

AFRICAN RESEARCH UNIVERSITIES ALLIANCE (ARUA)

Towards developing a Collaborative PhD Program across ARUA Member Universities

Experiences from the University of Dar es Salaam, Tanzania

**A Research Report Produced for ARUA by the
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1. INTRODUCTION AND BACKGROUND

1.1 Introduction

This report highlights the status of PhD education in Tanzania. Using the University of Dar es Salaam (UDSM) as a case study, the report provides an 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).

Detailed are the national and institutional policy and operational frameworks for PhD programmes at the University of Dar es Salaam, 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 Tanzania'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 Overview of country and the higher education system

Previously referred to as Tanganyika, present-day Tanzania became independent and a republic on 9 December 1961 and 1962 respectively. On 26 April 1964, there was a union of Tanganyika and Zanzibar which formed the Republic of Tanzania. The East African country is bordered by the Indian Ocean and eight countries - Burundi, the Democratic Republic of Congo and Rwanda to the West; Kenya and Uganda to the North; and Malawi, Mozambique, and Zambia to the South. Tanzania is the largest country in East Africa in terms of population and land size. In 2021, the country had a population of 59.7 million and it is projected that the population will rise to 61 million people in 2022 (National Bureau of Statistics, 2018). Tanzania has a total of land area of 947 300 square kilometres. In 2020, the World Bank declared that Tanzania had moved from a low-income to a lower-middle-income country status (Battaile, 2020). However, while there has been significant economic growth, economic development is still low, as in 2021, Tanzania was ranked 163 out of 189 countries and territories in terms of the human development index (UNDP, 2020). In terms of reporting on issues such as unemployment, there has been some political interference in the past six years. As such, it is difficult to get accurate data regarding unemployment. The National Bureau of Statistics (NBS) indicates that in 2018,

the unemployment rate decreased from 10.3% recorded in 2014 to 9.7% in 2018. In 2020, the unemployment rate was at 9.5% (Labour International Organisation, 2020).

Regarding youth unemployment, it is estimated that in 2021, it was around 12.80%. There is no clear data on graduate unemployment, although a study by the Inter-University Council for East Africa (IUCEA) indicates that 61% of graduates in Tanzania are ill prepared for skills that are required by the job market (Kalufya and Mwakajinga, 2016). Most of the employment opportunities are concentrated in the private sector amounting to 96.5% (NBS, 2018). Agriculture is the major employment sector, responsible for 63% of employment in the country as at 2018. Other economic activities include mining, tourism, fishing, construction and manufacturing. The table below is a summary of Tanzania's profile:

Table 1: Socio-economic profile of Tanzania

National population	57.6 million in 2021
Gross Domestic Product (GDP) per capital	985 USD in 2021
Human Development Index	Ranked at 163 out of 189 countries and territories in 2021
Unemployment rate	9.40% in 2021
Main economic sector	agriculture, mining, tourism, construction and manufacturing
Gross primary enrollment ratio	94% primary school population
Gross secondary ratio	29% secondary school population
Gross tertiary enrollment ratio	4% tertiary school population
Number of public universities	12 (2020)
Number of private universities	22 (2020)
Total number of doctoral enrollments	2 379 Tanzanians
Number of PhD graduates	302 in 2021
Higher education expenditure % as GDP	3.1% based on the 2020/2021 budget
Doctoral production per million	0.28 per million

2. HIGHER EDUCATION LANDSCAPE

2.1 Overview of the higher education system

Regarding the higher education system, the National Higher Education Policy of 1999 (Ministry of Science Technology and Higher Education, 1999) describes higher education as encompassing all courses of study leading to the award of a first degree, advanced diploma, postgraduate or any higher level degree. In this context, the system of tertiary education in Tanzania is dual, comprising of universities and university colleges, as well as non-university institutions (institutes and colleges), offering some degree programmes, but mainly focusing on three-year advanced diplomas in professional fields, such as accountancy, engineering, social welfare, materials management, community development, business administration and related fields of study. The first tier is under the supervision of the Tanzania Commission for Universities (TCU) whereas the second tier is under the National Council for Technical and Vocational Education (NACTVET). Both tiers are under the jurisdiction of the Ministry of Education, Science and Technology (MSTHE).

Since independence, the higher education landscape in Tanzania has changed significantly. The history of higher education in the country dates to the early years after independence in 1961. The sector started with the establishment of the UDSM, which was first established in 1961 as a college of the University of London (Mkude, Cooksey, and Levey, 2003). In 1963, it became a constituent college of the University of East Africa, alongside the University of Nairobi and Makerere University. Following the collapse of the University of East Africa in 1970, the UDSM emerged as an independent national university (Mkude, Cooksey and Levey, 2003). The UDSM became a pioneer of higher education in Tanzania as the majority of current public universities such as, Sokoine University of Agriculture established, Ardhi University, Muhimbili University of Health and Allied Sciences, Mkwawa University College and Dar es Salaam University College of Education, started as constituent colleges of the UDSM (Mkude, Cooksey and Levey, 2003). The UDSM and SUA which are first two higher education institutions were established within the political economy and ideology of socialism; thus, their mandate was to serve as apparatuses of promoting socialism and fighting what Julius Nyerere identified as three enemies of development, namely, poverty, ignorance and illiteracy. Other public universities that emerged post socialism include, Mzumbe University (2007), Moshi Co-operative University (2014), and University of Dodoma (2007).

