

Financing public universities and research in sub-Saharan Africa: Challenges and prospects in the context of Sustainable Development Goals (SDGs)

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Abstract

Public universities in Africa (which are essentially knowledge generating organisations by nature) have a strategic role to play in the implementation and achievement of Sustainable Development Goals (SDGs) through scientific research, teaching and community service. However, African public universities role in the achievement of SDGs is constrained by inadequate funding by their respective national governments, particularly for research and development (R&D). Inadequate funding for R&D activities in African public universities limits their capacity to undertake, publish scholarly and promote uptake of research relevant to attainment of SDGs. This paper reviews various financing modalities currently being used by African public universities, pointing out some limitations inherent in the financing modalities and proposes some innovative and eclectic financing modalities to enable African public universities effectively participate in the implementation of SDGs. The thesis of the paper is that current modalities of financing public universities have shortcomings which constrain their capacity to effectively participate in the implementation of SDGs and therefore, new financing modalities are urgently required. The new models are deemed to serve as a good compliment to correct modalities of financing public universities in Africa. These include existing and developed modalities such as Government funding, development partners support, cost-sharing, that have been implemented for several decades now; as well as emerging approaches such as a) performance-based funding; b) reasearch performance-based funding; and c) market model.

Key words: Financing, perfomance-based funding, public universities, sustainable development goals (SDGs), sub-Saharan Africa

Résumé

Les universités publiques africaines (qui sont essentiellement par nature des organisations de formation) ont un rôle stratégique à jouer dans la réalisation des objectifs de développement durable (ODDs), à travers la recherche scientifique, l'enseignement et les services communautaires. Cependant, le rôle de ces universités dans la réalisation des ODDs est contraint à un financement non adéquat de la part des gouvernements, particulièrement en ce qui concerne la recherche et le développement. Un financement non adéquat pour les activités de recherche et de développement dans les universités publiques africaines limite leur capacité à entreprendre et publier des recherches scientifiques importantes pour les ODDs. Le présent document a revu les différentes modalités de

financement couramment utilisées dans les universités africaines publiques, montrant quelques limitations liées aux modalités de financement, et a proposé quelques modalités de financement innovantes permettant à ces universités de participer de façon efficace à la réalisation des ODDs. L'avis dans ce document est que les modalités courantes de financement dans les universités publiques présentent des défauts contraignant leur capacité à participer efficacement à la réalisation des ODDs, et par conséquent de nouvelles modalités de financement sont urgemment requises.

Mot clés: Universités publiques africaines, financement, Objectifs de développement durable

Introduction

'Higher education institutions in sub Saharan Africa are the most financially challenged in the world' (Teferra, 2014).

The above quotation sums the state of funding of African public universities. African universities (due to their nature of being knowledge organizations) have a strategic and special role to play in the implementation and achievement of Sustainable Development Goals (SDGs) through scientific research (knowledge production and dissemination), teaching, community outreach and training of the human resource required to attain SDGs in the continent. However, their role in the achievement of SDGs is compromised or being constrained by inadequate funding of the institutions, particularly inadequate funding for research and development (R&D) which are critical in the implementation and achievement of SDGs. Without concerted efforts by African governments to strategically invest in R&D in African public universities, the contribution of African universities to the achievement of SDGs will remain minimal.

Available research and documentary evidences show that generally government funding of African public universities has been declining leading to number of challenges such as: shortage of faculty, teaching and learning resources and generally poor working conditions which have pushed some senior members of the faculty (senior researchers and professors) outside universities in search of greener pastures. Emigration of senior researchers and professors from African public universities has lowered the research capacity of these institutions and their ability to expand postgraduate education particularly at the doctoral level. Invariably this has led to the low production of PhD qualified faculty to serve universities and the wider development sector in the continent. Inadequate funding and/or financing public universities in Africa and related problems (such as shortage of academic staff with doctorates) make it difficult for African public universities to effectively implement or participate in the implementation of SDGs because of limited capacity to undertake and publish scholarly research relevant to SDGs. Declining funding of African public universities has 'left many universities and their capacity to undertake scientific research in a very precarious position' (Mouton, 2010).

