



## A REVIEW OF CROSS BORDER HIGHER EDUCATION IN AFRICA: FOCUS ON GRADUATE LEVEL TRAINING IN ENGINEERING AND TECHNOLOGY



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### ABSTRACT

Cross border education has become part of the options for higher education in countries with inadequate education opportunities. This is based on the fact that education is one of the pillar for economic development and improved living standards. Thus, many nationals from different African countries are taking higher education seriously and are seeking every available opportunity to pursue it. Consequently, this translates to an ever increasing demand for higher education in the continent. Cross border higher education has potential to meet this growing demand and provide more opportunities that can be leveraged to meet the engineering threshold for Africa and provide home grown technological solutions. This paper was motivated by the Mobility for Engineering and Technology Graduates (METEGA) in Africa and similar projects that have seen students move to other countries in the continent for graduate training. The paper presents a review of cross border higher education with a focus on graduate level training in engineering and technology.

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### Contribution/ Originality

This paper presents useful synthesis on trends in cross border higher education focusing Engineering and Technology. Africa needs more engineers and this paper presents a case for a concerted efforts for stakeholders to address cross border hurdles linked to training quality engineers for Africa.

### 1. INTRODUCTION

Cross border higher education dates back to the period before the colonial scramble for Africa (Njuguna and Itegi, 2013). At the time, internationalization was restrained to scholars and students physically crossing regions and borders for higher education and training. The intellectual capacity of Africa played an important role in shaping pedagogical approaches in many parts of the world including Europe owing to the fact that a number of institutions in ancient Africa formed a hub for scholarly work. Institutions like the University of Timbuktu in ancient Mali (12<sup>th</sup> century), Karawiyyinn in Fez in Morocco (859 AD), and Al-Azhar in Cairo Egypt (970 AD), served as hubs for

scholarly activities (Njuguna and Itegi, 2013). The arrival of colonial masters destroyed any form and traces of education and training that ever existed on the African continent, and instead this was replaced with education policies and practices based on the interests of the colonizing countries (Njuguna and Itegi, 2013). However, after gaining independence many institutions gained freedom though still followed the set trends with minimal programs focusing on enhancing student exchange, capacity building, and regional cooperation. This notwithstanding, cross border education has thrived alongside the rising desire for higher education in Africa.

Cross border higher education encourages an environment in which higher education can perform its different functions to ensure a positive transformation (Yeravdekar and Tiwari, 2014). Both universities and states benefit from the development and provision of education across borders. However, Africa continues to be vulnerable to the global system (Magnier-Watanabe *et al.*, 2010) and still depends on external controls. This situation is attributed to the colonial legacy which formed the basis for the South-North movement of international students. This is clearly demonstrated in the numerous efforts higher education is making in Africa to reinvent itself in the areas of teaching and research. Thus, a majority of higher education institutions in Africa require a clear articulation of their purpose and the motivation to internationalize and cater for students and staff from different parts of the continent and the rest of the world. Additionally, they also need to conduct research that is tailored to providing solutions to critical issues that have antagonized the African continent persistently while contributing to the development of the international community (Golba *et al.*, 2015). To be able to conduct sound research requires more graduate level training. Though, countries in Africa have produced numerous graduates, the number of engineering and technology graduates is relatively small compared to the needs of the continent. Therefore, this paper is a review of cross higher education with focus on graduate level training in engineering and technology.

## 2. METHODOLOGY

This paper is based on a review of existing literature (Adamu and Addamu, 2012). The paper focuses on cross border higher education training in Africa at the graduate level. This paper reviews scientific publications on cross border higher education in Africa from leading digital libraries. Some of the libraries that were used as sources for the scientific publications include ScienceDirect, Google Scholar, IEEE Explore, and CiteseerX. The databases (table 1) were identified based on the knowledge that they are known to contain published work on cross border higher education. Articles were downloaded from each database based on their relevance to the search terms. The search terms that were used included Africa, cross border education, graduate training, research, engineering, and technology.

Table-1. Online sources searched for relevant materials

Database	Url
ScienceDirect	<a href="http://www.sciencedirect.com">http://www.sciencedirect.com</a>
Google Scholar	<a href="http://scholar.google.com">http://scholar.google.com</a>
IEEE Explore	<a href="http://ieeexplore.ieee.org/Xplore/home.jsp">http://ieeexplore.ieee.org/Xplore/home.jsp</a>
CiteseerX	<a href="http://citeseerx.ist.psu.edu/index">http://citeseerx.ist.psu.edu/index</a>

Source: Compiled by authors

Publications were selected on the following criteria;

1. Peer-reviewed articles focusing on cross border education and research.
2. Articles that addressed graduate level training in Africa.
3. Articles describing approaches to higher education and graduate level training.
4. Articles describing challenges to and opportunities for cross border education.

