



The Impact of Scientific and Technological Innovations on International Relations in the Age of Globalization

KEHINDE ABIODUN ISINKAYE

Olabisi Onabanjo University, Ago-iwoye, Ogun State, Nigeria.

Abstract. Science and technology is a global phenomenon and their effects have been felt all over the world. The paper examines the new developments in the field of international relations brought about by a series of scientific discoveries and technology innovations in the contemporary period of globalization. These new developments in science and technology have triggered advanced development in economic, political and socio-cultural relations in the process of international relations. It has equally increase the sophistication of weapon system of weapon producing states of the world. It concludes that the process of international relations will continually advance with the implantation of scientific and technological development of the twenty-first century.

Keywords: Science, Scientific, Innovation, International Relations, Globalization.

1. Introduction

The increasing demand by mankind for new effective scientific discovery and technological breakthrough is an ongoing process. This is based on the thinking that scientific discovery usually opens up new method of solving an existing problem. The process of international relations has been greatly influenced by the advents of new scientific discoveries and high technological innovations in the last two centuries. This has transform the nature of global commerce, military weapon systems, political relations and cultural inter-change across different continents of the world, accentuated by forces of globalization in the contemporary period.

This article seeks to capture new realities brought about by scientific and technological innovations globally and their impacts on international relation in the contemporary globalized world.

2. Literature Review

2.1 Science

According to the international Webster encyclopedia (2004) science can be described as knowledge of facts, phenomena, law and proximate caused gained and verified by exact observation, organize experiment and correct thinking. It is also an expertness, skill or proficiency resulting from knowledge. It is an outlook, a means of study which involves precision, rigor and systematic way of proceeding (Wasby, 2005). The major objective of any science is the description of phenomena and the establishment of general principles by which the phenomena can be explained and predicted (Anifowose 2015). Science is a body of knowledge consisting of systematically arranged knowledge resulting from careful and purposeful observation, critically tested and formulated into general principle that is easily utilized and understood. Science is to established general laws covering the behaviors of the empirical events or objects, and thereby to enable to connect together the knowledge of the separately known events, and to make reliable predictions of events as yet unknown. (Adetayo, 2011)

2.2 Technology

According to Hutchson encyclopedia (2001), technology involves to the application knowledge to the arts, theoretical knowledge of industry and the industrial arts. It equally entails the use of tools, power and materials generally for the purpose of production. It has been categorized as low, intermediate and advanced invention to local materials and methods of production. The advanced technology is highly automated and specialized and on which modern society depends. When properly applied, technology can dramatically save time and money and, in addition, it can improve the decision-making process, as well as the speed of collecting,

analysing and processing data, with advanced analytical tools (Holzer, 2011).

The impact of technology, particularly information and communication technology on international relations is enormous in the contemporary period. Information technology which was introduced in recognition of the communication abilities and facilities offered by computer and it covers a whole range of applications, techniques, and systems such as communications equipment and services associated with them. This has fundamental skills necessary for good living and interactions in the global system (Jegade, 2019).

2.3 International Relations

According to Hoffman [1960] international relations is concerned with the factors and the activities which affect the external policies and power of which the basic units into which the world is divided and this include a wide variety of transnational relationship, political and non-political official and unofficial, formal and informal. On his part Dunn [1948] positioned that international relations maybe looked upon as actual relations that take place across national boundaries or as the body of knowledge which we have for those relations any given time. (Dunn cited in Ojo & Sessay 2011).

Palmer (2001) held that international relations focus on the study of world community in transition. It encompasses more the relationship among nation state and international organization, groups as it includes a great variety of transnational relationship at various levels above and below the level of nation-states in the international community. International relation is a field of study that is not only concerned with the interrelationship of state actors and non-state actors in the international system but also with the policy strategies, attitudes towards collective security, peace and justice (Johnson, 2014)

In summary, international relations deals with the sum total of relationships (political, economic, strategic etc) among diverse actors (states, international, organizations, multinational institutions etc) that cut across states boundaries or national frontiers. The main concern of the field must be to identify the links and interrelationship, that is, moral and materials which binds states and people together in an international society (Short, 1982)

2.4 Globalization

Friedman [2007] held that globalization can be conceptualized as the widening, deepening and

speeding up of worldwide interconnectedness in all aspects of contemporary life. It encompasses many such as expanded trade, telecommunication, monetary coordination, multilateral corporations, technical and scientific corporation, cultural exchange of new types and scales, migration and refugee flow and relation between the world rich and poor countries (Goldstein 2011). Globalization refers to processes whereby social and economic relations require relatively distance less and borderless quality, so that human lives is increasingly played out in the world as a single place. Social relations that is the countless and complex ways the people interact with the effect of each other, are more and more conducted, and organized on the basis of a planetary unit (Folarin, 2013). With the rapid growth in the internationalization of science, technology and higher education, globalization of innovation and revolutionary convergences that are taken place in ICT the world has not only become flat but much more independent⁸, occasioned by forces of globalization in the twenty-first century.