Under funding of public universities in Africa has also compelled these critical institutions to adopt various strategies to financially survive; some of the strategies have been counterproductive to their core missions and to the implementation of SDGs. As a part of survival strategies, African public universities have also changed their governance structures and transformed themselves into business-like corporations—the so-called entrepreneurial universities. National or development universities aligned to nations' development agenda and priorities common in post-independence Africa have been replaced by entrepreneurial/commercial universities, at times undertaking activities unrelated to their core missions and functions. The entrepreneurial university is logically a byproduct of inadequate funding of African public universities by governments.

Research evidence also shows that African governments invest very little in R & D in African public universities resulting into low research productivity. As a result of African governments' low investment in research in public universities, the majority of research in public universities is funded by international agencies and donor organizations. Findings from Otieno and Obamba (2013) revealed that the majority of African public universities and research institutes depended largely on declining public research subsidies and unsustainable donor support resulting into crippled research and innovation systems already facing severe financial deficit and researchers' lack of capacity to formulate and set their own research agendas related to national development goals (some of these aligned to SDGs). In Tanzania, UDSM (2015) research policy also acknowledges low level of research findings leading to weak infrastructure and facilities and calls for more government investment in research. Furthermore, research evidences also show that due to low investment in public universities in general and in R&D in particular, sub Saharan African universities, except for some universities in South Africa, rank among the worlds lowest in terms of research outputs. Africa has the lowest share of world researchers per million inhabitants (see Table 1). Although the African Union Commission (AUC) committed each member to spend 1% of the GDP on R&D, available evidence show that the majority of African countries except countries with stronger economies such as South Africa spend less than 1% of their GDP on R&D. Table 2 shows expenditure for R&D as % of GDP for selected African countries (2005-2014). Low expenditures/investment in R & D implies that African public universities cannot pursue basic and applied research related to the achievement of SDGs.

Another consequence of under-funding of African (public) universities with implication to SDGs is low enrolment ratios in universities. Low enrolment ratios in universities imply limited capacity for public universities to train critical human resources required for the implementation of SDGs. African public universities are unable to expand student enrolments because of limited teaching and learning infrastructures, as a result of inadequate funding. In 2012, higher education enrolment ratio in Sub Saharan Africa was lowest compared to other regions of the world (see Table 3). Low enrolment ratios in higher education in sub-Saharan Africa have negative implications on higher education institutions' capacity to participate in the implementation of SDGs. Low enrolment in African higher education as a consequence of low levels of funding and investment in higher education by governments

was internationally acknowledged as a challenge at the The African Higher Education Summit in 2015 in Senegal. The Summit, among other issues, proposed an action plan to raise higher education enrolment ratios to 50% by 2063.

Table 1. Researchers by Million Inhabitants by Region/Countries, 2011

Region	Researchers per million inhabitants
Africa	144
Other Sub Saharan African Countries	50
USA	4,673
North America	4,653
United Kingdom	3,947
Asia	660
China	863
Europe	2,691
Japan	5,180

Source: Adapted from UNESCO Institute for Statistics Estimates, December 2011

Table 2. R & D expenditures as % of GDP for selected African and other countries, 2005-2015

African countries	Expenditure for R&D as % GDP (2005-2015)	Other countries	Expenditures for R&D as % of GDP (2005-2015)
Burundi	0.12	China	2.05
Kenya	0.79	USA	2.73
Rwanda	(NA)	Japan	3.58
Tanzania	0.53	Korea, R	4.29
Uganda	0.48	Malaysia	1.26
DR Congo	0.08	India	0.82
Mozambique	0.42	Russia	1.19
Namibia	0.14	Germany	2.87
Zambia	0.28	France	2.26
Lesotho	0.01	Sweden	3.16
South Africa	0.73	UK	1.70
Ethiopia	0.60	Finland	3.17
Egypt	0.68	Norway	1.71
Morocco	0.71	Denmark	3.08
Nigeria	0.22	Israel	4.11

Source: Adapted from World Bank (2015). World development indicators: Science and technology. Chapter 5.13

The Summit further identified limited research capacity in African universities as a result of inadequate spending on research as a major challenge to the continent's sustainable development, which invariably retards the achievement of SDGs. The Summit strongly recommended a 'dramatic increase in African higher education investment and more research spending.'

