Research Universities in Africa

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Published by African Minds

Bunting, Ian and Nico Cloete.
Research Universities in Africa.
Project MUSE. muse.jhu.edu/book/63497.

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Chapter 7

Knowledge and networks

In this chapter, we shed light on some formal features of Herana and of the evolution of the global science system in order to deepen our grasp of the possibility and limits of networks like Herana and of the dynamics of the global science system more generally. We will do that through the lens of the theoretical concept of a ‘network’.

The first section of the chapter considers some general characteristics of networks; the second considers Herana itself as a network; and the third section considers the global science system as a network in order to see how that might impact both on emerging scholars from the developing world, and on the operation and possibilities for development of the national science system and the economy. The chapter concludes with a few brief comments on the implications of understanding development projects in network terms, particularly those projects with ambitions of establishing productive links with the global network of science while remaining relevant to local development priorities.

If our singular focus on networks seems forced, it is because we wish to foreground a particular understanding of an increasingly salient organisational form. We are certainly not suggesting that it is only networks that matter. Rather, we wish to suggest that networks as a form of social arrangement is often overlooked or goes unrecognised in favour of other arrangements (such as institutions) that may be less suited for the ambitions of knowledge-for-development projects.

Why networks matter

The network as a particular type of social arrangement does not necessarily capture all the social dynamics that account for the success (and limitations) of Herana. The dynamics of social institutions may also provide insight and, as Owen-Smith and Powell (2008: 11, 24) argue, networks and institutions should be regarded as ‘co-constitutive’. We
do, however, believe that our use of the concept of the network departs from more conventional notions of networks as merely comprising of contact lists or links between institutionally-bound actors. Instead, at the risk of oversimplification, we see networks as flows of information dislocated from place, infinitely scalable and occurring on a global scale in real-time, resulting in a new way of conceptualising how social arrangements are formed (Stalder 2006). We also see networks as an increasingly central form of social organisation in the global world characterised by the emergence of the knowledge economy and the age of information.

Like institutions, networks are durable sets of social arrangements directed to coordinate a set of common purposes. Networks have been a form of organisation that can be found in all forms of life. They have become far more salient since the 1950s as an organisational form particularly appropriate to organising social life by means of the new technologies of communication, allowing for both space (or distance) and time to be compressed, allowing in turn simultaneous communication of multiple participants in real time over great distances, where only common purpose governs the terms of interaction. In other words, today’s networks are profoundly different from traditional social networks. As Castells (in Stalder 2006: 181) explains:

> to be sure, networks have always existed in human organization. But only now have they become the most powerful form for organizing instrumentality, rather than expressiveness. The reason is fundamentally technological. The strength of networks is their flexibility, their decentralizing capacity, their variable geometry ... Their fundamental weakness, throughout history, has been the difficulty of coordination toward a common objective, toward a focused purpose, that requires concentration of resources in space and time within large organizations [...]. With new information and communication technology, the network is, at the same time, centralized and decentralized. It can be coordinated without a centre.

Actors wishing to join a network, and thereby to become a ‘node’, will be vetted by a more or less stringent gatekeeping process. Some networks are ‘closed’; the criteria for entry are highly specified, and only those who meet the criteria for entry are granted access. Others are less stringent; and some are ‘open’, which is to say, anyone can in principle join. In many cases, this ‘openness’ is more apparent than real, because the principal rationale of every network is to pursue a specific purpose or set of purposes. This means that the principal criterion for would-be
members of the network is that they are able to ‘add value to the network’ (Castells 2011: 774), that is, to the central purposes of the network.

As we see further below, the global science system is apparently open, but those that do not add much value simply get ignored: they will not gain citations, get invited to collaborate, or otherwise gain peer recognition. The other side of this coin is that entrants must themselves feel that it is in their interests to belong to the network. When they no longer perceive the benefits deriving from membership, they will leave the network. Members must add value; networks provide benefits. This is what sustains the network.