Instructively, Professor Klaus (2016) explicates that human history will be marked by technological shifts more rapidly and fundamentally, in the way we work, live and interact than ever before as a result of the break-through in artificial intelligence, quantum-computing and neuron technologies. The key elements are velocity (rapid), slope (cover all human interaction) and impact (changing the way we do things). Historically, the discovery of steam, water and mechanical production system of 1784, the 1870 division of labour, development of electricity and mass production; 1969 commencement of electronic, information technology and automated production and lately manufacturing of cyber physical system have possible impact to human society. Noting that artificial intelligence, material science, genome editing, quantum computer and block chain hold that the key while beneficiaries are those with intellectual or physical capital creativity and technological skills and the next (fourth) industrial revolution is built on digital infrastructure. Hence, scientific and technological innovation has greatly advanced the process of international relations globally.

3. Theoretical Framework: System Theory of Politics

David Easton (1965) popularized the application of the system paradigm for the analysis of political life. According to him, a political system is made up of elements; input, output, conversion process and feedback and environment. At the international level, the actors are the states, international organizations,

international court of justice, foreign ministers, etc. The outputs come out in form of treaty, agreements, communiqués, ICJ judgment among others. The environment is the physical, economic, political, cultural and the ideological sub divisions of the international environment dominated by state and non-state actors.

According to Ojo and Sessay (2011) the system approach is a convenient device used by political scientist and students of international relations to help them in their analysis of the nature and workings of the international system. System theory captures the centrality of the environment as a great influential factor in global interactions by governments and the peoples of the world. Hence, science and technology is a physical, cultural element dominant in the international environment and serves as a driving force in the advancement and achievement of progress in all dimensions of human life. It is very central in international relationship in that, it determines the destiny of nations making the possessors, giant and the seeker, subservient.

4. Methodology

The paper utilized the qualitative research design and historical research method was adopted to elicit data on progressive changes and attendant positive development in the process of international relations, with particular focus on the impact of scientific and technological innovations on international relations. The paper is a conceptual paper which relied on thick literature reviews, theory building, author's viewpoints and logical insights from other published works in the field of international relations. The paper examines how the advancement in science and technology has advanced the process of international relations and offer suggestions on further improvement of the field and practice of international relations in the twenty-first century.

5. Discussion of Findings

5.1 Impact of Scientific and Technological on International Relations in the Age of Globalization

The importance of science and technology in the in the conduct of international relations cannot be overemphasized. It has produced profound effects on the content, processes and methodology of international relations particularly in the age of globalization.

Firstly, it enhances the process of political communications among the world leaders. Political communication refers to the transmission or exchange of political significant information which can be sent to a desired target through multiple channels (Akeke, 2009). The improvements in information and communication technology has prompted increasing rate of political relations. An example is hotline-a direct telex link between the white house and Kremlin during Cuban crisis (Aja, 1999). The availability of telephone, Telex and fax machine, coupled with the internet service (Email, newsgroups, file transfer protocol, world- wide web) has impacted positively on international political relations (Bakare2004), Iyioma, (2006). This is because countries' leaders do try to influence the wider domestic structure is the communications revolution. Radio, then television, and now the internet place countries, their leaders, and their policies increasingly on display before the world. The communication's revolution also allows government to communicate much more easily with a worldwide audience. In-addition to traditional propaganda, public diplomacy includes shaping what leaders and other top diplomats say and do to play to public opinion abroad and otherwise conducting diplomacy in part as public relation campaign. Government also uses a variety of agencies and other organizations to project her image. The United States, for one, operates or sponsors the Voice of America, Radio Free Europe/Radio Liberty, and Radio Marti. The U.S information agency also reduces world-net, a television service available globally, provides web sites, and as other modern communication capabilities (Rouke, 2011).