Following the adoption of liberalisation or free market economy during the mid-1990s, Tanzania experienced an emergence and mushrooming of private higher education institutions. Several factors were responsible for this emergence. Central to these factors was the attempt to produce a critical mass of highly trained human resources, expand access, and diversify degree programmes. As such, in 1995, the Tanzanian government liberalised the provision of higher and technical education, thus, allowing private providers to operate across the country (United Republic of Tanzania, 1995). Following this government provision, Tanzania has experienced an exponential growth of private higher education sector. The evidence of this can be seen through the ever-increasing number of private higher education institutions (PHEIs).

2.2 Size and shape of the system

Regarding the current state of higher education, the TCU indicates that in 2020, there were 60 university institutions in the United Republic of Tanzania (URT). . The breakdown of these institutions included 34 full-fledged universities, 15 university colleges, 11 University campuses, centres and institutes. In terms of ownership, 18 are public university institutions, while 42 are private university institutions. Concerning enrolment, in the academic year 2019/2020, there were 189 291 students enrolled across the university institutions of which four percent were of the tertiary school-age population. In 2020/2021, the government allocated just over three percent its total budget for higher education (URT, 2021). The bulk of the budget for higher education is for student loans. In its 2022/2023 budget, the MSTHE is committed to investing in infrastructure development and refurbishment; capacity building; as well as support research activities across public higher education institutions. This includes, among other things, building offices for researchers, and research laboratories, supporting African Centres of Excellence (ACE II), supporting ICT infrastructure and research management systems, and preparation of 39 research areas in line with the National Five Year Development Plan.

3. Overview of the University of Dar es Salaam (UDSM) and selected PhD programmes

3.1 The University of Dar es Salaam

The UDSM began its history in 1961 as a College of the University of London, with only one faculty (Law) and fourteen students (Mkude, Cooksey and Levey, 2003). Together with Makerere University College in Uganda, and Nairobi University College in Kenya, it became a constituent college of the University of East Africa in 1963. Following the collapse of the University of East Africa, the national university, UDSM, was established in August 1970 (Leach et al., 2008). The primary focus of the university at the time of its establishment is described in a university document as follows: “Like other universities all over the world, it was meant to be an institution where people are trained at the highest level for clear and independent thinking, analysis and problem-solving” (UDSM,2007: 4).

In terms of numbers, the postgraduate student population increased from about 100 in 1993/1994 to about 5,000 in 2020/2021. Over the same period, postgraduate programmes increased to over 250. The university offers a wide range of postgraduate programmes at postgraduate diploma, masters and PhD levels. Currently, there are 15 postgraduate diplomas, 148 master’ and 118 PhD programmes. Twenty-two PhD programmes are offered by coursework and dissertation and the rest are offered by research and thesis. Specifically, in 2019/2020, there were 326 first-year registered PhD students. From the existing PhD programmes, two programmes, namely the PhD in Climate Change and Sustainable Development and the PhD in Law were selected as the focus programmes for in-depth analysis on issues of access, structure and experience.

With regards to investment in research and innovation, the university has, through its internal resources, increased its support. For example, in the 2020/2021 financial year, the university allocated USD 815,183.47 and in 2021/2022 it increased the amount to USD 1,351 488.23 USD (UDSM, 2022).

3.2 Recap of research focus and objectives

The overarching objective of this report research is to respond to ARUA’s objective to create globally competitive collaborative PhD programs among ARUA member universities, by

developing more collaborative PhD programmes across member universities. More specifically, the research seeks to identify selected PhD programmes at ARUA member universities, review the programmes, and make recommendations to ARUA for 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: (1) access to the programmes, (2) structure of the programme, and (3) experience through the programme. Interviews were also conducted with the Vice-Chancellor of each university to gather inputs on 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 Tanzania, the UDSM was included as the sample institution to be studied in the project. The PhD programmes from the university were selected through a negotiated approach between the research team and the 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 sciences. Two programmes were selected for detailed review. These are the PhD programme in Climate Change and Sustainable Development to represent the science, technology, engineering, and mathematics (STEM) fields, and the PhD programme in Law for the Humanities.

The research team encountered several challenges in accessing the data. These included among others, difficulties in accessing institutional key informants and data, as well as limited cooperation and delays in responding to communication.

As indicated in the previous section, two programmes were identified through a collaboration effort between the research team and the research office at the UDSM. Data was collected along three broad categories, (1) access to the programmes, (2) structure of the programme, and (3) the experience of the students through the programme. The data is presented in the table below along these three broad categories.

