AFRICAN RESEARCH UNIVERSITIES ALLIANCE (ARUA)

Towards developing a Collaborative PhD Program across ARUA Member Universities

Experiences from the University of Rwanda, Rwanda

A Research Report Produced for ARUA by the Human Sciences Research Council (HSRC)

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1. INTRODUCTION TO STUDY AND OVERVIEW OF COUNTRY

1.1 Introduction to the study

This report highlights the status of PhD education in Rwanda. The University of Rwanda, the only ARUA member university in the country serves as a case study to explore the nature of the doctoral programme within the country and the university. This is done in the effort of making recommendations towards the development of collaborative PhD programmes across ARUA universities. The report starts off by providing a brief overview of the country's socio-economic status which has a bearing on how universities organise PhD programmes, and which may influence the direction of the design of collaborative programmes as envisaged by African Research Universities Alliance (ARUA).

It further details are the national and institutional policy and operational frameworks for PhD programmes at the University of Rwanda, the nature of student access and progression policies across the programmes, opportunities for designing collaborative arrangements, and challenges that need to be addressed. The report is divided into five sections. The next section provides an overview of Rwanda's socio-economic and political dynamics, including a brief description of the Tanzania higher education landscape. Section three delves into the case study of the university and the two selected programmes. Section four presents the findings from the data collected from the two case study programmes. Section five provides some recommendations and conclusions.

1.2 Socio-economic profile of the country

Rwanda is a small and landlocked nation in East Africa. Rwanda was a German colony from 1900 until the end of World War I. After independence in 1962, the First Republic (1962-1973) opened the educational system to all children and founded the National University of Rwanda (NUL). Since 1962, the Rwandan government has actively sought to democratize educational access and to use the education system to produce a skilled labour force.

Following the 1994 genocide, international donors working in the country have increased and so has their attention to the social and political challenges facing the country. Post-1994, the country has relied on a combination of international donor funding and good governance policies to drive its development initiatives and social provisions. The country's main economic activities include agriculture, trade, hospitality, financial services, and energy. In

2021, the country's population was at 13.3 million and it ranked 160 out of 189 countries and territories in terms of the human development index (HDI).

Table 1: Rwanda Country and Higher Education Profile

Name of country	Rwanda
National population	13.26 million in 2021
GDP per capital	834 USD in 2021
Human Development index	An average of a country's adult literacy rate, life expectancy, and GDP per capita, Rwanda was ranked at 160 out of 189 countries and territories in 2021
Unemployment rate	19.4% of labour force in 2020
Main economic sectors/activities	Agriculture, trade and hospitality, financial services, and energy
Gross primary enrolment ration	131.3 % of primary school –age population
Gross secondary enrolment ratio	44.3% of secondary school population
Gross tertiary enrolment ratio	6.2% of tertiary school –age population
Number of public universities	2
Number of private universities	29
Name of participating university	University of Rwanda (UR)
Total number of PhD enrolment (latest statistics)	Not available
Number of PhD graduates (latest statistics)	6 in 2019
Higher education expenditure as % of GDP	0.66%
Doctoral production per million of population	Not available

Source: MINEDUC, 2019; Tvedten et al., 2019.

In terms of education, Rwanda, in its rebuilding strategies, has decided to invest more in higher education than most African countries (World Bank, 2011). While the majority of African countries and particularly in sub-Saharan Africa seek to invest 1% of GDP on higher education Rwanda remains at 0.66% with a renewed commitment to meeting the 1% R&D share of GDP by 2024 as stated in the 2020 Science, Technology and Innovation Policy (GoR, 2020b: 18).

According to the 2020 Global Innovation Index, Rwanda's performance in innovation is above expectations for its level of development for the 8th time, and it moves up three positions from last year to rank 91st in 2020. However, the same index has ranked the country very low on

Tertiary enrolments, quality and number of researchers, and the quality of the universities (World Innovation Index, 2020)[1].

1.3 Rwandan higher education sector

Rwanda's higher education structure is a complex system characterized by three distinct models of provision: public, private and public–private partnership. Universities and other further education institutions are classified under local and foreign institutions. The typology of these universities and other (public and private alike) further education institutions is distinctly based on whether they provide (research-oriented) general education, or technical and vocational education and training (TVET). For instance, the University of Rwanda (UR) – Rwanda's only public research university – was founded in 2013 from the merger of seven former state universities and institutes, with campuses across all five of the country's provinces (Twiringiyumana, Daniels & Chataway, 2021).

Rwanda's tertiary education sector is relatively small but has grown significantly in the past few decades (Schendel, Mazimhaka & Ezeanya, 2013). The Ministry of Education[2] (MINEDUC) provides a historical reference of this growth, which combines both High Learning Institutions (HLIs) and Technical and Vocational Education and Training (TVET) institutions.

