

# Partnership for Enhancing Developing Countries' Capacity in Participating in Global Knowledge Production and Use

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## Introduction

Africa is the second largest continent with about 54 countries and a population of over one billion people. Although African countries have experienced a series of natural and man-made disasters in the past, there has been significant progress in key human development indicators and toward the Millennium Development Goals (MDGs). However, despite the recent progress towards information technology infrastructure development, implementing digital technologies and facilitating access to information resources in a way that enables knowledge creation, access, and use remains a critical challenge in many African countries.

This poster highlights some of the contributing factors that enhance the capacity of African institutions to play active roles in the current global knowledge economy (in terms of information and knowledge creation, access, use and reuse).

In light of the rapid growth of Open Access and availability of scientific and educational resources, it also explores the potential role of international partnerships to enhance African countries' ability to improve the creation, management, use, and exchange of scientific information, including agricultural knowledge.

## Gross Domestic Expenditure on R&D (GERD) Impact on Research Performance in Africa

In the current global knowledge economy, power and wealth are increasingly measured by one's ability to access and use information and knowledge. Development of a national information and knowledge infrastructure is part and parcel of the national development program. Several indexes exist to measure the performance of nations' connectivity and broadband penetration:

- The International Telecommunications Union (ITU) Digital Opportunity Index (DOI)
- The Economist Intelligence Unit (EIU) E-readiness rankings

Regional totals for R&D Expenditure (GERD) and Researchers, 2002, 2007 and 2009	GERD (in billions PPP\$)			% world GERD		
	2002	2007	2009	2002	2007	2009
	<b>World</b>	<b>787.7</b>	<b>1,155.4</b>	<b>1,276.9</b>	<b>100.0%</b>	<b>100.0%</b>
Developed countries	650.0	882.9	931.5	82.5%	76.4%	72.9%
Developing countries (excl. least developed)	136.4	270.7	343.3	17.3%	23.4%	26.9%
Least developed countries	1.3	1.8	2.1	0.2%	0.2%	0.2%
<b>Americas</b>	<b>319.2</b>	<b>433.0</b>	<b>457.5</b>	<b>40.5%</b>	<b>37.5%</b>	<b>35.8%</b>
North America	297.2	398.6	417.5	37.7%	34.5%	32.7%
Latin America and the Caribbean	22.0	34.4	40.0	2.8%	3.0%	3.1%
<b>Europe</b>	<b>236.4</b>	<b>324.4</b>	<b>363.4</b>	<b>30.0%</b>	<b>28.1%</b>	<b>28.5%</b>
European Union	205.7	271.3	300.3	26.1%	23.5%	23.5%
Commonwealth of Independent States in Europe	16.9	30.6	37.0	2.1%	2.6%	2.9%
Central, Eastern and Other Europe	13.7	22.5	26.1	1.7%	1.9%	2.0%
<b>Africa</b>	<b>7.0</b>	<b>10.8</b>	<b>11.8</b>	<b>0.9%</b>	<b>0.9%</b>	<b>0.9%</b>
South Africa	2.3	4.4	4.7	0.3%	0.4%	0.4%
Other Sub-Saharan countries (excl. South Africa)	1.9	2.9	3.4	0.2%	0.3%	0.3%
Arab States in Africa	2.5	3.5	3.7	0.3%	0.3%	0.3%
<b>Asia</b>	<b>214.0</b>	<b>367.9</b>	<b>421.8</b>	<b>27.2%</b>	<b>31.8%</b>	<b>33.0%</b>
Japan	108.2	147.8	137.1	13.7%	12.8%	10.7%
China	39.2	102.4	154.1	5.0%	8.9%	12.1%
Israel	7.1	9.1	8.8	0.9%	0.8%	0.7%
India	13.3	24.3	26.1	1.7%	2.1%	2.1%
Commonwealth of Independent States in Asia	0.5	0.8	1.0	0.1%	0.1%	0.1%
Newly Industrialised Economies in Asia	39.7	71.3	78.7	5.0%	6.2%	6.2%
Arab States in Asia	1.2	1.7	2.3	0.1%	0.1%	0.2%
Other in Asia (excl. Japan, China, India, Israel)	4.8	10.6	11.0	0.6%	0.9%	0.9%
<b>Oceania</b>	<b>11.2</b>	<b>19.2</b>	<b>22.4</b>	<b>1.4%</b>	<b>1.7%</b>	<b>1.8%</b>