The principal form of social organisation and integration up to the advent of the new communication technologies was hierarchical, a principle of organisation that is an expression of the power and interests of an elite. This was and is the case whether we consider the state form itself, the military, organised religion, or the bureaucracies of the civil service. It was a command–and–control structure that proved its superior organising ability for centuries before the advent of electronic communications technology. The principal of organisation and integration of networks is horizontal, or ‘flat’. There is no central organising power vested in a person. What controls the network is a set of rules and codes which organise network interaction. Castells calls this set of rules and codes the network ‘programme’ (Castells 2009: 20), and the person, or usually a set of people, who set the programme in the first place have what he calls ‘network power’. These are the ‘programmers’ (Castells 2009: 42–47). However, once the programme has been set and accepted as the network programme, it develops something of a life of its own. In Castells’s terms, the programme becomes ‘self-configurable’. This contributes to one of three features of networks that make them distinct from hierarchical organisational structures. These are: speed and flexibility (adaptability and self-configurability); scalability (the ability to add or lose nodes); and survivability (there being no centre that can be ‘captured’ as in hierarchical organisations, although re-programmers and switchers can certainly disrupt or change the programme).

This latter point raises a critical feature of networks that bears both on Herana as a network and on networks of scholars and researchers that organise the focus of global scholarship. This is that networks do not respond well to regulatory forms that originate in hierarchical forms of social organisation. Of course, all academics ply their trade at a university, which is one of the oldest and most enduring hierarchical forms of organisation. But increasingly most academics also practice their scholarly activities in scholarly networks or in international and global forms of collaboration that are not easily steered by plans and
priorities set by the university or the national polity, even though they are incentivised and remunerated by their universities. We will examine some of the risks and opportunities this potential disconnect poses to the continuing vitality of Herana, or to scholarship in other networks.

**Herana as a network**

Before Herana, the eight universities were doing little to organise and coordinate their research activities and to record their outputs apart from setting out aspirations and ideals about research in their annual plans (see Chapters 2 and 6 above), including their aspiration to join the global network of science comprised of ‘excellent’ and ‘world-class’ research universities.

Most importantly, most of the universities had yet to develop a systematic data capture system that could provide them with robust and stable evidence on which they could make assessments of their academic core track record, and which was essential for strategic planning and decision-making. The first opportunity Herana thus offered the would-be Herana institutions was that they would receive expert collaboration to develop the instruments that would make this possible. This was the core resource that Herana offered. The price of entry was that they would commit to the collective process of indicator, instrument and target development.

Herana therefore had criteria for entry into the network, which were that members had to undertake to develop a data collection and processing system, and maintain it for the duration of the project. These criteria were subscribed to for the duration of the project with only the University of Cape Town providing some resistance because its extant data collection and processing systems did not mesh effortlessly with the standards (indicators) accepted by the network.

An aspiration to be a research university and the apex contributor to the national science system were more implicit requirements. Again, these criteria were tested in the Herana network. The Nelson Mandela University was originally the university from South Africa invited to the network. While it easily met and committed to collecting and processing the data required by Herana, it was excluded from the network after Phase 1 of the project by the other university nodes because it did not meet the criteria of being an apex institution in the South African science system. It was replaced by the University of Cape Town. It is important to note that by that stage it was not CHET or the Herana project team that brought the University of Cape Town into the network, although they might have been the ones actively negotiating their participation. A space was created for a new node in the network because the other nodes
in the network authorised its inclusion based on the criteria established by the network.

As indicated above, when nodes in a network no longer perceive the benefits deriving from being part of the network, they leave. This was also observed in Herana when the University of Nairobi ceased to participate in the Herana network. Rather than providing benefits to the University of Nairobi, the network exposed the relatively poor performance of the university in relation to other important nodes in the network, principally Makerere University.

Chapter 2 details the development of the founding ‘principles’ of Herana into a set of six propositions, which were then operationalised and successively refined into a set of indicators and their criteria for collecting robust, comparable evidence on the operation of the academic core over time. Both input and output data were collected, and notional targets set for each of the core data indicators. The combination of input and output indicators as defining characteristics of the research university in Africa differentiated Herana from other assessments of research performance. However, as shown in Chapter 2, the indicators that came to be most critical for the universities’ aspiration to be ‘research-led’ were the high-level outputs of doctoral graduates and research publications.

This would seem to suggest that Herana was at root a developmental exercise, and indeed, a good deal of development went into the fashioning of the final product. But as the chapters in this book also make clear, Herana was both a research project mapping academic core trends and comparing them between the eight institutions over time; and a development project, helping the institutions to map their own data, and to use it for strategic purposes. In this sense, Herana was a developmental capacity-building network. From this development perspective, what Herana set out to develop was the joint construction of a data tracking system that none of the universities possessed at the start of the process.

