

## 8. Africa's Science and Technology Strategy in the Thought of Kwame Nkrumah

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### Abstract

This paper explores the African Union's ("AU") science and technology plan and strategy for Africa within the construct of Kwame Nkrumah's socio-political thought. Nkrumah was one of Africa's most important political and intellectual agitators of the 20th century. He was Ghana's first prime minister and president, and a founding member of the African Union's forerunner, the Organization of African Unity. An Africa, unified, modernized and developed with science and technology for the benefit of all Africans, was the vision he strived for. The paper argues that while the AU is working toward to achieve Nkrumah's vision and quotes him prominently, their approach to the plan betrays an ideological conception for Africa's development that is in contradiction with Nkrumah's vision by, a) the S&T plan's ahistorical vision statement, b) exclusion of the African majority from the process, c) baring primarily the interests of the African elites and global corporation by its reliance on foreign aid and capital, and c) Planning and policy omissions in the continent's fastest growing area of technology adoption. Nkrumah's worldview and development thinking used to examine the African Union's strategy is explained with both classical and contemporary sociological theories and philosophy.

### Keywords

Science and Technology, Africa, African Union, Kwame Nkrumah, Pan-Africanism

# Africa's Science and Technology Strategy in the Thought of Kwame Nkrumah

African states in 2001 abolished their old association, the Organization of African Unity (OAU) and established a new organization, the African Union (AU). Five years later the new organization published the continent's first consolidated science and technology plan. When the leaders of fifty four "Third World" states (Morocco excluded, with South Sudan joining in 2011) with a combined population of over 1.1 billion people— about 15% of the planet's human population— announce a vision of unification, and launched a plan to use scientific "know why" and technological "know how" (Mishra, 1992) as a strategy to develop their nations, it is politically significant in world affairs. The new organization (AU) stated that its vision is to create **"[a]n integrated, prosperous and peaceful Africa, driven by its own citizens and representing a dynamic force in the global arena"** (African Union, 2013). It emphasized that they have shifted from the OAU's old 1963 mandate of supporting liberation movements—those seeking political independence from colonial rule, and freedom from apartheid (African Union, n.d.). The newest initiative, in the continuation of science and technology planning, signal Africa's resolve to surmount the obstacles presented by the social order which has perpetuated its "underdevelopment."

The vision and planning of the Union, described as part of the continent's "long-term people centered AU Agenda 2063" to "accelerate Africa's transition to an innovation-led, knowledge based economy" is not only remarkable, it is a fundamental change from decades of disparate country-led programs. Indeed, it is an important shift in strategy but not a new vision. While the African Union has presented its vision statement for unification and its plan and strategy for science and technology it has not outlined its philosophy of African Development—Precisely what is the theoretical framework being used to lead and manage the development of the continent in the context of the historical social transformation of society or a theory of science and technology that is guiding its planning and policies? Will the continent its dependence on external interests which are motivated by economic empire building, foreign states, global corporations and international organizations or turn to its best resource, its people? With a population of over one billion people, more than 60% of which are currently peasants with urbanization expected to reach almost 48% by 2030 the question is important. Nkrumah contemplated such questions, so too did Western social scientists such as Marx, Durkheim and Weber while Europe was undergoing its transition from feudalism to modern industrial capitalism. The African proposal beckons Kwame Nkrumah's vision, the leader who C.L.R, James once proclaimed will have a place in the history leadership which has steered the world away from the path of dystopia toward which global capitalism is inclined to push society (Holden, 2004, p.313; Hirson, 1989). An Africa, unified, modernized and developed with science and technology by the African majority for the benefit of all Africans, was the vision that Nkrumah struggle for. The

paper argues that while the AU is working towards to achieve Nkrumah's vision and quotes him prominently, their approach to the plan betrays an ideological conception for Africa's development that is in contradiction with Nkrumah's vision by, a) the S&T plan's ahistorical vision statement, b) exclusion of the African majority from the process, c) baring primarily the interests of the African elites and global corporation by its reliance on foreign aid and capital, and c) Planning and policy omissions in the continent's fastest growing area of technology adoption. The paper explores and employs Nkrumah's worldview and his development thinking to assess the African Union's science and technology plan and strategy for Africa.