Table 3. Higher education enrolment ratios by selected World Regions, 2012

Region	Total Enrolment	Enrolment Ratio
World	195,556,567	32.01
Developed Countries	48,567,285	75.98
Developing Countries	133,255,137	25.49
Sub Saharan Africa	6,342,249	7.81
Central and Eastern Europe	20,778,873	70.94
North America and Western Europe	38,860,500	78.95
Arab States	8,888,273	26.12

Source: Adapted from UNESCO Institute for Statistics

Challenges related to research funding in African public universities in the context of the achievement of SDGs emanates from wrongly conceived funding modalities adopted by these institutions. These research funding modalities undermine African universities' capacity to conduct cutting-edge research necessary for the achievement of the seventeen (17) SDGs. As the participants at the World Sustainability Forum (2017) correctly observed "Africa's ability to meet the SDGs is closely tied up with its research capacity" which is abundantly available in our universities but currently being constrained by low investment in public universities. African universities are unable to fully unleash their research capacity potential because of limited funding for research. Clearly, one of the major factors leading to inadequate funding of African universities is adopting of wrong funding modalities.

The current research funding modalities in African public universities including their limitations are discussed below. The inherent limitations of the current research funding modalities in public universities constitute challenges limiting African universities to contribute to the achievement of SDGs. The thesis of the paper is that current modalities of financing African public universities have inherent shortcomings and constrain their effective participation in the implementation of SDGs; therefore new financing models are urgently required. In the following section current research funding modalities in African public universities and their limitations and strengths are presented in the context of the African universities' capacity to contribute to the achievement of SDGs.

Funding modalities in sub Saharan African public Universities: Available documentary evidence shows that there are two dominant modalities of funding public universities and research in African universities: 1) government funding modality, and 2) donor support modality with the donor support model more dominant for research funding. In some African countries, cost sharing through revenue diversification and student loans schemes has been introduced as a strategy to fund public universities but this modality is not effectively functioning in many countries where it has been introduced because of many factors, one of them being lackadaisical attitude or outright resistance to cost sharing by beneficiaries (students and their parents) and lack of transparency and accountability as far as income and expenditure from revenue diversification activities undertaken in universities are concerned. Lack of transparency and accountability are a major challenge of cost sharing

and revenue diversification modality of funding public universities in Africa, in addition to the fact that revenue accruing from cost sharing are only used to cover budget deficits of recurrent expenditures common in many public universities in Africa, not research.

Government funding modality. The majority (if not all) public universities in Africa are fully-funded by governments through annual subventions to cover recurrent and development expenditures, including research. Many public universities in Africa are unable to internally generate adequate financial resources to cover their recurrent and development expenditures, and they (as a matter of necessity) depend almost by 100% on government funding, which in most cases, is always inadequate because governments have several priorities and obligations to fulfill amidst scarce resources. For example, in Tanzania at the University of Dar es Salaam (UDSM) government's approval rate of the University's budgets approved by the University Council declined from 93.2% in 2000/01 to 63% in 2010/11. The UDSM admitted: "it is becoming a common practice for the government to partially meet the budgetary requirements of the university" (UDSM, 2011). Wangenge-Ouma (2011) also observed that in many cases African governments "fail to remit approved funding, which is often already substantially lower than the requested funding by universities". Over-dependency of African public universities on government funding and underfunding are common even in countries with strong economies such as South Africa. The challenges related to the dependency on government funding of African public universities are many, but mainly two: late disbursements and inadequate disbursements of funds leading to other related problems such as delay in procurement of teaching and learning resources and other educational infrastructure important in the achievement of SDGs through universities. Also, African public universities' dependency on governments for funding of operating costs and research constrain their institutional autonomy and their capacity to set and pursue their own research agenda related to the achievement of SDGs.

