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**Research capacity building in Africa: networks, institutions and local  
ownership**

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## Abstract

Since the 1990s, global-health funders and policy makers have increasingly considered the potential of networked models to enhance the impact and efficiency of investments in health research capacity-building in Africa; the importance of ensuring stronger local ownership of initiatives; and the importance of building sustainable research institutions as key priorities. This matters because strengthening the capacity of developing countries to do and use research is widely viewed as vital for meeting long term innovation and public health needs. Despite the importance of research capacity-building for improving health outcomes, the evidence base on what works and what doesn't in research capacity-building in African contexts, and on how key policy issues unfold on the ground, is still fragmented. Existing literature on research capacity-building tends to discuss policy-relevant issues at a relatively high-level with less insight into the nuances of implementing research capacity-building models and policy choices in every-day practice, or potential solutions to capacity-building challenges. This paper helps to address this gap through an analysis of how multi-partner networks are built and how their success depends on building institutional level capacity strengthening within partner institutions. To do this, the paper focuses on the Wellcome Trust's African Institutions initiative, a recent (2009), innovative and large-scale example of the growing number of networked research capacity-building initiatives that are emerging in response to the need for research capacity growth. The initiative funds 7 interdisciplinary health research capacity-building consortia incorporating 51 institutions in 18 African countries, and 17 partners across Europe, the United States, Australia and Malaysia. As part of this, the Wellcome Trust commissioned an independent real-time evaluation of the initiative; this paper draws on evidence from baseline capacity assessments of participating African institutions, and findings from annual evaluations of the first 2 years of the initiative. We identify priority areas for policy attention and share emerging early insights on mechanisms and strategies consortia are implementing for: overcoming barriers to sustainable research activity (e.g. for establishing postdoctoral positions and research career pathways) through mobilising institutional support for research (e.g. advocating for merit-based promotion and accreditation standards); creating sustainable networks (e.g. through facilitating repeated interactions, the sharing of resources and addressing benefit distribution challenges); and enhancing governance, management, laboratory and ICT infrastructure.

## Introduction

There has been a sustained interest in north-south relationships among research communities from the 1980s onwards (Bautista, Velho et al. 2001; Young, 2001; Bradley, 2007). Only in more recent times have international funders and agencies began raising the importance south-south networks between institutions and researchers within Africa (West and Shackleton, 1999; Nchinda, 2002; Lansang and Dennis, 2004; Whitworth, Kokwaro et al. 2008) but embedded in the global scientific community. There is a gradually growing global health community with views that African leadership of networks could result in more socially relevant research than historical north-south ownership and control structures, as well as result in more impact by virtue of mobilising the influence and capacity of African researchers to change policy and practice in their home countries and the region (de Vre et al, 2010; Costello and Zumla 2000; Agid, 2004; Nuyens 2005; Hyder, Akhter et al. 2003; Jones 2008; Bautista, Velho et al. 2001; Pang, Sadana et al. 2003; Harris 2004; Velho 2004; Velho 2006; Fukuda-Parr et al, 2002; Ayuk and Jones, 2007). However, while the discourse supports the concept of African-led initiatives, literature has not provided evidence on the extent to which this can occur in practice and *how*, revealing an unresolved issue of how to define local ownership, and what is meant by 'African-led' networks.

Concerns about the relevance and sustainability of health research in developing countries and its contributions to wider development agendas have also prompted attention on capacity building efforts – *whose* and *what* capacity needs strengthening, and at what levels (e.g. individual, institutional, national research environment, international research environment, research networks; see (Ghaffar, IJsselmuiden et al. 2008; Lee, Walt et al. 2004). Efforts to address research capacity building grew in the 1990s with the development of the Commission and Task Force on Health Research for Development and the Council on Health Research for Development (COHRED) (Nuyens, 2005). Other agencies are also placing capacity building (Jones, 2008) increasingly higher in their funding priorities (e.g. The Wellcome Trust, DfID, IDRC, WHO/TDR, SIDA, SAREC, Bill and Melinda Gates Foundation, NIH Fogarty, EDCTP, the Netherlands Organisation for Scientific Research, European-Union Network for the Co-ordination and Advancement of sub-Saharan Africa–EU Science and Technology Cooperation).

This paper is based on evaluation evidence from early phases of the Wellcome Trust funded African Institutions initiative ([www.wellcome.ac.uk/aii](http://www.wellcome.ac.uk/aii)). It provides insights on the challenges that African-led research capacity-building networks can experience as they establish their identity, highlighting the drivers of these challenges and ways they play out in reality. It also identifies potential ways of managing challenges and developing resilience, as perceived and articulated by African capacity-building practitioners and drawing from their own prior experiences. This learning is important as the current literature provides little insight on approaches to managing risks in these models of research capacity-building. The paper also seeks to shed new light on what it takes to establish complex networked capacity-building interventions in African

contexts. Despite the strategic importance of the initial stages of program design and early implementation (e.g. Barret, Crossely et al., 2010; Costello and Zumla, 2000; Engel and Keijzer, 2006) in influencing programme evolution, adaptiveness and performance, there is, again, strikingly little focus on it in the literature. Finally, the paper also discusses how the initial experiences of the African Institutions initiative enrich the existing pool of knowledge on research capacity building in Africa.

This paper is based on the initial findings from an independent *real-time* evaluation of the initiative— i.e. an evaluation taking place during the programme’s life - that was commissioned by the Wellcome Trust as part of their capacity strengthening programme and conducted by RAND Europe in collaboration with Open University and the African Centre for Technology Studies. This paper does not assess the performance of the initiative nor of the capacity-building model in which it is rooted – it is too early to draw such assessments. However, in the spirit of real-time evaluation, it shares important early insights on the evolution of activities. It draws directly on the experiences of those who are actually implementing capacity-building efforts: the African research leaders, researchers and research managers and administrators. As such, it aims to address the scarcity of evidence from African voices in existing literature. This learning should be relevant for funders considering similar initiatives in the future, practitioners embarking on new efforts or evolving existing interventions and academics as it further conceptualises our understanding of health research capacity building.

The evaluation is rooted in a theory of change led, realist evaluation approach (e.g. Weiss, 1995).<sup>3</sup> A theory of change sets out the building blocks needed to deliver on a programme goal, through a pathway of interventions, and based on a range of assumptions about the underlying logic and types of interventions which can result in desired outcomes (Weiss, 1995; Connell and Kubish, 1998). Realist evaluation puts emphasis on the importance of context – it asks not only what works, but for whom and under what circumstances (Pawson and Tilley, 1997). A comprehensive understanding of what consortia funded in this initiative are trying to achieve, and of the causal pathways and relationships they *expect* to unfold in the process of pursuing their objectives, is essential for building more robust evidence about what works and what doesn’t in research capacity-building efforts. A thorough appreciation of expectations needs to be accompanied with efforts to identify whether these expectations are being met through the interventions that are assumed to enable them, and why (or why not) (Weiss, 1995; Pawson and Tilley, 1997). This evidence in turn informs more effective practice in the programme as well as contributes to the global pool of knowledge in the science of capacity-building.