Table 2: Summarised description of the two PhD programmes

PhD Programme	Access	Structure	Experiences
PhD in Climate Change and Sustainable Development	<ul style="list-style-type: none"> • Online Application Portal • Honours degree¹ and master's degree • March and July intakes • 1 075 USD for Tanzanian nationals and 4 020 USD for non-Tanzanian students per year 	<ul style="list-style-type: none"> • Thesis only • Minimum of six semesters with 540 credits • Three seminar presentations during the proposal writing stage • Two seminar presentation during the research stage before the examination • Two supervisors with PhD qualifications, and with at least one of them holding the rank of associate or full professor) 	<ul style="list-style-type: none"> • Collaborative programmes with the University of Copenhagen, Denmark • Availability of scholarships • Viva Voce (PhD defence) • One paper published and two accepted manuscripts before graduating • Modern Library • Duration: three years
PhD in Law	<ul style="list-style-type: none"> • Online Application Portal • Master of Law (LLM) degree from the UDSM • LLM or equivalent master's degree from another accredited university • Application must be approved by the Board of Postgraduate Studies • Only 10 students are admitted per year • 1290 USD for Tanzanian nationals and 4,020 USD for non-Tanzanian students per year 	<ul style="list-style-type: none"> • Thesis only • Minimum of six semesters with 540 credits • Three seminar presentations during the proposal writing stage • Two seminar presentation during the research stage before the examination • Two supervisors with PhD qualifications, and with at least one of them holding the rank of associate or full professor) 	<ul style="list-style-type: none"> • Two scholarship schemes (Germany Centre for Postgraduate Studies in Law and the Everyday Humanitarians) • Viva Voce (PhD defence) • One paper published and two accepted manuscripts before graduating • Three years for full-time and five years for part-time students

¹For the UDSM, an honours degree implies not having failed or supplemented any subject at undergraduate level.

4. Findings: systematic, national and institutional dynamics

This section presents the main reflections from the policy documents reviewed, institutional documents and the data collected from the two case study programmes. Some of the data is supplemented by interviews with some key programme and institutional leaders within the university and the selected case study programmes. The findings are divided into two main sections. First is the policy reviews at national review on doctoral training and collaboration and the second section is a presentation of the case study data along three broad themes of access to the programmes, structure of the programmes and the experience students and supervisors have within the programme.

4.1 Tanzania Commission for Universities' (TCU) and PhD production and collaboration

The TCU acknowledges the importance of postgraduate training, research and innovation functions of universities. For the Commission, these functions are critical in contributing to development, producing high calibre human resources, creating the next generation of academics, generating new knowledge, and creating enterprises based on innovations (TCU, 2019). The intersection of these functions is fundamentally crucial in driving national socio-economic development. In addition, for a country that has embarked on industrialisation, the TCU recognises the need for well-trained experts with master's and PhD qualifications. However, an important observation of the TCU's articulation is that there is no mention of the actual number of PhD degrees required, timeframe, priority fields of studies, as well as alignment with national development goals and strategies to enable universities to achieve these. In fact, there is no mention of the role of higher education or PhD graduates across key development policy frameworks such as the Tanzania Development Vision 2015 as well as the recent National Five-Year Development Plan 2021/2022 – 2025/2026. This perhaps emphasises the reasons behind the absence of budget allocation for research and development, as well as the infinitesimal production of PhDs in the country. For example, in the 2022 graduation period, the UDSM, the leading university in Tanzania, had 68 PhD graduates who were registered between 2011 and 2018. Such silence confirms the argument by Quintana and Calvet (2012: 10) that:

[...] structural factors show that there are generally few strategic public policies on a national level on higher education, science, technology and innovation guided towards establishing priorities in science and in defining innovative programmes, strategic investment, the guidance of PhD studies,

and cooperation between actors and partners critical in this area of intervention to promote the training of teachers and researchers in the Region. (Quintana and Calvet, 2012: 10)

4.2. The influence on PhD programmes and practices from the TCU

Against the importance that the TCU places on PhD production, one of the key features of PhD programme and practices in Tanzania is the influence of the TCU. All public and private universities offering PhD programmes must adhere to the guideline and directives of the TCU (2019). In its handbook for standards and guidelines for universities, the TCU articulates a number of issues and expectations related to PhD programmes and practices in Tanzania. The articulation cuts across issues of admission, general structure, supervision, graduation requirements and other experiences. Some of these guidelines are expanded on below.

4.2.1 The TCU's position on admission

The TCU articulates that:

- A university shall admit into a doctoral degree programme a candidate who has a master's degree (UQF level 9) in a relevant discipline/area or equivalent with a minimum of grade point average of 3.0 or B grade.
- A university shall process provisional admission into a PhD degree programme of a candidate waiting for final results of his/her master's degree and has completed the degree requirements but is waiting for the results.
- An applicant with foreign qualifications shall be considered for admission into relevant postgraduate programmes after obtaining approval from the TCU.

4.2.2 PhD programmes' structure, requirements and supervision

According to the TCU, a PhD programme can be offered by coursework and dissertation as well as by research and thesis. There are some convergencies and divergences in terms of continuous and summative assessments with respect to these two forms of PhD programmes. For PhD by coursework and dissertation, continuous assessments include elements such as tests, assignments, seminars, practical sessions, three seminar presentations during the proposal writing stage, and two seminars during the research stage before the examination. In terms of summative assessment, there must be one internal examiner of the dissertation, two external

examiners of the dissertation, and a viva voce session consisting of a panel of at least five examiners including two examiners external to the university or their representatives. In addition, to qualify for an award of a PhD, a candidate requires a minimum of six semesters with 540 credits, at least one accepted manuscript (article/paper) in a peer-reviewed journal based on research, and the journal must be acceptable or recognisable by the respective university (TCU, 2019).

For PhD by research and thesis, the TCU calls upon universities to establish a credit accumulation system for students pursuing PhD programmes via this route. In terms of summative assessment, the TCU requires a candidate to conduct at least three seminar presentations, one during the proposal writing stage and two during the research stage before examination. As per the TCU, the examination of the thesis must involve one independent internal examiner, two external examiners, and a viva voce session composed of a panel of at least five examiners, including two examiners external to the university. For a candidate to qualify for the PhD award, a minimum of six semesters with 540 credits is required. In addition, for a candidate to qualify for the PhD award, he/she has to have at least one accepted journal article for the PhD by coursework and dissertation and for PhD by research and thesis one paper published and at least two accepted manuscripts (articles/papers) in a peer-reviewed journal based on his/her research and the journal be acceptable or recognisable by the respective university.