Donor-support modality. As a result of declining African governments funding of public universities in general and research in particular, universities have opted for donor support as an alternative. Currently, donor support modality for funding African public universities is dominant, although systematic and reliable research data on donor support of African universities is difficult to access. Documentary and research evidence reveal that external donors (bilateral and multi-lateral) and international organizations support African public universities operations and research. Research appears to be overwhelmingly supported by donors. Dependency of African public universities' on donor support even for critical core functions such as research and community service/outreach (consultancy) should be located in a larger context of African countries endemic dependency on foreign aid since their independencies. For example, Ilorah (2011) citing the World Bank (2006) observe that 'aid dependency ratios for sub Saharan Africa are generally much higher than those of other regions in the world. Africa especially sub Saharan Africa region, remains heavily dependent on aid'. Documentary evidence shows that the majority of research in African public universities is donor-funded because as pointed out earlier, governments invest very little in research. This dependency has implications on the research agenda-setting and

ownership. When university research is funded by donors, an institution loses autonomy and freedom to set research agenda related to national development priorities and in this context, Sustainable Development Goals. Furthermore, donor support is unpredictable. This is the major challenge of this model.

Cost sharing modality. As pointed out earlier, some African public universities have embraced cost sharing as a strategy of mitigating budget deficits arising from inadequate government budgetary allocations by diversifying income streams. In sub Saharan Africa, Makerere University in Uganda and the University of Nairobi are frequently cited in literature on cost sharing in higher education in Africa as success stories. Cost sharing as a strategy of funding public universities in Africa has mainly been implemented through revenue diversification activities aimed at generating extra income and through student loans schemes.

Although cost sharing as funding modality has great potentiality of significantly increasing African public universities' incomes and enable them achieve their missions and visions and contribute to the achievement of SDGs; it is also challenged. Apart from other challenges mentioned earlier, cost sharing as implemented in some public universities in Africa is challenged by lack of synchronization and harmonization of a plethora of revenue diversification activities undertaken by public universities to address a specific aspect of a university mission and vision (some related to achievement of SDGs). The current practice of undertaking revenue diversification activities in public universities is for each individual academic unit/department to undertake their own activities deemed potential for generating extra income needed for carrying out activities which are not centrally funded, despite the existence (in some universities) of organs established ostensibly to coordinate university-wide income generation activities. Another challenge of cost sharing through revenue diversification is the tendency of universities to concentrate on activities conceived profitable which might not necessarily be aligned to the institution's mission and vision or Sustainable Development Goals. For example, a common income-generation activity in many universities is introduction of evening degree programs and short courses in 'demanded by the labor market.' Despite the challenges and limitations inherent in the current funding modalities discussed above there are prospects of African universities adopting new funding modalities which are discussed in the following section.

Prospects: Towards new modalities for funding public universities and research to achieve SDGs

The thesis of this paper is that current modalities of funding public universities and research in sub Saharan Africa constrain universities' capacities to fully contribute to the achievement of SDGs, although in a way 'African universities are already contributing to the achievement of SDGs expected results through teacher training, research, community engagement and advisory services.' African public universities can do more in terms of contributing to the achievement of SDGs if their full potentialities are unleashed through new funding mechanisms particularly for research to enhance research capacity which has been acknowledged as a sine qua non for Africa's ability to achieve SDGs. The current

modalities of financing public universities discussed in the preceding sections are not effectively working. Thus, the following funding mechanisms are proposed:

Performance-based funding (PBF). Currently, in most African countries historical/incremental budgeting approach is used to allocate financial resources to public higher education institutions. Annual university budget allocated by respective government is ‘determined by simply adjusting the previous year’s budget by a percentage, depending on the availability of public funds’ (Mohamedbai, 2011). This approach is also used to allocate research funds in public universities. While this budgetary approach is common and popular because it is easy to prepare and implement (even by the novice universities’ financial management officers) and ensures that no large budgetary deviations are reflected for easy approval by the governing boards, it has inherent structural problem, limiting its efficiency. Its major weakness lies in its assumption that current year’s budgetary requirements are likely to be marginally different from last year’s without accounting for unforeseen changes that are likely to happen leading to significant budget revisions or mini-budgets. Budget revisions leading to mini-budgets because a respective government has not remitted the full requested budget are common budgetary processes in African public universities.