This meant that, insofar as the universities even wanted to track their knowledge production activities, they couldn’t, because they did not have systematic methods nor instruments to do it with. What is more, many of the institutions did not even realise what they didn’t have, so the first task was to persuade them of its long-term value for their strategic planning and policy development. Herana’s first task then was to generate institutional buy-in. This had to happen at the top, at the level of the planning departments, but also at the level of the faculties who had to assemble and supply the raw data to the planners. They had to buy in, and they had to stay in. And by and large they did.

Herana had then to generate a rolling consensus over the evolving categories of capture, taking into account the local realities of either poor
record keeping and data gaps or legacy data systems that could not readily provide the necessary data. Through this sometimes-thorny process, Herana had to keep everyone in the project so that when it was done, the final instrument was perceived by all as thoroughly legitimate. And with this instrument, all the partner institutions had a mechanism for longer-term institutional planning and steering, and the wherewithal to compare themselves to their peer partners on the same indices.

If we consider Herana as a network, we can see that Herana actually comprised the more visible, external network of the eight institutions – the network proper – as well as inner subnetworks that legitimised and guided the process of network formation and nourishment.

It would be natural to say that there was a single subnetwork and that the subnetwork of Herana was CHET. But it would be more accurate to say that there were two Herana subnetworks or expert clusters connected to the institutional network. The first subnetwork was an expert group recruited by CHET for their expertise in, and deep experience of, data management. The second was also an expert group but their expertise lay in higher education studies, particularly related to matters of governance and institutional change.

This expert data-subnetwork knew their way around data, how to clean it, how to configure it, how to use it. To put that another way: The network’s prime mover, the CHET Board, compiled an expert team who proved equal to the developmental job, and who also stayed in until the end of the process. Together, this team, in Castells’s terms, was the network programmer which became the custodian of the network standard and its guarantor of probity and efficacy. What can also be observed is that once the programme had been set, it became very difficult to change by any one actor; equally the successive refinements of the programme show the ease with which re-configuration could happen with a coordinating programme structure regulating the process and to whom the process was accountable.

This data expert subnetwork assumed the role of the network programmer in a singular way. It was not itself an interested party in what the standard should look like. Its interest was from the start on design coherence and operational implementability. It set itself up, not as a contending player, but solely as the custodian of the standard and its development. Each institution became committed to participation and the task of setting up institutional systems; in return, the institutions could, in a grounded way, benchmark themselves for the first time against both their immediate peers and against the apex peer in the network, the University of Cape Town. And because CHET published the Herana data under an open license on its website and in online data repositories, other universities, researchers, policy-makers and donor
agencies are able to access the rich comparative data for further analysis. By doing so, the programmatic standards set by Herana may propagate to other emergent networks in the global system of science.

While this subnetwork did not deliberately devise a programme to contend with the existing programme of the global institutional network – one founded on institutional reputation, increasingly defined by the standards of the global rankings agencies – it did provide an alternative set of criteria and standards that the eight African universities could buy into.

The second subnetwork of higher education studies experts was simultaneously connected to the data subnetwork and to a network of international higher education experts. The connection between the two subnetworks was important because while the data subgroup may have taken a technical and pragmatic approach to creating the standards of the network, the higher education expert subnetwork conferred legitimacy on the concepts in the Herana toolbox. In particular, the concept of the academic core and the indicators for measuring the academic core of a university were developed through ongoing interaction between nodes in the subnetwork, as well between the expert data-subnetwork and the network of universities.

The higher education subnetwork in Herana played an important role in legitimising the network and its programme in relation to other network-like organisations in the global network. The success of the subnetwork’s work of legitimising the Herana network is apparent in the formal interest shown by, amongst others, the Guild of European Research-Intensive Universities, the International Panel on Social Progress, the Global Higher Education Salon of the International Institute of Education, the Commonwealth Tertiary Education Facility, the International Higher Education Research and Policy Roundtable hosted by Shanghai Jiao Tong University, and the Consortium of Higher Education Researchers (CHER).

