

New Approaches for Funding Research and Innovation in Africa

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Structure of the Presentation

- The case for new approaches for funding research and innovation
- Problem statement and research questions
- New approaches in conceptual context
- Historical and contemporary context
- Research methodology
- Findings
- Key messages
- Recommendations

Why new approaches?

- **Societal development has many definitions** (Chambers, 1997; Hettne, 2009; Cowen and Shelton, 1996)
- **Or ... development as a system-wide manifestation of the way that people, firms, technologies and institutions interact with each other within the economic, social and political system** (Barder, 2012).
- **Research and innovation are a key driver of economic growth, sustainable development and societal prosperity** (Oyeyinka et al, 2018; Chataway et al., 2009; NACETEM, 2010; NEPAD, 2006)

Why new approaches?

- African countries have many economic development challenges and opportunities to deal with (Agenda 2063)
- New knowledge and innovations seen as key drivers in these
- These drivers need resources
- Different ways of funding have been deployed, but some shortcomings remain, with respect to, *inter alia*
 - **Consistency** of the funding
 - **Sufficiency** of the funding
 - **Relevance** of the fundingAffecting **impact** of the funding and actions funded

Why new approaches?

- Persistent funding shortcomings part of larger **global, national and sectoral structural and operational realities**
- Aim of this paper is to identify and analyse “new approaches, mechanisms, schemes or models for funding research and innovation in Africa”
- **Funding** – the actual money provided for a purpose, usually with no expectation to repay; while **financing** is money or capital provided, with a repayment expectation
- **Funding approaches** – broadly to denote the different ways, models, schemes, mechanisms or institutional arrangements to deal with funding challenges
- **Newness** necessary, but not sufficient
- We also explored **effectiveness** of the research and innovation funding approaches with respect to mutually reinforcing and complementary multiple impacts on the R&I value chain

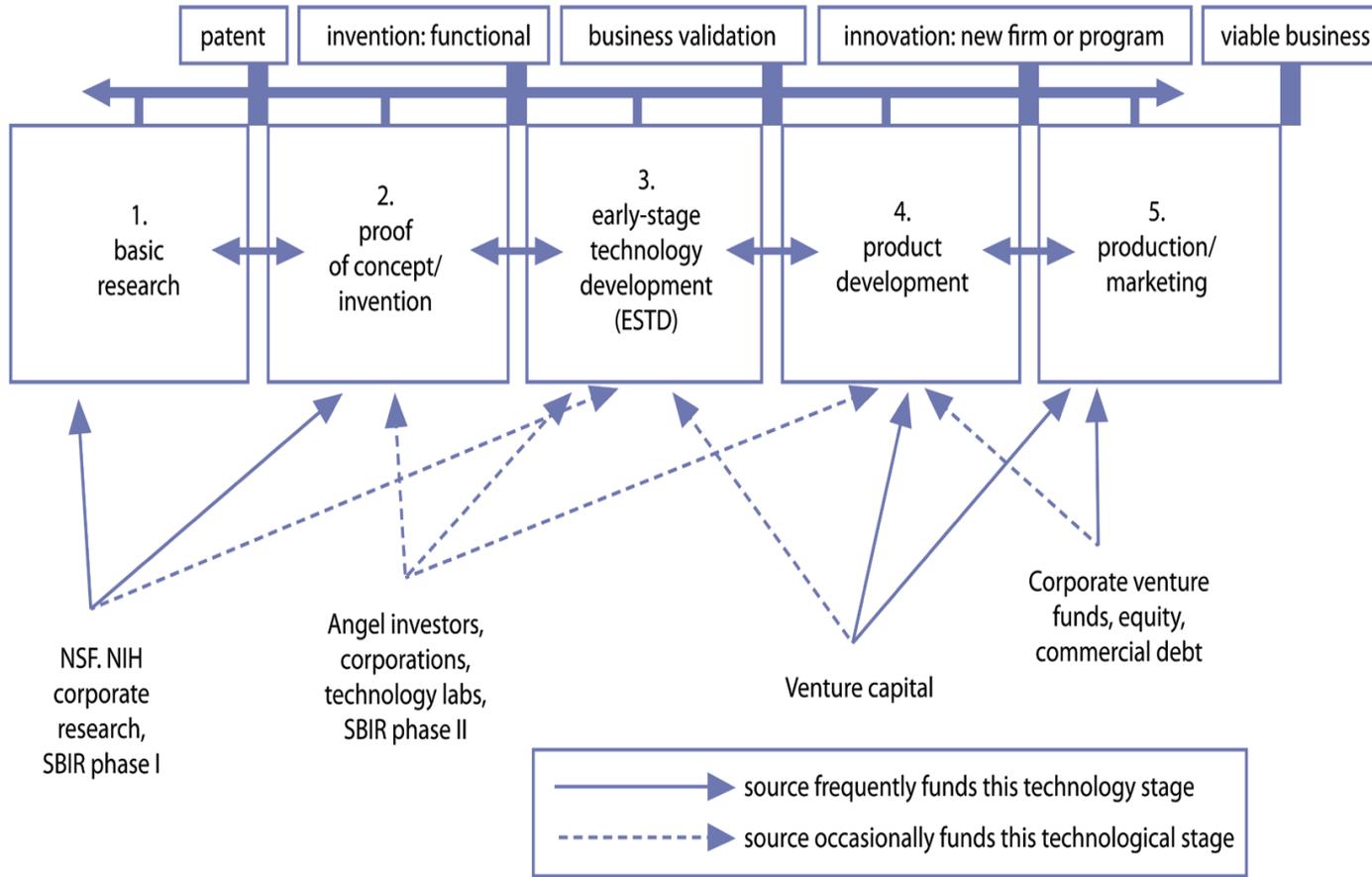
Conceptual context - research and innovation

- **Research** - the robust knowledge generation activities using the scientific method carried out in universities, research institutions as well as the private and public sector.
- **Innovation** as the introduction of new or significantly improved products (goods or services), processes, organizational methods, and marketing methods in internal business practices or in the open marketplace.
- Innovation as any **combination of activities or technologies** that breaks existing performance trade-offs in the attainment of an outcome, in a manner that expands the realm of the possible (Raynor, 2013).