The process of international relations is enhanced by international law, international morality and international morality (Umozurike, 2010). International law provides the legal basis of inter-states relations and regulates the operations of international organizations behaviours of individuals with international personality of notes are the practices of international norms and usages rights from the 29th century and subsists till date. This has further broadened the idea and practice of international society. International society as Mclean and Macmillan, (2009) note, is based on the interactions of states as they are seen as legal equals and possess share identity as members of the international society. They share norms, rules and institutions and the rise of globalization in the twenty-first century with the operations of global communication, transportation, international financial system and operations of global business institutions

have impacted inter-state interactions and the relationship between and among social movements.

Secondly, the prevalence of science and technology has led to the proliferation of international institutions built around new technologies in the globalized world (Skortiff 1973). Adebisi (2007) observes that the increasing wave of international problems and challenges that cannot be tackled alone by a nation state has equally led to the multiplication of international organizations such as atomic energy agency to moderate nuclear proliferation, UNESCO, OPEC, UNICEF are other examples. In the recent times, a prominent international organization, ECOSOC agenda have included such diverse issues as housing, narcotic drug control, water resources, desertification, world population, trade, the UN children's fund UNICEF, industrial developments, literacy, refugees, the environment, science and technology, the status of women and the problems of the disabled. Further, ECOSOC operates as a research agency and clearing house, in order to coordinate the work of numerous committees, study groups, private or non – governmental organization. The information /data gathered is significant in helping the UN and member states come to terms with global problems, and frankly speaking no other agency has such inclusive research and information gathering authority (Mba, 2013).

In addition, many International Non Governmental Organisations activities that have impacted the process of international relations have been made possible by scientific and technological innovations of the twenty-first century. For example, global civic networks that consist of new transnational movements and NGO's who are concerned with global issues such as the environment, war, poverty, women rights, and who find allies within the emerging global media and within international organizations (Kaldor, 2007).

Thirdly, science and technology have spiraled the collective efforts in solving health and environmental problems globally. According to (Ekop 2006) note that such problems include greenhouse effect, ozone depletion, automobile pollutants industrial pollutants and other global environmental problems occurring due to climate change and human activities most, as exemplified by global warming, involves international decision making on health issue. Furthermore, medicine is not left out in this globalization process. For instance, in what we call medical tourism, patients now move to other parts of the world to receive treatment. This could be due to lack of expertise in their country of origin or due to

cheaper services in other countries. In the same vein, doctors and other medical personnel now move freely to other countries due to better pay and facilities. It is important to note that globalization has brought about standardization of medical training and practices making it possible for best practices, to be available in many parts of the world. Also, influx of Chinese medicines into USA, Britain and Nigeria are examples of this modern mobility of services and consumption (Muoghalu, 2018). Regrettably, UNDP development report [2004] indicated that Africa health governance is passing through a crisis due to insufficient hospital, medical personnel and migration of Africa health experts to abroad.

Fourthly, there has been an appreciable development in international economy relations due to the coming of electronic commerce. New technologies have also been a key factor in the expansion of the world economy by dramatically improving our ability to extract raw materials, turn them into products, and transport them to consumers and this brings benefit of improve standard of living to people, home and abroad (Rourke, 2008). According to Adiele (2006) technology has linked nations or economics of the world by specifying resources that could not be obtained from a single economy, cheaply produced components of a good are imported into an economy and assembled cheaply to form the whole or complete good. Also, various internet media serve as potent instruments in international business dealing. Such as E-learning, E-Business, E-auctioning, E-mail, Electronic Data Interchange, B2B among others (Bakare 2004). Also, the idea of collective good that involves choices that are interdependent and the decision by one country have effects on other states are monitored by advanced technological nations of the world. For example, the decision by wealth countries to continue the production of chloroflou carbon affect other countries longtime depletion of the ozone layer and pumping of industrial waste in the ocean portends danger for the countries of the world (Migst, 1999). The third world countries are disadvantaged in the scheme of things due to the facts that they are exporters of primary, raw materials and paradoxically, importers of finished goods sold at exorbitant prices. Lack of indigenous technology to access their national resources is also an important factor that has crippled the economies of Africa states. This has led to the huge repatriation of capital from third world countries (Africa inclusive), by foreign technical experts in multinational enterprise and the need foreign technology.