The subnetworks in Herana illustrate some of the advantageous features of networks over hierarchical organisational structures. The network was both scalable and flexible, and did not depend on any single central organising node for its survival. Some may argue that CHET was such a node, but CHET itself operates as a network organisation. The composition of the higher education subnetwork changed regularly during the three phases of the Herana project. Experts entered and exited the network as the value proposition of the network changed or as the network no longer valued the contribution of the expert. The subnetwork of data experts was always going to become redundant once the network had been programmed. And the institutional nodes which are strictly speaking not nodes, but clusters of nodes made up of institutionally-
sanctioned representatives, saw their composition change as those representatives either left the institution, or were promoted to new positions. But neither the entry and exit of experts and institutional representatives nor the diminishing value of a subnetwork jeopardised the survival of the network.

Herana research showed that most of the Herana institutions were far closer to each other at the start of the process than at its end. At the start of Herana, the institutions were mostly clustered together towards the bottom end of the scales. With the network standards and targets clarified, stabilised and agreed upon, some institutions responded with greater alacrity than others to the challenge of expanding their research activities and outputs. The network standard then was a means for differentiating the institutions on a continuum from research-aspirant to research–led. This picture will change and develop as the institutions move forward, resources and conditions permitting.

Differentiation in network terms is not insignificant as it provides the network with one of its key distinguishing characteristics from more communal social morphologies: the heterogeneity of its nodes. As Stalder (2006: 179) explains, a network is ‘not based on the idea of sameness, but on the idea of difference among its constituent parts. As much as nodes are defined by a network, they still retain a crucial degree of autonomy that prevents the network from collapsing into one big mega–node’.

At the outset, the centrifugal forces were very similar in Herana institutions and again, as we saw, it was the very poor physical resources which inhibited an optimal use of space and time for serious research, together with the ongoing political instability on the campuses, that created the conditions to force promising and productive researchers away to institutional environments and subnetworks more propitious for research, invariably overseas. For example, Coussens et al. (2018) report that nearly 7 000 African scientists leave Africa every year, citing as principal reasons the lack of mentoring, resources and funding. These conditions will have to change for the Herana institutions to realise their research aspirations.

Be that as it may, Herana has left the institutions with an endogenous instrument to help steer the institution by taking rational strategic choices based on hard information. The institutions can now choose to maximise or minimise their vulnerability to centrifugal or centripetal forces, admittedly by taking what will amount to being tough choices. The network standard is thus a tool for rational strategic decision–making and comparison, whether it gets used in that way or not. But more, the network of the eight universities continues to exist as a collegial resource even if the funding cycle that powered the original
process has ended. For example, the ‘emerging research’ institutions can provide valuable lessons for the research aspirant institutions, since their material and social conditions are still not that far apart. The network ‘glue’ will continue to be the Herana programme, and possibilities for productive collaborative work amongst the institutions will depend on the institutions continuing to maintain their data capture systems based on the original Herana programme. Once the institutions let the network programme lapse, the network will begin to wind down, unless a successor network is established.

**BOX 2: ARUA: A FOLLOW-ON NETWORK OF RESEARCH UNIVERSITIES?**

The African Research Universities Alliance, or ARUA, was inaugurated in Dakar in March 2015 to create a network of 16 leading universities in Africa. The network’s purpose is to enhance the quality of research done in Africa by African researchers. Its approach is to bring together a number of peer African institutions willing to work together by pooling their own limited resources with a view to generating a critical mass that could more effectively support research. Underlying this is the conviction that ARUA universities could leverage this critical mass for additional resources from outside.

There is some hope that the newly established ARUA network will take over the momentum that Herana created. The fact that the vice-chancellor of one of the emerging research universities was appointed as the first chair of the ARUA board, and that its secretary-general was the vice-chancellor of one of the emerging research universities in the Herana group, bolsters hopes of continuity. As does the fact that five of the eight Herana universities are participating in ARUA.

Much, though, will depend on the network dynamics set up by this fledgling network. Has it, for example, assembled as Herana did an expert network to help inaugurate the network programme and its standard? Has it a clear set of criteria for entry? And are those criteria informed by imperatives related to research? The exclusion of universities found by Herana to be research-oriented or research-aspirational, and the inclusion of those found to be research-led or emerging research universities (see Chapter 2), suggests that ARUA may well be applying research-related criteria. However, there is also some deviation. The inclusion of the research-oriented University of Dar es Salaam suggests that there may be political as well as research criteria in play.

Other important questions for ARUA are: What value do the members add? What benefits do the network provide? Without clear answers to these questions, the new network will not thrive.
Above all, the success of ARUA as a network will depend upon whether the universities see value in the network, and whether they are successfully bound together to a common set of purposes in the form of a network programme. If not, we can expect the universities to gradually drift away.