Disruptive and Incremental Innovation

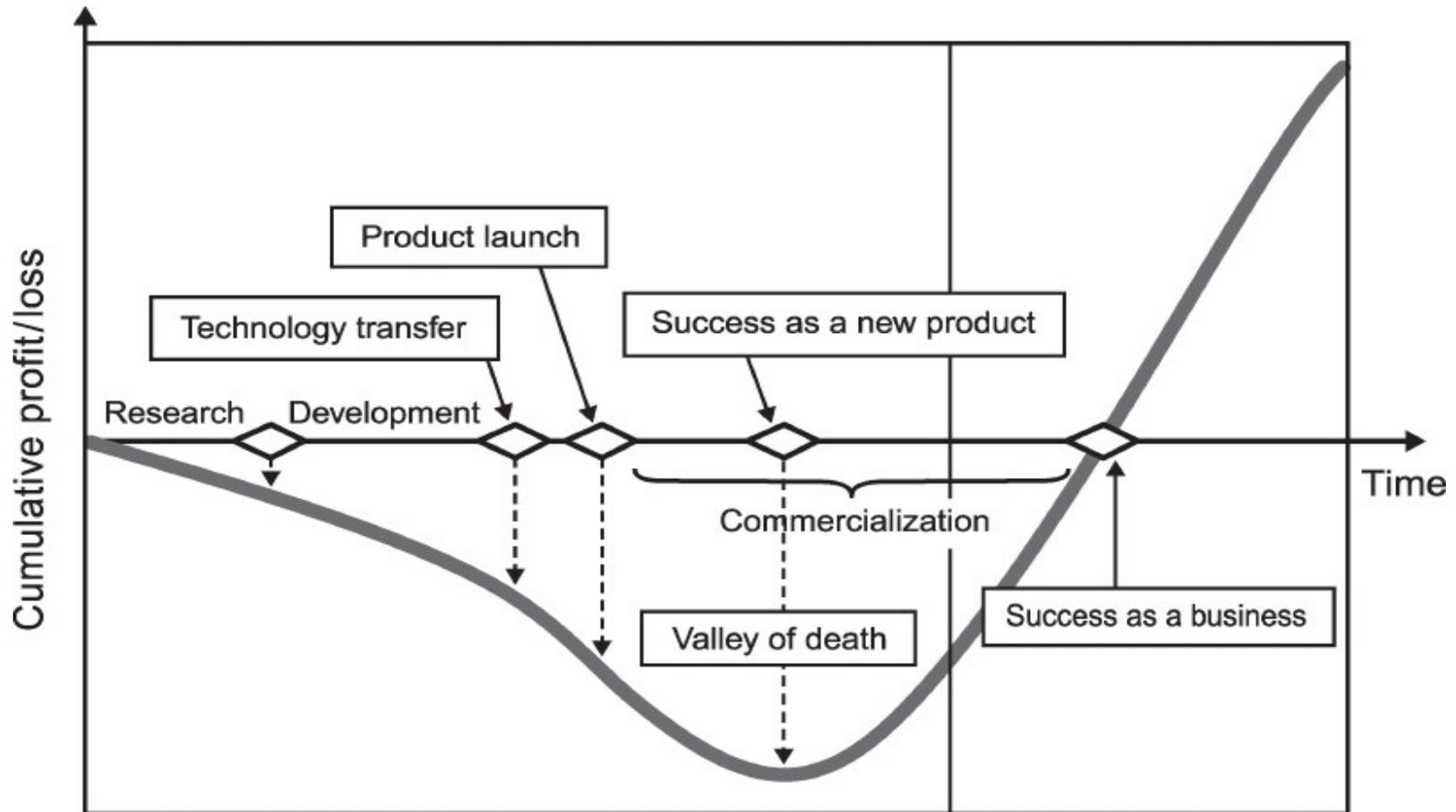
- **“Incremental innovation fits well with the current business model** of a firm. It generates competitive advantage and contributes to the economy through more efficient use of resources, or elimination of wasteful or environmentally damaging practices. It is likely to have a pre-existing regulatory framework in place, will not lead to sectoral transformations and is unlikely to lead to stakeholder or citizen concerns or opposition” (Tait et al, 2017)
- **“Disruptive innovation involves discontinuities in innovation pathways,** requires new areas of research and development, creation of new modes of production and new markets. It can lead to **sectoral transformations and the displacement of incumbent companies**, and the creation of entirely new sectors with significant societal and economic benefits. There may be no obvious regulatory precedent to govern potential human and environmental safety issues, in some cases it may lead to citizen and stakeholder concerns from an early stage of development. For a disruptive innovation, there may be no existing business model on which a company can build, and there may also be a need to create a new value chain, or to create a new role in an existing value chain” (Christensen et al, 1995).

Research and innovation continuum



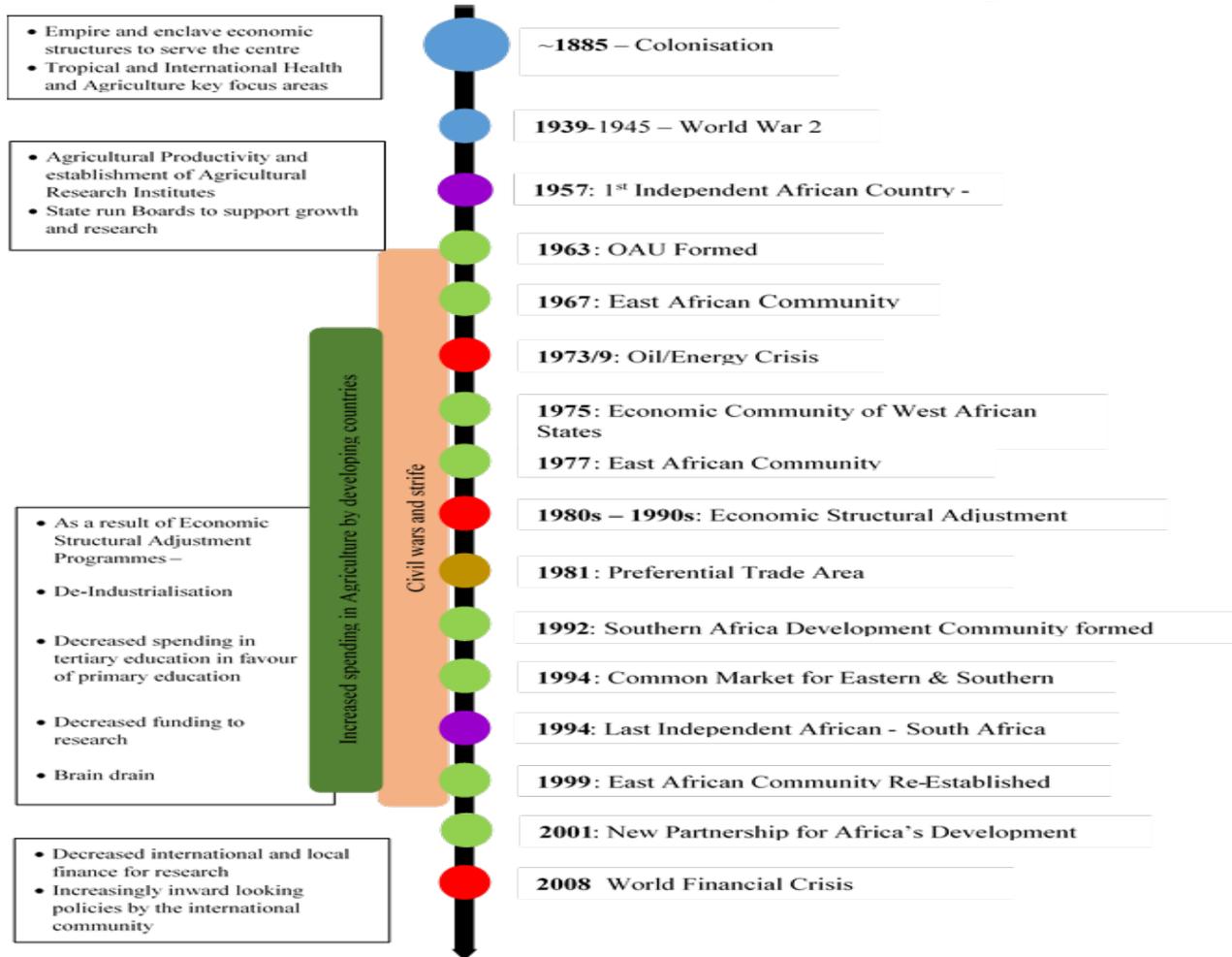
Adapted from: Branscomb, L.M. and P.E. Auerswald. *Between Invention and Innovation: An Analysis of Funding for Early-Stage Technology Development*, 2002.