In the context of the above limitations of the incremental/historical approach it is proposed that adoption of performance-based funding in sub Saharan African public universities is needed to motivate them achieve their missions and visions and SDGs. Performance-based funding (PBF) is based on the past performance of a public university, particularly on specified outputs in the field of teaching and learning and research. ‘In the field of teaching and learning, performance could involve any number of ‘measures’ such as student completion rates, student throughput rates, and absolute numbers of graduates and postgraduate students’ (Luruli and Mouton, 2016). Funding is pegged on the extent to which a public university has performed in each of the predetermined proxy indicator. In PBF, ‘funding may be also be allocated in a variable/competitive manner tied e.g. to ex post assessments of the output and performance of universities’ (Cruz-Castro *et al.*, 2010, cited in Jonkers and Zacharewicz, 2016). PBF has been successful in South Africa where it was introduced in 1985 ‘and it rewards the most research-productive universities’ PBF is very popular in other parts of the world including US and Europe because it enhances institutional and research productivity in higher education institutions, enhances quality of higher education and promotes accountability in public higher education systems in a larger context of New Public Management, whose key elements include: increasing use of markets and competition and increasing emphasis on performance, outputs and customer satisfaction. If PBF has effectively worked in South African universities and other higher education institutions in the world, there is no reason why it should not work in other sub Saharan African countries. Governments may consider using PBF systems to steer their universities to academic excellence.

Research performance-based funding system. Closely related to PBF above is Research Performance-Based Funding System (RPBFS), ‘one of the central mechanisms through which many EU member states have used to increase the effectiveness and performance of

their Public Sector Research Systems' (Jonkers and Zacharewicz, op.cit.). RPBFS also if adopted by African public universities can significantly increase their research productivity and enhance their contribution to the achievement of SDGs. Slightly different from PBF, RPBFS exclusively focuses on public universities or public research organizations' research performance. The rationale for adapting RPBFS in countries where it has been implemented are three: 1) it provides incentives and motivation for improving research performance in public universities, 2) it helps to concentrate resources on best performing research organizations, and 3) it increases the accountability by public universities in their spending of public R & D funding (Frolich, 2008 and Hicks, 2012 cited in Jonkers and Zacharewicz, *ibid.*). Another rationale for RPBFS is related to motivating research organizations to increase the volume and quality of their research output and prioritize their fields of research and also help public universities perform better in terms of achieving their missions and visions. The above RPBFS rationale of prioritizing research fields is useful in motivating African public universities prioritize their research disciplines in terms of seventeen (17) Sustainable Development Goals.

Market model. This model, which is eclectic in nature, assumes that higher education is composed of different market segments (stakeholders or consumers/beneficiaries of higher education products) which are willing to finance public higher education if they are mobilized through dialogue and by using effective marketing strategies. These are: 1) higher education institutions, 2) students and their parents, 3) government, 4) external donors, 5) financial institutions, 6) private sector and other potential graduate employers, and 7) alumni (see Table 3). The market model stresses the injection of the market principles and market-driven approaches into financing of public higher education to make it fully self-financing. The market model of financing higher education is justified in the larger context of market and neo-liberal economic approach which has been embraced by many African countries to improve efficiency, accountability and quality of the economic system.

Conclusion

Under-funding of African public universities is a critical challenge constraining their capacity to effectively contribute to the achievement of SDGs expected results through training of human capital, research and consultancy services. Inadequate funding of these institutions is partly a result of universities' lack of creativity and innovation in thinking about alternative and sustainable approaches of generating extra income and lessen their dependency on governments which are already overwhelmed with other financial obligations, apart from funding higher education. However, African governments should remain major financiers of public higher education and research because higher education is a public good and governments are also major beneficiaries of higher education products.

Table 3. Components of the market model for financing public higher education

Market Segment	Financing Mode
1. Higher education institutions	Revenue diversification and privatization of services, contracted research and consultancies, enrollment of privately-sponsored students, sale of patents
2. Students and their parents	Cost sharing
3. Government	Direct subventions to HEIs to fund core functions of universities, including research
4. Private sector and other potential employers	Direct donations to respective institutions for capital development activities, students and professorial chair sponsorships, financing of contracted research and consultancies, sponsorship of professional development conferences and workshops
5. External donors	Direct grants to HEIs, faculty, departments, schools etc.
6. Financial institutions	Educational loans to students to pay for tuition and other costs
7. Alumni	Direct donations to their alma mater to establish endowments and trust funds

Source: Ishengoma, J.M. (2013). Funding Higher Education in Tanzania: Modalities, Challenges, Prospects and a Proposal for New Funding Modalities. In Teferra, D. (Ed.) Funding Higher Education in Sub Saharan Africa pp.214-246. London: Palgrave and Macmillan.

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