1.3.1 Size and shape

While the system graduated merely 2,000 students in three decades between (1963, when the National University of Rwanda was founded and 1994), there are now 40 HEIs in the country with a total enrollment of 86,140 students (2019). Private higher education institutions dominate the enrollment with 50,421 of which public higher education institutions enrollment are 35,719. Together, private institutions enrolled 57 percent of all tertiary students in 2019. The overall number of students has doubled within the last decade while the tertiary GER jumped from 3 percent in 2005 to around 7.40 percent in 2019 of which enrollments are predominantly in undergraduate programs.

In terms of HLIs, in 2019 there were 29 private and private HLIs and 2 public HLIs

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[1] https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2020/rw.pdf
[2] https://www.mineduc.gov.rw/higher-learning-institutions#:~:text=A%20ten%20years'%20trajectory%20indicates,up%20from%20602%20in%202010.

(MINEDUC, 2019). The government of Rwanda continues to set up several higher education institutions throughout the country (Schendel, Mazimhaka & Ezeanya, 2013; MINEDUC, 2019). While there are only two accredited public universities, the total number of accredited private universities is 29. In 2019 there was a total of 89,000 students enrolled across HEIs in the country. Enrolments are predominantly in undergraduate programs. For example, in the 2016/2017 academic year, there were only six PhDs and 1,338 master's degrees among the 23,100 academic qualifications awarded. The Rwandan government through its Vision 2050 (RSIF, 2021) has realized that raising the level of educational attainment is crucial for the economic prosperity of the country. Nonetheless, "net enrolment in higher education is calculated to be 1 per cent, which is well below the Sub-Saharan African average of 6 per cent" (Tvedten et al., 2018).

Some of the initiatives Rwanda has taken in the quest to increase its human capital capacity particularly doctoral training is the Partnership for skills in Applied Sciences, Engineering and Technology (PASET[3]) through the Regional Scholarship and Innovation Fund (RSIF). Rwanda was one of the founding members of RSIF. The RSIF involve several countries and universities, which offer a strong program in one of the PASET priority thematic areas. The participation of Rwanda in RSIF has benefited the higher education, science and innovation ecosystem (RSIF, 2021). Although the programme is yet to produce PhD outputs, in 2020 it enabled 20 Rwandan to be enrolled in PhD programme. Overall, PhD graduate production is extremely low in the country (Tvedten et al., 2019).

1.4   Challenges facing the Higher education system

Rwanda higher education system and institutions faces several systemic and structural challenges. These include but not limited to low enrolment of underprepared students due to socio-economic conditions and poverty and quality of primary and secondary education, general dearth of well qualified local academic staff, PhD and other degrees are perceived to be pre-condition for career in government and private sector and not necessarily as the start of an academic career (Tvedten et al., 2018). The system is engulfed with potentially weak research culture. As described by Fosci et al., (2019: 10) "the University of Rwanda is the country's only higher education institution with research capacity, while the wider sector does not have the resources, reputation or recognition to undertake meaningful research". In the

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[3] https://www.rsif-paset.org/

context of limited research culture, private universities prioritise vocational training over research function and struggle to recruit enough PhDs (Fosci et al., 2019). Other challenges as highlighted by Fosci et al., (2019) include:

- Very few people in the country complete secondary and tertiary education, considerably restricting the talent pool for research.

- Many researchers that acquire a PhD qualification choose to take their skills elsewhere due to the lack of research funding and infrastructure available at home.

- There is a dire need to ensure that researchers are trained and are incentivised to continue researching in the country.

- Significant investment is required to build research capacity and create the conditions for the development of a national research culture.

2. Overview of the University of Rwanda and recap of study

This section presents an overview of the university of the Rwanda, introduces the focus of the study and presents the case study PhD programmes selected for the study.

2.1 The University of Rwanda as participating university

The University of Rwanda was established by the Government of Rwanda in 2013. It resulted from the merger of seven public higher learning institutions including the former NUR into a consolidated entity. The rationale for the merger was an acknowledgement that each of the institutions was relatively weak institutionally as well as academically, and that a merger was necessary in order to create one consolidated and more efficient entity of higher learning in Rwanda (Tvedten et al., 2018). UR currently consists of 6 colleges with 24 schools and 11 Centres on 14 different campuses. Some of the colleges are spread on several campuses. In the 2019/2020 academic year, UR had a total of 2,491 postgraduates and 30,447 undergraduate students. Specifically, since 2013 UR has graduated 2,053 graduates at postgraduate level. Only 22 per cent of its instructors held a PhD in 2019. UR did not start offering doctoral programs until 2014. Today, UR is emerging as an increasingly important academic hub in East Africa. Since its establishment seven years ago, UR has graduated a total of 49,477 with 53% non-STEM graduates, 475 in STEM, 36% female and 64% male. However, the number of doctoral graduates is extremely low with only nine out of the total graduates being at a doctoral level (two females and seven male) (UR, 2020). The distribution of doctoral graduates according to the field of study indicates the following:

Table 2: University of Rwanda doctoral graduates per field since 2013

Field of study	Number of doctoral graduates
Social work and counselling	2
Medical diagnostic and treatment	2
`Journalism and reporting	1
Environment sciences	1
Literature and linguistics	1
Statistics	1
Management and administration	1

Source: University of Rwanda (2020).