Challenges of funding innovation



Source: Osawa and Mizaki (2006)

Historical and contemporary context

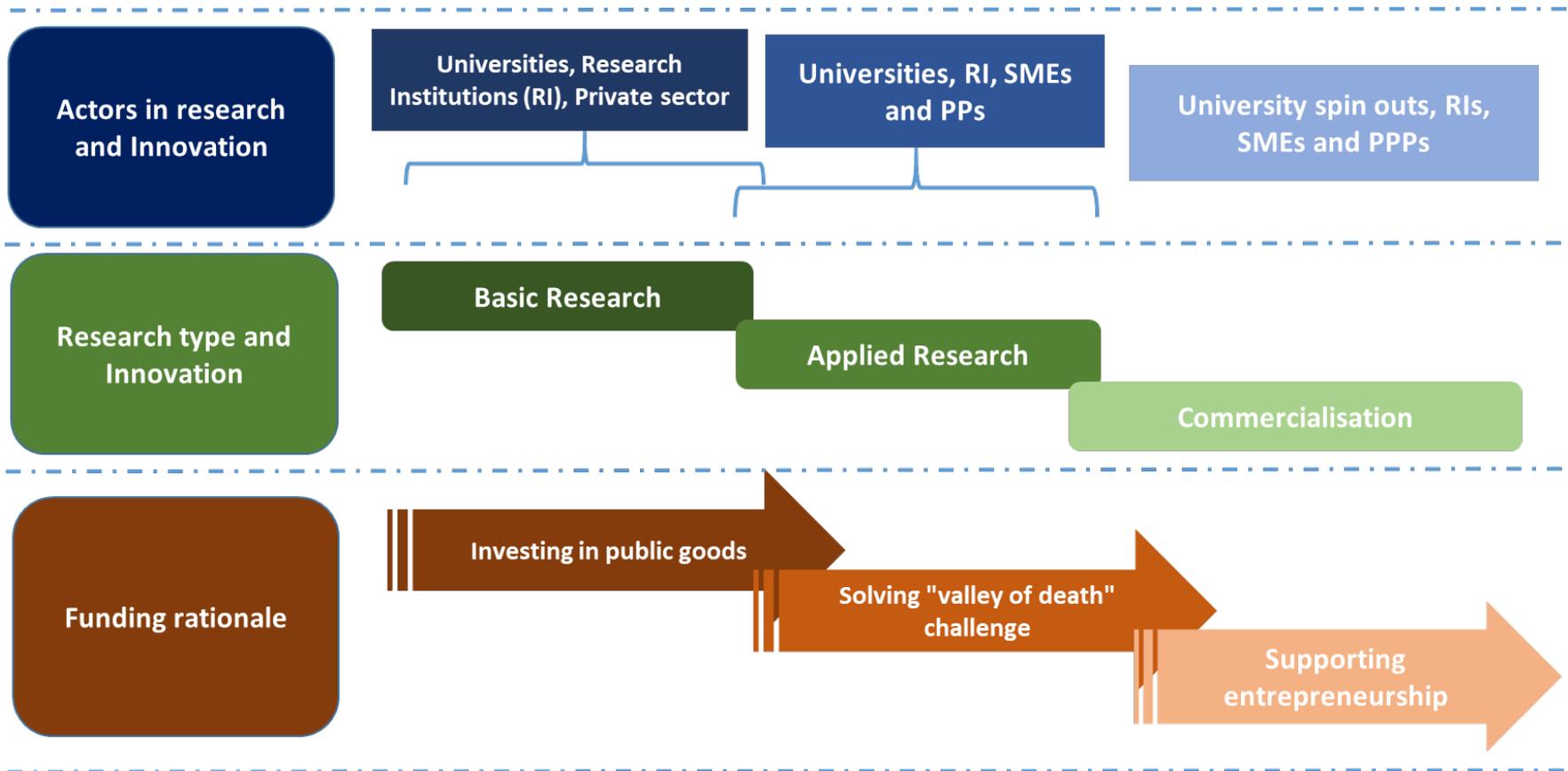


Source: Developed by authors using various sources including Mouton (2008), Waast and Krishna (2003) and government and regional economic communities' websites

Research questions

1. How **important** is the funding of research and innovation among African countries and what is the evidence to demonstrate the level of importance?
2. What are the **new and innovative** funding approaches (schemes, models and mechanisms) that have been applied across the world and what lessons could be drawn for African countries?
3. What **historical and current factors** facilitate or constrain the implementation of the funding approaches and how have/can the gains be enhanced or the challenges resolved?
4. What **institutional reforms** accompanied the new approaches and how could Africa re-position its own institutional architecture for enhanced research and innovation funding?
5. How are other **broader issues** pertinent to research and innovation broadly being taken into consideration towards more efficient and effective funding for research and innovation?

Conceptual Framework



Methodology

- Multi-method, multi-stage study, involving multiple countries
- **Stage one** involved collecting and analysing published and grey academic, policy and practice literature on research and innovation in Africa broadly, and funding models in particular.
- **Stage two** covered two related aspects – development of a semi-structured research and drawing up of a participants' list.
- A total of 60 participants were targeted, 15 of them being officials in science granting councils from SGCI countries (list provided by ATPS), 28 were from the UK regenerative medicine network, while 17 were from research organisations, funding agencies or policy bodies in Africa or elsewhere (key informants purposively targeted based on researchers' experience and literature reviews).
- **Stage three**, the research instrument was administered via email in all the cases, with varying response rates among the respondent clusters; 73.3% (**11/15**) for SGC respondents; 64.3% (**18/28**) for UK regenerative medicines respondents; and 35.3% (**6/17**) for academic, policy and practitioner, including private sector, respondents in Africa and elsewhere.

Methodology cntd

- In **stage 4**, data from the research instrument was collated, anonymised, aggregated and analysed using Thematic Analysis using a combination of themes drawn from literature and from the research findings.

Limitations

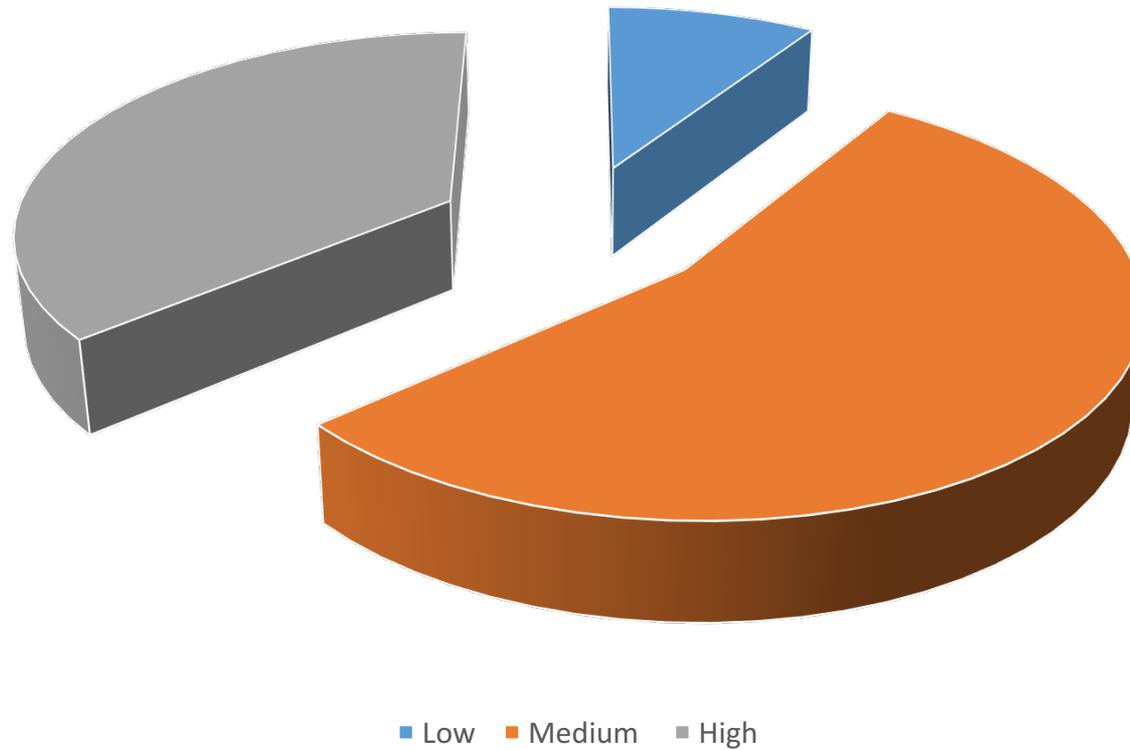
- Relatively low response rate among the **third category** respondents
- **Less detailed** responses from some respondents
- **Time**
- There were no other significant constraints or limitations to the research process.