Table-1 Gross expenditure on Research and Development (GERD) and Research Performance

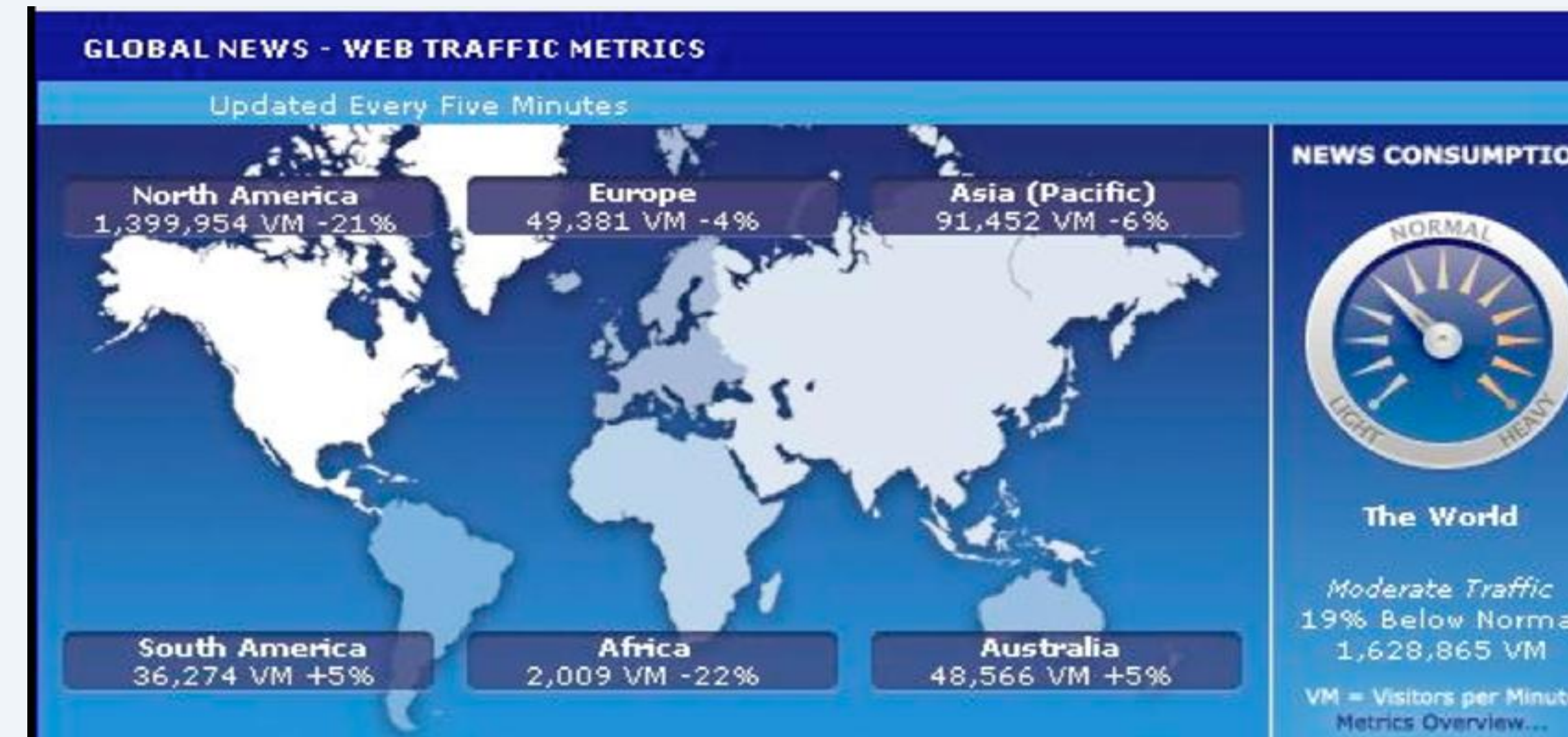


Figure-1 Visitors per minute for News Traffic (Consumption)