ARUA member universities: University of Lagos, Nigeria; University of Ibadan, Nigeria; Obafemi Awolowo University Ille-Ife, Nigeria; University of Ghana; University of Dar es Salaam, Tanzania; University of Nairobi, Kenya; University of Cape Town, South Africa; University of the Witwatersrand, South Africa; University of Rwanda; University Cheikh Anta Diop, Senegal; Makerere University, Uganda; University of Stellenbosch, South Africa; University of Pretoria, South Africa; Rhodes University, South Africa; University of KwaZulu-Natal, South Africa; Addis Ababa University, Ethiopia.

Global research networks

In considering the future prospects for the Herana programme, and indeed for the eight Herana institutions, it will be fruitful to consider the larger science field globally, and some of the dynamics that are taking it in specific directions. Science is growing in a distinctively new way and can be considered ‘a new organisation on the world stage’ (Wagner et al. 2015: 1). It is increasingly collaborative, for example, and the percentage of international co-authorships has more than doubled in 20 years (Wagner et al. 2015). Global science can be considered as a global network, though, in reality, it is made up of a myriad of subnetworks or ‘invisible colleges’ (Wagner 2008), each driven by the epistemic interests of its participants, and of widely varying lifespans. Wagner and her collaborators argue that overall the science network is robust, and is not affected by the appearance or disappearance of nodes, neither is it affected by the activities of individual agents. This is because science self-sets the scientific agenda at the cutting edge of the disciplines and depends neither on individual participants nor on and regulative structures external to global science.

There are three noteworthy properties of the global science network. The first is that it is open, in the sense that participants join and leave in a dynamic fashion. But its openness doesn’t mean that everybody communicates or collaborates with everyone else. It is an association of ‘weak ties’. Though there may not strictly be a price of entry, there is a price of recognition, which is reputation and resources. The ‘value’ determining attention in global science is thus either what track record the entrant brings or what resources of value to other members is brought
in. For would-be entrants from developing countries, resources may be an under-appreciated good; science is always seeking to expand its fields of testing and application and developing countries can bring opportunities – like access to rare diseases – that the higher profile members of the network might be eager to gain access to.

The second property is that it is what is called a ‘scale-free network’ (Wagner 2008: 39). That means that very few participants or nodes link to a great many nodes, but most nodes (or participants) are linked to far fewer nodes. The mutual contact rate drops off sharply. This can be seen in the citation and collaboration rates in various fields, where a few ‘network stars’ (Wagner 2008: 41) are ‘high-cites’, the rest tailing off sharply until there is the bulk that have modest citation and collaboration records at best. This feature of being scale-free, says Wagner, is typical of a complex adaptive system.

The third property is that the science network is one that is potentially very rich in resources. It attracts the most productive and innovative researchers, who bring with them in turn access to lucrative research grants, connections to many other nodes with resources. This means that the best researchers in a field are invariably linked to the network. It also means that researchers join and collaborate in the network ‘not because they are told to but because they want to’ (Wagner et al. 2015: 2). They gain direct and indirect benefits from access to expertise, infrastructure, funding and exposure to an ideas hub that is simply not available ‘back home’. Since these scientific incentives drive the activities in the science network, it means in turn that the science system is essentially self-directive and increasingly de-coupled from institutional goals and from national science policies. This has a number of major entailments we will explore below.

The global science network is growing fast, and there are now very many more countries than there were 20 years ago in the dense centre of the network, including more and more developing countries which now compare favourably with more low- and medium-income countries in terms of scientific output.16 For example, by 2010, the BRIC countries – Brazil, Russia, India and China – had ‘about the same percentage of high-quality science (publications, as measured by the Science Citation Index) from these four countries as for North America and Europe’ (Wagner & Wong 2012: 1001). At the same time, however, there are a great number of indigenous publications that are invisible and therefore remain ‘unseen’ by the global science network, resulting in lower rates of citation.