Findings - summary

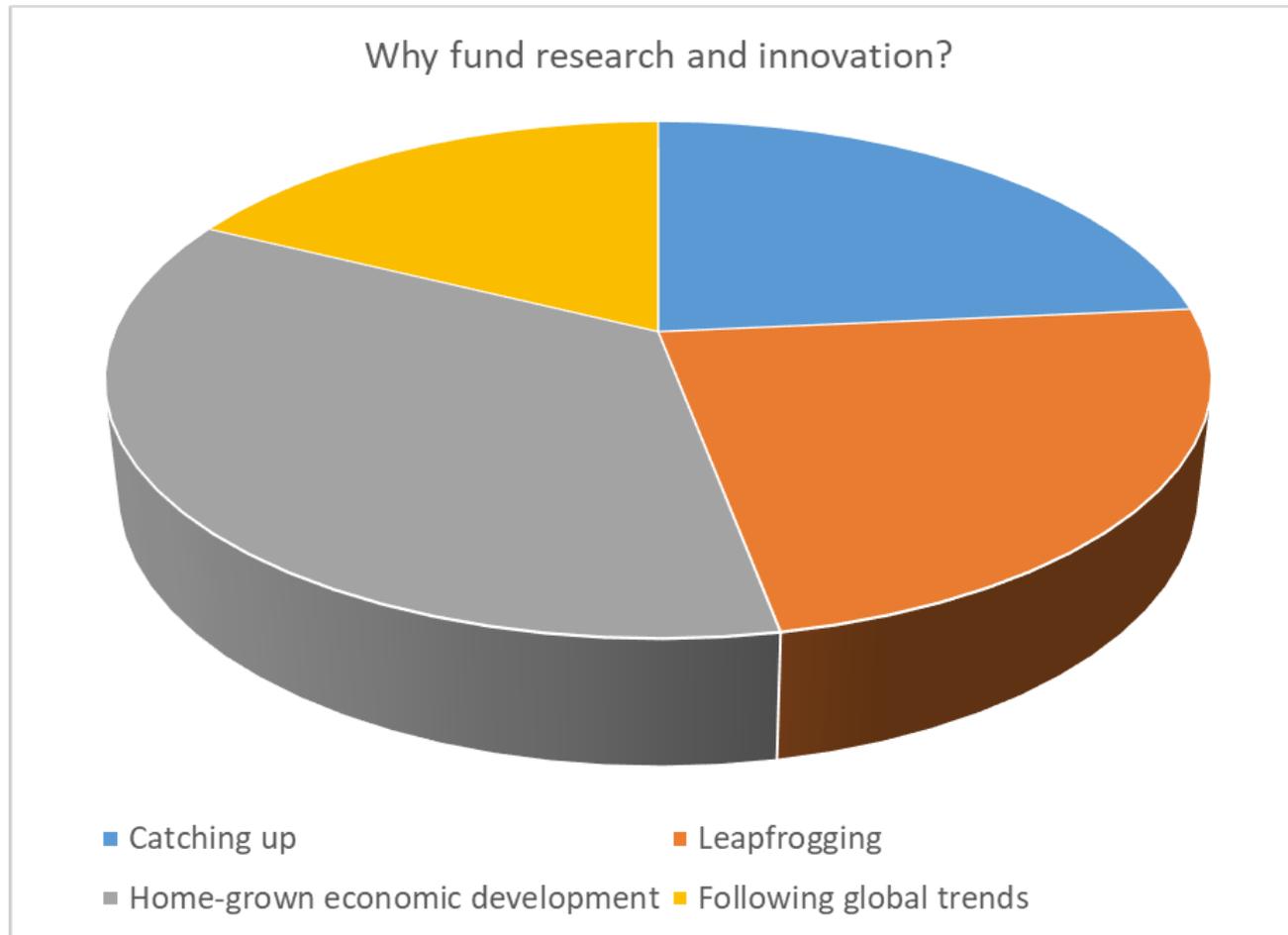
- Dynamic changes and complexity noted in the practice of research and innovation
- Ensuring context-driven, efficient and effective utilisation of scarce resources a high imperative
- Dynamic changes have entailed that new forms of collaboration are required not only among the key players around research and innovation, namely academia, industry/business and government, but with other players outside these sectors as well
- Not surprising therefore that the new approaches hinge on enhancing **partnerships**, **co-funding** and **multi-disciplinary approaches**

Importance of funding R&I – rated medium to high

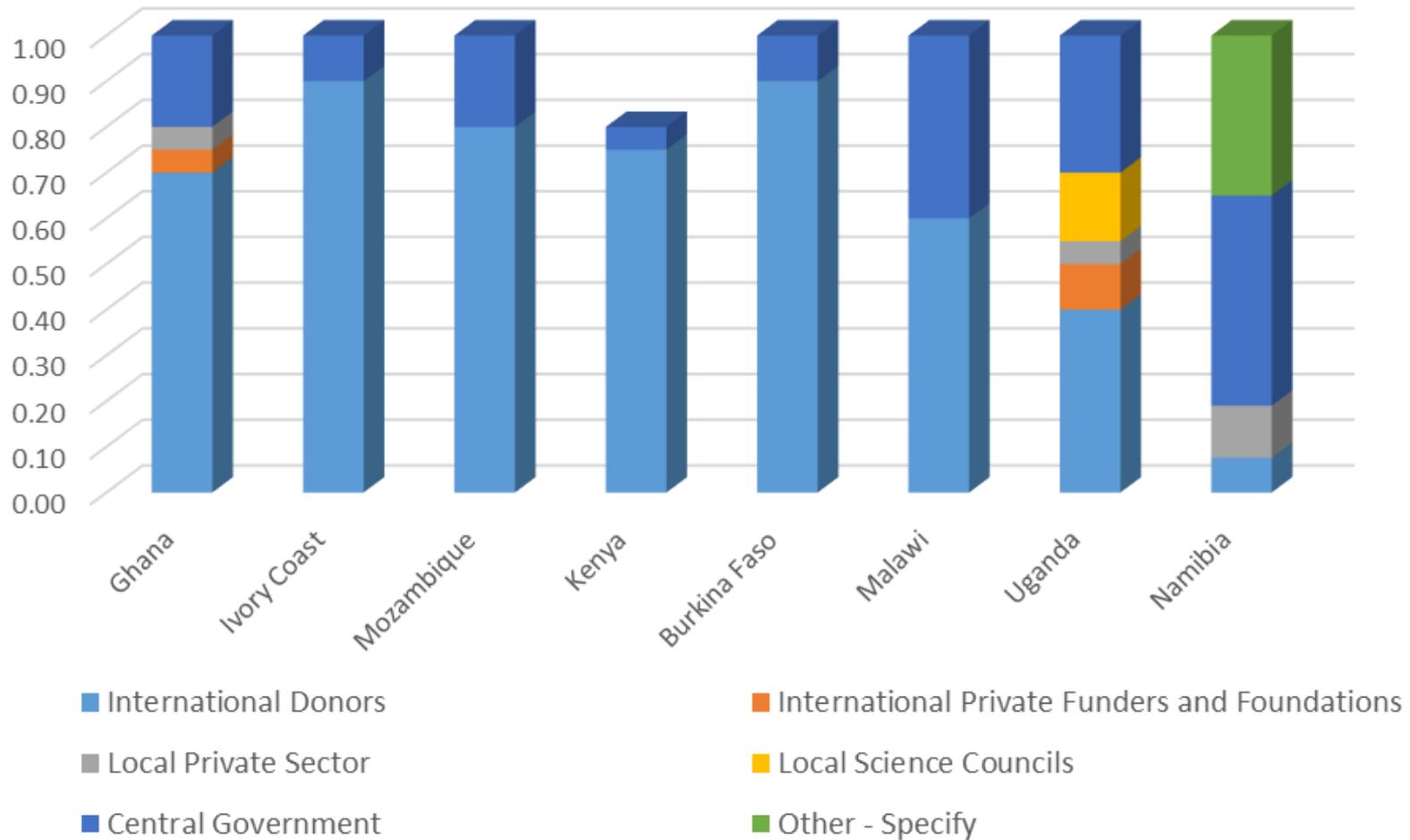
Importance Placed on Funding Research and Innovation