The evidence presented here is based on data collection and analysis which has taken place during the real-time evaluation in 2010 and 2011. The starting point for this was to develop a more nuanced understanding of each consortium’s respective capacity-building approaches: i.e. their ‘theory of change’ and intervention logic.

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<sup>3</sup> It is outside the scope of this paper to describe the evaluation approach and methods in great detail— this will be the subject of a forthcoming publication.

Each consortium as well as the funder have theories of change and logic models with a combination of common and unique features. Common features include efforts to build capacity at individual and institutional levels through local leadership and a networked approach, and an emphasis on scientific skills, professional practices and infrastructure strengthening. Some of the unique features include differences in disciplinary and field focus, the mix of capacity-building interventions, and the levels of funding awarded. We have compared and triangulated the individual logic models and theories of change across the seven consortia and the funder, and present an over-all high-level shared logic of intervention for the initiative (see Table 1 and Box 1). This highlights the fundamental assumptions behind the capacity-building model and the features of capacity-building strategies<sup>4</sup>

In real-time evaluation, logic models together with the rich narratives that accompany and contextualise them, can provide a guiding structure for establishing performance indicators that meet multiple evaluation aims (including accountability, learning and documenting and demonstrating achievements). This allows the evolution and performance against plans to be reflected on, learnt from, and acted on (McLaughlin and Gretchen, 1999). Thus we worked with the consortia and the funder to jointly develop bespoke frameworks of qualitative and quantitative performance indicators (including associated milestones and targets) which will be used over time to examine consortia and overall initiative progress.

This involved bringing to the surface the assumptions associated with the overall implementation strategy for an individual consortium (or in the case of the funder the overall initiative) and specifying the intervention logic. We held workshops in Africa with each individual consortium, bringing together consortium leadership and representatives from partner institutions. The workshops involved representation of scientific, management and administration staff. This was complemented with document reviews and desk research, teleconferences, email and telephone interview follow up. The same approach was followed with the funder, with workshops taking place in London.

In order to interpret and make sense of evaluation evidence and contextualise evolution and progress over time, it has also been essential to understand where the funded consortia are coming from: This involved conducting a survey of baseline research capacity across all of the participating African institutions (51 institutions – universities research groups, faculties and departments, as well as research institutes - across 18 countries).<sup>5</sup> The survey captured information on baseline status in terms of scientific skills and human resource capacity, research management and governance capacity, and physical infrastructure.

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<sup>4</sup> Within this high level overview, nuances and some diversity inevitably exists. For example, there are a variety of views on the scale and scope of change that can be achieved, and the time-frame needed to achieve it.

<sup>5</sup> Clearly, attributing such changes is not without challenges, particularly in initiatives and programmes which gradually build on existing relationships, or where core activities at institutions may be supported by multiple funders or closely interconnected. This is where contribution rather than attribution becomes important.

In what follows we discuss some of the key issues impacting the consortia and which are based on our findings to date, as they relate to core variables in capacity-building pathways in the African institutions initiative: managing network relations, mobilising the support of senior authorities for sustainable research career pathways and strengthening professional practices in African institutions (i.e. research governance, management and administration), and improving physical and communications infrastructure.

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**Box 1. The perceived theory of change in the African Institutions Initiative, key assumptions of the consortia and funder.**

1. The initiative will be empowering individuals with the skills, competencies and credentials needed to continue to pursue research careers and to lead research at institutions in Africa, for the health priorities of African populations. To do so, the initiative will be drawing on a diverse range of resources (e.g. financial support provided by the Trust, the experience and expertise of all African and 'Northern' partners in the consortia and of the Trust's own staff, existing infrastructure and networks as some examples).

2. Empowering institutions depends in part on empowering individuals as drivers of change, but individuals need conducive research environments in order to be able to conduct cutting-edge research and empower others over time. Building such environments therefore also asks for strengthening institutional capacities to manage, govern and administer research effectively, and requires supportive incentives and provisions for sustainable career pathways within African institutions. The initiative is providing support for the implementation of a mix of unique and common activities (across consortia) to: *build capacity in scientific skills and establish sustainable career pathways* (e.g. through the development and delivery of training courses; fellowships and studentships; improved supervision and mentorship arrangements; advocacy efforts); *strengthen research management and governance in institutions* (e.g. through embedding transparent and rigorous structures, systems and reporting processes in consortia; training courses in research management; funding of dedicated management and administration posts in consortia implementation groups); and *improve the physical and ICT environment in which research takes place* (e.g. through limited financial support for procuring equipment, refurbishing laboratories, website maintenance).

3. The sustainability of research careers in Africa, of research at institutions, and of a model of research capacity-building that is African-led also depends on creating and nurturing equitable national, regional and international collaborations for the long-term. The initiative aims to be implemented in a way that relies on learning, linkage and exchange between partner organisations in consortia, between different consortia and with external stakeholders.

4. The capacity-building activities are expected to yield a number of outputs and outcomes. Some key examples include contributions to:

- strengthening the scientific impact and competitiveness of African researchers and research groups (e.g. their ability to attract third party research funding);
- improving the quality, scope and scale of training opportunities available at African institutions;
- enhancing the transparency, rigour and efficiency of research governance, management and administration practices and the associated skill sets of support staff.

In the longer term, it is also expected that established networks will expand and pursue new shared activities with support from a diversified funding base. The initiative also hopes to contribute to a step change in research cultures in African institutions. Contributing to these changes requires the individuals empowered through the African Institutions initiative to be able to serve as advocates and role models of good research practice, communicate and demonstrate the value of research, help create demand and spread their experiences more widely in institutions and future networks. In the long-term, and together with other international, regional and local efforts, the initiative hopes to contribute to African environments where researchers, university authorities and policy makers cooperate more, and where research results can be better adopted and used to reduce the burden of disease and improve population health. Senior researchers, embedded in universities, developing research portfolios with external grant funding, some internal support and dedicated time for research could be sign of investments made to support these wider institutional and environmental changes.