Regarding supervision, the TCU articulates that a PhD candidate must have a minimum of two qualified and experienced supervisors who possess PhD qualifications. It is preferable that at least one of them hold the rank of associate or full professor. Another important condition is that the maximum number of PhD candidates to be supervised by one supervisor at any time shall not exceed five (TCU, 2019).

4.3 Top-down: the TCU's directives without support structure for universities

The articulations and directives of the TCU regarding PhD programmes and practices are important in guiding universities and ensuring quality PhD programmes, practices and products. Such directives are important in ensuring a “harmonized higher education management system and to regulate quality aspects” (TCU, 2019: vii). There are several caveats and challenges associated with this articulation. There are two elements of the

directives, one referring to PhD completion, and the other to registration. The first speaks to one accepted manuscript for PhD by coursework and dissertation and one paper published and at least two accepted manuscripts (articles/papers) in a peer-reviewed journal before graduation for PhD by research and thesis. A second directive speaks to having a minimum of two qualified and experienced supervisors who possess PhD qualifications, with preferably at least one of them being at the rank of associate or full professor to supervise a student. Both directives require support systems in terms of capacity and infrastructure for PhD candidates as well as human resources for universities as they require enough senior academics. However, such support or strategies is not articulated by the TCU. Universities are enrolling and producing few doctoral students and graduates which is largely attributed to limited capacities in terms of supervision and other infrastructure.

4.3.1 One published article and two accepted manuscripts requirement for PhD completion

The TCU's directives and conditions of PhD candidates having to publish or have accepted manuscripts before graduation appears to have received mixed reactions and even resistance from some sections of the universities. While such practice can be important in increasing research outputs in terms of publication, it can also be detrimental to the universities and PhD candidates. This is especially the case where there is inadequate support systems and structures to enable PhD candidates to produce the articles or manuscripts required before they are awarded their degree and graduate. Furthermore, most often the students do not have control of the pace at which articles are reviewed and other journal processes. The main fear is that having to publish as one of the requirements for completing a PhD creating a backlog from the start, resulting a long queue of ungraduated or uncompleted PhD candidates. As described by one of the institutional leaders below, this policy has a number of inherent challenges:

We are killing our own PhD production. It is impossible and impractical to tell a student to publish three papers (one published and two accepted). How do you tell a PhD student to have three papers in three years and at the same time complete a PhD project? Remember, the first year as a PhD student is new, and the student is not used to the demands of the PhD in terms of proposal writing and overall understanding of what it means to do a PhD. No, it can't happen (Personal Interview, institutional leader, 2022).

With such concern, there appears to be some resistance from universities. A possible compromise could be having a journal submitted as done in other universities. From the analysis, it appears that there was no proper consultation between the TCG as the regulatory

body and universities regarding this directive. Given that it is top-down instruction, universities are compelled to implement it with varying levels of buy-in. As revealed below:

It is impractical but is a directive from the regulatory body but maybe they will see that this is not working and they will review it. It is surprising that such a decision was made without our consultation. ... I am sure in two years we will start seeing the outcomes because students will finish their thesis and dissertation, but they won't graduate because they do not have articles. In fact, we have students in a queue because they have no papers... How long will students stay in a queue because publishing is out of our control ... I think they needed to involve the universities better. (Personal Interview, institutional leader, 2022).

The statement above indicates some tensions between the regulatory body and universities. The institutional reaction to the TCU directive on PhD candidates' having to publish in order to graduate supports earlier findings on the lack of coordination of the higher education system. A study on the functions of higher education councils/commissions, which included Tanzania, found that they were operating in the absence of a pact and limited coordination (Bailey, 2015). In the context of the response from the case study, there appears to be a clear tension and mixed messages between the TCU and the university. If such tensions are not cleared, they could also affect prospects for PhD collaboration.

4.4 Access to PhD programmes

In ensuring a coordinated approach to accessing PhD programmes, universities have, and are developing, different mechanisms and strategies. These include the university's contextual and traditional practices that have been guiding access to PhD programmes, as well as technologically driven mechanisms and strategies. The measures listed below allow for access to the PhD programmes At the UDSM.

4.4.1 Online application portal

The university has established an online application portal through which all PhD applications are channelled. The doctoral applicants submit a dossier via this portal. There are three intakes, March and July for taught PhD programmes, and October for PhD by thesis. The decision to introduce an online application service was made to streamline and centralise the application process. As described by an institutional leader:

The university now receives applications strictly online across all programmes. The student applies online, and the application is processed and then they receive feedback. It is working well, and we have three intakes, so, if you miss the March intake, there is the July and October intakes. For

taught PhD programmes, the intake is October but for the thesis PhD, the intake is March and July (Personal Interview, institutional leader, 2022).

The above shift to an online system suggests the university is making efforts to maximise the use and application of ICTs into its systems which could be relevant in fostering collaboration and internationalisation. The shift to an online system provides opportunities for students from neighbouring countries and beyond to apply and receive feedback as easily as local students do.