16 For example, in 2016, South Africa produced more published papers than did Norway, Egypt, Romania, Singapore, Finland and Greece, virtually the same as Israel, and just less than Portugal and the Czech Republic (Marginson 2018: 61).
As the overall network grows, so the interrelationships become denser, which means in turn that there are fewer highly central nodes, and it becomes less important to have direct contact with the ‘star’ nodes. The global science network no longer displays a core/periphery grouping (Leydesdorff et al. 2013: 92). ‘New entrants are able to find collaborators without having to pass through a core of highly powerful (or central) nodes’ (Marginson 2018: 8). This means in turn that fewer nodes dominate the network and contributes to the increasingly ‘democratic’ quality of the global science network (Wagner et al. 2015: 6).

The innovation space in all countries is now directed and regulated by two different logics, one directed by national innovation plans and investments, the other driven by the logic of the science network which operates at a tangent to these national plans. ‘This dynamic system, operating orthogonally to national systems, is increasingly difficult to influence, and even less amenable to governance as it grows’ (Wagner et al. 2015: 12). Wagner (2008: 105) says forthrightly: ‘the (related) concept of a “national innovation system”, while relevant in the twentieth century, (is) waning in relevance and will do little to help build scientific capacity in the developing world’.

This creates difficulties not only for central ministries in developing countries still trying to direct development through command-and-control structures that seek to dovetail national and institutional development plans. It also raises questions for national funding regimes. As Marginson (2018) says, nation-states are still the principal investors in large scale national research efforts, and they do this to secure competitive advantage over other nation-states in the global polity; at the same time, the global science network is globally cooperative and obeys its own dictates. The question might then arise as to the benefits that accrue to nation-states in return for their investments. For Castells, Wagner and Marginson, this question is misconceived and is brought about by clinging to what Beck (2005: 50) has called ‘methodological nationalism’ and Wagner (2008: 105) ‘scientific nationalism’. This describes an attitude where countries regard their economic and scientific standing solely from a national point of view, and compete with other countries for economic standing and dominance.

The account developed here suggests that the terrain has changed. Benefits will still accrue to nations and national systems, but more through spill overs, less by edict, and what now becomes critical is the number of scientists a country has that are a productive part of the global science network, not whether or not the scientists and universities of a country are or are not pursuing science according to a national innovation or development plan. A key way to do this is to send budding researchers to prestigious universities active in the global science network. China is
one country which seems already to be reaping the benefits of this lesson (Marginson 2018).

There are a number of implications for developing countries worth teasing out briefly. At the national or state level, the new dynamics of global science pose distinct challenges, as well as benefits, for a nation-state wishing to advance development. While it is true that large, centrally organised and state-underwritten scientific projects still exist and thrive, it is also true that these projects are not only in the minority, but that most new innovations are not of this nature, being laterally organised by the scientists themselves, and it is these laterally distributed projects that are growing at a far faster rate than the centrally organised ones (Wagner 2008: 29).

What should a central ministry do? As we said above, science policy authors writing about this are unequivocal that states must change their ‘nation-first’ vision, they must drop their ‘scientific nationalism’. It should be said that not all scientific fields are equally globally driven, and Wagner (2008) distinguishes between those fields where science is principally domestically driven because of their local contextual relevance – she mentions soil science, agriculture, aquaculture, biology and hydrology (Wagner 2008: 79) – and those ‘hot’ fields like astronomy which are firmly collaboration-driven and global. Given this, the first developmental priority for a state is to decide which locally relevant fields are required for national development, and which global fields would also benefit national development. On this basis, the national planners could develop a dual strategy which Wagner calls ‘sinking’ and ‘linking’: sinking investments into fields of local relevance; and linking promising emerging scientists to the best global networks: ‘In science and technology, then, the question facing a developing country .... is not how to keep smart people home. It is not even how to get them to return home. The real challenge is how to get a country’s researchers into the new invisible college ... and then attract other researchers to work on local problems’ (Wagner 2008: 67).

It is all too clear that all the countries in the Herana project are still immersed in scientific nationalism. National plans are framed at a distance from, and quite unconnected to, the potential innovative researchers in the universities. As Chapter 5 shows, the incentive systems for the Herana institutions are not targeted and far from adequate. Above all, there is little recognition in the ministries that the generative hubs of science have moved to a global level, and that this is potentially of great benefit to developing countries; as Marginson (2018: 70) says, ‘collaborative global science advances modernisation in emerging countries. It helps to build stable states and functional economies, diffuses technologies, enhances economic and cultural exchange, and
“thickens” global civil society’. But ‘policy-makers are not only slow, but reluctant, to grasp the importance of the new networks’ (Wagner 2008: 4).