**Table 1. The overall logic of intervention in the African Institutions Initiative, as perceived by consortia and funder**

INPUT	PROCESS	OUTPUTS	OUTCOMES/ IMPACT
<p><b>What is invested? What resources are available for the initiative?</b></p>	<p><b>What is being done to pursue goals and objectives?</b></p>	<p><b>What are the expected direct results?</b></p>	<p><b>What are expected the longer term outcomes, and long-term ultimate impacts?</b></p>
<p><b>Financial resources</b></p> <p><b>Experience and expertise of African institutions and research leaders</b> (i.e. consortia members)</p> <p><b>Some existing physical infrastructure</b> at institutions</p> <p><b>Some existing examples of good research management practice</b> at African institutions (but fragmented and piecemeal)</p> <p><b>Some existing training programmes</b> at consortia member institutions (South &amp; North)</p> <p><b>Baseline networks of different stakeholders:</b> within and between consortia, between Trust and consortia, externally</p> <p><b>A generally positive attitude and willingness to cooperate and collaborate</b> within consortia, as well as formal collaboration agreements</p> <p><b>Consortia's 'action plans' to guide their implementation activities</b></p> <p><b>Funder (Wellcome Trust) experience and leadership</b> as a source of guidance and support through staff skills and time</p> <p><b>Initial publicity for the initiative</b> so that other funders are aware of the model, can follow developments and learn from it to inform their own approaches</p>	<p><b>Creating enabling institutional environments:</b></p> <ul style="list-style-type: none"> <li>- Implementation of a capacity-building approach that focuses on institutional and individual capacity</li> <li>- supports diversity of capacity-building activities</li> <li>- The implementation and sustenance of transparent and robust academic and financial governance and management structures and reporting systems in consortia</li> <li>- Principal investigators are encouraged by funder to advocate for supportive research environments at universities, from vice-chancellors and national ministries</li> </ul> <p><b>Promoting African leadership of capacity-building:</b></p> <ul style="list-style-type: none"> <li>- African institutions receive direct funding and lead capacity-building efforts</li> </ul> <p><b>Supporting networks:</b></p> <ul style="list-style-type: none"> <li>- Consortium network with established and promising African institutions and Northern partners capitalising on complementary capabilities</li> <li>- Collaboration and exchange of knowledge at multiple levels</li> <li>- Efforts to ensure that enthusiasm and commitment from all involved is sustained</li> <li>- Trust engagements in guiding and assisting consortia activities and their management</li> </ul> <p><b>Real time evaluation and learning</b></p> <ul style="list-style-type: none"> <li>- Participative external evaluation to enable timely learning and adaptation and help in risk management and Trust's own annual reporting process</li> </ul>	<p>Consortia make a scientific impact, e.g. through publications</p> <p><b>New or adapted and replicable, and credible and internationally recognised training courses</b> at African institutions</p> <p><b>Internationally competitive researchers</b> (existing researchers with enhanced skills and newly trained ones)</p> <p><b>More effective financial governance and management mechanisms at consortia implementation group levels</b></p> <p><b>Research administration staff</b> at universities and institutes with new and improved skills</p> <p><b>Consortia pursuing new collaborative research opportunities:</b></p> <p><b>African-led networks' can conduct interdisciplinary research and apply interdisciplinary lenses to health priorities</b></p> <p><b>The evaluation provides evidence on the strengths and weaknesses of this capacity-building model</b></p> <p><b>The experiences of Northern partners and the evaluation contribute to greater clarity on the diversity and feasible ways of engaging Northern partners in this model</b></p>	<p><b>Senior researchers, embedded in universities, with external grant funding and dedicated time for research</b></p> <p><b>The initiative in complement with other efforts makes contributions to reducing the burden of disease and improving population health</b></p> <p><b>Network sustainability: collaborations continue and grow</b> (e.g. new shared activities; representative, empowered &amp; democratic networks)</p> <p><b>Consortia (and their members) are better able to obtain third party funding</b></p> <p><b>Reduced staff turnover at African institutions</b></p> <p><b>Benefits to science and learning communities through cultural changes at institutions:</b></p> <ul style="list-style-type: none"> <li>- research and research training is valued more, there is increased demand for it, increased facilitation of research careers</li> <li>- more transparent and more efficient governance</li> </ul>

## ***Building institutional capacity I: managing network relations***

### ***Internally in a consortium***

Evaluation evidence from early phases of the initiative provides insights on the diversity of relational opportunities but also challenges that African-led research capacity-building networks can experience as they establish their identity and highlights the drivers of these challenges. It also identifies potential ways of managing challenges and developing resilience, as perceived and articulated by African capacity-building practitioners and drawing from their own prior experiences. This learning is important because although there is much literature on the relational challenges in inter-organisational relationships more generally, including evidence on challenges in north-south relationships in the development literature (Cohen, 1993; Gaillard, 1994; Bradley, 2007; Barrett, Crossley et al. 2010; Maselli and Sottas 1996; Fuest 2007), evidence on the relational challenges in *South-South* collaborations (i.e. pan-African networks) and *South-led* networks is scarce. In-depth insights on the drivers behind relational challenges and their effects is also fragmented, and there is very little insight on approaches to managing and mitigating challenges and risks in these models of research capacity-building.

Partners in the African Institutions initiative consortia (both African and northern) have by and large successfully established early working relationships and strengthened them over time. Partners are engaging with each other on research, training, fundraising and dissemination activities. Intra-consortium collaboration has been enabled through multiple mechanisms across the initiative, including: annual meetings, remote communications and web-based portals, opportunistic discussions at conferences, linkage and exchange during training courses, joint proposal activity, and seminars on consortia activity to institutional authorities.

However, leadership, programme managers and evaluation officers across the initiative have identified challenges in maintaining regular communications between participants from different African partner institutions. These were said to relate both to limitations in communications infrastructure (e.g. power cuts, internet service reliability), and to the extent to which a consortium is forming new relationships (i.e. to the absence of a history of collaboration and trust, a topic discussed widely in literature on research and development collaboration, e.g. Wagner, 2008). All of the consortia are building on some established links, but the strength of these links varies.

The African Institutions initiative is also confronting traditional north-south power hierarchies and some of the relationship and communications challenges relate to this dynamic. Capacity-building interventions were decided on through processes of consultation and needs assessments by African leadership and with African researchers and policy-makers across partner countries. Northern partners were to varying degrees a part of the consultation and proposal development process, but in more advisory roles in the majority (though not in all) cases. As the initiative has moved towards implementation, traditional asymmetries are being reconfigured.