The relatively small number of PhD graduates may be due to the limited supervision capacity, with only 13% of academic staff ranked at senior lecturer and professorial levels in the 2019/2020 academic year (UR, 2020). However, there has been a significant increase in doctoral student enrolment over the past seven years. For example, in the 2013/14 academic year there were only two PhD doctoral students. That number has grown to 210 in the 2019/20 financial year (UR, 2020). The majority of PhD enrolment is in programmes such as medical diagnostic and treatment technology (30.4%), education science (15.7%), electricity and energy (14.2%), with computer sciences (8.6%), and teaching training with subject specialisation (8.1%) capturing much smaller proportions of enrolment. This could suggest an opportunity to increase enrolments in the social sciences and creative outputs for which Rwanda is lowly ranked in the Global Innovative Index ranking (GII, 2020). Overall, the percentage of academic staff with PhDs has increased from 18% in 2013/2014 to 26% (UR, 2020).

UR has six academic colleges, which offer doctoral training: the College of Arts and Social Sciences (CASS), the College of Agriculture, Animal Sciences and Veterinary Medicine (CAVM), the College of Business and Economics (CBE), the College of Education (CE), and the College of Science and Technology (CST). UR has four Centres supported by the World Bank (Dorimana, Ndihokubwayo & Uworwabaheho, 2021). Falling under the broader category of African Centres of Excellence (ACEs), they include:

1. ACE in the Internet of Things
2. ACE for Data Science
3. ACE for Innovative Teaching and Learning in Mathematics and Science
4. ACE in Energy for Sustainable Development

The UR currently has 116 PhD programmes offered across six colleges. The number of programmes is significantly high relative to the small number of PhDs enrolled and graduated. From the existing PhD programmes, two programmes, namely PhD in the Internet of Things and the PhD in General Management were selected as case studies for this study.

2.2   Recap of research focus and objectives

The overarching objective of this research report is to respond to ARUA's objective to create globally competitive collaborative PhD programs among ARUA member universities. More specifically the research seeks to identify selected PhD programmes at ARUA member universities, review the programmes and make recommendations to ARUA towards better collaboration across the Alliance. Two PhD programmes were selected from each university; one from the humanities and one from the natural sciences. Data was collected from each of the programme coordinators or head of programmes. Institutional data was further collected from the institutional websites and these were analysed according to three main themes: access to the programmes, structure of the programme and experience through the programme. The research further sought to conduct interviews with each university vice chancellor to get inputs into four main issues related to collaboration: national and institutional policy, current collaboration practice, challenges facing collaboration and recommendations for better collaboration. As the only member of ARUA from Rwanda, the University of Rwanda was included as the sample institution to be studied in the project. However, the PhD programs from the university were selected through a negotiated approach between the research team and UR research office. While a set of criteria were proposed, the university had the discretion to suggest a preferred programme from the humanities and another from the natural science. Two programs have been selected for detailed review. These are: The PhD programme in Internet of Things to represent the STEM/Natural Sciences fields and the PhD programme in General Management to represent the Social Sciences/Humanities fields.

It must be mentioned that access to the data was a major challenge faced by the research team and this was a particular issue at the University of Rwanda in terms of slow communication and lack of timely responses from key informants or administrative officials within the relevant post-graduate and research office. In some cases, the informants appeared not to understand questions asked. In addition, the majority of documents focusing on higher education are not in public domain, thus it is difficult to have access to them. Furthermore, while ARUA recommended and facilitated an interview with a senior management representative, all efforts to getting such an interview did not yield the expected outcomes due to limited responses made.

Table 3: A summary of two selected PhD programmes

PhD programme	Access	Structure	Experience
PhD in Internet of Things	• Registration is done in September • Applicant must have MSc degree in relevant discipline of Engineering/Technology (Computer Engineering, Computer Science, Information Technology, Electrical Engineering, Electronics and Communications Engineering • Applicant must Second Class Upper division – equivalent > 70% • Applicant must submit a research concept note not exceeding 2000 words • A non-refundable application fees of 10,000RWF for nationals and members of East African Community (EAC) and 12,000 RWF or 11.57 USD for others.	• The duration of the programme is 3 years and maximum 4 years for both PhD by course work and by thesis • Two published publications prior to completion and graduation	• 18 PhD students enrolled in 2020 • 1 Professor and 10 staff with PhDs • The programme is under the centre funded by the World Bank • The programme has a number of collaborations continentally and in Europe and India
PhD in General Management	• Coursework and dissertation	• Duration of the programme is minimum 3 years	• 40% Professors and

