

# Technology Diffusion and Economic Progress in Africa: Challenges and Opportunities

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## Abstract

Application of appropriate technology has been noted as one of the distinguishing factors in growth disparities across countries. Thus, this study investigates the role of technological diffusion in economic progress in Africa. This was achieved using descriptive and empirical analyses based on imitator-innovator theoretical framework. The study established that the sub-regions in Africa with higher values in technological diffusion indicators experienced higher economic progress, which is a good indication of a significant positive relationship between economic progress and technological diffusion. Thus, the study concludes that if Africa must make contribution to the global knowledge economy and move on the path of economic

progress, the issue of technological diffusion through adequate investment on R&D, functional education, among others, needs to be addressed with all serious efforts.

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## 1 Introduction

One of the most distinguishing factors between the developed and developing countries is application of appropriate technology as well as its diffusion to different sectors of the economy (Ekekwe, 2010). The growth in technology transfer across the world especially in the 21<sup>st</sup> century has greatly impacted various sectors of the economy across countries around the world. For example, the rise in technology has brought about growth in cross-border trade, investment, and so on. Furthermore, there has been increase in cross-border listings of firms in foreign stock markets, rise in wireless transactions through electronic payment of goods and services, *inter alia* (Osabuohien, 2010). As stated by Mukoyama (2003), technological progress is the engine of growth in any country. However, to sustain this growth, appropriate research and development (R&D) needs to be considered, which can be facilitated by channeling resources (financial and otherwise) and infrastructural development to enhance technological diffusion. This leads to some pertinent questions for Africa especially with little resources being available for R&D. for instance, the average public expenditure for R&D as a percentage of total public expenditure in African countries is less than 1% (World Development Indicators, 2010).

The scenario described above have even been appreciated by some African leaders as can be seen in some of their efforts to sensitize different segments of leadership with respect to the promotion of relevant technological changes and R&D. However, these steps are not only inadequate but have not yielded sufficient outcomes especially based on the witty progress of the world as regards knowledge. The experiences and progresses made by China and India in global knowledge economy support the belief that countries that are able to promote appropriated knowledge economy will experience economic progress more than others that lag behind (Mukoyama, 2003).

Technological diffusion process has four elements-innovation, communication channels, social system and time or rate of

adoption (Ejiogu, 2010). To further substantiate this and relate it to the African context, some indicators of research and technological diffusion are presented in Table 1. From the Table, it is obvious that the sub-regions in Africa are not only far behind other regions of the world but they are many folds below the world average. SSA had an average of 0.54 internet users per 100 persons compared to the world average of 5.66 during the period 1998-2001. There was improvement in the indicators as it was 1.65 and 3.93 for internet users per 100 persons in SSA during the period 2002-2004 and 2005-2008. The telephone usage in SSA also witnessed improvement from 4.10 per 100 persons in the period 2002-2004 to 8.77 during the period 2005-2008. However, when compared to the global average and other regions of the world such as EAP, ECA and MNA, the values for SSA were far lower than them. For instance the value of internet users in SSA (3.29 per 100 persons) was about five times lower than the world average of 20.58 within the period 2005-2008. Comparing the sub-regions, it could be observed that, the South African sub-region had a higher number of internet users, compared to other sub-regions in SSA. The Central African sub-region had the lowest internet users, followed by the West African sub-region and East African sub-region.

*Table 1.*  
Some channels of technological diffusion

Regions	Internet Users per 100 people			Telephone users - mainline +mobile (per 100 people)		
	1998-2001	2002-2004	2005-2008	1998-2001	2002-2004	2005-2008
Central Africa	0.14	0.64	2.63	1.15	3.58	13.65
East Africa	0.24	1.11	5.68	1.50	4.91	26.84
North Africa	1.35	5.27	14.55	1.57	2.37	2.72
Southern Africa	1.56	3.67	6.03	8.77	15.05	17.51
West Africa	0.19	0.89	4.96	2.04	6.42	29.03
SSA	0.54	1.65	3.93	2.23	4.10	8.77

EAP	1.58	4.53	8.03	5.91	7.97	14.77
ECA	2.68	8.82	20.10	17.03	26.42	48.80
LAC	2.78	8.88	16.37	14.47	22.85	36.79
MNA	1.11	3.61	9.42	7.18	11.19	19.80
High OECD	23.44	40.32	55.29	66.35	100.19	132.12
High non- OECD	12.07	27.12	42.34	44.07	66.69	100.54
World	5.66	12.02	20.58	20.27	30.67	45.77

**Note:** EAP-East Asia and the Pacific; ECA-Europe and Central Asia; MNA-Middle East and North Africa; LAC-Latin America and Caribbean; SSA-Sub-Saharan Africa; OECD-Organization for Economic Cooperation and Development.

**Sources:** Computed by the authors from data obtained from World Bank (2010).

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