### 3. CROSS BORDER EDUCATION

Cross-border higher education is one the ways that now countries are using to respond to globalization (Altbach, 2004; Njuguna and Itegi, 2013). With globalization, both international and intercultural issues are mainstreamed into the higher education teaching and research (Altbach and Knight, 2007). This adds to the enhancement and aligning of education to international standards as a step towards being responsive to the global environment. Cross border higher education takes different forms including franchising or partnerships, articulation, and studying across the border (Alam *et al.*, 2013). In the partnership mode, institutions from different countries partner and exchange students, staff, and faculty. The teaching, assessment, and awarding of qualifications is done in compliance with the host country's regulations and procedures. In the articulation mode, the host country institutions are recognized by those from other countries (Chen, 2015). An institution from one country partner with a provider in the host country to develop an articulation plan to allow students take courses in the host country's institution and get credit transfer. In the study across the border form, students from one country travel to undertake courses for a period of time at an institution located in a different country. Besides training and research, cross border education enables students to be exposed to experiences in different cultural diversities and lifestyles (Dearden *et al.*, 2014).

### 4. ACADEMIC MOBILITY ACROSS BORDERS IN AFRICA

For Africa to develop, there is a need for considerable growth in dedicated skills needed to support and develop the different industrial sectors (Watkinson *et al.*, 2012). Additionally, a deeper understanding of the different cultural settings across Africa is necessary. As part of revitalizing higher education in Africa, many partnership projects are offering maintenance grants to students studying in other countries. Maintenance grants have had a positive impact in other regions like the UK for students participating in higher education (Dearden *et al.*, 2014). The benefits associated with education and research across borders (Chan and Lau, 2005). Cross border education is promoted by inadequate educational opportunities in home countries (Altbach and Knight, 2007; Deniko *et al.*, 2015). It is also a way of attracting international students. The process takes two forms: internationalization at home and abroad. Internationalization abroad takes the forms of education across borders and mobility. Student mobility initiatives help largely in reducing brain drain from the developing countries (Luhanga, 2010; Golba *et al.*, 2015). Figure 1 depicts the number of students moving into countries outside Africa for academic mobility. Australia tops the list followed by New Zealand while Japan and Italy receive the least number of students. Most of the student moving into these countries come from Africa.

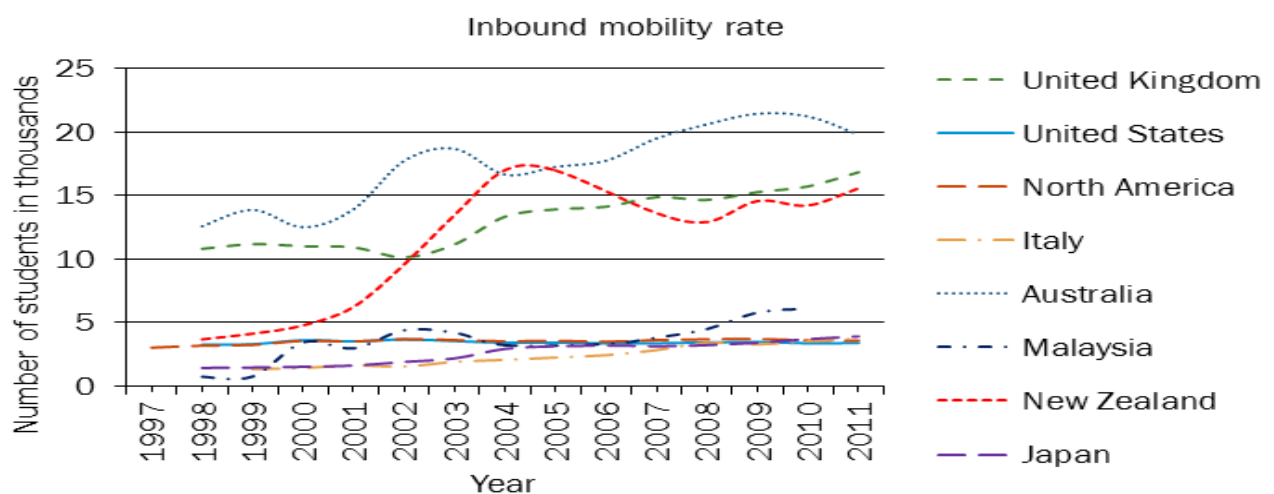


Figure-1. Inbound academic mobility for selected countries outside Africa

Source: Knoema (2014)

Figure 2 depicts the number of students moving from Africa to other countries for academic mobility. From the trends in the figure, Morocco has the highest number of mobility. This can be attributed to political instability and search for quality education. Also, there is a perception that quality higher education can only be obtained outside the African continent. With regional initiatives (e.g., the Mobility for Engineering and Technology Graduates (METEGA) project (EU, 2013) WASCAL project (Golba *et al.*, 2015) the Pan African University (PAU) project (Golba *et al.*, 2015) and WaterNet project (Golba *et al.*, 2015) which lay emphasis on cross border mobility within the continent, the situation can be contained.