Evidence from the evaluation and learning project (e.g. from formal reports and observations made during field work) suggests that at the early stages of implementing

consortia awards, decision-making seemed to be more markedly African-led in some networks than in others. But overall, the basic premise of the initiative as African-led is being demonstrated. The experience and reputation of senior consortium leadership appears to be important in this regard. Senior researchers have also needed to take on new roles and responsibilities, including those not typical of (African) research careers (e.g. involvement in research management capacity strengthening in institutions, advocacy and lobbying for research support). The lack of a critical mass of researchers and support staff has also highlighted a need to avert potential over-reliance on a single individual or small number of individuals for progress with initial activities. At the same time, some consortia (in particular those where the majority of partners do not have a prior history of collaboration), have found the process of establishing relationships and reaching consensus on roadmaps and plans of action for capacity-building activities particularly laborious and negotiation-intensive (as well as delayed by institutional bureaucracy), but at the same time essential and beneficial for building up a functioning and viable collaboration in both spirit and substance.

The roles, incentive and reward structures for northern partners also differ to historical practices. Literature highlights that northern partners in international collaborations have historically played roles in their management and governance. In the African Institutions initiative, most of the northern partners are engaged in supervisory, mentorship, course delivery and advisory roles. There is a need to further explore the diversity of their contributions. There are also important questions emerging around issues such as the types of skills and capacities northern institutions need to develop in order to engage as partners rather than leaders of research collaborations.

Decisions on whether funding is allocated based on merit or equitable distribution also impacts on the extent to which capacity-building occurs in a context of mutual learning and experience-sharing, as opposed to in relative isolation from partners. There is a general consensus in academic literature that mutual benefit, outweighing the costs of participation, is required to support long term, sustained engagement. (Costello and Zumla, 2000; Nchinda, 2002; Reddy et al. 2002; Bradley, 2007; Nakabugo et al., 2010). The strategies for allocating funding for capacity-building within the African Institutions initiative vary across the funded consortia, but most are combining merit-based procedures with some quotas for African member organisations. This is rooted in a perceived need (by African leadership) to build capacity with due consideration of both academic standards and social norms, recognition of the different states of research competitiveness across partners and the need to distribute resources in a manner that is bespoke to the priority partner capacity building needs (e.g. specific stages in a career pathway). The experiences of consortia leadership suggest that a degree of equitable opportunity in the form of ring-fencing some awards for specific institutions is important for all member organisations to see the benefits of participation in the network and for sustaining commitments. In its absence, and particularly in large networks bringing together partners with different levels of research capacity, relational tensions can emerge and need to be delicately managed. However, an awareness of the trade-offs in terms of the comparative quality of research that capacity-building funds are supporting exists. This is in line with wider discussions raised in the literature about the trade-offs between investing in excellent

research (with capacity-building as a potential spill-over) versus investing specifically in capacity-building focused initiatives (Bautista et al., 2001; Young, 2001).

In the context of funder policy, these types of decisions also have implications on efforts to establish a critical mass. Undoubtedly, critical mass in research is hard to define (although it is easier to recognise its absence). One way to see it is as the minimum capacity (e.g. staff, research units, equipment, money, management and governance systems and practices) needed to compete effectively at an international level in a given area of research. It will vary from one area to another. Thus, critical mass has both scale and scope considerations, (Grant et al., 2011) and decisions around who receives funding and for which areas of research and capacity-building activity will influence pathways to critical mass. Some consortia have emphasised that a degree of equitable distribution is in line with a scalability agenda and with efforts to create critical mass across the region, rather than in a small number of established organisations. They argue that wide-spread regional coverage has multiple benefits, including: creating new opportunities for capitalising on established relationships, while also developing new ones; sharing of scarce resources in the region; and increasing impact from research activities, not in the least through strengthening the influence of a collective African voice on policy and practice. However, others have noted that diluting resources across too many partners can raise the risk of hindering commitment and sustained involvement by all partners, and accentuates coordination costs. This raises the importance of carefully considering the comparative benefits and limitations of alternative network sizes and structures when designing capacity building strategies and proposals. It also raises wider questions about the potential staging of decisions on network concentration or expansion over time.

Sustaining commitment, enthusiasm and delivery by all partners in the network is a key variable in the viability of a networked model. Principal investigators from all partner institutions, central consortium leadership and in many cases management and support staff were engaged in a consultative process to identify strategies which could help achieve this. Drawing on an analysis of risk-management plans from consortia across the initiative, some examples include: (i) setting up multiple formal communication channels (formal and informal); (ii) inclusiveness of partners in decision making processes reflected in governance and management structure and accountability lines; (iii) formal collaboration policies, terms of engagement and codes of conduct; (iv) entry and exit criteria; (v) systems for monitoring adherence to commitments; (vi) documenting activities to ensure wide-spread accessibility by partners; (vii) considering some institutional quotas for funding allocation; (viii) efforts to work within university systems to the extent that is feasible and appropriate to mitigate against challenges to partnership activity that could emerge if partnership policies conflict with incumbent institutional procedures; (ix) clear work-plans and road maps from the onset to provide a sense of direction and sustain momentum across the network and time.

With external stakeholders:

Consortia have since the beginning of the initiative, been working towards engaging high-level institutional and regional authorities in their activities, as well as – to varying degrees - other external stakeholders (e.g. academic, policy-makers, healthcare practitioners, the public, funding agencies, IGOs/NGOs). Most consortia see external engagement as important for strengthening the capacity of African institutions to not only do research but to translate it into impacts. As one consortium leader expressed, on-going external engagement can help build the capacity of healthcare organisations, policy makers and the public to absorb and act on research evidence and innovations. This is a view widely shared in implementation sciences literature in healthcare, (e.g. Denis and Lomas, 2003; Greenhalgh et al, 2004). Some consortia have adopted a very formal approach to external engagement (with annual plans and milestones and clear organisations they wish to engage), whilst others (although acknowledging its importance) see it to be a less integral part of their capacity-building remit (and budget), and especially so at early stages. In their case, external engagement is being manifested as a more informal network activity.

Some insights around approaches to managing political instability have already emerged from the experiences of one consortium in particular, and point to the nuances of navigating political relationships. The experience of the Ivory Coast is a stark reminder that political instability is a particular risk in some African contexts. As pointed out in an article by the Director of a consortium with the lead institution in the Ivory Coast, in all of the projects of his institution, ‘maintaining neutrality’ and steering clear of local politics is an essential survival tool (Bonfoh et al, 2011). Having a contingency plan whereby leadership authority, budget management and ‘hosting capacity’ (e.g. for students from a conflict affected zone, for expensive equipment) can be transferred to a partner institution has also already proved important in his engagement with the African Institutions initiative specifically.