4.4.2 Honours degree requirement

One of the requirements for some PhD programmes, for example, the PhD in Climate Change and Sustainable Development, is an honours degree. In this context, in as much as an applicant is required to have a master's degree, which is a prerequisite, he/she has to be in possession of an honours degree. As per the UDSM definition, an honours degree implies having not failed or supplemented any subject at the undergraduate degree level. Perhaps this is one of the unique features of admission criteria in this case study as the basic requirement for the majority of universities is a master's degree (see van't Land, 2011). This honours requirement does not apply to all PhD programmes at the UDMS; rather the main prerequisite is a master's degree with a grade point average of at least 3.0 or B grade.

4.4.3 PhD students/candidates' profile

The question of who the typical PhD student and candidate in an African higher education context is, has somewhat featured in the literature. In a study of six universities across the African continent, van't Land (2012) found that most doctoral students were relatively advanced in age. According to van't Land (2012), this pattern was partly because:

- ❖ most 'students' are full time staff members, and that the university has put in place mechanisms to strongly incite their staff to secure a PhD, thus increasing their academic level,
- ❖ the need to enhance the profile of the university by increasing research capacity overall, and
- ❖ the need to increase the supervisory capacity of the staff.

This trend has not changed much. The African Network for Internationalisation of Education (2018) argues that previous research has identified the relatively mature age of PhD cohorts in the region, for example the mean age being between 35 and 45 years in South Africa. Similarly, across the region, PhD students comprises of mature cohorts who are university staff (ANIE,

2018). This has resulted in countries such as South Africa pushing for institutional strategies to recruit younger PhD students (ANIE, 2018).

At one case study university, van't Land (2012) found that most doctoral students are faculty members who have a secure job at the university, who needed to complete their PhDs, and were supported by the institution to do so. In the same case study university, it was expected that the next generations of PhD students would be younger in age, and those who have finished their master's degree and looking to embark on their PhD journey immediately after graduation (van't Land, 2012: 27).

The data collected in this case study university indicates a similar trend to that observed by van't Land in terms of PhD candidates being those who are employed. However, there was the dimension of employers' sponsorship attached to it. The institutional leaders stated that "*for PhD applicants, we mostly get those who are already employed and most of them were sponsored by their employers*". Additionally, a good number of doctoral students are employed across the case study university. It appeared that only a few of those who can afford to transition from master's degrees to doctoral studies actually make it. As stated by the institutional leader below:

Very few are fresh from master's degrees and these are those whose parents can afford them because relatively PhD studies are expensive (Personal Interview, institutional leader, 2022).

While from the above statement it appears that funding is the principal factor, there could be other elements to consider.

4.5 Structure of the PhD programmes

At the UDSM, there are three key issues regarding the structure of programmes that have been identified.

4.5.1 PhD by coursework and thesis

The structure of the PhD programme at the UDSM involves both coursework and thesis. PhD by coursework involves doctoral students who enrol for PhD coursework, and are required to complete a requisite number of compulsory courses, undertake some form of research, and produce a dissertation. Some departments which offer PhD by coursework include Political Science, Public Administration, Education and Economics. The rationale behind having PhD by coursework, as described by one leader, is to enable:

- students to complete their PhD project in time.
- the UDSM and specific departments to partner with other universities with similar structures (for example in Kenya and Nigeria).

PhD by thesis is the dominant structure or model of PhD programmes at the UDSM. It involves students who enrol for a PhD and requires undertaking research without attending any course as part of the programme. However, as indicated by the institutional leader, students in this category are encouraged to undertake some non-credit and non-compulsory courses. As summarised by Aryeetey (2013):

The University of Ghana has introduced a new doctoral programme that has replaced the traditional 3-year research-only PhD programme model that was found to be inefficient. The new PhD came into effect in August 2013 and takes a minimum of four years of training, including one year of course-work, two years of practical training in research (through collaborative research and seminar presentations that would be assessed towards the doctorate), and a final year dissertation writing-up period.

The structure highlighted above is similar to the dominant model used at universities such as the University of Ghana, although a decision was made to transform it, having realised its weaknesses. This model is also widely adopted in Northern American universities and increasingly in other parts of the world. There seem to be increasing calls for the adoption of some of the above-mentioned courses within the doctoral programme on the African continent.

4.5.2 PhD supervisors' requirements

The PhD supervision structure at the UDSM aligns with the directives from the TCU. According to the TCU (2019: 137), supervision of PhDs involves three key elements as listed below:

1. A minimum of two qualified and experienced supervisors who possess PhD qualifications and preferably at least one of them being at the rank of associate or full professor.
2. A supervisor at a rank lower than associate professor is required to meet the following conditions, (i) have attained his/her PhD/MMed/MDent in at least the last four years, (ii) previously had supervised master's student(s) to completion, and (iii) have outstanding achievements in scholarly works published in a relevant field in refereed journals, books or scholarly papers in peer reviewed proceedings of professional international symposia or conferences recognised by the university and the TCU for the purpose of academic staff promotions.

3. Only five PhD candidates can be supervised by one supervisor at any time.

4.6 Institutional PhD programme experience: support and challenges

The experience of doctoral students at the UDSM, like at most universities, is characterised by enabling, but also constraining issues, which could limit the capacity of the programmes to adequately train doctoral students but also their ability to effectively collaborate. While there is some level of support, evidence suggest several institutional challenges that characterise the doctoral programme.