Fifthly, the development in military, defenses and intelligence gathering efforts have been influenced by

the development occurring in science and technology. The development of guns and cannons in the ancient time followed by aero plane, hydrogen bomb and armored vehicles in 20th century and the availability of nuclear weapons such as intercontinental ballistic missiles and advanced military strategy of the contemporary period came as products of scientific and technology prowess (Aja 2006). This development has invariably endangered mankind as any attempt to use them will lead to extermination of people of the world. We are now in the era of drone and satellite surveillance, the latest approach to air warfare stimulated by advanced satellite and technological discovery of the 21st century by the western powers. Satellite perform military surveillance and mapping, communication, weather assessment and early warning of ballistic missiles launches and it also provide navigational information to military forces (Army units, Ships and Planes) and guided missiles in flights (Goldstein, 2011). Also the intelligence function include gathering, processing, and dissemination of information needed by participants in decision making, have been enhanced by forces of globalization in the contemporary period.

Iwu (2016) underscores the importance of intelligent gathering as it is considered as a tool in military strategy and national security and have a nation crafts its strategy determines how it employs intelligent gathering institutions. To him, it is a secret - information which is collected through clandestine, means by satellite to earth orbit, monetary communication or electronic signature. Hitherto, global collection of the so called open source information has always been an interesting in reading foreign publication or listening and watching radio and television broadcast. The coming of internet has caused a dramatic explosion in the volume and scope of foreign source case as they monitors millions of publication, broadcast and website and made report as produced for intelligence analysis and decision makers. The purpose of these reports is to inform as well enable decision makers to construct and implement policy to advance national strategies, identify threats and evaluate the actions and intentions of foreign adversaries. The huge amount generated in societies with a science-based technology can now be mastered with the aid of computers, modern technology is devising sophisticated paraphernalia (telephone tape, radio to installation, pinhead microphones, ultra red photography) to strengthen authorities (Laswell 1975). The technological revolution in electronic has advanced military strategic and tactical moves in

cases of war or armed conflicts in the contemporary world.

Finally, global cultural relations and mutual dependence have been strengthened by science and technology and the people are culturally homogenous across the planet earth. Durotoye (2006) asserts that the world has become a global village due to the discovery in the technology which has resulted in the compression of the time and space. Due to satellite technology events occurring 1000 miles away are seen instantaneously and programs being broadcast on cable networks (CNN) do influence the behavior of the people globally. The information revolution has greatly increases transparency in international relations as the ability of government to bargain effectively with each other and to reach mutual beneficial outcomes is enhanced by the availability of instant communication channels. In those ways, the increase transparency allowed by new technologies strengthens the reciprocity principle as a solution to international relations' conflicts. Also, the information revolution aid the development of international identities as journalists, scientists, environmentalists, church members among others, work or operates in communities spanning national borders as the link forged in such transnational communities create a new functionalism that could encourage international integration on a global scale (Goldstein, 2011).

Also, prestigious functional institutions whose quality of teaching and, research are respected and valuable abroad can be assessed on line (Akeke, 2009). There are now on-line libraries that have millions of digitalized journals, books, articles, bibliographies and encyclopedias which are made available in the public domain and ICT enables the exchange of ideas, and materials among social scientists and to come together irrespective of location thus forming a global village (Jegade, 2019). Also, the process of conducting research in international relations have been greatly enhanced by latest technological discovery such as computer-aided statistical packages such as Computer Aided Qualitative Data Analysis Software (QAQDAS), Statistical Package for Social Sciences (SPSS), and have greatly improved social sciences research in the twenty-first century. There is global mobility of labour as skillful workers and experts are recruited from across the globe. This has led to brain drain in Africa as experts from the continent are migrating to the developed west for greener pasture and the effects have been that of cultural imperialism on African society. Africa is lagging behind their counterparts elsewhere in the world in access to

scientific production; dissemination of their scientific findings and activities and exchange of scientific ideas due to lack of constant and affordable electric power supply has a limited access to the computer and cheap telephone service (Nnoli, 2003). In addition, the continent will remain subservient to technological push of the advanced countries and its attendant developmental consequences for a long time to come due to state of Africa' technological backwardness (Muhammed, 2013).