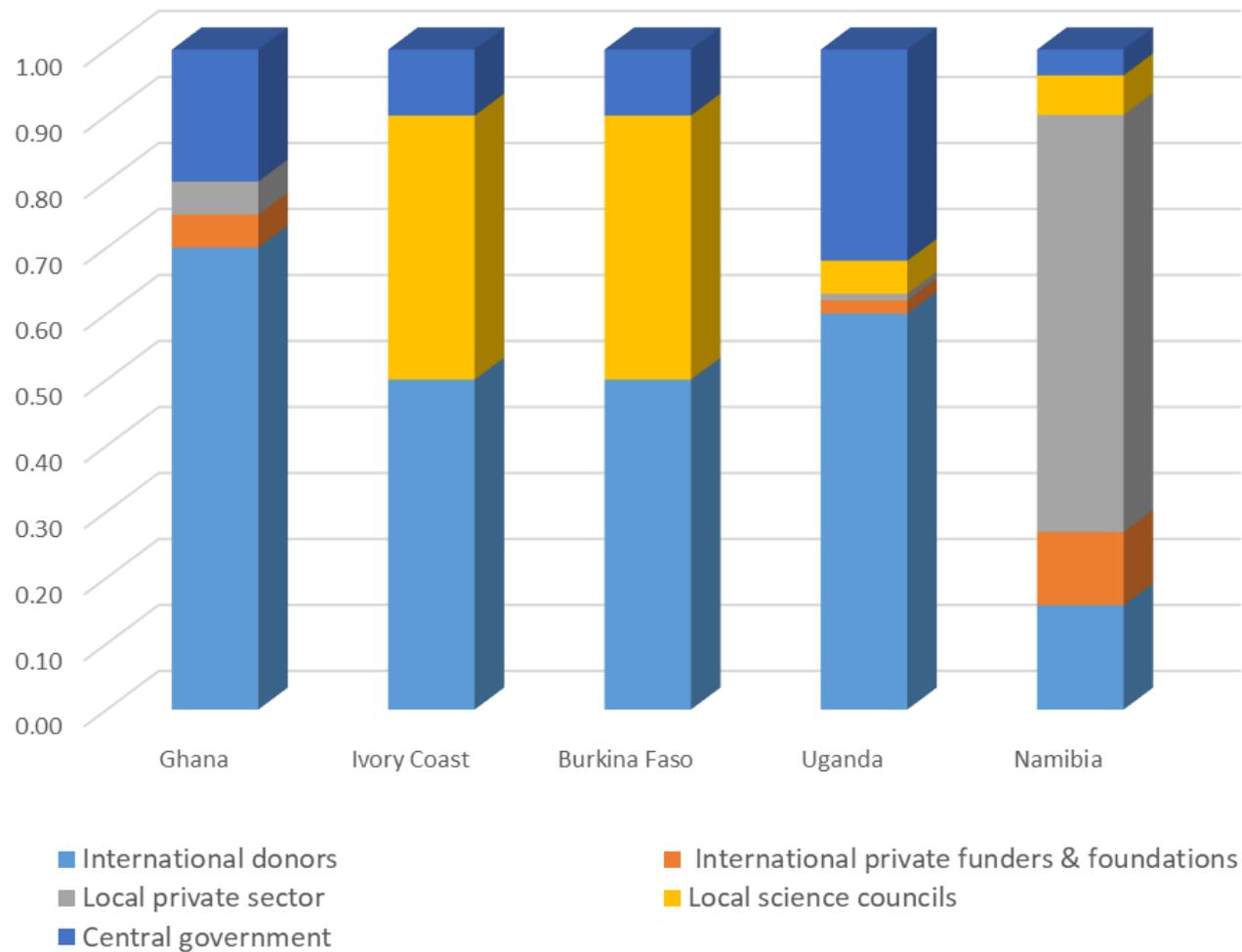
Why Fund Research and Innovation?