4.6.1 Institutional support for PhD students/candidates: evidence of some institutional support for PhD candidates

Different forms of institutional support such as seminars, workspace, access to ICT and internet connectivity are critical for the quality and timely completion of doctoral studies (van't Land, 2012; Quintana and Calvet, 2012). Other forms of support, which provide enabling conditions for doctoral students include, attending and presenting at local and international conferences, regular engagement with experienced scholars and their peers, as well as attending and running workshops and seminars. When asked to comment on the kind of institutional support provided at the case study, one leader stressed that:

In terms of supporting students' conferences, especially international conference or workshops, that is up to the sponsor of the student. The university does not support students to attend conferences. But within the institutions we have seminars and workshops and they are discipline driven. We have weekly and monthly seminars/workshops (Personal Interview, institutional leader, 2022).

From the statement above, it appears that the only form of support provided is seminars, which are mainly disciplinary driven. The comment that a PhD candidate attends a conference if supported by his/her sponsor speaks volume about lack of internal capacity to support PhD candidate during and towards completion of their PhD degrees.

4.6.2 Institutional challenges of PhD training: limited supervision capacity and supervisors' attitude and involvement

Limited supervision capacity was identified as one of the systemic and institutional challenges with regards to PhD production in Tanzania. The TCU acknowledges the inadequate supervision existing in Tanzanian universities (TCU, 2019). Similar views were highlighted by

the institutional (UDSM) leader responsible for postgraduate studies. The limited supervision capacity is attributed to: (i) the retirement of most professors and senior academics; (ii) some of the professors and senior academics taking up government positions and moving into politics; and (iii) the absence of a succession plan, which was caused by prolonged lack of employment of new academic staff. The poaching of professors and senior academics by the government is at odds with the TCU's directive that a PhD candidate must be supervised by a senior and experienced PhD holder, with at least one being at a rank of associate or full professor. As described by one of the institutional leaders:

There is limited supervision capacity in some disciplines. In order to supervise PhDs you need senior staff, but you find that in some units, senior staff are very few. Some have retired. For example, in the School of Law, we get about 200 PhD applicants, but we only take 10 students because of limited supervision capacity. Some have been appointed as judges, so you find that in the whole school, there may be one professor and no senior lecturer. So, you find that you have lowered the capacity. And because there was a gap in terms of new employment, you find that the succession plan was interrupted. (Personal Interview, institutional leader, 2022).

The statement above demonstrates some complex and systemic issues regarding staff capacity, some of which are beyond the institution's control. While at systemic level, the TCU is explicit in terms of qualifications and experience, the TCU needs to work closer with government to ensure that universities are adequately resourced for the academic enterprise. The TCU's directive, therefore, looks conflicted, because as a government agency, it is expected to be aware that universities have limited supervision capacity, which is partly due to the government's poaching of professors and senior academic members of staff for public service functions, without no timely replacement in appointment.

While limited supervision capacity is a common problem across Sub-Saharan African countries (Jowi, 2021), the Tanzania case indicates that there are more contextual factors at play. While some professors and senior academics are assuming government positions, the remaining few senior faculties must juggle with the workload of teaching and assessment, publishing, administrative tasks, and consultancy. The overburdened workload is also coupled with the tendency of allocating staff new PhD students to supervise without considering the previous existing unfinished PhDs. In many ways, the number of PhD students, and allocation of new ones, does not align with the TCU condition that only five PhD candidates can be supervised by one supervisor at a particular time.

Regarding supervisors' attitudes and involvements, which are fundamental in supervision of PhD students (Bøgelund, 2015), it was revealed that there are some challenges with supervisors' lack of involvement, personality and attitudes. It is argued in the literature, that regular meetings, timely feedback and positive relationships between supervisors and students are critical elements in supervising PhD students (Mbogo et al., 2020; Motseke, 2016). Such dynamics may have pernicious implications on an institution's ability to increase PhD throughput rate.

Another challenge is supervisors' personality and attitudes. Some supervisors are not very much active. We have come up with online supervisions, where we monitor and track supervisor-student interaction. We monitor those interactions and see how long it takes for the supervisor to give feedback to a student (Personal Interview, institutional leader, 2022).

The above-mentioned could be part of the reason why PhD students take long to complete their degrees.

4.6.3 PhD candidates' completion time/duration

The time which PhD candidates take to finish their research projects is another problematic aspect observed. The inconsistency in terms of PhD candidates' completion time was highlighted by institutional leaders at the case study university. At the case study university, it was revealed that most PhD candidates take an average of four to five years to complete their PhD research projects; there are cases of some candidates going beyond five years. The view from the case study is in line with van de Schoot et al. (2013:1) that "while many countries maintain a notional PhD duration of three or four years, in reality, PhD candidates often take much longer to complete their doctoral studies". Nevertheless, there are some factors which determine the record time completion of PhD projects. Some of these factors include, among others, source of funds in terms of whether a PhD candidate is self-sponsored or funded externally. It was revealed that PhD candidates, who are sponsored by their employers or sponsored by being linked to an external funder, tend to complete their PhD projects in time compared to those who are self-funded. This is potentially due to the conditions of sponsors who demand value for the money and return on investment. For example, using the 2022 graduation information, the table below provides a summary of completion trends.

