Positioning Mbeya University of Science and Technology in Tanzania in the Systems of Innovation Perspective

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The chronological development of universities ranges from the state at which universities are considered to be knowledge accumulators followed by knowledge factories and finally the knowledge hubs. The various national systems of innovations are aligned with the knowledge hubs and it involves a substantial amount of research activities. The newly established Mbeya University of Science and Technology is recognised as a knowledge hub in some particular niches. However, there are a limited number of research activities conducted at the university and this study is an attempt to identify the reasons that limit research activities. Well-structured research questionnaires were designed and distributed to academic staff members and thereafter the respondents were analysed by using SPSS software package. The lack of knowledge, skills and funds as well as equipment was earmarked as the reason that hindered the research activities. Therefore, resources are required to improve the capabilities of the staff members and the study recommends on the need for deliberate efforts to improve the knowledge of the staff members with respect to research activities.

Keywords: Mbeya University of Science and Technology; 3rd Generation Universities; Knowledge; Attitude; Perception

Introduction

The national system of innovation constitutes several elements as well as their appropriate relationships which include the production, diffusion, use, as well as transformation of new and economically useful knowledge (Asheim & Isaksen, 2002; Freeman, 1995; Lundval, 2007; Mwamila & Diyamett, 2006). Among these elements are the national education systems (universities, research centres, scientific and technical institutes), industrial relations, government policies and cultural traditions. Mbeya University of Science and Technology (MUST) is one such university located in Mbeya, Tanzania. Its major roles among others include training of students who will be responsive to the existing challenges at national and international levels through the application of science and technology, conducting research activities that contribute to the knowledge on poorly understood issues as well as offering consultancy services that adequately respond to the socioeconomic needs of the nation (MUST, 2013). As such, the establishment of niches that adequately respond to the needs of the nation in a sustainable manner is imperative. The evolving university context and missions discussed by Youtie and Shapira (2008) show a timeline of three models of universities. These models are known as traditional, present and evolving. The traditional model positioned universities as the knowledge accumulators (storehouses) with limited interaction with the rest of the society. The present model which started in the beginning of the nineteenth century witnessed the emergence of knowledge factories where universities were the supplies of the input and output of the needed technology. Lastly, the evolving model is also called the 3rd Generation Universities and it considers universities as knowledge hubs and the institutions are integrated in an intelligent manner to promote indigenous development and new capabilities (Tjakraatmadja et al., 2008; Youtie & Shapira, 2008). In another perspective that supported the evolving model, Tjakraatmadja et al. (2008) noted that knowledge sharing was the only tool for the survival of any Academic, Business or Government (ABG) organization. Mwamila and Diyamett (2006) explicitly discussed the role of universities in Tanzania with respect to the national system of innovation, which was in line with the 3rd Generation Universities. For newly established universities like Mbeya University of Science and Technology, contributions towards the socioeconomic development need to be pronounced within the three pillars (research, consultancy and teaching) so as to be in line with prospects of the 3rd Generation Universities.

Although the recently developed organisation structure of Mbeya University of Science and Technology suggests otherwise, currently the University has nine academic departments. Among these departments, six departments offer ordinary diploma, undergraduate programmes and in the near future postgraduate programmes will be offered. The other three are: Continuing Education Department which deals with all short

courses, some of which are tailor-made, the MUST Consultancy Bureau which is involved with all consultancy activities and the Department of Research and Publication which deals with all research and publication activities. For monitoring and accountability purposes, all consultancy and research projects conducted by MUST are registered under the respective departments. With respect to publications, both consultancy and research activities have the potential to be published when the executors have the intention to publish. In addition, when a comparison is done on the number of research projects registered with the Department of Research and Publication and the consultancy projects registered with MUST Consultancy Bureau (MCB), the difference is substantial as such: the number of research activities lags behind. Challenges that contribute to the limited publications as well as the lag in research activities need to be dealt with in manner that seeks to increase the annual number of journal publications and increase research related projects that lead to promoting innovations that are highly needed for developing nations like Tanzania.

Promoting these innovation related activities requires appropriate measures targeted at the upcoming researchers and the university in general. At university level, an analysis of existing policies needs to be done so as to identify the gaps that need to be dealt with in order to create conducive environment. At individual level, the knowledge, attitude and perception with respect to outreach activities (research and consultancy) conducted by the academic staff members need to be studied.

