

TECHNOPOLICY BRIEF 6

WHAT IS THE ROLE OF SCIENCE IN A  
GLOBALIZING WORLD?

WHAT ARE THE IMPLICATIONS FOR  
AFRICA?

Awele Maduemezia

**AFRICAN TECHNOLOGY POLICY STUDIES NETWORK**

## Table of Contents

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<b>1.0</b>	<b>Introduction</b>	1
	What is Globalization	1
	Science in a Globalizing World: Implications for Africa	3
<b>2.0</b>	<b>What is the Main Thrust of World Science Today</b>	5
	What are the Implications for Africa?	5
	Leapfrogging	7
<b>3.0</b>	<b>Conclusion</b>	8

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## Introduction

### What is globalization?

Globalization is the growing view of the world as a single coherent entity with respect to socio-economic planning, coupled with its enforced development as a single coherent entity, under the pressure of international market forces, engineered primarily by the perspectives, national interests and current values of the Western world.

Globalization is a term that is loathed by most developing countries because of the activities of the International Monetary Fund (IMF) and the World Bank (WB). Recently articles in some Nigerian newspapers suggested, in effect, that Globalization is an imperialist plot to keep Africa and the rest of the developing world down. While this might be an over-reaction there are aspects of globalization that are contentious and those that are appealing.

For many cultures, globalization is West over the rest. Ideas, politics, and technology are perceived as following in the footsteps of explorers, missionaries, and soldiers. From a certain standpoint, the trend is in America's face. Globalization is seen as the increasing extent, intensity, velocity and impact of world-wide interconnectedness. Such interconnectedness has existed for some hundreds of years. Tracing its increase, it can be argued that there is now an ongoing transformation, from economics, politics and migration to culture and law, which is creating a new kind of world order. It is essential to examine the various forms that globalization can take. These are political, economic or financial and market, social, technological, and scientific globalization. These have different characteristics:

- **Political globalization** is a beneficial structure and is represented by the United Nations Organisation.



- **Economic or financial and market globalization** is represented by the IMF and its kindred organisations. This type of globalization seems to be creating problems throughout the developing world.
- **Social globalization** is one in which weaker cultures are subsumed by stronger ones. An example is the phenomenon of the English Language slowly but surely becoming the universal language of science and technology, at the expense of even relatively strong European languages, not to mention African languages. This is a good thing for science, as it simplifies publication, but not for the humanities, as it suppresses other cultures.
- **Technological globalization** leads to the creation of uniform technical specifications and standards in industry. It is driven by the need to create wider markets especially for hi-tech goods. It leads to operational compatibility of equipment from different manufacturers. It also simplifies engineering design. This is a good thing for industry, especially for the computer industry.
- **Scientific globalization** is the medium through which the science research front is now universally accessible, so that the practice of science now has hardly any geographical boundaries. This is undoubtedly a good thing.

It is the last of these species of globalization that concerns us today.

Delivering the second Dag Hammarskjöld Lecture at Uppsala University in February 2000, Sir Brian Urquhart pointed out that the concept of globalization, popular with the Western media, was encountering some opposition from a variety of groups and interests worldwide. This is because there are so many unresolved apparent contradictions for example:

- Does the Internet bring people together or isolate them?
- Is global consumerism destroying diversity and identity or is it reviving national and ethnic feelings?
- Is it not true that globalization in its present form deepens already existing inequalities?
- How can the benefits of globalization be distributed more evenly?



### Science in a Globalizing World: Implications for Africa

- Is the surging phenomenon of globalization shrinking the decision making powers of the young and politically fragile nation states of the developing world?

The Western nations cannot be blamed for trying to protect, advance and sell their own national interests as long as this does not stop others from doing likewise. Given the human and material resources that many African countries have, the assumption should be that the playing field is level. Unfortunately, Africa is yet to master the art of creatively managing her resources.

The apparent contradictions outlined above derive from the fact that enlightened self-interest is the primary driving force behind this world phenomenon. And there is no way in which this can be wished or talked away. It is deeply entrenched in the instinct for self-preservation that is internalized everywhere in varying degrees.

#### **Science in a Globalizing World: Implications for Africa.**

Science in a globalizing world has benefits that Africa can and should take advantage of. It is a fact that, "computers, telecommunications and the Internet are the embryonic stages of a single global nervous system."