On the one hand, it is beyond the scope of a consortium to prevent a political risk from materialising. However, approaches for responding to and managing the implications of political instability have been considered by most of the consortia in the initiative (and not only partners in high-risk zones), and learning has accrued from past experiences of survival in places like Uganda, Rwanda and the Ivory Coast. These approaches include efforts to: (i) establish lines of communication with politicians and policy makers with different affiliations, but strictly around research matters; (ii) ensure that a consortium is politically-neutral and that if consortium members engage in political activities, these are disassociated from the consortium’s name; (iii) develop security protocols and other procedures for responding to (unforeseen) conflict and instability, including that capacity for consortium leadership exists at a second member institution; (iv) embed plans for reallocation of students and other resources to safer locations if necessary (Bonfoh et al, 2011).

Box 2 summarises the experimental approaches and perceived enablers of African Institutions consortia efforts to manage relations and develop a fully fledged networked identity in each consortium. It is still early days and the examples below

should not be taken as prescriptions in any way – rather they illustrate the diversity of interventions being initiated and implemented by the African researchers and research leaders in the initiative.

## Box 2. Factors perceived as enablers of network establishment and stabilisation

MANAGING NETWORK RELATIONS AND DEVELOPING A FULLY-FLEDGED NETWORKED IDENTITY
<p><i>Laying the foundations for a networked model of capacity building in a consultative manner</i></p> <ul style="list-style-type: none"> <li>- Negotiating capacity building priorities with all partners at the onset to ensure early buy-in; considering the bespoke capacity building needs of different partners given unique baseline capacity positions</li> <li>- Seed funding at the stage of developing capacity building proposals can enable the consultative process</li> <li>- Considering alignment of researcher interests and experiences, institutional agendas and regional health priorities is important in decisions on the direction of research</li> </ul> <p><i>Ensuring transparency and a shared understanding of both formal rules and less formal norms of behaviour in the network</i></p> <ul style="list-style-type: none"> <li>- Specifying criteria for the allocation and distribution of funding in a network from the onset and reaching consensus on selection processes for trainees and infrastructure investments in a way that balances concerns for merit and equity</li> <li>- Addressing formal and informal incentives for partners to deliver on early commitments, as part of risk management planning (e.g. terms and conditions governing the network, ensuring that all partners are represented in governance and management structures, entry and exist criteria, organising work within inter-organisational teams to minimise overreliance on specific partners, ensuring continual professional development opportunities to sustain individual commitment)</li> </ul> <p><i>Building in flexibility and diversity in the operationalisation of the network</i></p> <ul style="list-style-type: none"> <li>- Within quota-based approaches, building in some flexibility in use of funding, to respond to emerging needs (e.g. scope for substituting funds for post-docs with funds for masters or doctoral student support)</li> <li>- Creating space for repeated interaction through both formal and informal, and 'real-world' and virtual interactions – a balanced mix of face-to-face and remote contact</li> </ul>

### Mobilising the support of high-level university authorities:

There is relatively little and fragmented information on the roles and responsibilities of senior institutional authorities in creating research-friendly environments in African universities, and especially on how to mobilise their engagement (i.e. the challenges and enablers associated with the process) (Barrett, Crossley et al. 2010; The Africa Unit 2010). According to the Directors of consortia in the African Institutions initiative, engaging high level university authorities in efforts to create sustainable research career pathways has been essential from the very onset of capacity-building efforts. For example, consortia needed early support and buy-in of vice-chancellors and deans of faculties to establish memoranda of understanding and collaboration agreements, ensure approvals for various posts (e.g. to accept and recognise postdoctoral positions as more than a temporary measure) and for training curricula (e.g. accreditations for both new longer-term postgraduate programmes and for shorter training modules). Their support was also important in efforts to reduce administrative delays associated with institutional bureaucracy and to ensure adherence to transparent and accountable management and governance processes (e.g. agreed on selection criteria

for allocating fellowship or infrastructure funding). Negotiating prospects for course credit transfer between collaborating institutions or for cross appointments of staff (areas which Directors and programme managers of some consortia see as priority elements of their long-term sustainability strategies), were also conveyed to be areas where the buy-in and continual engagement of senior institutional leadership is pivotal for sustainable capacity-building outcomes.

All of the initiative Directors also recognise the key roles that university vice-chancellors, deans and deputy deans could play (together with researchers) in lobbying to help raise the profile of African science in political and policy circles (including with ministries of science, finance and education), and through their influence mobilise greater commitment to national funding streams, regional research collaboration, and also to the practice of evidence-based policy making. These are seen as crucial issues for the longer-term sustainability of African science. In fact, although the appointment of postdocs in institutions lacking a history of these positions is one of the key early successes of the African Institutions initiative, further strengthening the position of postdocs and role of health research more widely in African Universities calls for targeted dialogue with national policy makers, global funders, and regional stakeholders (e.g. African Union, Association of African Universities) around how they can further support current step-changes and address associated needs for merit-based promotion procedures for researchers, accreditation of research training programmes, agreements on credit transfers, and facilitation of shared appointments between universities, and between universities and research institutes. These are medium to longer term ambitions for consortia, and could contribute to a cultural shift in the way by which research competitiveness in Africa evolves.

However, in many of the consortia, establishing and sustaining support from high level university authorities has been a time and relationship intensive processes. African research leaders recognise both funding and political will to be important incentives for senior university authorities to embark on reforming universities to embrace research as a more central activity (Barrett, Crossley et al. 2010; The Africa Unit, 2010). There is recognition that university reform would entail significant operational and administrative challenges (Lansang and Dennis, 2004). Consortia representatives provided some examples: pre-existing shortages of teaching staff in many universities can create obstacles to building research capacity, if research opportunities are seen as a risk that could deflect staff from already modestly resourced teaching and administration needs. And if there is not a sufficient critical mass of funding committed to support new research posts, or a sufficient pool of trainees to engage in research at an institution, then potential long-term benefits could be compromised by the absence of short-term returns and incentives. This is especially so in light of short-term demands on university authorities who are already busy running administrations, managing teaching agendas and to varying degrees navigating political priorities and multiple interest groups. As with any type of reform, there are likely to be supportive camps and those resisting change that would need to be managed. These challenges also echo the experiences of university reform in other contexts (Moini, Bikson et al, 2009).

Despite these challenges, according to the Wellcome Trust, the scale of the African Institutions initiative presents a unique opportunity for a concerted effort to change the standing of research in universities in the region. We believe that the initiative could also shed new light on the effectiveness of different means of advocating for and attaining high-level support for research system strengthening. Early insights from consortia representatives already indicate that there are a number of important enablers (Box 3).