	• Master degree with second class Honours upper division minimum (70%) • Application is received once in two years • Application is done online containing a PhD proposal; cv; degree and transcripts, identity or copy of a passport • The total cost of the programme is 6,200 USD	and maximum 4 years • Compulsory 2 years coursework, 6 seminars attendance) • The overall minimum credits needed for PhD award is 360 • A compulsory conference • Two peer-reviewed articles (published) • Requires a monograph and articles	60% PhD holders • 13 Students (one cohort) • The program is in collaboration with Jonkoping University in Sweden

3.   Findings from the institutional data

Rwanda acknowledges the importance of investing in doctoral training. As described by its Higher Education Council, this realisation is due to two main reasons: 1) to build internal capacity through training local academics at doctoral level in preparation for its expatriates exit strategy, and 2) to promote research and innovation to support Rwanda's social and economic development. The evidence of this can be seen from the country's investment in doctoral training using internal resources and infrastructure as well as attracting external funds. The focus on funding and infrastructure development for doctoral training has been largely in the science, technology, engineering, and mathematics (STEM) fields. The relatively high ranking of Rwanda among other SSA economies as observed in the 2020 Global innovation Index supports an emphasis on the natural science but arguably more needs to be done to provide similar support to the social sciences and humanities especially ARUA's emphasis on the development and support of collaborative PhD programmes could be one of the avenues to strengthen the production of more quality PhD graduates. A clearly articulated and implemented collaboration and internationalisation policy with adequate funding for staff and students through member universities, would be within ARUA's mandate to facilitate. This mandate looks at the full spectrum of doctoral training from access to the structure and content of the PhD programmes and the conditions for completion.

Before delving into the specific findings, the table below presents a summary of the structure of PhD, which comprises some elements of experiences doctoral student go through at UR.

Table 4: Structure of PhD programmes at UR – PhD by research/thesis

Year	1	2	3	4
Structure	• Induction • Initial proposal presentation and allocation of	• 1core disciplinary graduate modules completion • 1 minor generic module – compulsory	• Comprehensive exam by Doctoral Committee on extensive Research	• Continue with PhD Research work • Semester wise progress report submission (8)

	core graduate modules by Doctoral Committee • 1 core disciplinary graduate module completion • 1 minor generic skills module compulsory • Literature review and data collection for PhD Thesis • Semester wise progress report submission (8) submitted during first week of June and December every year • UR Research and Innovation	• Literature review and data collection for PhD Thesis • Comprehensive exam by Doctoral Committee on Extensive Research Proposal & Research Progress at the beginning of the 4th semester – Doctoral candidate require a PASS • Continue with PhD Research Work • Semester wise report submission • Seminar presentation at Centre/School level • 1 conference paper publication (maximum time limit)	Proposal & Research Progress at the beginning of the 4th semester – Doctoral candidate require a PASS • Continue with PhD Research work • Semester wise progress report submission (8) submitted during first week of June and December every year • Seminar presentation at Centre/School level • 2 workshops attendance • 2 journal publications (continuous) • 2 Industrial attachments (3 to 4 months)	submitted during first week of June and December every year • Presentation of Synopsis at Doctoral Committee (during the last three months of 7th semester). APPROVAL GIVEN FOR THESIS WRITING • Submission of Thesis and Final Viva Voce Defense • 2 journal publications (maximum time limit) • UR Research and Innovation week • Graduation

	week attendance	• UR Research and Innovation week attendance	• UR Research and Innovation week attendance	

Source: UR PhD handbook (2018)

NB: The structure provided in the above table is built around PhD programmes offered within the African Centres of Excellence (ACEs) of UR. As described in the UR PhD handbook, the structure applies across all PhD programmes at UR.

Findings from the data is classified into three broad themes that speak to critical aspects for consideration in efforts to establish collaborative PhD programmes across ARUA institutions: *access, structure and experience.*

3.1   Findings linked to access to PhD programmes

Two main findings related to access were identified from the data. These are:

3.1.1 Stringent or elitist access conditions

According to the CHE, entry to PhD (admission and registration) may involve two routes. The first route is through the Master of Philosophy with possibility of transferring to a Doctor of Philosophy (MPhil/PhD). An important entry requirement for this route is a first upper second-class honours degree. The second requirement is that of direct registration through which an applicant must have a Master's degree in an appropriate discipline. The programme requirements outlined by the CHE are similar to those mentioned at programme level. The pass rate or score required for a Masters degree is 70%. Both routes appear to be stringent and elite in nature and in practice as they are likely to keep the majority of prospective doctoral students from applying for PhD studies at UR. Perhaps such stringent and elite access conditions and particularly the high masters score point requirements are a reflection that higher education in Rwanda is, as Trow (1973) characterises, elite.