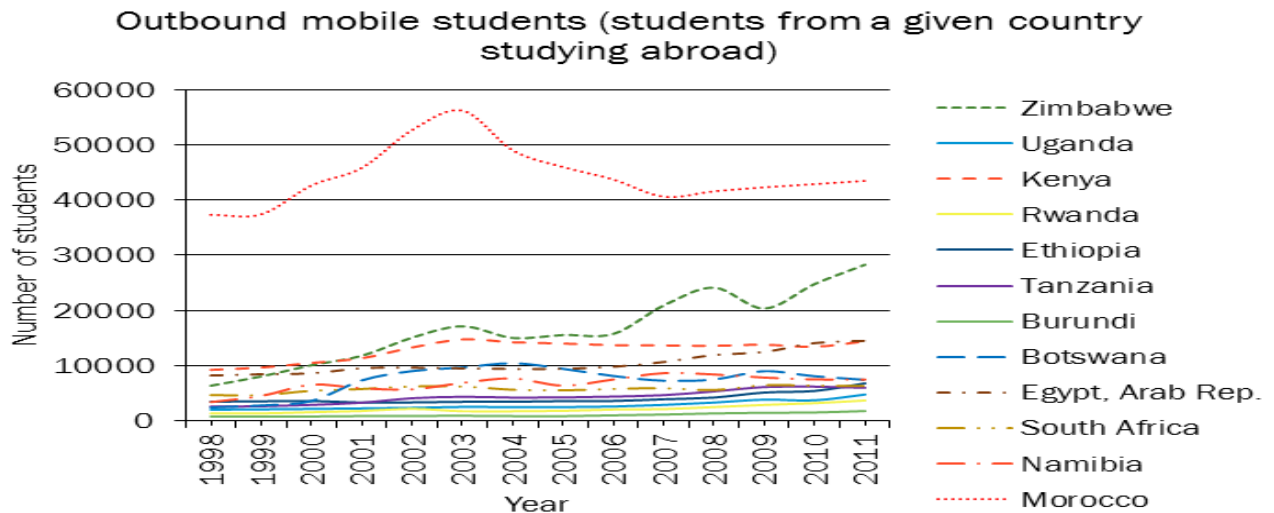


Figure-2. Outbound mobility for selected countries in Africa

Source: Knoema (2014)

## 5. BENEFITS FOR CROSS BORDER EDUCATION

Cross-border education comes with many benefits including international security, maintenance of economic competitiveness, nurturing understanding across nations, spread of technology, promotion of knowledge economies, and creation of regional networks. Given the limited resources at the state level, there is great potential for regional development through partnerships, especially in developing countries (Njuguna and Itegi, 2013). Cross border education helps to develop regional skills, reduce brain drain, and pressure on local education (Alam *et al.*, 2013). Also, the current trend of internationalization of higher education generates student and staff mobility between countries. Student and staff mobility are continuing to grow in international higher education (Chen, 2015; Golba *et al.*, 2015; Lee and Sehoole, 2015). Also, regional collaborations are initiated to provide support to individual institutions and the countries involved (Njuguna and Itegi, 2013). The cooperating institutions, students, and staff/faculty share a variety of benefits that foster human understanding across borders (Wu *et al.*, 2015). This also comes as an indirect investment in the future economy (Wu *et al.*, 2015) the labor market, and national educational to attain international levels of research and teaching. The collaborating institutions also build on quality improvement. As the need for collaboration extends across borders, countries within the same geo-political spheres, create regional networks that give them strength to compete with other regions of the world. Additionally, cross border provision transcends the focus on production for subsistence and development of manpower for respective countries. It provides a good avenue for knowledge and technology acceleration. It includes the promise to penetrate new markets and increases competition for scarce resources such as human capital, research infrastructure, and foreign investment.

## 6. OPPORTUNITIES PRESENTED BY CROSS BORDER EDUCATION

Institutions of higher learning are expected to produce graduates with relevant knowledge and attitude for the labor market in different countries. Through the graduates, these institutions contribute to the human resource requirements for a country to improve and maximize on socio-economic development (Moses and Eva, 2015). Like other parts of the world, the institutions of higher learning in Africa are expected at the minimum to provide education and conduct research (both theoretical and practical) for industrial development and sustain socio-economic in the continent. To a great extent, the evolution of the society is determined by the quality of higher education offered by universities and institutions of higher learning (Medvedeva, 2015). Given that these societies spread across regions, cross border education presents numerous opportunities that can be tapped into for the benefit of communities.