**Box 3. Factors perceived as early enablers of efforts to ensure institutional support and buy-in for research activity in African universities**

<b>SECURING INSTITUTIONAL BUY-IN AND COMMITMENT TO RESEARCH ACTIVITY IN RESEARCH CAREER PATHWAYS IN AFRICAN UNIVERSITIES</b>
<p><i>Engage senior authorities in setting the direction of research</i></p> <ul style="list-style-type: none"> <li>- Consider alignment of research interests and experiences, institutional agendas and regional health priorities in deciding on the thematic focus of capacity-building efforts</li> <li>- Empower researchers with the skills needed to involve ministries and local authorities in research planning, so that research portfolios are more demand driven (e.g. science communication skills)</li> </ul> <p><i>Demonstrating reputational gains from research activity for an institution early on:</i></p> <ul style="list-style-type: none"> <li>- Engaging the media, early dissemination activity for awareness raising (e.g. press-conferences, news-releases, early features in academic journals)</li> <li>- Some early efforts and success in leveraging additional funds</li> </ul> <p><i>Demonstrating tangible ‘quick wins’ which are also in the interest of a university’s education agenda</i></p> <ul style="list-style-type: none"> <li>- E.g. Investments in improving physical infrastructure (equipment and facilities that can also be used for teaching purposes)</li> </ul> <p><i>Mobilising intermediaries as advocates for supportive research environments and in efforts navigate institutional bureaucracy</i></p> <ul style="list-style-type: none"> <li>- individuals within an institution who have close and amicable relationships with university vice-chancellors and faculty leaders</li> </ul> <p><i>Ensuring a degree of equitable benefit distribution across partners to help secure both initial support and continual endorsement from institutional authorities</i></p> <p><i>Bringing together senior authorities from across the region (e.g. Vice-Chancellors, Deans, Deputy-Deans), targeting discussions around key issues in the ‘agenda for change’ and establishing follow-up action plans to meetings to mobilising commitment to action</i></p> <p>e.g. issues relating to institutionalising postdoc positions, issues related to merit-based promotion trajectories, credit transfers, joint appointments between universities and research institutes, freeing up resources for and improving supervision and mentorship</p>

Another important issue for both capacity-building practitioners and funders has to do with the trade-offs between a tight focus on a specific research area within an institution and network, or a strategy of thematic diversity in funding distribution. There is debate in the academic literature on whether specialisation within an institution, or building capacity across multiple disciplines is more effective and sustainable (Chataway et al., 2005; Smith, 2005; Bradley, 2007). Literature highlights that decisions on thematic areas of focus and disciplines to involve tend to be made with due consideration of the priorities of specific institutions, regions as well as (senior) researcher interests and areas of expertise, and that this is important for

sustainability of the built capacity (Chataway, 2005). Interest across multiple stakeholder groups can be complementary or contradicting. In this context, the relationships between researchers in an institution, senior university authorities and political powers are an important factor in agenda-setting and prioritisation of research and capacity building strategies. There is diversity in the African Institutions initiative in terms of a broad or narrow focus, and in terms of the levels of emphasis on multi and/or interdisciplinarity. According to stakeholders in the African Institutions initiative, it is important to empower researchers with the skills needed to involve ministries and local authorities in research planning, so that research portfolios are more demand driven. Training researchers in science communication is one way through which such skills could be enhanced.

### ***Building institutional capacity II: research governance, management and administration***

Whitworth et al (2008) highlight the need for African governments to work together with the wider international community to ensure appropriate research conditions in their home countries. This includes national investments in creating the basic infrastructure needed for health research, with infrastructure considered to include amongst other aspects also research management, governance and support services. They argue that “for research to flourish, requisite organisational frameworks, adequate human resources, and access to appropriate skills are needed” (Whitworth et al, 2008, pX). Lansang and Dennis too (2004) consider the potential impacts of investing in research management infrastructure and working conditions on both the efficiency of research activity and on the attractiveness of research as a career option. Yet gaps exist in our understanding of both the *extent* to which sustainable institutional strengthening depends on investment in improving professional practices at research institutions in Africa, *which areas* of research governance, management and administration in particular are most in need of strengthening, and what are the *challenges and opportunities* in this arena (Lansang and Dennis, 2004); (The Africa Unit, 2010; Ghaffar, IJsselmuiden et al. 2008).

According to both the Wellcome Trust and to consortia leadership in the African Institutions initiative, further enhancing the credibility of African institutions in terms of their ability to govern, manage and administer research grants in a transparent and accountable manner is central their attractiveness to external research funders, as well as for more efficient and effective research operations locally. The assessment of baseline research capacity across partner institutions, conducted as part of the evaluation project, indicated that strengthening research governance, management and administration capacity is needed across the region, although dispersed examples of good practice in specific areas do exist.

Research governance structures and policies in universities are common, but their functionality in practice seems to vary widely. In general, consortia representatives communicated and agree that research institutes have more established research management and governance infrastructures than universities. In most consortia within the African Institutions initiative, lead institutions tend to have more

sophisticated governance and management infrastructures than sub-awardees – both in terms of formal structures, systems and research policies and in terms of human resource support. With some exceptions, research offices are often poorly staffed: Senior researchers generally assume lead management and administration roles and responsibilities, with some support from finance officers and administrative assistants.

Consortia leadership communicated that training opportunities in research management and administration skills are fragmented across the region, and often temporary. Opportunities for the professional development of research support staff are often unsustainable, as they tend to be nested within funding for specific projects and programmes of limited duration. Some of the comparatively better established institutions in most consortia do offer research management training courses, but these are often not widely accessible to outside organisations.

Early experiences of the African Institutions initiative suggest that financial management, grants management, and monitoring and evaluation remain common areas in need of improvement as well as formalisation. The degree to which guidelines exist on specific administrative processes varies widely across the region, and many aspects of research administration are implemented through improvisation and without consistent adherence (though institutions tend to have unwritten traditions). With a few institutions as exceptions, data management and storage systems and practices are generally weak: younger and less established organisations in particular rarely keep records of research outputs, funding applications and grant applications.

Despite the need for much improvement, some examples of effective research governance practices exist across the region, and particularly in well-known research institutes that have historically received external funding, as well as in some of the more established universities. One of the challenges for the initiative as a collaborative effort rests in embedding good practices more widely and systematically, across organisations at different levels of development and across west, east and southern African regions. According to consortia representatives, this is not straightforward, given disparate incumbent practices, the financial resources and timelines needed for institutional change, as well as a need to work within a system and specific institutional context, while attempting to evolve it. As a first step, one consortium in particular has engaged in a detailed needs assessment exercise to identify examples of good practice across its network, and to specify areas of capacity-building need at distinct institutions. Obtaining approvals for postdoctoral posts in organisations without a history of such positions also took much time and effort from senior consortia leadership, in advocating for and communicating the importance of such positions and the potential benefits of having them for African universities.