Table 3: The UDSM 2022 graduation figures

Total number of graduates		Year of registration	Number of graduates/frequencies	%	
68	Female	36	2011	1	1.5
			2012	0	
		32	2013	3	4.4
			2014	10	14.7
	Male		2015	5	7.3
			2016	27	39.7
			2017	13	19.1
			2018	9	13.2
			2019	0	

Source: UDM graduation booklet 2022

From the above table, 39.7% of graduates were registered in 2016, which implies that they have taken six years to complete their doctoral degrees. This is followed by 19.1% of those who have taken five years, which is beyond the TCU and the UDSM stipulated completion time.

The table highlights that 14.7% of students took eight years to complete their doctoral degrees. This is followed by 13.2% who took four years, which is in line with the TCU and the UDSM stipulated completion timeframe. There is another group which represents 7.3% and who took seven years to complete their doctoral degrees. This is followed by 4.4% of students who took nine years to complete their degrees. There was 1.5% of individuals who took 11 years to complete the doctoral degree.

Realising that several factors determine and dictate the above doctoral degree completion duration, the university has put in place some mechanisms to accelerate the completion of doctoral degrees. For example, in February 2022, the university introduced an online supervision system, which allows easy and effective tracking of student progress and transparent supervision and interactions between supervisors and students.

4.6.4 Inadequate institutional infrastructure

Building PhD production capacity requires an enabling environment in terms of appropriate infrastructure. This includes, among others, physical infrastructure such as laboratories, libraries, office spaces, study rooms, accommodation, and internet with modern equipment and facilities. Cloete, Mouton and Sheppard (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”. Two elements, (i) low quality or lack of research infrastructure to support PhD students; and (ii) institutional infrastructure capacity variations affect PhD production in Africa (Bunting, Cloete and van Schalkwyk, 2014). When asked about infrastructure such as libraries and laboratories, the institutional leader stated that:

The library is not the problem; we arguably have the best library in the East Africa region. I am from the science background and if I speak from my experience, I would say the laboratories are not bad. We have labs for research for PhDs which are accessible anytime (Personal Interview, institutional leader, 2022).

There was an admission that overall, the university does not have enough infrastructure to support PhD production. This emerged from the analysis of the data. Specifically, there were concerns that accommodation and study rooms are not at the adequate level required for PhD students. This was coupled with challenges of unreliable electricity. Central to these concerns are limited resources required to put in place infrastructure for PhD candidates. As explained below:

Another issue in Africa is infrastructure which is a problem in our universities. Infrastructure in most universities is not the best. Under normal circumstances, PhD students ought to have their own accommodation, labs, post-graduate rooms, even their own library. You find that a post-graduate room is not at the level of PhD. We are trying, but still the infrastructure is still limited, you find masters and PhD students sharing a post graduate room, which is under resourced (Personal Interview, institutional leader, 2022).

Emphasising the issue of accommodation, it was stated that:

Accommodation is a challenge although we have tried, especially for international students. Still, you cannot compare with international standards where you have your own room, kitchen, study area etc. We are trying, but overall, the accommodation is not the best. We are trying to change that, and we are building a students' centre – maybe that will help. We will get there, but for the time being we are not there (Personal Interview, Institutional leader, 2022).

As far as the electricity is concerned, the concern is that:

There is a problem of electricity and sometimes you may be busy with your experiments before you know electricity goes off the whole day. So, these power cuts are the problem although there are standby generators still when it happens it is the problem, particularly over the weekend where most PhDs like working in the labs. But again, there are some units that are better off and have their own generators. Internet is available but it goes with electricity availability and you know these days Internet is very crucial for learning purposes as we get a lot of useful information from the Internet (Personal Interview, institutional leader).

The above evidence suggest that not only are the current resource challenges a potential limitation to effective PhD training, experience and success, it could also compromise potential international collaboration with external universities or partners due to inadequate resourcing of the research process.

4.6.5 Institutional infrastructure variations

While the challenge of infrastructure shortfalls is common across the two programmes examined in the case institution, there is evidence of infrastructure variations within the institution. The existing variations is due partly to, differences in terms of resources between, and among, units and programmes. The main determinant of the variations is the funding, and particularly, external funds dedicated to specific units or programmes. What is peculiar from the institutional data is that only units or programmes, which are funded mainly by external funders, are the ones with better infrastructure.

There is so much variation between and among units; some are better off, some are not. Especially those which have external funds, you find that they have new buildings and have put some infrastructure. But still, if you compare with other universities, particularly in developed countries, we are very much behind. (Personal Interview, institutional leader, 2022).

The above excerpt indicates institutional dynamics, which dictate the availability and quality of infrastructure for PhD candidates. It appears that there are deliberate institutional efforts to put in place infrastructure, however, due to limited resources, those infrastructures are not at a similar level and quality across the university. Potential collaborations, such as those via ARUA, will have to consider supporting less well-resourced units to improve or rather work with already well-resourced units.

5. Recommendations for ARUA PhD collaboration programmes, institutional and national

For ARUA to support the development of an inclusive framework, which will enable the establishment and sustenance of PhD collaboration across member universities, several considerations at programme, institutional and national level are proposed.

5.1. Recommendations at institutional levels

5.1.1 PhD collaboration considerations at programmes level

At programme level, there is a need for considerations to be given to issues of admission criteria, requirements, and experiences toward completion and awarding of the PhD degrees. Without interfering with institutional autonomy and existing practices, how to develop more collaborative PhD programmes, which have some form of similar admission criteria as well as requirements and experience towards awarding the degree, will be considered. This will help to avoid students involved in the collaborative programmes having varying experiences. Perhaps there should be special, and specific, ARUA collaborative PhD programmes with specific fields of study, which are attached or linked to a PhD programme across the member universities based on synergies.