3.1.2   Cost of doctoral programmes

The cost of studying a doctoral degree at UR, for example 6,200 USD, appears to be high. This is when compared with other universities, even within the ARUA framework. For example, in Tanzania, the cost is 4,020 USD for a non-Tanzanian per year while in Kenya, it ranges between 4,880 to 6,213 USD. In the main, the cost at UR can be considered high particularly for students

from low-income backgrounds and those that are self-sponsored. Tuition fees of 6,200 USD at UR is likely to be one of the constraining factors towards establishing collaborative PhD programmes across ARUA member universities.

3.2   Findings linked to the structure of PhD programmes

3.2.1   Coursework component and generic skills attached to the PhD programmes

The structure of PhD programmes at UR constitutes some activities, which offer specific experiences for doctoral candidates (UR, 2018). Firstly, are two seminar presentations, through which doctoral students are required to present two seminars about their research work to Masters students. This is important experience for doctoral students as it offers opportunities for their work to be shared and critiqued by others. Secondly, there are internally and externally organized workshop attendance and UR research and innovation week attendance. These can be regarded as important platforms for doctoral students to present their work, learn and gain insights that can be incorporated into their doctoral project writing. Finally, is the compulsory 3-6 months industrial attachment experience, which must be undertaken after confirmation of doctoral candidature. The industrial attachment component, while it looks to be a useful experience, it is not clear as to whether it is compulsory for all PhD programmes across UR or it is meant for specific programmes.

Also, the structure of PhD programmes as indicated in Table 4 involves elements, such as induction (orientation), proposal writing and presentation, writing of the thesis, submission of thesis and viva voce, which seem to be common across most universities, particularly in the East African context. For the purpose of UR, two elements are worth examining. These are (i) minor generic skills compulsory modules, and (ii) a comprehensive exam on the research proposal and progress.

While the PhD structure of UR is like most universities across Africa (see Obamba (2017) for the analysis of PhD structure), the compulsory minor generic skills modules doctoral students are required to undertake appears to be unique and peculiar to the UR. In the first and second years, doctoral students are required to undertake compulsory minor generic skills development modules. Although these modules are not explicitly described in terms of names, content, weight, and assessments, they form an important part of the requirements for doctoral training

and awarding of the degree. Although modules are not credited, they assessed on a pass or fail basis.

The analysis of secondary data as well as responses from the institutional leader responsible for post-graduates revealed some specific programme structures of doctoral training at UR. The table below presents a summary of the structure of doctoral training at UR. The structure comprises three main components; namely, preliminary activities, research progress-related activities and other mandatory activities.

3.2.2 Publications requirement

At UR, doctoral candidates are required to produce two peer-reviewed journal articles. The two publications are compulsory and must be produced during the four years of PhD project (see table 4). However, when asked to comment on the practicality of this requirement, the institutional leader did not provide any information. As such, as highlighted in Table 3 and 4, it appears that the two published articles are critical components of PhD completion at UR. This requirement is for both PhD by thesis as well as by coursework. In its PhD handbook, the UR states that:

> Doctoral students are required to publish and disseminate research findings. A Doctoral thesis shall comprise of at least three published papers out of which two articles must be published in a Scopus indexed peer reviewed journal like Thomson Reuters, Elsevier etc (UR, 2018: 12).

In practice and ideally, the demand for publications prior to graduation provides an important experience for PhD candidates, which also contributes to knowledge production. However, the practicality of such a requirement is complex given the demand of a doctoral project as well as the complexities involved in the process of writing and producing a journal article, which is dependent on the efficiencies of the particular journal and review process. The question that one may ask is how many PhD candidates are able to produce two publications to meet the doctoral degree completion requirement within the minimum four years of studies? Perhaps a more detailed study will be required to assess the practicality of this requirement and its benefits to the PhD process within the context of providing post-doctoral opportunities to students who can use the time to publish from their theses.

3.3 Findings linked to experience

3.3.1 Shortage of academic staff with PhD level qualification

Having a sufficient pool of academics with PhD qualifications and experience is critical for enhancing knowledge production in terms of research and doctoral training (Cloete, Mouton and Shepphard, 2015). Several authors have identified academics with PhD qualifications as one of the major contributors to building doctoral training in sub-Saharan Africa (African Network for Internationalisation of Education [ANIE] 2018; van't Land, 2012). This element is important in ensuring quality and expediting the completion of doctoral degrees. As described by Manderson et al., (2017: 24) "even with coursework, individual success is influenced by the quality of supervision, professional support, and guidance to students on their research, analysis and writing". Notwithstanding the importance of this factor, it is said that the production of PhD graduates in sub-Saharan Africa is low, partly due to limited number of academic staff with PhD qualifications, abilities and experience to supervise doctoral students (Igumbor et al., 2022; Samuel Adeyemo, 2018). The shortage of academic staff with PhD qualifications and research experience is said to be a common issue in Rwanda (Lwakabamba, 2011; Tvedten et al., 2018; Fosci et al., 2019). Such challenges is historical and has been compounded by the country's political instability experienced in the few decades ago. As Tvedten et al., (2018: 23) capture:

> With the history of higher education in Rwanda, and the way the sector was affected by the genocide, there is a general dearth of well qualified academic staff in the country and at UR.