Despite the fact that 90% of the people worldwide, have no access to computers, the communications revolution has made economic globalization possible. This revolution has also provided, through the Internet, a new, quick and inexpensive way for scientists in developing countries to make contact with the research front in the various disciplines, something that we could never have dreamt of some decades ago. Information is now available, if scientists are prepared to use it. The trend of globalization has caught on, and cannot be halted because some African intellectuals are raising objections, however cogent these might be. The question of whether or not to develop/globalize is in Africa's hand.

The computer is globalizing science in so many ways. Most serious scientists anywhere in the world today have the kind of working access to a personal computer that they could not have dreamt of a few decades ago. They may not own one, but there is likely to be one in the neighbourhood. This is true even in Africa. This development has broadened the range of problems that can be tackled not only by the individual scientists but also by collaborating groups. The easy exchange of



information through the Internet has virtually eliminated the isolation of scientists in the developing world.

Electronic publishing has relieved us of the burden of relying on inefficient postal systems. Once the work is done, it can be dispatched to the editor of a journal in a moment, anywhere in the world. Wireless telecommunication protocols have liberated scientists from the yoke of inefficient fixed-line telephone networks. Very soon, hand-held wireless telephones will be able to carry sufficient data for full Internet interaction, and the world of science will indeed become one monolithic family.

Africa should take advantage of such new opportunities by taking an active role in the creation of a new computer culture to fully appreciate the benefits derived from them. The result is that the West has embraced the computer while Africa is pre-occupied with other things, thus the widening technological gap between them. It is the responsibility of good governance to inspire people in directions that would highlight the need for Africa to move forward. Intellectuals who blame foreign powers for the continent's continuing backwardness are doing a great disservice. The searchlight should be turned on Africa.

Development is something that one does by, and for, oneself. It is not something that someone else does for you, or fails to do for you. If the gap between Africa and the rest of the world is widening, it is because the developed world is moving forward while Africa is sliding backwards due to a variety of factors.

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### **What is the Main Thrust of World Science Today?**

The overriding concern of man today is that science should function as a tool for sustainable development, a means of improving the quality of life of man on earth. This is why attention has been focussed on four principal concerns, namely, energy, the environment, food, and communication.

Science is expected to find solutions to problems that beset these sectors through research and development in four principal areas, namely;

- agriculture-inspired gene technology
- information and communication technology
- environmental science and technology for sustainable development
- energy research that is directed at reducing world dependence on fossil fuels and nuclear technology, the former of which have a finite life time, and the latter, unresolved environmental hazards.

### **What are the Implications for Africa?**

Today in the USA, there is active research and development going on in the area of hydrogen fuels obtained from water. When the commercialization of this device succeeds, it will reduce or eliminate the importance of petroleum in world politics. It will also place nations that have not developed the capability to produce this new kind of fuel at a disadvantage. This will include most of the African continent, with the probable exception of South Africa.

USA has also built a prototype power station that it is hoped "will turn in a performance that any conventional generating plant would be hard pressed to match. It will derive energy from fuel without burning it, turning it into many kilowatts of electricity, usable heat, and water of a purity that no mountain spring could match. At the same time, it will produce only a modest amount of carbon dioxide." Eventually, its performance



will be more reliable than that of the conventional power plant with a lower cost of operation. Energy consumption is a reliable measure of modern civilization.

The bottom line is that, there really is a need for Africa to join in such research as hydrogen fuels and other forms of alternative energy? Africa must not wait for the Americans to produce it then later complain about being enslaved.

The January/February 2002 issue of the Journal Technology Review, published by Massachusetts Institute of Technology (MIT), some new energy technologies that might propel Americans to the post-petroleum age are discussed in sufficient detail. When they succeed, the five or six discussed methods will send countries Nigeria into panic. African governments should now be laying out blueprints for the post-petroleum age that is in the offing, whether they have petroleum reserves or not.