As part of the African Institutions initiative award's terms and conditions, all of the funded consortia have needed to establish systems which could demonstrate African ownership, control and accountability and ensure that all partners in a consortium (not only the leading and more established institutions) are represented and included in decision-making structures and processes. For example, this has included embedding rigorous financial management procedures required for the release of Trust funding; the development of clear selection criteria for allocating funds internally, including

selection criteria for trainees; establishing supervision and mentorship arrangements; specifying terms of reference for various committees, and the recruitment of core programme support staff. The consortia are implementing a mix of centralised and devolved coordination mechanisms with decision-making bodies at secretariat, national, research theme and functional levels. These are being operationalised through a mix of committee meetings, annual management and advisory board meetings and remote communications on an as needed basis.

Close communications and repeated interactions between consortia with both the funder and with senior authorities at African institutions have been essential for establishing these requisite research governance, management and administration arrangements. In fact, the real – time evaluation of the African Institutions initiative is unique in that the funder has agreed to be evaluated: the Wellcome Trust wants to learn about how they can most effectively engage with the initiatives they fund, to maximise chances of successful outcomes and the efficiency of the capacity-building process. The experience of establishing and incubating the African Institutions initiative has exposed some interesting insights on funder roles and engagement avenues at early stages of capacity-building, and accentuate the importance of funder roles in facilitation.

For example, embedding financial management procedures required for the release of Trust funding (e.g. creating separate financial accounts for the initiative and dealing with issues such as accruals) has been particularly novel, time-consuming and challenging for some institutions, and has required training to be delivered by the funder to finance officers in lead recipient institutions. As another example, many consortia have invited Trust staff to participate in their annual meetings, which helped create channels for dialogue between participants from different institutions within a consortium (and not just the lead institution and Directorate) with the funder. Consistency and clarity in the messages funders convey to funding recipients was also identified as an important factor for developing a shared understanding and appreciation of expectations. A number of consortia also see funders as partners in their efforts to raise the profile of science in Africa. Towards this end, the Wellcome Trust in collaboration with consortia organised a meeting of Vice-Chancellors of East African universities to discuss the prospects for research and sustainability of research careers in Africa.

Although consortia have ring-fenced parts of their budgets for management, coordination and administration posts (e.g. programme officers, finance officers, communications and IT officers, administrative assistants) at central secretariat levels and in some cases also across partner institutions), a number of senior consortia representatives have highlighted a need to embed management and administration functions as permanent posts in organisations, rather than as temporary positions within projects and programmes of limited duration. Within the initiative, one consortium is trying to address this through a strategy of establishing institutional research support centres, with the aim of recovering costs through future successful grant applications, in order to be self-financing and sustainable in the long-term. According to consortia leadership, institutional investments of this nature are likely to

happen more widely, only if and when the importance of research in university agendas is raised. There are further questions related to the role and extent that external funding agencies can target funding specifically at fostering sustainable change in professional practices at institutions.

Most consortia are also investing in research management and administration training in what they have identified to be priority areas (grants management, financial management, project management, ethics, publication writing, and supervisory skills in particular). African partners are often doing this in collaboration with their counterparts in developed countries, who have existing courses of this nature to build on and adapt to African needs. Opportunities for training are increasingly available externally as well, through organisations such as Southern African Research and Innovation Management Association (SARIMA), The West African Research and Innovation Management Association (WARIMA) and The Association of Research Administrators in Africa (ARAA). However, evidence from our interactions with African institutions to date (and especially drawing on views from senior researchers) suggests a need for a wider scale effort to identify key skill gaps across different research management and administration functions, and to establish a more integrative portal for identifying and coordinating access to training.

Box 4 highlights the perceived early-stage facilitators of consortia efforts to improve the supportive practices for research activity through capacity building in research governance, management and administration systems and practices. This is widely seen by initiative participants to be important for institutional attractiveness to external research funders as well as for more effective and efficient research.

**Box 4. Factors perceived as early enablers of efforts to strengthen professional practices**

Strengthening research governance, management and administration capacities
<p><i>Creating an enabling human resource environment from early on:</i></p> <ul style="list-style-type: none"> <li>- Assessing needs for support staff, ring-fencing budget for this at proposal stages, ensuring places are in post from the onset</li> <li>- Exploring opportunities for embedding support staff as permanent posts in institutions (e.g. complementary support across projects)</li> </ul> <p><i>Identifying key areas of research governance, management and administration in need of improvement through a needs assessment and prioritisation</i> Considering needs across (i) structures, systems and policies/guidelines; (ii) skills and training; and (iii) staff</p> <ul style="list-style-type: none"> <li>- Identifying examples of good practice and existing capacity across the network and exploring the scope for their wider-scale adoption</li> <li>- Identifying research management training opportunities across the network and externally, to which access can be shared</li> </ul> <p><i>Early investment in 'solidifying' specific governance and management processes, to aid accountability, transparency, resilience and reliability:</i></p> <ul style="list-style-type: none"> <li>- Establishing financial management systems and reporting procedures required by funder</li> <li>- Specifying both vertical and <i>horizontal</i> lines of accountability and responsibility</li> <li>- Clarifying terms of reference for various committees, to ensure clarity in roles, responsibilities and commitments</li> <li>- specifying and agreeing on selection criteria for distribution of funding across the network and across activities</li> </ul>

*Important role played by funder as a facilitator of capacity-building interventions, from the onset*

- Close communications around financial management, reporting , grant terms and conditions,
- funder involvement in providing financial management training
- Creating channels for dialogue for all network partners with the funder to build a shared understanding and manage of expectations.

Exploring opportunities for donor coordination in terms of reporting requirements

***Building physical infrastructure: ICT, equipment and lab facilities***

Drawing on the findings from our baseline assessment, African institutions see improvements in ICT infrastructure as a very high capacity strengthening priority across the region; as essential for competitiveness in research and research collaborations, with current limitations being a significant barrier. This reflects also findings from the literature (e.g. The Africa Unit 2010); Volmink and Dare 2005). Our baseline assessment revealed that most researchers have access to the internet at their institutions, but there are substantial challenges related to the speed, reliability and quality of service. It is not uncommon for academics to use email providers other than those provided through a university infrastructure. One Director told us of travelling over an hour from his office to access the internet. In many countries, power-cuts further exacerbate the difficulties, something we have ourselves witnessed during the course of our interactions with the consortia. A need for more stable power-supplies was commonly expressed by participants in the baseline assessment. Access to requisite laboratory facilities and equipment varies widely between different institutions - with some very well equipped and some highly under-resourced establishments. According to the leadership of two consortia in particular, the challenge rests not only in upgrading infrastructure in the regions' universities, but in encouraging ways to share access to existing facilities and ensure better coordinated resource utilisation.