To address such shortage, partners and international donors such as Swedish International Development Cooperation Agency (SIDA) to focus more on building capacity and increasing number of academic staff with PhDs (Tvedten et al., 2018).

Having adequate capacity to supervise is an important factor in building and strengthening doctoral training. A study on building PhD capacity in sub-Saharan Africa (ANIE, 2018), found that most countries faced the challenge of inadequate doctoral supervision capacity. Rwanda is a case in point. The CHE demands that a doctoral candidate should be supervised by two supervisors. In its PhD handbook, UR states that all PhD candidates are required to work under the supervisory team (ST) consisting of one main supervisor and two co-supervisors. In some

cases, PhD students are supervised by external supervisors who are familiar with the university and programme regulations and expectations. The main supervisor is expected to have undertaken supervision training, demonstrate expertise in the relevant field and have publications in the relevant areas of research within the past three years. While the supervision arrangements of UR appear to be similar to other universities in other countries in Africa, UR experiences the challenges of low supervision capacity for doctoral students. The existing pool of academics with PhD qualifications is dominated by expatriates. For example, a study by Tvedten et al., (2018) indicates that UR had 21 per cent of academic staff who hold PhDs. The number has not changed much as during academic year 2019/2020, UR had 26% of academic staff with PhD qualifications. Consider this comment:

> *Our lecturers supervise the PhD students, and we have partners who organise training for supervisors to build capacity of our local supervisors* (Personal Interview, Institutional leader).

This shortage in institutional capacity emphasises the earlier point made on the need for Rwanda as it strives towards developing its local academics with PhDs to replace outgoing expatriates.

3.3.2 PhD completion time

The time doctoral students take to complete their research projects and eventually be awarded PhD qualifications is one of the major challenges facing countries and universities in Africa and particularly sub-Saharan Africa (African Network for Internationalisation of Education, 2018). Such a pattern is said to be present in Rwanda as the case study of UR reveals. The completion duration can be categorized into two components, namely duration for PhD by transfer as well as direct PhD entry. The former involves transfer from Masters registration (MPhil/PhD), which for full-time is a minimum of 33 months and maximum of 60 months and for part-time is a minimum of 45 months and maximum of 72 months. For direct PhD registration, full-time is a minimum of 24 months and a maximum of 60 months and for part-time is a minimum of 36 months and a maximum of 72 months.

In its website[4], UR states that "currently, PhD studies can only be undertaken by research only, in all the disciplines and the duration is at least three years". However, table 4 indicates that doctoral students take about 4 years to complete their studies. While there is a contradiction between what is stated in the UR website and UR PhD handbook, on average, PhD candidates do not complete their degree in time. As emphasised by the post-graduate institutional leader commented that:

> *One of the challenges of our PhD programmes is that our students can't finish on time often* (Personal Interview, Institutional leader).

While there are no reasons provided regarding doctoral students not being able to finish in time, comments on doctoral training being at an infant stage, as well as the low number of PhD graduates are potential elements, which might be feeding into delays in completing degree programmes. As observed in a recent South African report, as well as in other parts of the continent, the delay in completion time could also be due to the fact that most of the PhD students are also fulltime lecturers, junior lecturers or employed in other fields and studying part-time (Mouton and van Lill, 2022).

3.4   Institutional infrastructure and support for doctoral training

Building PhD production capacity requires an enabling environment in terms of appropriate infrastructure and institutional support structures. These include among others, physical infrastructures such as labs, libraries, offices, study rooms, accommodation, and Internet with modern equipment and facilities. Cloete, Mouton and Shepphard (2015: 1919) indicate that "existing support infrastructures (writing centres and graduate schools that provide support in the development of doctoral proposals and research methodology as well as editorial services) will continue to play a crucial role in doctoral education". At UR, infrastructure critical for doctoral training is being put in place with room for improvement:

> *We have some infrastructure in place, but UR is still doing the construction of new ones* (Personal Interview, Institutional leader).

