Research Policy xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Research Policy

journal homepage: www.elsevier.com/locate/respol

Research Article

Factors influencing research collaborations in Kenyan universities

Petronilla Muriithi[a,b,*], David Horner[a], Lyn Pemberton[a], Hesborn Wao[c]

[a] School of Computing, Engineering and Mathematics, University of Brighton, Brighton, BN2 4GJ, United Kingdom
[b] School of Computing and Information Technology (SCIT), Jomo Kenyatta University of Agriculture and Technology (JKUAT), P.O. Box 62000-00200, Nairobi, Kenya
[c] Division of Evidence-Based Medicine, USF Health Program for Comparative Effectiveness Research (EBM − CER), Department of Internal Medicine and Health Outcomes, Morsani College of Medicine, University of South Florida, United States

ARTICLE INFO

Keywords:
Collaborative research
Academic scientists
Developing countries

ABSTRACT

This paper presents the results of an exploration of factors influencing the organisation and conduct of academic research collaborations in Kenya. A mixed methods research design, involving 248 academics in four disciplines across four major public Kenyan universities, was employed. The study reveals a relatively high level of collaborative research which varies by disciplinary areas. Resource dependence emerged as having a strong influence on decisions to collaborate for this community. This was mainly attributed to low levels of investment in funding research, at both the institutional and national level. At the institutional level, inadequate policies, high levels of bureaucracy, competition among local institutions, weak links with industry, and a major focus on teaching as opposed to research, were reported as barriers to collaborative research. These contextual issues informed the resulting discussion of factors that affect collaborative research in Kenya.

1. Introduction

Past studies record a gradual increase in collaborative research over the years (Adams et al., 2010; NSF, 2012; Tijssen, 2007). Walsh and Maloney (2007) attribute this increase to attempts at solving global problems such as climate change that span disciplines and nations and advances in information and communication technology(ICT) that make remote collaborations easier. Gibbons et al. (1994) attribute it to attempts to solve practical problems affecting the society that call for expertise across disciplines and institutional boundaries.

The level and nature of collaborative research and attainment of associated benefits depend on the context within which research is conducted, and includes social, institutional, and technical environments. This differs between regions, countries, and even individual institutions. Although scientific collaboration is a multidisciplinary and widely researched area, majority of these studies have focused on research collaborations in the developed world. Reference to the issue in developing countries is mainly based on assumptions that need verification (Ynalvez and Shrum, 2011). Such reference includes generalisations made from bibliometric analysis in international databases, which point to low levels of research productivity (Adams et al., 2010; Adams et al., 2014; Mouton, 2008; Tijssen, 2007) and networking (Gaillard and Tullberg, 2001; Harle, 2009) from Africa. Bibliometric measures tend to under-represent research conducted in Africa (Mouton, 2008; Shrum, 1997). In developing countries, more priority may be towards research that addresses local needs such as poverty, food security, and disease control, resulting in much of the publications locally but not in international journals (Ynalvez and Shrum, 2011; Harle, 2010), hence reduced visibility.

This study sought to understand the nature and conduct of academic research collaborations in Kenya, leading to identification of influencing factors. It focused on collaboration at the individual level because, as Bozeman and Corley (2004) noted, 'many of the factors governing individual scientists collaboration choices remain very much within control of the individual, especially when the researcher works in an academic institution' (p. 600).

A number of studies refer to research collaboration as a form of interaction towards achieving a research goal (Laudel, 2002; Smith and Katz, 2000; Sonnenwald, 2007; Ynalvez and Shrum, 2011). However, differences arise in the definition of a collaborator. In this study, collaboration is defined as an interaction between two or more individuals, whether locally or remotely, within or across institutions or organisations, working closely together in a research project, to achieve a common goal(s). This definition differs from that of Ynalvez and Shrum (2011) who view collaboration as ties with individuals in organisation/institution outside the researcher's own.

* Corresponding author at: School of Computing and Information Technology (SCIT), Jomo Kenyatta University of Agriculture and Technology (JKUAT), P.O Box 62000-00200, Nairobi, Kenya.
E-mail addresses: pmuriithi@jkuat.ac.ke (P. Muriithi), D.S.Horner@brighton.ac.uk (D. Horner), Lyn.pemberton@brighton.ac.uk (L. Pemberton), hwao1@health.usf.edu (H. Wao).

http://dx.doi.org/10.1016/j.respol.2017.10.002
Received 16 October 2015; Received in revised form 27 August 2017; Accepted 2 October 2017

2. Related literature

Scientists collaborate for various reasons. Focusing on the individual/micro level, Melin's (2000) examination of reasons for, form and effects of collaboration established that most people view collaboration in terms of the gains, whether 'material, knowledge based, or social kind' (p.38). This view is supported by Sargent and Waters (2004) who break down motivating factors into 'instrumental' and 'intrinsic' factors. Instrumental motivation refers to resource based rationales including access to resources and special equipment (Beaver, 2001; Birnholtz, 2007; Duque et al., 2005; Katz and Martin, 1997) whereas intrinsic motivation refers to factors related to individual choic es and preferences such as boosting productivity(Beaver, 2001; Lee and Bozeman, 2005) and personal gains (Birnholtz, 2007; Katz and Martin, 1997). Knowledge based rationales include access to diversified expertise and special skills (Beaver, 2001; Hara et al., 2003; Sonnenwald, 2007)

The extent to which instrumental or intrinsic reasons influence collaboration decisions may depend on the existing conditions within the research environment. For example, Bozeman and Corley (2004) found that personal interest was a major determinant of American scientists' collaboration choices and strategies. However, with the majority of research systems in developing countries being constrained by limited resources (Gaillard and Tullberg, 2001; Harle, 2009), resource based and environmental constraints may outweigh personal interests in scientists' collaboration decisions in developing countries.