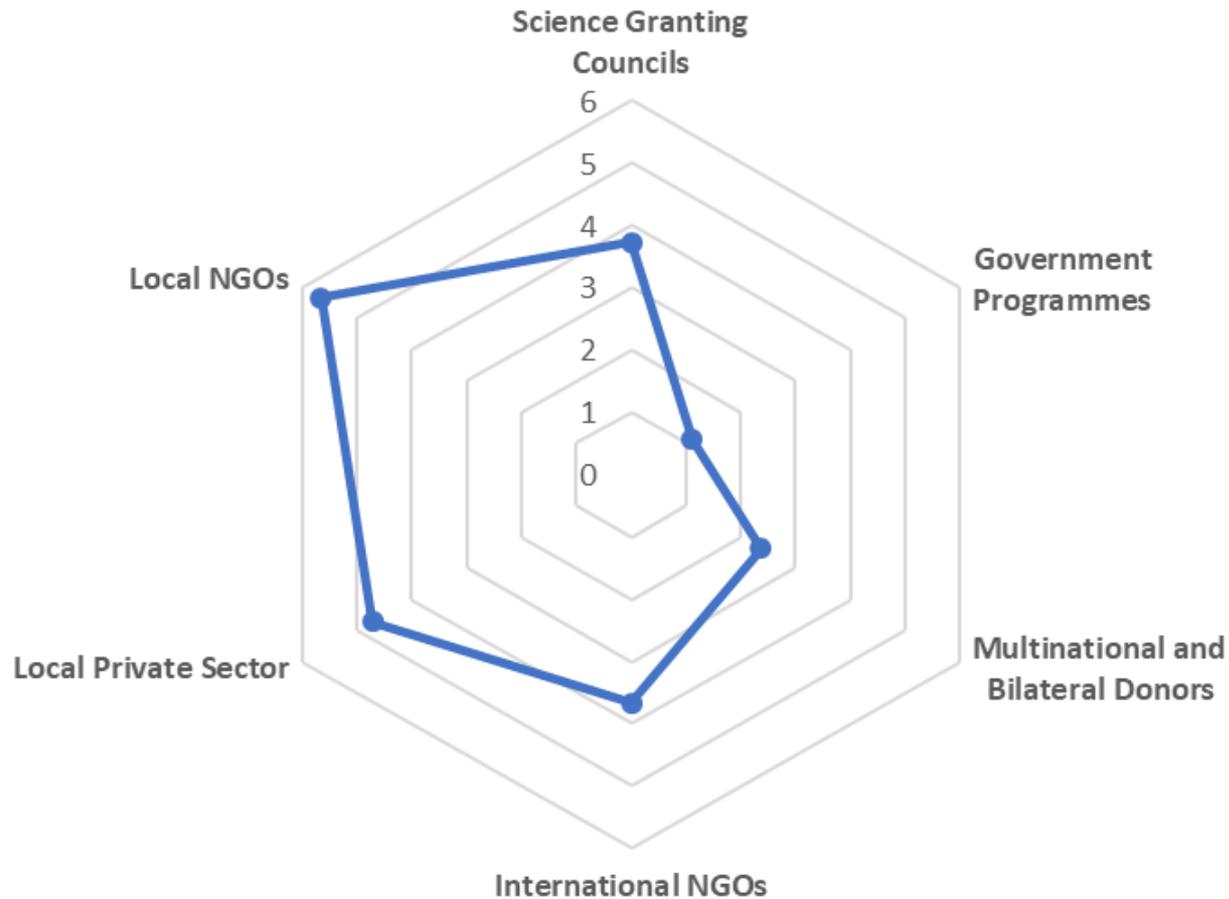
Historical Contribution to R&I Funding



Sources of Innovation Funding in last 5 Years

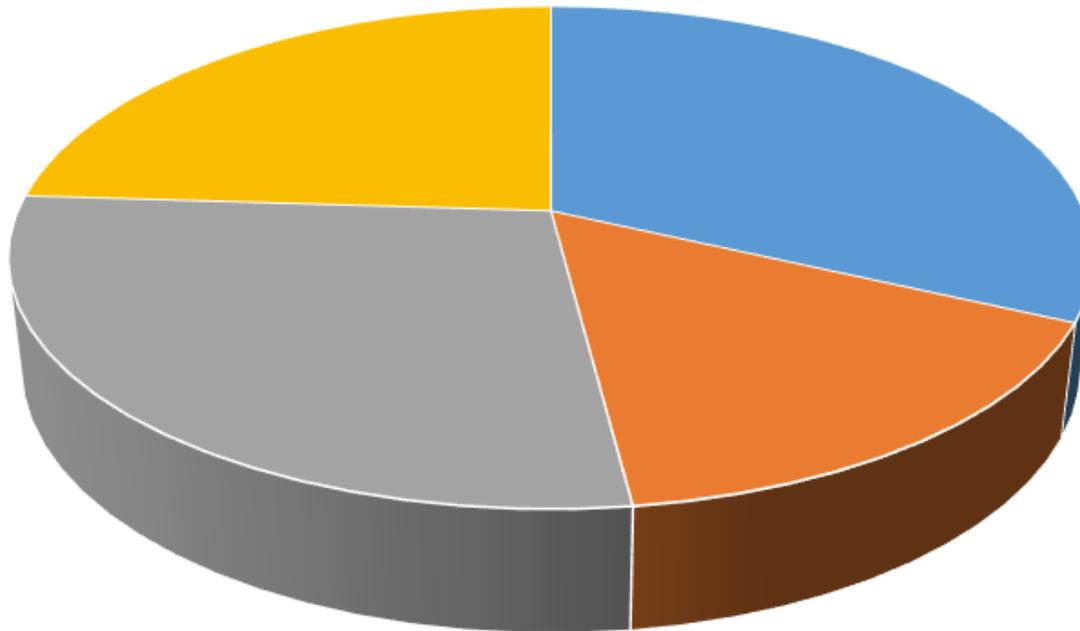


Current Sources of Finance for Research and Innovation



Key: 1 is most important and 7 is least important. The closer to 1 the more important the source of finance

Challenges faced by organisations funding research and innovation



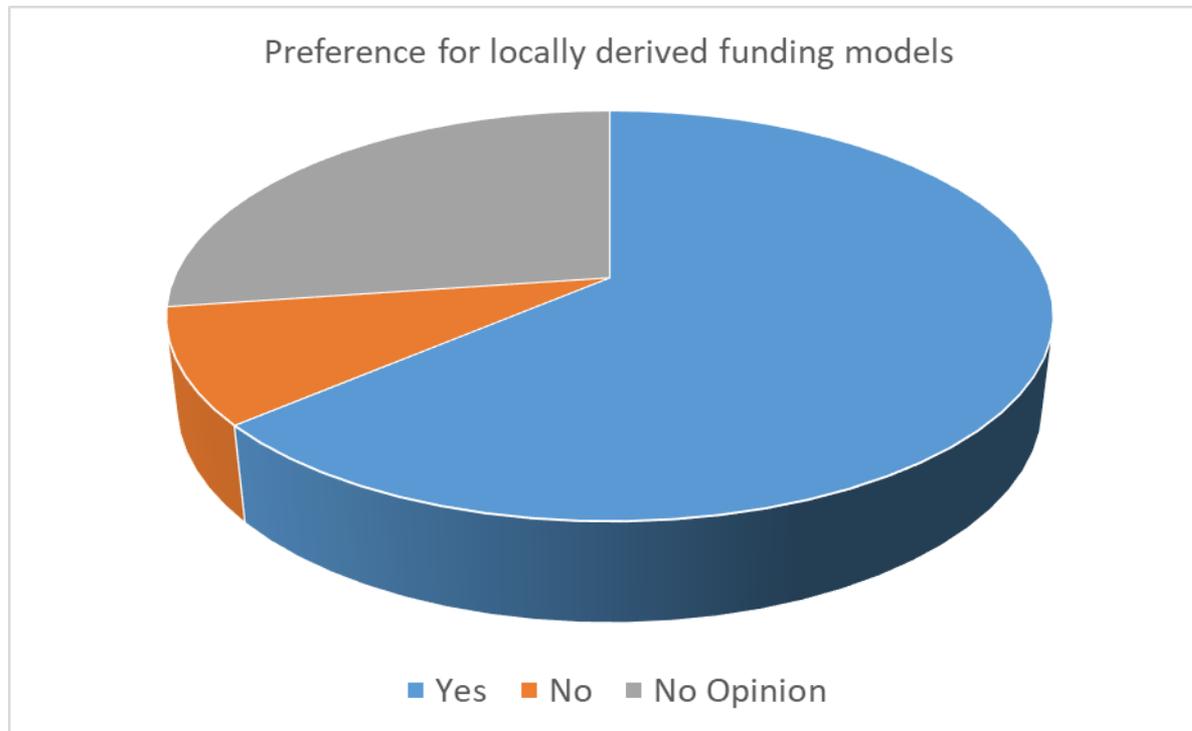
■ Adequacy of funding

■ Compliance with funding requirements

■ Timely availability of funding

■ Seeing benefits of funding

Preference for local funding – for sake of sustainable funding



Old and **New** Funding Models

Funder	What is funded	Funding Mechanism	Rationale
Government	Basic Research Applied Research Translational Research Commercialisation Entrepreneurship (SMEs)	Grants and grand challenges Public institution co-funding on interdisciplinary and multidisciplinary programmes Innovation brokerage Formation of national research funding consortia Co-funding with SGCI in the Region Investment in high-end research programmes, incl. Chairs (240 in SA) and Centres of Excellence, with 15-year funding horizons	Traditionally governments have funded basic, applied and translational research as investment in economic growth and development. These are deemed public goods.
Private Sector	Applied Research Commercialisation	Retained profits and borrowing for capital markets Corporate Social Responsibility	Profit driven motives
Public Private Partnerships	Applied Research Commercialisation	Equity and project funding	Solving market failure issues
Impact Investors	Commercialisation	Equity or debt	Solving market failure with a focus on social goods