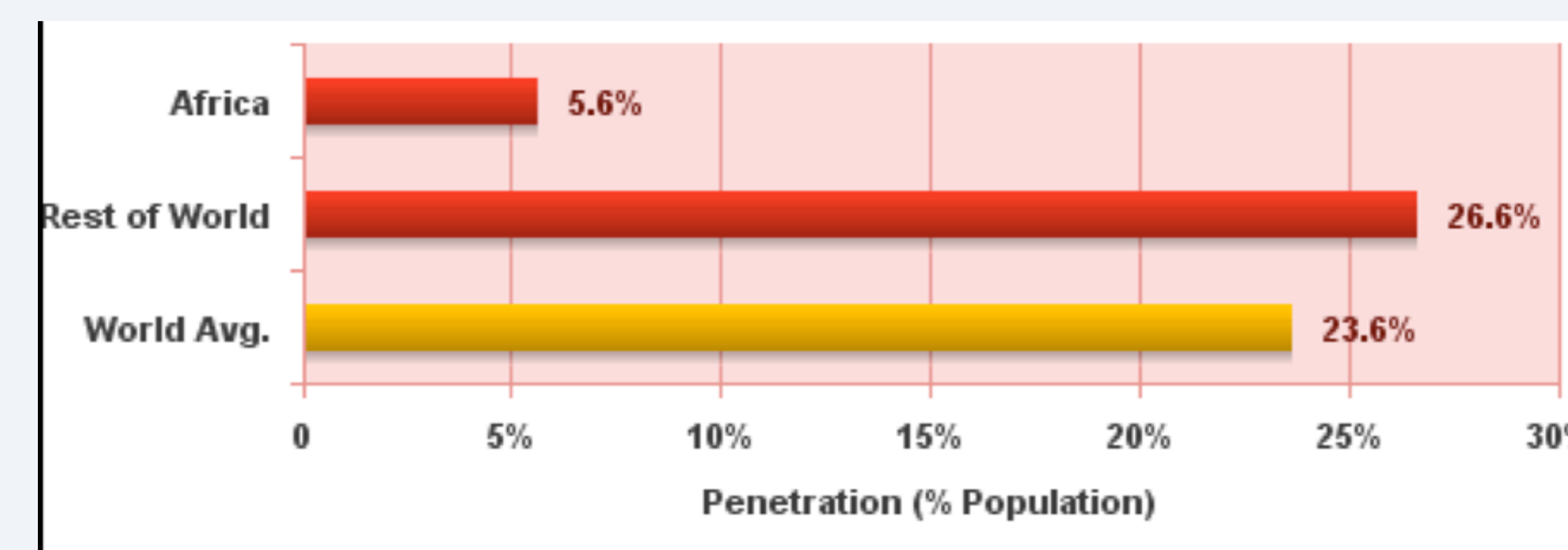


Figure-2 Internet Penetration per Population

The digital divide in content networks is even more severe than the physical network. The contribution of African universities to the global scientific knowledge base is very small:

- South Africa is the only country from Africa in the top 31 countries in the world that account for more than 98% of the world's highly cited papers.
- The world's remaining 162 countries contributed less than 2% in total.
- A search of African authors and researchers in the ISI Web of Knowledge database (or using anyone of the analytics tools there) reveals very few works produced in Africa.