6. Conclusion

Attempts have been made in the research work to show the important roles that science and technology has played in the conduct of international relations over the times. The fact that science and technology have increased the frontier of international relations and have further deepened the complex nature of the social relationship globally, as the development of nations is strengthened by scientific revolution of our time. It is incontrovertible that mankind will continually use science and technology to improve the condition of mankind and avoid scientific invention that can jeopardize their peaceful co-existence in the universe. This is because it has brought modernity to the people and states of the world. In addition, to the advancement to be derived in the continuous use of science and technology open up new discoveries in all spheres of life [military, health, agricultural practice, environmental conservation] that will further advancement of human condition on the planet earth in the first century global system.

References

- Adebisi A. (2007) *International Organisation on the World Stage*. Akure: Adams Publisher.
- Aja A. (1999) *Policy and Strategic Studies*. Enugu: Willy Rose Apple Seed Publisher.
- Akeke O. (2009) *Foundation of Political Science*. Ibadan: Flag Publisher.
- Anifowose R. (2015) The Nature and Scope of Politics. In Anifowose R and Ememuo F. (eds) *Elements of Politics*, Lagos: Sam Iroanusi Publisher pp 1-15
- Bakare R. and Ajayi .A. (2004) *Science; Human Development*. Lagos: New Life Publisher.
- Easton D. (1965) *A System Analysis of Political Life*. New York: Wiley Publishers.
- Ekop H. (2006) Ecology and Environment of in International Relations. In Adegbulu . F. (ed) *Topics and Issues in International Relations*. Illisan: Backcock Univeristy Press.
- Holzer .M. and Schwester .R. (2011) *Public Administration: An Introduction*. Delhi: Phi Learning Private limited.
- International Webster Encyclopedia (2009) Florida: Tryhon International Corporation.
- Iyame H and Okoye I. (2006) National ICT Strategies for Developing Countries, *JICCO 12* (2) 38-40
- Jegede A (2019) Information and Communications Technology and Social Sciences in the 21st Century. In Lafenwa S. and Jegede A. (eds.), *Introduction to Basic Concepts in Government, Society and Economy*. Ibadan: Ibadan University Press.
- Johnson I (2015) *Diplomacy, Conflicts, Bargaining and Peace building in International Relations*. Ijebu- Ode: Gracia Publisher.
- Kaldor M (2007) Global Civil Society. In Held, D and McGrew, A (eds.), *The Global Transformations: A Reader*. United Kingdom: Polity Publisher
- Klans .S. (2016) The Fourth Industrial Revolution and its Transformational Impact, organized by World Economic Forum in China. Accessed 10th July, 2019.
- Lasswell .H. (1975) The Future of World Politics and Society. In Sasam .W. and Lerner D. (eds.), *Communication and Change*, Honolulu: University of Honolulu Press.
- Mba .M. (2013) *International Organisations and Institutions in World Affairs*. Enugu: Rex Charles and Patrick Publication.
- Mclean, I and Mcmillan. A, (2009) *Oxford Concise Dictionary of Politics*. Oxford: Oxford University Press.
- Mogalu C. (2018) Culture and Medical Practice in a Globalized World. In Ogunbameru. A.A. and Adekoya, D (eds.), *Cross-cultural Management: A Multi-Disciplinary Approach*, Ile-Ife: Obafemi Awolowo University Press.
- Muhammed A. (2013) Globalization. In Saliu H. and Aremu F. (eds.), *Introduction to International Relations*. Ilorin: African Centre for Peace Research, Empowerment and Documentation.
- Nnoli O. (2003) Globalization and Africa Political Science, *African Journal of Political Science* 8(2) 11-32.
- Nwachukwu .C. (2009) *Management: Theory and practice*. Enugu: Africans First Publishers.
- Ojo O. and Sessay A. (2011) *Concepts in International Relations*. Ile-Ife; Classy Publisher.
- Palmer N. and Perkins H (2001) *International Relations*. New Delhi: CISS Publishers.

- Ronke J. (2008) *International Politics on the World Stage*. New York: McGraw Hill Publishers.
- Short A (1982) History and Theory in International Relations, *Nigerian Journal of International Affairs*, 8 (1) 60-80
- Skortiff E. (1973) Science and Technology: The Implication for International Relations. In Goorich .L. and David .K. (eds.), *International Organisations*. Winsconsin: University of Winsconsin Press.
- Wasby S. (2015) Political Science: Discipline and Dimension. In Anifowose R and Enemu. F. (eds.), *Elements of Politics*. Lagos: Sam Iroanusi Publisher