Several studies that have involved the knowledge, attitude and perception of various issues have been conducted worldwide (Abasiubong et al., 2009; Adediwura & Tayo, 2007; Anjum et al., 2008; Erhum et al., 2008; Tjakraatmadja et al., 2008). For instance, in India the knowledge, perception, attitude of adolescent girls towards STIs/HIV and safer sex education were done and indicated the need to implement gender-based sex education (McManus & Dhar, 2008). In another study, the knowledge, attitude and perception of water pipe smoking were done in Pakistan (Anjum et al., 2008) and the study indicated that pipe smoking was prevalent among high socio-economic groups due to cost, accessibility and availability. The situation has improved after introducing health awareness sessions. In Nigeria, the knowledge, attitude and perception were considered as the predictor of academic performance in schools (Adediwura & Tayo, 2007). The knowledge of the symptoms of malaria, attitude towards preventive measures as well as treatment seeking behaviours among members of the Ile-Ife community in south-western Nigeria were conducted (Erhum et al., 2008). The study concluded that public enlightenment efforts needed to be intensified, effective malaria preventive methods should be affordable, and support should be provided to make malaria treatments at hospitals free (Erhum et al., 2008). In this regard, there are limited studies that have looked at the knowledge, attitude and perception towards the execution of research projects in academic institutions. Therefore, the objective of this study is to assess the knowledge, attitude and perception of the upcoming researchers at Mbeya University of Science and Technology in conducting research related activities.

Instrument and Method

In addition to the review of the existing policies, the extent of knowledge with respect to executing research activities, the associated attitude and as well as the perception of the upcoming researchers at MUST, it was found necessary to conduct a study to identify the reason behind the limited research activities. The study was conducted at the university campus and targeted the academic staff members whose education level is equal to, or above bachelor degree. Questionnaires designed to capture all the necessary issues with regards to research were designed and circulated. A covering letter accompanied the questionnaire with an introduction and explanation of the project and the required information that will thereafter be used to enable the university to take necessary measures in alleviating the identified issues. The number of questionnaires administered to the staff members was 127 which was the actual population of the staff members during the study period. The collected data was analysed using the SPSS software package. In addition, focus group discussions were held to further gather more information.

Results and Discussion

Characteristic of the Respondents

Although the number of the questionnaires distributed was 127, the number of respondents was 30 which represent 24%. The high non-response rate suggests that the staff members may have lacked confidence in this study and considered the process as another fruitless exercise or maybe staff apathy. With respect to the respondents' characteristics, 73.4% of the respondents were aged between 30 and 49 year old. Majority (70%) of the respondents were male and is in line with current trend of composition where females are less their male staff members. Majority of the respondents where staff members whose level of education is Master's degree (57%) and bachelor degree (43%) (Table 1). The approach used involved hardcopies of the questionnaires. Another suitable approach that would have been used by the study should have involved online survey distributed via e-mail.

Perception on the Advantages of Research Activities

Considering the advantages associated with research activities, majority of the staff members consider research activities as among the processes of gaining knowledge (67%) so as to improve their capabilities in handling issues under high demanding environments (Table 2). About 57% of the respondents consider research activities to be suitable for socio-economic development of a society and the nation as a whole. On the other hand and for personal gains, 50% of the respondents consider research activities are suitable for career development and promotion purposes. With respect to the use of research outputs for policy formulation, only 37% agree with the statement. This suggests that academic staff members have varying degree knowledge as well as the attitude towards research activities. In general, research activities do require some demonstrations in creativeness and innovativeness and is time de-

Table 1.
Response based on education level.

Education level	Frequency (%)
Bachelor	13 (43.3)
Masters	17 (56.7)
PhD	-

Table 2.
The importance of research activities.

Description	strongly agree	agree	Not sure	disagree	Strongly disagree
For career development	15 (50%)	12 (40%)	1 (3.3%)	1 (3.3%)	1 (3.3%)
For promotion	8 (26.7%)	15 (50%)	5 (16.7%)	1 (3.3%)	1 (3.3%)
For adding knowledge	20 (66.7%)	4 (13.3%)	4 (13.3%)	1 (3.3%)	1 (3.3%)
For improvement of various activities of the organization	13 (43.3%)	12 (40%)	2 (6.7%)	3 (10%)	-
For socio-economic development of the country	17 (56.7%)	9 (30%)	3 (10%)	-	1 (3.3%)
For policy formulation	11 (36.7%)	10 (33.3%)	6 (20%)	2 (6.7%)	1 (3.3%)

manding. When compared to consultancy services a similar approach may be applied somewhere else but the remunerations are higher than those obtained from undertaking research activities. However, research activities involves the developed the tools some of which are usually used when conducting consultancy activities.

