remote and underserved areas.

The M-Pesa mobile payment system, originating in Kenya, has transformed financial services in East Africa, enabling individuals to make payments, transfer money, and access banking services through their mobile phones.

4. Innovations emanating from Africa

4. Environmental Innovations

Smart Cities and Urban Planning: . Cities like Kigali in Rwanda and Cape Town in South Africa are incorporating innovative technologies to enhance urban living standards and sustainability Initiatives include the use of IoT (Internet of Things) sensors for efficient waste management, intelligent transportation systems, and smart grids for energy management.

Water and Sanitation Innovations:- low-cost water purification systems, water ATM machines, and water management technologies. Sanitation innovations range from low-cost toilet designs to waste management systems that promote hygiene and health.

The EcoAct Tanzania project focuses on reforestation and sustainable forest management, engaging local communities to protect and restore forests

5. Innovations emanating from Africa

5. Social Innovation:

The Ushahidi platform, developed in Kenya, enables crowdsourced reporting and mapping of crisis situations, aiding humanitarian responses and disaster management efforts.

The African Leadership University (ALU) offers a disruptive model of higher education, providing accessible and affordable education through a network of campuses across the continent.

Grameen Bank, founded by Muhammad Yunus, pioneered microfinance, providing small loans to individuals in poverty, empowering them to start businesses and improve their livelihoods.

7. Innovations emanating from Africa

7. ECONOMY

Mobile Money and Financial Inclusion: Africa has pioneered mobile money services, such as

M-Pesa in Kenya, which revolutionized financial inclusion. Mobile-based payment systems allow individuals to access banking services, transfer money, and make payments using basic mobile phones, addressing the challenges of limited banking

8. Innovations emanating from Africa

8. Education, Teaching and Learning:



Online learning platforms, such as Massive Open Online Courses (MOOCs), have expanded educational opportunities for individuals across the continent.



Mobile-based learning applications and low-cost devices are being utilized to deliver educational content and bridge the digital divide.

Roles of Applied Sciences in Promoting Innovations

- 1. Knowledge Generation and Research:** Science serves as the foundation for innovation by generating new knowledge and conducting research. Through scientific inquiry, African scientists and researchers explore various fields, including agriculture, health, energy, and technology, to expand understanding, discover new ideas, and develop innovative solutions to address local challenges.
- 2. Capacity Building and Human Capital Development:** Science plays a vital role in building scientific capacity and developing a skilled workforce. Investments in science education, research institutions, and training programs enable the development of a talented pool of scientists, engineers, and innovators in Africa. This human capital is essential for driving innovation by applying scientific knowledge and skills to tackle complex problems.

Roles of Applied Sciences in Promoting Innovations

3. Technology Transfer and Adaptation:

Science facilitates the transfer and adaptation of technologies to address local needs.

Collaboration with international partners, research institutions, and industry enables African countries to access advanced technologies and adapt them to their specific contexts. This transfer and adaptation of technologies foster innovation by creating new applications, products, and services tailored to the African market.

4. Entrepreneurship and Start-up

Ecosystems: Science-based entrepreneurship is thriving in Africa, driven by innovative start-ups and entrepreneurial ventures.

Science provides the foundation for these enterprises by enabling the development of new

Roles of Applied Sciences in Promoting Innovations

5. Policy and Governance: Science plays a critical role in evidence-based policymaking and governance. Scientific research and data inform policy decisions, ensuring that innovation strategies are based on sound scientific evidence. This integration of science in policymaking promotes effective regulations, investment in research and development, and the creation of an enabling environment for innovation.

6. Collaboration and Networks: Science thrives on collaboration and networks. African scientists and innovators collaborate with international peers, institutions, and organizations to share knowledge, resources, and best practices. This collaboration fosters innovation by facilitating the exchange of ideas, cross-disciplinary approaches, and access to global expertise and markets.

Roles of Applied Sciences in Promoting Innovations

7. Sustainable Development and Social Impact:

Science plays a crucial role in promoting sustainable development and addressing societal challenges. By applying scientific principles, African innovators develop solutions that promote environmental sustainability, resilience, and social impact. Science-based innovations in renewable energy, sustainable agriculture, healthcare, and water management contribute to improving livelihoods, reducing poverty, and enhancing the well-being of communities.

8. Science Communication and Public

Engagement: Science communication plays a vital role in promoting innovation in Africa. Effective communication of scientific knowledge and breakthroughs raises awareness, builds public trust, and fosters a culture of innovation. Engaging the public, policymakers, and stakeholders in science-based discussions enhances the understanding and support for innovation, driving its adoption and impact.

Strategies for Empowering Applied Sciences in Africa to promote Innovations.

1. Increase Investment in Research and Development:

- African countries need to increase their investment in research and development (R&D).
- Governments, regional organizations, and international partners are prioritizing science and innovation as key drivers of economic growth and social development.
- The investment should aim to strengthen scientific infrastructure, support research institutions, and foster collaborations between academia, industry, and government.

Strategies for Empowering Applied Sciences in Africa to promote Innovations.

2. Strengthening Scientific Capacity:

- These initiatives contribute to building a skilled scientific workforce and promoting indigenous research and innovation.
- Efforts should be made to strengthen scientific capacity in Africa.
- Supports should be given to Universities and research institutions to expand their programs and facilities, attracting and retaining talented scientists and researchers.
- Scholarships, grants, and fellowships should be provided to support African scientists, enabling them to pursue advanced degrees and conduct cutting-edge research.

Strategies for Empowering Applied Sciences in Africa to promote Innovations.

3. Promote Collaboration and Networks:

- Collaboration and networking among African scientists and researchers should be promoted
- These collaborations enhance scientific output, facilitate technology transfer, and promote knowledge exchange.
- Platforms such as the African Union Scientific Research and Innovation Council (ARISIC), the AAU – African Research, Innovation and Development (AfRID) and the African Academy of Sciences (AAS) platforms

**Strategies for
Empowering
Applied Sciences
in Africa to
promote
Innovations.**

**4. Promote research that Addresses Societal Challenges to
make Impact**

- ❑ Need for more research that has direct social impact, improving the quality of life for African populations.

Strategies for Empowering Applied Sciences in Africa to promote Innovations.

5. **Recognize Indigenous Knowledge in Innovation:**

- Recognize the value of indigenous knowledge in innovation systems.
- Traditional knowledge, practices, and technologies needs to be integrated with modern scientific approaches, leading to hybrid solutions that are culturally relevant and sustainable.

Strategies for Empowering Applied Sciences in Africa to promote Innovations.

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6. Promote Science Communication and Public Engagement:

- We need to improve science communication and public engagement in Africa.
- Give support to Science journalists and communicators,
- Build Science centers, museums,
- Organize Innovation Fairs, science

Strategies for Empowering Applied Sciences in Africa to promote Innovations.

7. Policy, Data Management and Governance:

- Need to create policy frameworks that support innovation, technology transfer, and scientific collaboration.
- Develop Policy Data Units – for data on Innovation.
- incorporating scientific evidence into policy decisions



Thank You