Two or three decades ago, African scientists gave lecturers on strategies that various African nations should adopt for development. The main paradigm at that time was that one had to learn to walk before one could run. At the urging of European countries, African scientists held on to the concept of appropriate technology for Africans, and argued endlessly about what was known as transfer of technology. Appropriate technology is technology packaged to match the state of development or underdevelopment of a developing country. It is based on the assumption that such a country does not have what it takes to grapple with the intricacies of modern technology, and therefore must be assisted. There were those who insisted that there was no such thing as transfer of technology. Others argued that it was there all over the place. That was decades ago. However, it is important to note that many scientists of the older generation consider and appreciate the need for a shift of paradigm that is what is suggested by science in a globalizing world. We must reject the paradigm of appropriate technology because it does not fit into what is now the global village.

An aspect of science in a globalizing world that impacts on Africa is the "Tokunbo syndrome". "Tokunbo" is Nigerian colloquialism for second hand European goods. The rapid development of technology in the West has given rise to an equally rapid rate of obsolescence, especially in the automobile sector. Equipment that does not satisfy the stringent standards operative in a hi-tech oriented society find a ready



market in Africa. This has both a positive and a negative impact. The positive is that it temporarily takes care of the short-term needs of cash-strapped consumers in Africa. The long-term effect is, however, harmful, as the easy availability of such equipment impedes all efforts at local development of technology, and removes any initiatives that might have been lying dormant in the local folk.

The Internet has opened up a vast array of possibilities worldwide. Wireless communication has topped it up. There are areas in which Africans can compete quite effectively with the West. One such area is software development, without which computers cannot function. To make scientific progress that would benefit the masses in Africa, it is not necessary for the entire population to engage in scientific research. However, three things are needed:

- an environment to conduct serious development-oriented research like the Sheda Science and Technology Complex (SHESTCO) in Abuja, Nigeria
- a few dedicated people supported to the hilt by a government that is not just paying lip service to science and technology, and most importantly,
- a shift to a new paradigm, namely, leapfrog.

**Leapfrogging** is used figuratively to denote the process of vaulting over the intermediate steps in technological development. It means jumping from where we are to where we ought to be as an active part of the global village that the world is tending to be. It should be the new paradigm for African countries, taking into account the enormous possibilities provided by the Internet. In practice, this would involve a selection of a few areas, at a time, and the concentration of effort and resources in this area.

Serious work is currently going on in the area of biotechnology directed at improving the yield of Africa's agricultural products. Frontline research should also be carried out in theoretical/mathematical physics, aspects of material science, natural products chemistry, pharmacology of herbs, and in the applications of solar energy, to mention a few areas.

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### Conclusion

Globalization of science can have a positive impact on the development of African countries if its possibilities are fully grasped. One effective way in which progress can be made in this regard is through the establishment of advanced research laboratories like SHESTCO, Abuja, Nigeria in all African countries.

In these laboratories highly motivated scientists should be given the tools and the environment needed to leapfrog into the world stage using the assistance provided by the Internet. "A little at a time" should be the slogan at the beginning. The spirit would spread to the universities and other government research institutes. Ultimately, the end users in the street will feel the impact of such ground-breaking innovations. All this requires proper planning and basic commitment at the relevant levels.

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The author is a Professor of Physics at the University of Ibadan, Nigeria. The paper was a speech given at the Workshop on "*Science and Technology and Africa's Global Inclusion*" sponsored jointly by the ATPS and the Federal Ministry of Science and Technology of Nigeria in November 2002.

## **ABOUT THE AFRICAN TECHNOLOGY POLICY STUDIES NETWORK**

The African Technology Policy Studies Network (ATPS) is a multi-disciplinary network of researchers, policy makers, actors in the private sector and other end-users interested in generating, promoting and strengthening innovative science and technology policies in Africa. With a regional secretariat in Nairobi, the network operates through national chapters in 17 African countries, with an expansion plan to cover the entire sub-Saharan Africa.

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Published by

The African Technology  
Policy Studies Network,

P.O. Box 10081, 00100 General Post Office,  
Nairobi, Kenya.

© 2003 African Technology  
Policy Studies Network (ATPS)

Printed by



**ISBN: 9966-916-66-0**

For more information this series and ATPS Contact:

The Executive Director  
The African Technology Policy Studies Network  
3rd Floor, The Chancery, Valley Road  
P.O. Box 10081 00100 General Post Office  
Nairobi, Kenya

Tel: +254-20-2714092/168/498

Fax: +254-20-2714028

Email: [info@atpsnet.org](mailto:info@atpsnet.org)

Website: <http://www.atpsnet.org>