Publishing and Its Challenges

On the other hand, in academic arena as discussed in several studies (Clapham, 2005; Jones, 1997; Ali, 2012) the phrase "Publish or perish" has been used to researchers and academicians to describe the need to publish their research works. However, it does not take into consideration other aspects such the working environment which significantly contributes to the quantity and quality of publications. The lack of publication for academician indicates the injustice committed to fellow academicians by denying them to learn from your work experience as such the researchers keep the gained knowledge to themselves. In this regard, the respondents indicated that only 23.3% are published while 76.7 are unpublished (**Table 3**). Some of the reasons for not publishing are shown in **Table 4** in percentage wise. Among these reasons include 1) limited funding 43.3%; 2) lack of proper guidance from senior staff (26.7%); 3) limited knowledge and skill to carryout research (20%); limited time allocated for research activities (17%) and lack of motivation (10%).

The respondents indicated three main challenges as indicated in **Table 5**. These include limited of funds to undertake research, lack of scientific knowledge and skills as well as limited research facilities. Although, the lack of scientific knowledge and skills was ranked the second, however, the knowledge and skills plays an important role which includes the ability to write a winning research proposal and the subsequent implementation of the proposal. Once this is achieved, the limited funds as well as limited facilities will be reduced since the research budget does cover the necessary facilities, however it also depends on the supporting organisation.

Focus Group Discussion

With regards to the need for conducting research, it was realized that the limited knowledge on preparing a winning research proposal was a challenge. In addition, there is a need to have a database of the published papers in the library where upcoming researchers can learn from. It was identified that there is a need to establish research units based on selected niches such as climate change group, water research unity, materials research unity and other similar units. With such units

Table 3.
Status of published staff members.

Status	Frequency (percentage)
Published	7 (23.3)
Unpublished	23 (76.7)
Total	30 (100%)

Table 4.
Reason for the academic staff not publishing.

Reasons for not publishing	Frequency (Percentage)
Lack of fund	13 (43.3)
Lack of proper guidance from senior staff	8 (26.7)
Lack of scientific knowledge/skills	6 (20%)
Inadequate time allocated for research activities	5 (17)
Lack of motivation	3 (10)

Table 5.
Challenges faced by upcoming researchers.

Challenges	Frequency (percentage)
Lack of fund	14 (46.7)
Lack of scientific knowledge/skills	12 (40)
Lack of research facilities	6 (20)

in place, noticeable contribution to development will be realized.

Opportunities, Challenges and Implication for MUST Being a 3rd Generation University

Mbeya University of Science and Technology has been recently established, as such, the university intends to expand its facilities as well as the programmes and community outreach activities. In this regard, the design and the subsequent implementation of the designed facilities should take into consideration the future demands in offering education for sustainable development. However this has some financial implications and other resources as well. Majority of the respondents are either Bachelor or Master's Degree holders, there is a need to develop these upcoming researchers so as to be equip them with the appropriate knowledge that culminate to the increase in number of research activities. With respect to this, the major challenge is on how to design a suitable mode of identifying the willing and unselfish tender hearts which will spearhead the research

activities in a sustainable manner for the benefit of the surrounding communities and beyond. Several universities have been in existence, and they have various degrees of experience in offering education, MUST has an opportunity to learn from the challenges experienced by other universities and thereafter build from these experiences. When this is implemented accordingly, chances of using fewer resources (time, money and material) exist since it will only be on critical review on experiences. Also, there will be less chances of falling into similar mistakes that were experienced by older universities. When these are taken into consideration MUST's contribution will be substantial.

Conclusion and Recommendation

The study attempted to review the chronological development of universities and the position of universities in the innovation systems. The 3rd Generation Universities' systems are integrated in an intelligent manner to promote indigenous development and new capabilities and therefore they require research activities be conducted. The number of research activities conducted at MUST as well as publications is low. An attempt to identify the reasons behind this was done by using questionnaires and the respondents were analysed by using SSPS software package. The lack of knowledge, skills and funds as well as equipments was earmarked as the reason that hindered the research activities. Therefore resources are required to improve the capabilities of the staff members, and the study recommends on the need for deliberate effort to improve the knowledge of the staff members with respect to research activities. On the other hand, learning from experiences gained by other universities will walk a long way in reducing resource use and increasing chances of success.

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