Continent	S&T Journals	% of Titles	Patents Filed	% of Patents
Africa	54	0.64	438	0.24
Asia	968	11.28	70,500	38.76
Europe	4,134	48.55	56,134	30.86
Oceania	175	2.08	2,065	1.13
North America	2,966	35.2	51,519	28.32
South America	173	2.26	1,205	0.66
<b>Total</b>	<b>8470</b>		<b>181861</b>	

Table-2 Global knowledge Production

## Higher Education, Research and Education Networks as Links to the Global Knowledge Base

There has been a great expansion in higher education enrolment around the world. Currently over 170 million students attend higher education, which is a five-fold increase since 1970 and a three-fold increase since 1980. A growing trend is also seen in cross-border higher education, which is characterized by the movement of:

- people: (students, professors, scholars, researchers, experts, and consultants)
- programs (course, academic programs, and degrees)
- providers (institutions, consortia, and companies) across national borders

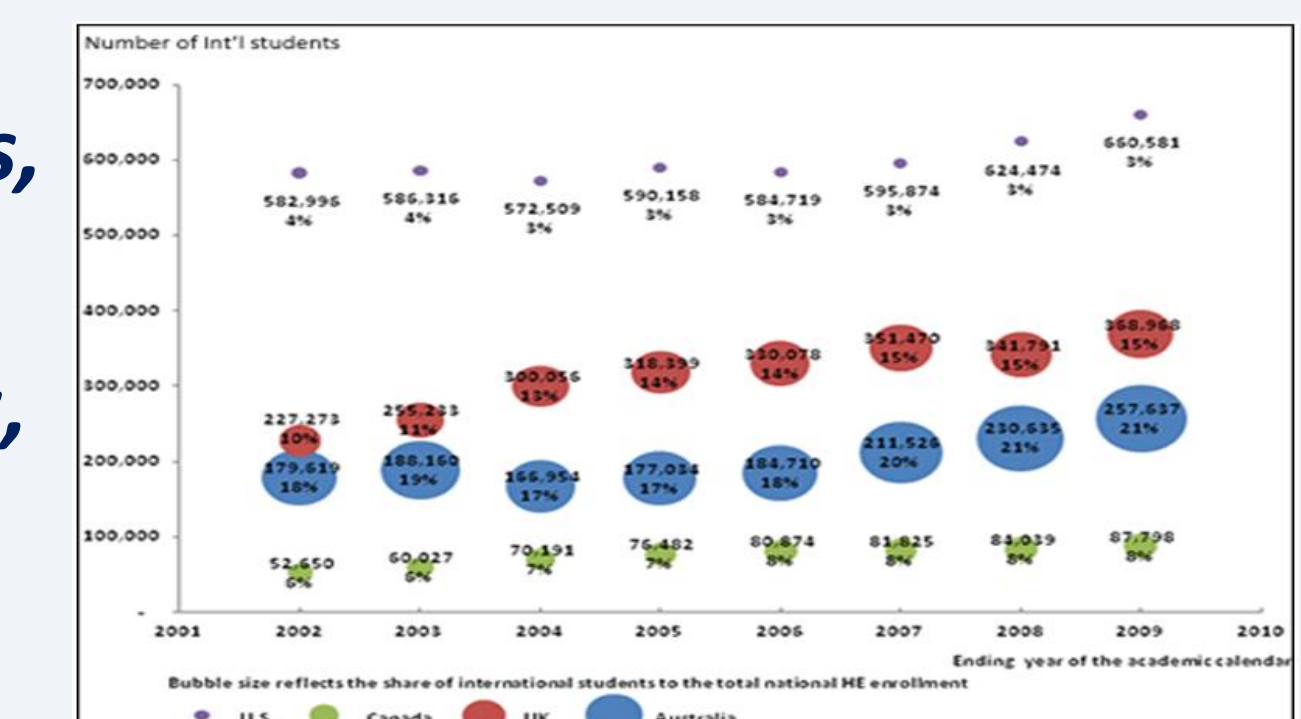


Figure-3 Patterns in Workforce Mobility

The Southern African Development Community (SADC) has the highest outbound mobility percentage worldwide (6%).

## Infrastructure for Building Scientific and Research Capabilities in African Countries

The digital library environment provides scholars with access to more diverse and previously unavailable contents that span myriad technologies across institutions and nations. Although much work needs to be done, the current infrastructure development facilitates access and reduces information poverty.