5.1.2 PhD collaboration considerations at institutional level

At institutional level, institutional conventions (existing practices) used in doctoral training, as well as institutional readiness in terms of infrastructure and capacity to provide support to PhD candidates, needs some review. One of the recommendations from the institutional leaders, when asked to mention and recommend important elements for collaborative PhD programmes across ARUA members, was the importance of streamlining the programmes, awareness creation, and readiness. One of the key observations made was that collaborative PhD programmes should offer some sort of similar standards and experience for students moving across the member universities. To ensure such, one leader expressed that:

There should be streamlined programmes that allow for collaboration, and within each institution, there should be special facilitators/supervisors who understand the rationales and expectations and outcomes of the collaboration. It should not just be about sending students across ARUA members, rather those who are responsible for taking care and facilitating the collaboration should be well prepared (Personal Interview, institutional leader, 2022).

Achieving such preparedness might demand having capacity development workshops around hosting and conducting collaborative programmes, sharing expectations, deciding on relevant fields based on institutional capabilities and resources, and leveraging supervisory support across participating institutions.

The statement of the institutional leader above emphasises the importance of the collaborative PhD programmes offering similar experiences to students and other stakeholders involved within the institution. Such experiences, as described by the leader, would require ARUA to ensure that the universities involved, endeavour to put in place support structure and conditions prior to the commencement of the programmes. This leader's recommendation is aligned to what Bates et al., (2011) state about the need for methodologies to evaluate gaps in universities' policies and processes for doctoral programmes.

5.1.3 PhD collaboration considerations at national level

At national level, ARUA could consider regulatory and coordination issues and their influence on doctoral training across ARUA member universities. For example, in Tanzania, some of the guidelines for graduation, developed by the TCU as a government regulatory body, might need to be engaged with to establish what implications these have for collaborating students. Given the influence of the regulatory body, it is important for ARUA to ensure that the framework and practice of collaborative PhD programmes consider regulations and guidelines universities adhere to with respect to doctoral training.

5.1.4 Tapping into the existing collaborations and support

Against the evidence presented in this report, several recommendations for the UDSM regarding doctoral training can be made.

The UDSM has established several collaborations with other universities on the continent and beyond. The existing collaborations can be tapped into, and be utilised as springboards for building capacity for doctoral training. This is partly because such collaborations may offer possibilities for drawing lessons to develop frameworks for collaborative doctoral programmes, resources mobilisation, capacities building, and other related support systems necessary for doctoral training. Similarly, the UDSM is one of the beneficiaries of support from organisations such as the Swedish International Development Cooperation Agency (Sida), which has been supporting most African universities to promote their research capacity (Hydén, 2006). Such support should be directed toward doctoral training, which is also regarded as an important phase of knowledge production. There should be the establishment of

Centre of Excellence within societal relevant programmes for which capacity can be developed at PhD level through collaboration.

5.1.5 Alternative solutions for overcoming doctoral training challenges

The challenges of doctoral training as highlighted in this report are both systemic (national) and institutional. There is evidence to suggest solutions to these challenges. One of these solutions is for the UDSM to realise the importance of doctoral training not only for its institutional outlook, but also because of the importance of doctoral training for local and national socio-economic development within a knowledge economy context. Secondly, apart from relying on external support, the UDSM should strive towards developing its own internal doctoral training capacity using the minimal but available local and institutional resources.

5.2 Recommendations to ARUA

5.2.1 Starting with strengthening doctoral programmes across ARUA

ARUA's focus to strengthening doctoral training in its member universities, and what can be learnt between, and among members, is applauded by each institution and country. If there are strong doctoral programmes, the key features of those programmes need to be identified. These can be drawn on, and through this, a sustainable and strong doctoral programme can be developed in each of the partner countries. This will help to address the question of programme sustainability post collaborative doctoral programmes. Thus, while striving towards collaboration, ARUA should focus largely on strengthening doctoral programmes across members with the aim of supporting infrastructure and capacity in order to have a decent platform for doctoral education.

5.2.2 Sourcing external funding and establishing more functional Centres of Excellence

Given that financial challenge is common denominator among ARUA members, it is critical for ARUA to strive towards mobilising internal and external funds to support doctoral training across member universities. The funds should be directed towards establishing more functional Centre of Excellence across member universities. This is an important initiative, which may be utilised to enhance doctoral training in Africa.

6. Conclusion

This report underlines the conditions and possibilities of developing collaborative PhD programmes across ARUA member universities. While there are many avenues and possibilities for collaborative PhD programmes, the report has uncovered some key issues, which should be taken into account when developing such collaborative programmes at the UDSM. The uniqueness of the findings of the report allows the university to somewhat retrospect on its doctoral training policies, practices and challenges, but also allows for organisations such as ARUA to develop a better understanding of the requirements and processes needed in establishing collaborative PhD programmes across its member universities. The report allows ARUA to understand the possibilities and limitations of institutional and national policy guidelines, and to begin exploring how such collaborations can evolve. Of specific relevance to possibilities of establishing collaborative PhD programmes is the ability of ARUA to reconcile programmes, institutional and national convergencies as well as divergences, which may act as enablers or deterrents to establishing and implementing collaborative PhD programmes across ARUA members.

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