The Herana institutions and countries have yet to embrace the potentials of global science in a focused way and are as yet not privy to the benefits and riches that will accrue when they do: ‘they must still ‘learn to manage and benefit from a (global scientific) network’ (Wagner et al. 2015: 8). We would suggest that of particular relevance to Africa is that donor funders also have not yet realised the potentials of networks for development. This is apparent in their preference for funding individual researchers or institutions and in their reluctance to fund networks.

A similar switch of perspective is required at the institutional level. The national rankings have sharpened inter-institutional competition, and institutional leaders have developed a kind of zero-sum mentality which does not encourage collaboration, especially not with what are perceived as near-rivals in the rankings. Yet co-publications with global peers raises visibility and increases citations, lifting the quality of science produced as a consequence. Institutional policy should not only encourage collaborations, but also send emerging young scholars to prestigious overseas institutions for doctoral and post-doctoral work and for research attachments with prestigious research groups. The benefits will be large. Yet, as with scientific nationalism at the national level, institutions all too often see their mission as being to ‘keep smart people at home’ (Wagner 2008: 67).

At the level of the individual researcher, the benefits are perhaps more obvious. There are direct benefits to be leveraged, including access to unusual resources, to funding and to leading interconnected peers. There are also indirect benefits, like access to evolving specialised knowledge and ideas, recognition by peers and specialist membership. Exposure to eminent scholars in a budding researcher’s career gives them early advantages which they cannot get ‘at home’. The generative effects of belonging to a productive network cannot be overestimated, and such early interaction with eminent global peers has been shown to have a significant influence on whether an emerging researcher later becomes eminent or not (Reyes-Gonzalez 2018). Not having such exposure will in future be a significant brake on a young researcher’s future career prospects and standing if it is not so already.

The account presented above may create the impression that switching to a ‘sinking and linking’ approach to planning and funding the science system is straightforward. It is not. The distinctive logics or programmes of the networks of science and politics will clash, and nationalism may continue to trump cross-border collaboration and the formation of
productive global networks of scientists. Scientific networks will falter when their programmes are superimposed by agents who do not share the norms and values of scientists. Universities and researchers wishing to participate in the global network of science will need to attract the attention of star nodes in the network, and they may resort to questionable tactics to do so; tactics that may not be in the best interest of science. And even when universities and researchers successfully attract the attention of stars in the network, it cannot be taken as given that standards subscribed to by the network will result in the meaningful participation of new entrants.

Possible implications of network thinking

This chapter is a product of a realisation by the Herana team that it had in its previous reflections on the contribution of the project overlooked the importance of networks, both in how the project organised itself and in how the global research landscape is arranged. But what is the value of this realisation? We suggest that its value lies in bringing to the fore a different way of conceptualising and designing knowledge for development projects, and that such a different approach is more likely to yield the expected benefits. This requires, first and foremost, to augment our thinking with a network perspective. Several possible implications then become apparent.

First, a 2007 review of development aid (Maassen & Cloete 2009) concluded that while many development aid agencies adhered to an instrumental notion of development, their own countries had shifted to an engine of development model. In 2018, it appears that many aid agencies are still predominantly funding individual projects in particular institutions and countries. In 2017, CHET developed a proposal for an international network in higher education studies and it was dismissed by Carnegie on the grounds that it cannot fund researchers from the US and Europe as part of an Africa grant. Such funding models run counter to a globally networked understanding of knowledge production and exchange. Put differently, a change to network thinking makes the case for supranational funding structures that value borderless collaboration over national interests.

Second, no longer should projects be thought of exclusively in national terms. Designing and investing in projects in terms of local relevance without consideration of how they link to global knowledge networks will increasingly deliver less by way of social returns on the investments made.

Third, a change to network thinking also requires those investing in development and research to accept that the returns on their investments
are more likely to accrue indirectly. In instances where research funding is directed at linking rather than sinking, it is not that investments will be without social or economic impact, but that impact will follow only after the effects of new knowledge produced within the scientific network agnostic to national boundaries travels circuitously through global communication networks to produce often unexpected innovation.

And, finally, for universities and researchers in Africa, a network approach offers hope in the sense that it provides an alternative to the approach that depends on a pact between society, the state and the university that have yielded development benefits for other nations, but may well be out of reach for African countries in the foreseeable future.