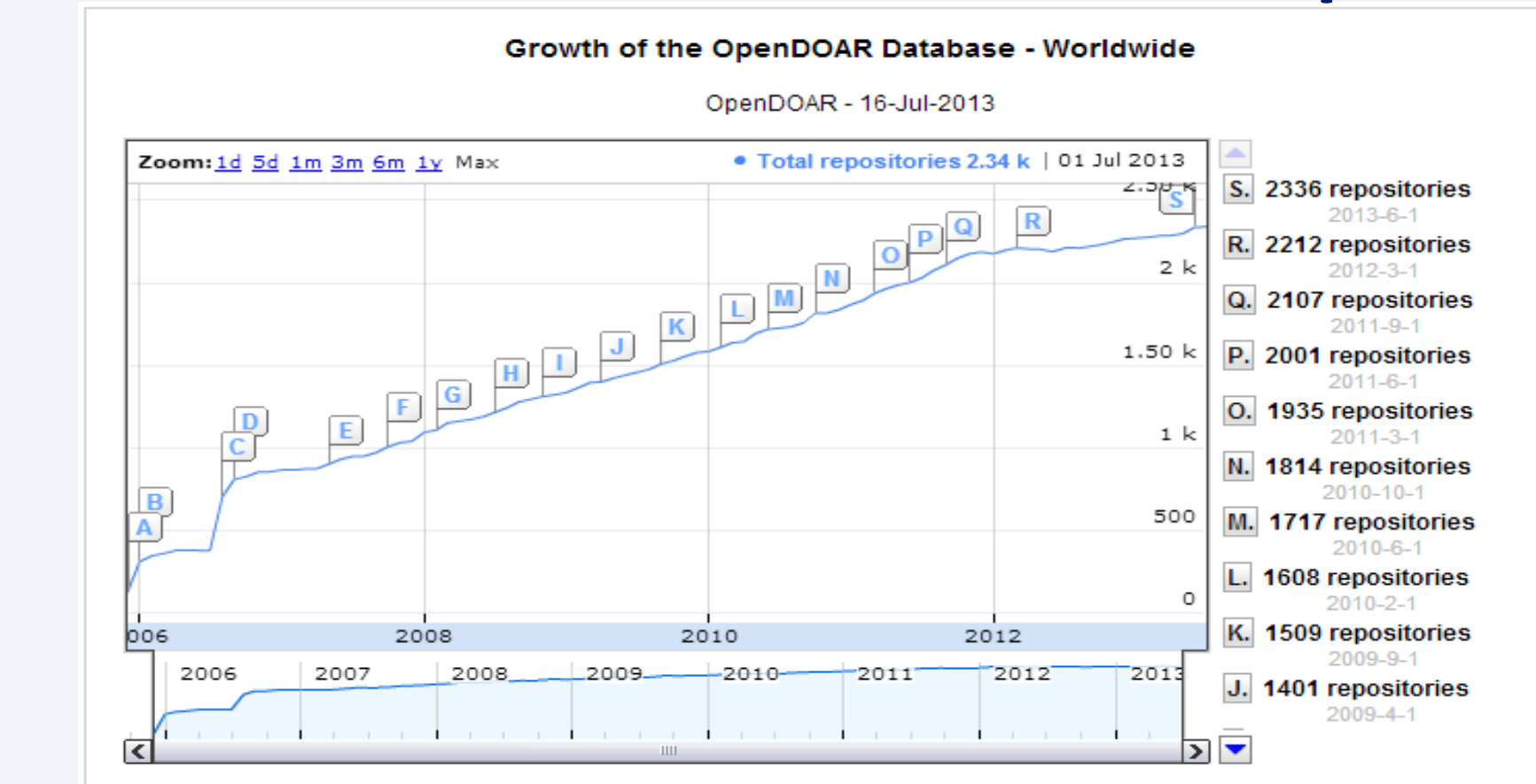


Figure-4 Growth of Open Access Digital Content

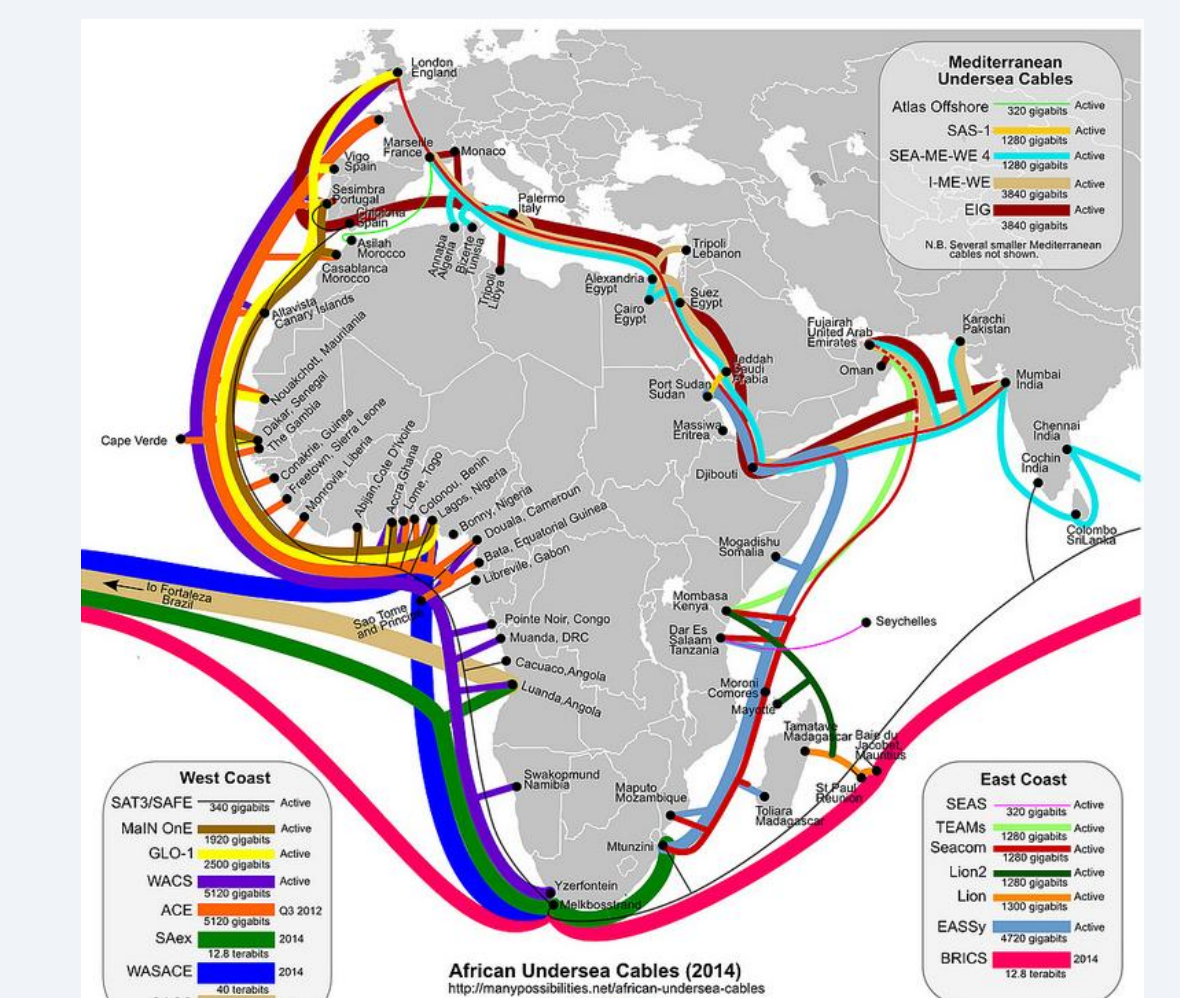


Figure-5 Undersea Cables are Changing Access

Infrastructure development, coupled with the increased availability of interoperable Open Access content, helps to integrate, aggregate, and enhance access to diverse digital resources. There are several multi-scale (local to international) and multi-sector (Academic, government, commercial not-for profit, etc.) initiatives underway:

- New Partnership for Africa's Development (NEPAD)
- Access to Online Global Research in Agriculture (AGORA)
- Health InterNetwork Access to Research Initiative (HINARI)
- Online Access Research in the Environment (OARE)

Such partnerships and synergetic activities create digital opportunities for developing nations, both in the use and generation of knowledge on the web.