The comment above confirms the earlier observation that it is only in the recent past that the doctoral training at UR started to gain a foothold. In this context, it is understandable that infrastructure in terms of laboratories, accommodation, study and seminar rooms and other

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[4] https://admissions.ur.ac.rw/?q=Academic_Programmes

facilities are not of doctoral standard yet. The level and state of infrastructure needed for doctoral training at UR is still low and growing slowly. Overall, the university has limited resources with respect to infrastructure and facilities and this presents a major challenge to doctoral education in Africa. As described by Tamrat and Fetene (2021: 25) in recently completed research on the university:

> "doctoral students are dissatisfied with the poor standard and availability of resources such as IT and computer facilities, personal work or study space, library and electronic research resources and services, quality of library holdings, and availability of laboratory, clinical, or related physical facilities".

Regarding specific institutional support for doctoral candidates, it appeared that the main support at UR is scholarships, which are available within the ACEs. The scholarships are offered to both local and international doctoral applicant students. Offering scholarships for international students is an important element for PhD collaboration given the limited resources to train PhDs across ARUA and other African universities.

3.5   Presence of collaborative and external support for doctoral training

One of the key features of doctoral training at UR is the notable presence of collaborative or partnerships between UR and external partners and particularly funders. Since its establishment in 2013, UR has been establishing relationships with several external partners, who are central to developing its doctoral training capacity. Some of the programmes aimed at supporting doctoral training include the:

i.   Enhancement of Rwandan Higher Education (EnRHEd)

ii.   Partnership for Skills in Applied Sciences, Engineering & Technology (PASET) – Regional Scholarship and Innovation Fund (RSIF)

Other initiatives and programmes as described by the institutional postgraduate leader include those that are supported by international organisations, which offer infrastructure and financial support to training doctoral students.

> *We have many partners such as SIDA, JICA, DAAD, WORLD BANK and others to support our PhD programs* (Personal Interview, Institutional leader).

The comment above supports earlier reports on collaboration as one of the ways the university is utilizing to enhance doctoral training. These collaborations have been central in providing scholarships for PhD students, staff development and joint supervision of PhDs (Akudolu & Adeyemo, 2018).

4. Emerging insights toward collaboration

Doctoral training at UR is still at an infant stage across many aspects: infrastructure, support and facilities, enrolment, throughput rate and supervision capacity. This is attributed to among other things, the fact that UR is relatively a young university having been established in 2013. At national level, Rwanda has embarked on supporting higher education institutions and particularly universities to increase doctoral training capacity (RSIF, 2021). As stated earlier, this is due to the realisation of the importance of doctoral training and production in promoting national development (Ministry of Education, 2018). Such government intention may enable ARUA to expedite the process and procedures of establishing collaborative PhD programmes within the Rwandan context and other member universities.

Rwanda appears to be committing notable amounts of funding into HE as a percentage of GDP. Although it is unclear as to how much of this is going into PhD and research collaboration, there is evidence to suggest doctoral training is on a right track (Baxter, 2012). An important aspect could be to fast-track the development of PhD supervisors. The work of supervisor training could be the first level of collaboration with other partner universities such as Stellenbosch University, which through its African Doctoral Academy (ADA) provides training for doctoral supervisors. This might be an important step for UR given its challenge of limited doctoral supervision capacity.

At an institutional level, the UR context seems to be permeable in terms of initiating PhD collaborative programmes. This proposition is based on the fact that UR might not as yet have strong and entrenched institutional culture and practices that are restrictive and can impede possibilities for collaboration. Related to this is that UR is one of the leading institutions in terms of getting support from international funding organisations as well as having strong regional partnerships. The support given to UR through the partnerships with external institutions has created and continue to create an important indication that UR is open for collaboration. Similarly, the existing support and partnerships seem not to be fully utilised due to a lack of internal capacity. This provides an opportunity for ARUA through the PhD collaborative programme to tap into the available resources the UR can offer to other universities through the Alliance.

Beyond the above emerging insights and possibilities is the initial initiatives of the Inter-University Council for East Africa (IUCEA) of which Rwanda and the UR is a member. The

IUCEA's call to harmonise the higher education system and practices connote some elements, which are useful when debating and thinking about developing PhD collaborative programmes between and among ARUA members. Some of the elements that the IUCEA is pushing for, which have the potential to facilitate PhD collaborative programmes especially among the four East African ARUA member universities include but are not limited to (i) easy mobility of students across the region, (ii) compatibility of the curriculum, (iii) qualification/s recognizable among members involved, (iv) quality standards and assurance mechanisms (IUCEA, 2015).

5. Recommendations and conclusion

For Rwanda higher education system and UR

Building continental collaborations

As started earlier, higher education institutions in Rwanda have strong collaborations with partners and donors particularly those located in the global North. Although existing collaborations are important in building research and doctoral training capacity, some argue that the collaborations are creating high degree of dependency on foreign aid in Rwanda and undermine collaborations with Sub-Saharan African countries (Fosci et al., 2019). As such, it is recommended that Rwanda increase its connection with other African research organisations and universities in order to support African-led research that responds to African priorities, share lessons between countries with similar socio- economic challenges and lessen Rwanda's dependency on development support. The support provided by global North partners and donors could enhance PhD collaborative programmes by expanding opportunities for UR to better integrate with other African universities. ⌞SEP⌟

For ARUA to develop an inclusive framework, which will enable the establishment and sustenance of PhD collaboration across member universities, several considerations at programme, institutional and national levels could be taken into account.