Consortia widely perceive support for infrastructure improvement in the initiative to be modest, but acknowledge that infrastructure strengthening is not the core purpose of the programme. Despite this, some consortia have noted that their early investments into improving the environment for research have been crucial for securing partner commitment to the initiative at early stages, for ensuring support from high level authorities in institutions, and for facilitating network communications. Box 5 highlights the diversity of perceived enablers of efforts to strengthen the physical environment for research in African universities and research institutes so as to facilitate research competitiveness and virtual collaboration in networked models of capacity-strengthening.

## Box 5. Factors perceived as early enablers of efforts to improve the physical environment for research

Strengthening research facilities and ICT infrastructure
<i>Even modest infrastructure investments help in securing partner commitment , and ensuring support from high level authorities in institutions</i>
<ul style="list-style-type: none"><li>- E.g. refurbished lab, new software, independent power generators'</li><li>- Tailoring infrastructure investments to needs of not only a project but the institution and region more widely</li></ul>
<i>Exploring creative ways to address limitations in physical infrastructure, ICT infrastructure and/or costs of remote communications and to make the most of existing resources</i>
<ul style="list-style-type: none"><li>- Skype as a cheaper alternative to video and teleconferencing; Using alternative internet service providers to those of university is the reality for many researchers, but not ideal solution);</li><li>- Promoting the sharing of access to existing facilities across the network, and within participating institutions in a specific country is perceived as a cost-efficient approach to addressing infrastructure limitations</li><li>- Addressing institutional barriers to sharing of existing infrastructure between researchers and projects</li></ul>
Training researchers on the use of newly acquired equipment

### Conclusion

This paper documented and critically examined key factors which have influenced the set-up and early evolution of the African Institutions initiative, and examined how emerging insights related to existing literature and gaps within it. We explored the reality of implementing institutional capacity strengthening interventions through the example of a highly networked and African-led model, in particular at early stages of capacity building efforts when foundations are being laid down. We reflected on the substantial transformative potential of the capacity-building model in which the African Institutions initiative is rooted, on associated challenges, and examined some of the core strategic concerns affecting the day-to-day reality of capacity building in the funded consortia. Our findings broadly support existing thought within the global health research community about the importance of institutional strengthening for the sustainability of outputs and impacts from research capacity-building investments, but we went beyond identifying important capacity building issues to describing the nuances of these issues and identifying ways by which challenges are being addressed in every-day reality of capacity-building on the ground, with the aim to shed light on prospective effective approaches. The experimental approaches and enablers of capacity building reality (as being implemented by the consortia) are summarised in Boxes 2, 3, 4 and 5, focusing on interventions directly geared at strengthening research capacity at the levels of networks and institutions (with sustainable institutions important for strong and sustainable networks in the long term).

All of these insights on perceived enabling mechanisms relate directly to the process dimension of the African Institutions initiative theory of change and logic model introduced earlier in this paper. Exploring and unravelling the intricacies of the processes involved in setting up and incubating health research capacity strengthening initiatives of this nature was a key aim of our paper, particularly given the importance of process in understanding causal pathways to impact. Clearly, not all of the consortia

in the initiative are using all of the mechanisms summarised in Boxes 2, 3, 4 and 5, but we hope they reflect the diversity of perceived options, enablers and experimental approaches being taken, and evoke reflection and discussions in the wider global health community. Our intention in illustrating these issues was also not to be prescriptive and normative: it would be too early to do so, and it is likely that multiple viable and effective approaches to tackling research capacity building in Africa and associated challenges exist. Rather, we wanted to in a timely manner share the views and practices of African researchers and research leaders – based on their wider experiences and contextual knowledge, as well as the independent observations we have made in our role as an evaluator. As such, we hope this paper contribute towards addressing the scarcity of grass-root voices in current literature.

Our research to date places strong emphasis on the importance of integrated approaches to capacity-building coupling concerns for individuals and research training with those for the gradual transformation and improvement of professional practices supporting research activity (governance, management, administration) and physical infrastructure, and these arguments have also been made by others (e.g. Lansang and Dennis, 2004; Whitworth et al, 2008; Nchinda, 2002; Gyapong and Ofori-Adjei, 2011; Ghaffar, IJsselmuiden et al. 2008). However, Chataway, Smith et al. (2005) identify that funders and local stakeholders strongly advocate for institutional capacity building, but diverge in terms of what their main priorities are, in this regard. The different areas of institutional capacity-building reveal a complex array of approaches that can be taken at the institutional level, but also a lack of consensus on the appropriate balance between focusing on different potential priority areas for institutional capacity strengthening within institutions. We hope to have re-iterated complementarities between different capacity-strengthening aspects in this paper and exposed how efforts to simultaneously tackle the foundations for sustainable capacity-building are unravelling in everyday reality in a particularly large-scale, innovative and comprehensive capacity-building initiative.

Finally, there is a vacuum of insights as to how perceptions on the efficiency and effectiveness of specific interventions changes throughout the life of complex and long-term efforts. Yet perceptions strongly influence actions. By exposing the issues of importance and relevance at the very beginning, (and returning to them at later stages of initiative life) we hope to in a future research agenda contribute to demystifying the evolutionary dynamics and dialectics of international, collaborative but African-led efforts to build and sustain knowledge-based competitiveness of African countries and the region more widely, in the field of health research. The African Institutions initiative's independent real-time evaluation provides timely data for learning about how such initiatives develop and change over time and facilitates adaptability, while also aiming to build local capacity to implement similar evaluations in the future.

The experiences of the initiative to date outlined here raised a number of important questions around how African-led networked research communities can thrive and prosper for the long term. As the initiative continues to evolve, we hope to learn more about how priority areas of collaboration are enabled and barriers addressed. This includes further enriching insights on questions such as: How can dispersed individuals

and institutions, working across geographies and disciplines be brought together into vibrant African research communities, embedded in global scientific landscapes, and with sufficient critical mass? How can this be done in a context of new relationships, changing power-dynamics, and resource disparities between partner institutions and ICT infrastructure limitations? What are the most sustainable and efficient mechanisms of developed country partner contributions to African-led capacity-building efforts? How is African ownership changing incentives for participation by northern partners and the nature of their engagements? How do decisions on merit or equity-based funding distribution and broad or narrow thematic focus in capacity-building consortia influence pathways to critical mass and associated decisions on network sizes and structures? In the context of strengthening governance and management capacity, how can efforts taking place at institutional level best be complemented with gradual transformations in region-wide practices to enable efficient and effective research? This applies to aspects such as raising the profile of and support for research activities from universities and national ministries, coordinating the efficient sharing of resources (both physical infrastructure, human resources through joint appointments for example, and training curricula and standards), ensuring step change in the sustainability of research career opportunities, merit-based promotion trajectories and of support systems for such endeavour.

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