A number of models and frameworks have been developed to explain the process of scientific collaboration. Some focus on identification of stages and tasks associated with each phase of the collaboration (Kraut et al., 1987; Sargent and Waters, 2004; Sonnenwald, 2007), while others focus on factors that influence accomplishment of the tasks or performance (Amabile et al., 2001; Maglaughlin and Sonnenwald, 2005). Though some models address a range of factors across personal and process-specific issues, a single model may be insufficient to explain the process of scientific collaboration in the developing world. Kraut et al. (1987) and Vasileiadou (2009) models, for instance, mainly focus on the internal processes such as decision making, coordination and sharing information, thus falling short of explaining potential contextual factors influencing the internal processes. To encapsulate both internal and external environment factors, the variables identified for exploration in this study were mainly drawn from a synthesis of studies, models and frameworks in literature. We broadly classify them into personal, disciplinary, institutional, and resource availability factors (2.1–2.4) as presented next, forming the conceptual framework for this study.

2.1. Personal factors

Personal factors include the intrinsic motivating factors referenced by Sargent and Waters (2004), and factors relating to researcher characteristics and role of the individual in the conduct of collaboration tasks. Personal compatibility, an important ingredient of successful collaborative relationships, is influenced by individual work styles, approach to science, and personality (Hara et al., 2003). Personal differences may arise regarding perception and attitudes on various issues. These include information security issues (Walsh and Maloney, 2002), issues of trust (Olson and Olson, 2000), and differences in working styles of individuals from different cultural/disciplinary backgrounds (Sonnenwald, 2007; Amabile et al., 2001). Other personal factors include characteristics that define a person such as skills and capabilities, and prior collaboration experiences (Cummings and Kiesler, 2008; Sonnenwald, 2007; Hara et al., 2003).

2.2. Disciplinary factors

Disciplinary factors that may affect collaboration processes include the level of resource dependence, largely defined by the nature of the work in a discipline and the different disciplinary cultures and practices (Birnholtz, 2007; Melin, 2000; Lee and Bozeman, 2005; Whitley, 2000). The differences in the nature of intellectual fields mainly result from 'task uncertainty' and 'mutual dependence' with regard to both the field and scientists (Whitley, 2000). Work involving a higher level of interdependency may require more communication and coordination mechanisms (Cummings and Kiesler, 2005; Walsh and Maloney, 2007; Olson and Olson, 2000). No previous research in the region has examined differences in collaboration based on disciplines. This study sought to establish and seek explanations for possible differences between disciplines.

2.3. Institutional factors

The University plays a major role in the knowledge production process. Its role has continuously evolved, from the core function of teaching and training to creation of knowledge so as to contribute to the economy and meet societal needs (Martin and Etzkowitz, 2000). Thus, significant changes have been noted in the structures of university functions and external relationships, with more links with non-academic institutions and private organisations (Martin and Etzkowitz, 2000).

Prestige of an institution has been found to determine the kind of environment in which a scientist operates, for instance, in terms of research facilities, working with prominent scientists and contacts developed, thus affecting overall productivity (Crane, 1965; Long, 1978). In Kenya, older universities have much more established departments mainly in the traditional disciplines and enjoy such prestige. However, it is unclear if there are significant differences in volume of research and productivity between universities, a subject of exploration in this study.

2.4. Resource availability

Funding has been identified as a major constraint for research in Africa (Gaillard & Tullberg, 2001; Harle, 2009). Most African nations spend on average 0.4% of their GDP on research and development compared to a global average of 1.7% (UNESCO, 2012). Thus, research is highly underfunded, and mainly dependent on donor agencies and international organisations (Gaillard and Tullberg, 2001; Harle, 2009; Jowi and Obamba, 2013; Mouton, 2008; Shrum and Beggs, 1997). Overdependence on donor support may affect the type of research conducted and how it is conducted, as 'donors and international organisations continue to maintain a diversity of goals and interests in developmental issues.…S & T policy does not have its institutional locus 'within' the country' (Shrum & Beggs, 1997, p.1). Access to special equipment (Melin, 2000; Katz & Martin, 1997; Birnholtz, 2007; Beaver, 2001) and information resources (Harle, 2010; Duque et al., 2005) have been identified as being a hindrance to collaborative work. Though some studies involved scientists across African nations (Gaillard & Tullberg, 2001; Harle, 2009; Shrum and Beggs, 1997), the huge sampling frames used cast issues of representativeness and generalisation of results to a particular African nation. This study examined the extent and nature of resource based issues involving scientists in Kenya.

In sum, the above classification of factors formed the conceptual framework for this study. We examined the extent to which the factors determine involvement in collaboration and affect the levels and conduct of collaborative work. The following research questions were addressed:

1. What is the level of academic research collaboration in Kenya?
2. What factors influence the levels, motivation for, and conduct of academic research collaborations in Kenya?