Funder	What is funded	Funding Mechanism	Rationale
Non-Governmental Organisations	Commercialisation	Equity or debt	Solving market failure
Capital Markets	Commercialisation	Equity	Attractive return on investment in the venture
Crowdfunding	Research and commercialisation	Equity	Social investment because of market failure
Local and International collaborative research grants	Research	Grants	Scarcity of local funding for research in many African nations
Private sector	Take-over of applied research after proof of concept, safety and efficacy	Patent buyouts	Innovators either selling off patents to fund more innovation or researchers not interested in entrepreneurship
Charities	Basic and applied research as well as clinical trials	Grants and co-funding academia and SMEs working neglected areas	These tend to be niche areas such as rare diseases where market failure is common
Cities or regions	Land, labour and utilities	Grants given as incentives to firms that relocate to a city or region targeting industrial development	Attracting particular industrial activities to a particular city or region to boost economic activity and contribute to rejuvenation of de-industrialised places

Examples of Innovative Funding Models

	Funding model/ mechanism	Features/characteristics of model	Countries adopted	Impacts recorded so far
1	Patent buyouts		Zambia	Strengthening research programmes and research dissemination
2	Local and international collaborative research grants		Zambia, Ivory Coast, Malawi	Strengthening research dissemination
3	Rewards and incentives for specific outcomes		Zambia, Ghana	Enhancing research expertise and research dissemination
4	Research infrastructure fund	Fund for renewal, replacement and acquisition of essential national research infrastructure	South Africa	Improvement of research infrastructure
5	Public-Private Partnerships	Focused particularly supporting human capital development for R&I activities	Mozambique and South Africa	Strengthening of research and innovation expertise
6	Investment in high-end research programmes	15-year funding horizons for research chairs and centres of excellence	South Africa	240 research chairs in post
7	Multi-institutional co-funding for inter- and multidisciplinary research		Kenya and Zambia	Strengthening research and innovation programmes
8	International strategic research partnerships		Kenya, South Africa	Strengthening research and innovation institutions and policy
9	Human capital development pipeline	Funding for emerging and established researchers	South Africa	Enhancement and retention of research and innovation expertise

UK Regen. Med - Types of funding, who uses them and why

Type of Funds	Who uses them and why
Grants	These funds are available to universities, research institutions and private firms. There are specific challenge funds that especially encourage collaborative partnerships between industry and academia
Innovation Challenge Funds	Firms at various stages of innovation translation compete for funds to move them to the next level on the value chain
Regional Regeneration Funds	Firms located in old industrial cities are promised to be paid a flat amount for each person they employ. One firm used this approach to raise over £100 000 to fund its early operations because it is not yet generating revenue
Equity Markets	Firms with promissory medical technologies to meet unmet needs such as cancer therapy. Investors fund the early stages based on the promise to be paid out when an initial private offering is made
Consultancy Income	Early movers who have become experts of the regulatory process or optimisation of production processes or assaying methods use their skills as consultants for late comers. They then use the consultancy fees to finance innovation in their firms.
Contract Manufacturing	Firms that had invested in cGMP (current Good Manufacturing Practice) contract manufacture for firms which have not yet constructed their own manufacturing plants or are at the early stages of proof of concept. The income from contract manufacturing is used to finance research, development and translational activities.
Early stage exit through sell off of IP rights to large firms	These are usually researchers with no interest in entrepreneurship who exit by selling off IP rights after proof of concept, safety and efficacy for their therapies

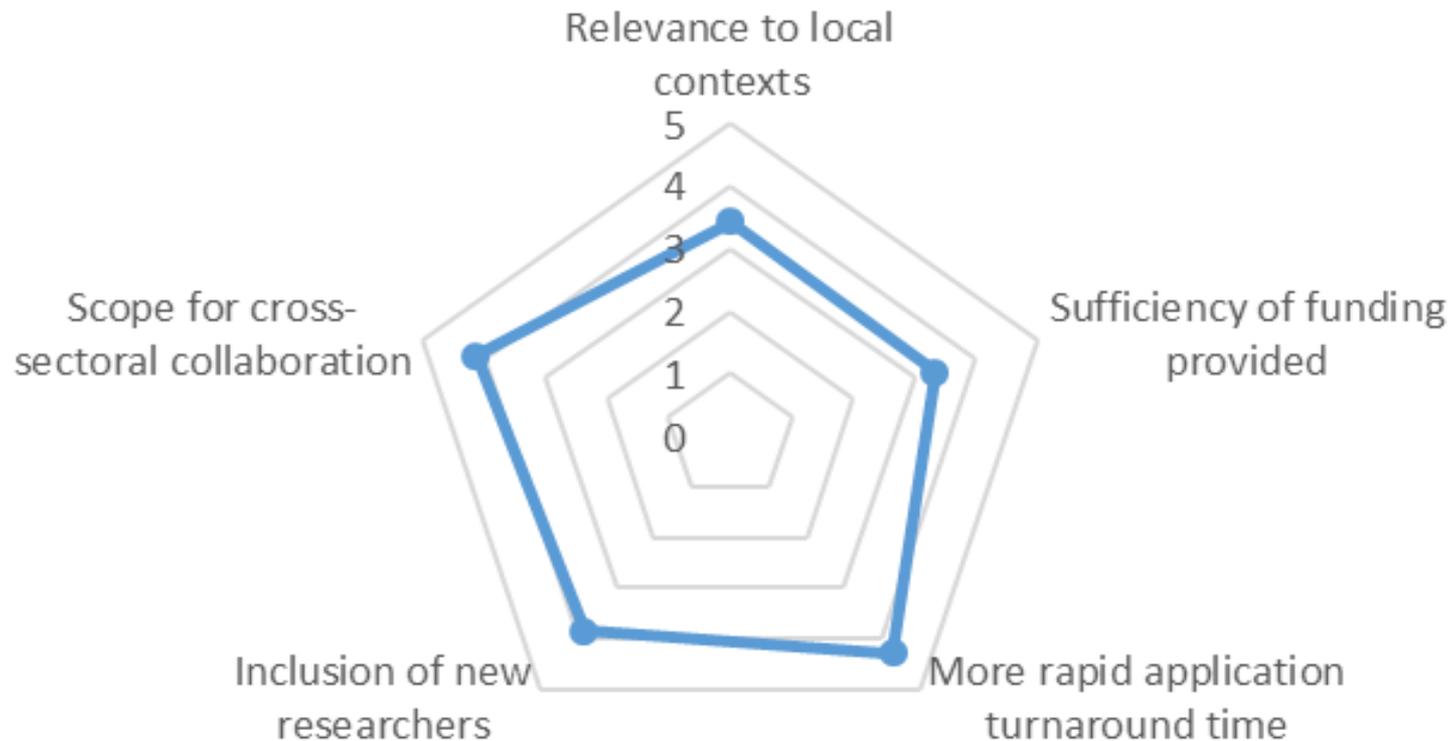
Other funding case studies

- TIBA (Tackling Infection to Benefit Africa) Research Consortium – **collaboration** - “shifting the centre of gravity to African researchers”
- UK Regenerative Medicine: Business models and financing mechanisms – **mixed approaches** for funding SMES – **grants, contracts**
- Cell and Gene Therapy Catapult – **De-risking early stages of innovative technologies**
- Innovative procurement in the pharmaceutical sector – **partnership - procurement as a industry policy tool**
- Chilecon Valley – enhancing the Chilean entrepreneurial and start-up culture – pooled funds and co-funding for incubators
- African Network for Drugs and Diagnostics Innovation (ANDI) - **Centres of excellence, pan-African networking and harnessing global resources**