5.1.   Building local institutional PhD training capacity

One of the enablers or impediments to ARUA's efforts to establish PhD collaborative programmes would be the differences between and among ARUA members in terms of PhD training capacities. A case in point is the limited doctoral training capacity at UR in terms of infrastructure, facilities and supervision, which is largely due to the fact that UR is relatively a new university and doctoral training is only an emerging capacity currently. While other ARUA members may have a long history of doctoral training coupled with institutionalised culture and practices, a case of UR calls upon the ARUA to first consider thinking and re-thinking of ways in which doctoral training within member universities particularly those with low capacities such as UR can be enhanced prior to establishing PhD collaborative programmes. Given the relatively weak doctoral training capacity at UR, it would mean in UR the scope and capacity for collaborative programmes would be quite small at the university. By developing local institutional doctoral training capacity, the collaborative PhD programmes would have

some sort of arrangements, which potentially offer similar experiences for doctoral students moving across the ARUA member universities. Of critical importance is the fact that comparatively UR is a very new university, and one actually cannot judge it in comparison to much older and established universities. As such, it offers a fertile and uncultivated space and institutional culture and practices, which might be supportive to PhD collaborative programmes.

In addition, given that UR has a strong track record of attracting external funders, it may enable ARUA to leverage on the existing resources and utilise them to growth PhD collaborative capacity.

5.2   ARUA guidelines for admission, supervision and degree award requirements

It may be necessary for ARUA to develop guidelines for admission, supervision, and degree award requirements, which are agreed by and used across ARUA members. This could start off with its Centres of Excellence and gradually work through other programmes. ARUA could also collaborate with the IUCEA to suggest some collaborating guidelines for universities within the region. Without interfering with institutional autonomy and existing practices, ARUA ought to consider how to develop collaborative PhD programmes, which have some sort of similar admission criteria, supervision model as well as requirements and experience towards awarding the degree. This will help to avoid students involved in the collaborative programmes having varying experiences as they move between and across ARUA members during their doctoral training. Perhaps there should be a special and specific ARUA collaborative PhD programmes with specific field of study, which are attached or linked to some well-functioning PhD programme across the member universities. For example, at the case study university (UR) programmes such PASET (RSIF) are examples of what ARUA can build its collaborative PhD programmes around. However, ARUA must consider the supervision modality (model) and how doctoral students' experiences, training and outcomes obtained across ARUA members are compiled and contribute to awarding PhD degrees. Other examples, that ARUA may think when developing PhD collaborative programmes observed at the case study university (UR) are the viva voce (defence) and publications requirement prior to graduation.

Related to the above is for ARUA's PhD to reconcile the access requirements, which in UR's case are elitist characterised by a relatively small intake of doctoral students. This may affect the process of developing equitable PhD collaborative programmes.

5.3 ARUA member universities to have willingness and commitment

One of challenges in establishing and sustaining initiatives such as ARUA's PhD collaborative programmes is lack or minimal willingness and commitment of member universities. While the potential proposed PhD collaborative programmes are critical for all ARUA member universities, ARUA will have to find ways and ensure that members are willing and committed to creating enabling environment, which allow high standard of training doctoral students. This may include among other things, making the existing infrastructure and resources available and accessible, high standards are maintained and members are striving toward achieving the common goal. Such willingness and commitment depend on the buy in and support of university's top management and/or leadership structure and personnel.

6. Conclusion

This report highlights the institutional doctoral training conditions and possibilities of developing collaborative PhD programmes across ARUA university members with a focus on the University of Rwanda. One of the main threads, which cuts across the report is that while there are many avenues and possibilities for collaborative PhD programmes, there are some key issues, which ought to be taken into account when developing such collaborative programmes. The doctoral training in Rwanda and at UR is at an infant level characterised by inadequate infrastructure, low supervision capacity, and low throughput rates. Notwithstanding these limitations, Rwanda and UR continue to attract external funders and partners in their quest to build doctoral training and knowledge production capacities. As such, Rwanda and UR offer unique findings, which may allow ARUA to develop a better understanding of the requirements, processes and conditions which can act as enablers toward establishing collaborative PhD programmes across ARUA member universities. The report, hopefully, allows ARUA and even UR to understand the possibilities of PhD collaboration at programme, institutional and national and/or systemic levels when thinking. Of specific relevance to possibilities for establishing collaborative PhD programmes is whether ARUA member

universities have willingness and committed with respect to the principles and ethos of mutuality, reciprocity and ownership.

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