On the onset, cross higher education offers a great opportunity for localizing engineering curricula that is fit for purpose to address specific needs for different regions (Mohamedbhai, 2015). This makes execution of the curriculum, learning, and training to be contextually meaningful (Ghorashi *et al.*, 2008). Though, Africa has suffered periods of turbulent and devastating economic crisis (especially the 1980s) that saw universities suffer substantial deterioration (Moses and Eva, 2015) owing to overcrowding and deficiencies in infrastructure (Matthews *et al.*, 2012), governments through cross border higher education can harness efforts to provide state of the art facilities for graduate training (Golba *et al.*, 2015). For instance, states in a particular can focus on specific themes, especially in engineering and technology, and provide the requisite infrastructure to support those themes. This can foster mobility of students which can further enhance regional integration efforts especially in the African context. Additionally, an apparent opportunity for this kind of graduate training is research collaborations and networks through which financial support can flow into universities (Golba *et al.*, 2015). Adequate mentoring and supervision systems are required at masters and doctoral levels to improve the quality of research (Moses and Eva, 2015). These systems are developed through mentoring and coaching of the junior faculty by the experienced senior staff. Some regions have these expertise to provide mentorship. Other regions can tap into this through the opportunities presented by cross border education.

## 7. CHALLENGES OF GRADUATE TRAINING

Although higher education plays an important role in many nations, few countries have made commitments regarding graduate training. The global demand for education, training, and research propels mobility of people largely for study and research activities (Alam *et al.*, 2013). Thus, countries in Africa need to invest more in higher education in terms of infrastructure, programs, governance, and research to enhance the mentality of obtaining quality graduate training in Africa. Worldwide demand for higher education grows exponentially (Lee and Schoole, 2015) with key driving forces that include economic and demographic progress of developing nations, and increased globalization of economies and societies (Altbach and Knight, 2007). Cross-border education promotes multicultural, diverse and internationalized outlook among students (Altbach and Knight, 2007). It transforms the social, cultural, and identity perspectives perceived by learners.

Most developing economies in Africa have a fast-growing young population which is putting pressure on the domestic education systems. These countries are not able to meet the demand for higher education, especially in engineering and technology. Many of these countries are not in a position to develop and expand the prevailing capacity of higher education in engineering due to constraints on financial resources. The already available and existing resources are stretched over large populations of students. Therefore, the additional demand for higher education in engineering in most developing countries can be met by cross-border education; these countries can

share educational resources. By 2020, around 3 million students from the developing nations are likely to seek higher education outside of their own countries (Alam *et al.*, 2013).

## 8. QUALITY ASSURANCE FOR CROSS BORDER HIGHER EDUCATION

Higher education is one of the fundamental factors that contributes to socio-economic development (Adamu and Addamu, 2012; Alshayea, 2012). The wealth of nations depends on the quality of higher education. A good training and research at higher education level assures compatibility with the needs and expectations of countries. Thus, higher education institutions should endeavor to provide quality education. Quality is considered as achieving goals and aims in an efficient and effective way while meeting the requirements of stakeholders. Quality is developed in a harmonized way nationally, regionally, and internationally. A number of networks working on quality assurance have been established. These networks are meant to improve the education quality culture. For example, the Inter-University Council of East Africa (IUCEA) works on regional quality assurance initiative aiming to develop a harmonized quality assurance for Kenya, Tanzania, Rwanda, Burundi, and Uganda. The networks have been used in the parts outside Africa, for instance, to improve the quality of higher education in the Kingdom of Saudi Arabia, the government of Saudi Arabia established the National Commission for Academic Accreditation and Assessment (Alshayea, 2012). Many countries demand accountability, efficiency, competitiveness, and transparency from institutions of higher education. In so doing, many countries in Africa have a quality assurance agency. One of the most important safeguards for students and other key stakeholders is the existence of a strong and transparent mechanism for accreditation and external quality assurance of higher education institutions. The system provides assurance to stakeholders including students that an institution or program meets certain standards and is or has been subject to external evaluation (Dugarova *et al.*, 2015). The quality audits help in ensuring that institutions provide higher education, awards and qualifications of acceptable quality standards regionally and internationally.

## 9. CONCLUSION

Education beyond borders has accrued benefits that can help foster regional integration and fast track socio-economic development. Though, efforts have been put in place to allow student mobility across borders, there is still more to be done in terms infrastructure, and graduate training and research. Africa needs more engineers to meet the requisite threshold for growth and development. Enhancing cross border education adds to the combined efforts by the African states to meet this threshold.

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