Other funding case studies

- African Agricultural Technology Foundation (AATF) - **Facilitating public private partnerships, harnessing local and global intellectual and technological resources to address local problems**
- Grant-making for transformative agents – AGRA – Alliance for a Green Revolution in Africa
- **Local and cross-national collaborative research and innovation** – NEPAD SANBio
- Academia and supranational agency partnership – (AESAs) Alliance for Accelerating Excellence in Science in Africa

Advantages of new funding models



Factors facilitating or constraining the implementation of funding approaches

Facilitators

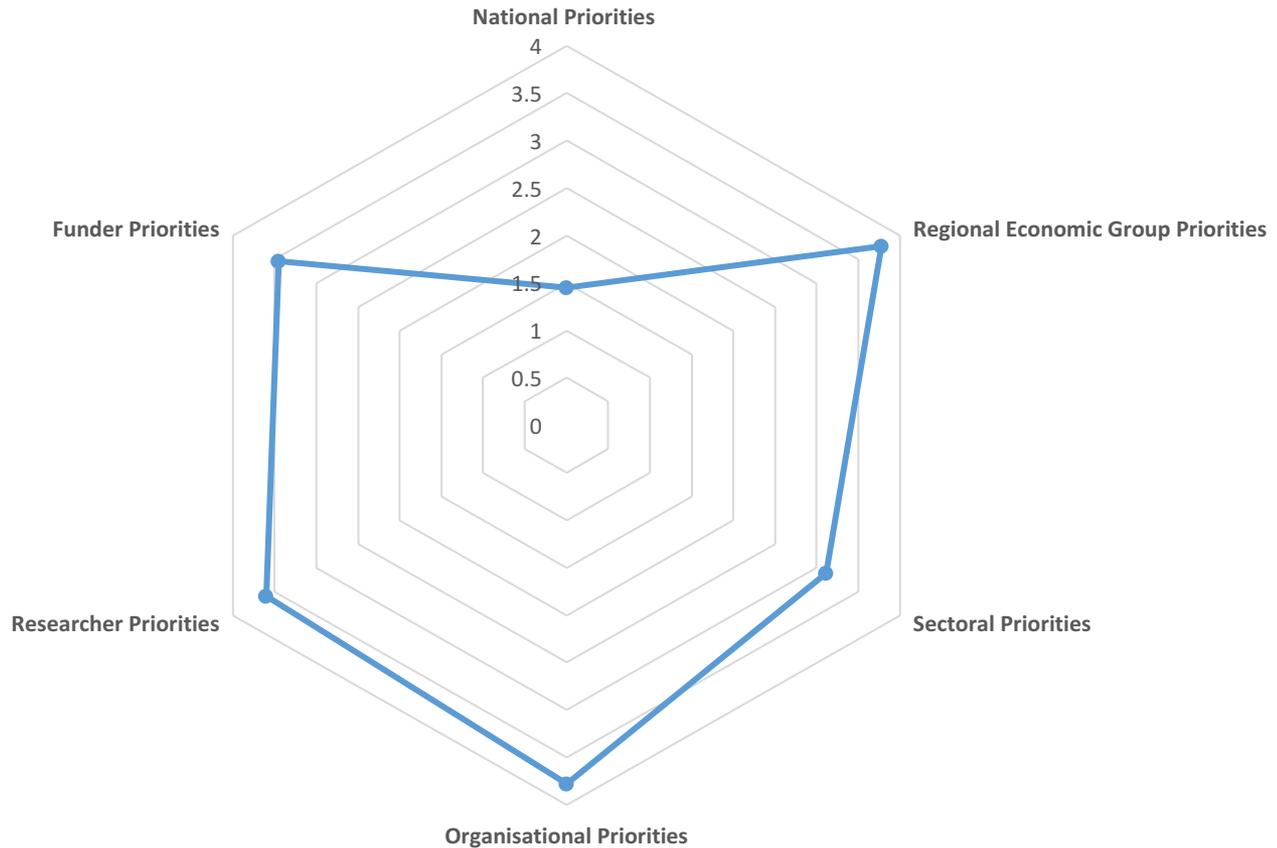
- Harmony with global, continental and national agendas
- Increasing political will
- Increasing access to knowledge resources

Constrainers

- limited government financial resources,
- unfavourable institutional traditions,
- policy incoherence across sectors,
- mismatch between research priorities and developmental challenges,
- lack of long-term policy planning,
- rapid technological changes
- and poor strategic partnership choices

Reforms that accompanied the new approaches

Important Priorities Driving Funding for Research and Innovation



Reforms that accompanied the new approaches

- Focus on responsibility and assured output (Kenya)
- Emphasis on international competitiveness, consideration of transdisciplinary, multidisciplinary and interdisciplinary approaches;
- Greater science-policy linkages (South Africa)
- Ensuring enhancement of human and societal benefits (Namibia)
- Learning from the past (Malawi), including potential to revive old models

Broader issues pertinent to research and innovation

- Some actors said to be too dominant in discourses, while others were missing
- Weak links with informal researchers and innovators
- Insufficient translation of political will to political action
- How to cushion R&I agendas across political and policy regimes

Conclusions

- Overarching key message from this study is on **consistency, sufficiency and relevance** of funding
- **A wide range of capabilities and funding options** is required for different stages of the research and innovation value chain
- A number of dynamic new funding models have been developed, adopted and deployed in countries and sectors to deal with the **realities of decreasing traditional funding for research** and innovation sources.
- New and innovative funding approaches have been developed emphasizing **partnerships, co-funding and multi-disciplinary arrangements**

Conclusions

- A number of **historical and current factors** facilitate or constrain the implementation of the funding approaches
- New funding approaches were said to have brought more **standardisation of research applications, better resource tracking and accountability** among recipients and **stronger research-policy institutions**
- There are numerous **context-specific and context-transcending technical, social, political and economic issues** that stakeholders in the research and innovation ecosystem need to be aware of and to take into consideration in order to optimise use of research and innovation resources.

Recommendations – AU/RECs/National Govts

Increasing, sustaining and operationalising political will

1. Funding commitment by African Union and RECs

There is need for committed funding for continental and regional programmes which such as Agenda2063 and STISA2024

2. Honouring 1% GDP to STI commitment by National governments

- Government funding is trusted and strategic. National governments need to explore innovative ways to expedite meeting and sustaining the 1% commitment
- Beyond tactical addressing of current socio-economic challenges, African governments need to develop unifying long-range, yet operable ideologies on R&I

Recommendations – SGCs

1. Generate and document evidence of R&I impact

As part of their mandate to support and manage research programmes, SGCs should assist researchers to generate research and innovation impact evidence and sustained relevance which will result in political will and commitment to funding research and innovation.

2. Map out research and innovation ecosystems

As part of their objective of strengthening research and evidence-based policies, SGCs should lead processes of mapping out different stages of the research and innovation value chain, for the purposes of defining research and innovation policy objectives and identifying appropriate approaches for funding research and innovation

3. Leadership and oversight role

Access to and deployment of effective approaches for funding research and innovation require strong leadership and oversight from governments and SGCs, especially with respect to identifying and balancing the disparate requirements of different sectors and areas of application with their points of commonality.

Recommendations – private and non-profit sectors

1. Increase levels and relevance of funding and activities

Work with national and local governments, as well as academia in co-designing policies and R&I responses that are aligned to sectoral and national developmental objectives

2. **Harness and leverage financial resources and partnership models** at their disposal for strengthening sectoral and national research and innovation ecosystems

Recommendations – development partners

1. Support countries to reconfigure the R&I systems

Leveraging their access to global knowledge resources, development partners should help countries develop or reconfigure their STI policies to be not only forward-looking and agile, but also how they influence funding approaches and other interventions towards strategic goals, and **stimulate demand for** research and innovation

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- Forum participants

merci beaucoup

About UCL STEaPP