### **Kwame Nkrumah and his Socio-Political Thought**

'We shall accumulate machinery and establish steel works, iron foundries and factories; we shall link the various states of our continent with communications; we shall astound the world with our hydroelectric power; we shall drain marshes and swamps, clear infested areas, feed the undernourished, and rid our people of parasites and disease. It is within the possibility of science and technology to make even the Sahara bloom into a vast field with verdant vegetation for agricultural and industrial developments.'

So writes the African Union (2013) in the *African Union Science, Technology & Innovation Strategy for Africa*, quoting prominently Nkrumah's (1963, May 24) "First speech at the foundation of the summit of the Organization of African Unity" in Addis Ababa (Nkrumah & Pan-African News Wire, 2012, September 4). The quote shows the extraordinary nexus between Nkrumah's vision, the modernization goal of the African Union, and the continent's science and technology strategy. Kwame Nkrumah (1909-1972) was Ghana's first Prime Minister and later president. He acquired his advanced education in the U.S.A. and England. While in England (1945) along with Trinidadian Pan-Africanist George Padmore, organized the Fifth Pan-African Congress (one of the most important of the congresses), held in Manchester. The significance of the fifth congress is the contributions that its participants later made to their states, and the development of African and African Diasporan intellectual history and politics. Among them were Jamaica's politician, diplomat and trial lawyer Dudley Thompson; W.E.B. DuBois the renowned African American sociologist, historian, civil rights activist, editor and author; and Kenya's independence leader, Jomo ("Burning Spear") Kenyatta. Six years after the Congress, Nkrumah's Convention of People's Party (CPP) won elections in Ghana 1951 (then a British colony called the Gold Coast) and formed a government, which he later led to independence in 1957. He continued his leadership of the state until 1966. While on a trip to Hanoi, Vietnam to meet with Hồ Chí Minh (the Vietnamese revolutionary leader) in February, 1966, Nkrumah was overthrown in a military coup (Ghana Nation, 2011, Nov. 11). Following the coup he

resided in Conakry, Guinea where he continued his intellectual works and political agitation for African liberation, while serving as Guinea's co-President.

Nkrumah was not only a political leader. He was one of Africa's leading intellectual agitators who wrote several books and pamphlets. His lasting influence on African development thinking, and his making of a leader can better appreciated by taking a brief survey of the important currents in world events, and the radical but conflicting ideas about society that gained global prominence during his era. Nkrumah lived in dynamic times that saw the emergence of revolutionary ideas about society and development thinking which conditioned his own thought. Among the important elements that influenced his worldview, three are highlighted. First, the historical and social setting of his time during which he witnessed a series of chaotic conditions in world affairs, and on the African continent. They included: a) The scramble for Africa which increased European colonialism from ten percent (10%) in 1870 to ninety percent (90%) in 1914; b) World Wars I and II which erupted as an outcome of economic empire-building rivalries and crisis in modern industrial capitalism (for example the great depression), c) The communist revolutions— Russia, China, and Cuba, and ) The independence and liberation movements in Africa, as well as the anti-racism and anti-apartheid struggles in the colonized world, and North America. The second element in the making of Nkrumah's thought was the European theoretical debates about society (classical sociological theory) which came to prominence during his time. The debates attempted to make sense of the world (from the 16<sup>th</sup> century to the 19<sup>th</sup> century), and the rise of modern industrial capitalism. They were also used in Africa and other "Third World" countries to grapple with development questions but perhaps most importantly, the debates flourished in the West due to tremors of the Russian Revolution, and the wars. Three of the most influential European sages who laid the foundation for the new theories of society were Émile Durkheim, Max Weber, and Karl Marx (Klarén & Bossert, 1986, p.5).

Durkheim, (1858-1917) in social development was concerned about disorder, what he felt was the breakdown of society, observed in Europe's transition from feudalism to modern capitalism. He was a French theoretician regarded as the father of sociology whose reaction to capitalism was influenced by his anxiety about the integrity of the social order undergoing chaotic conditions in its transition from feudalism to modern capitalist society. Social disorder he thought was created by urbanization, the process in which the massive move to cities as urban workers. Urbanization he felt created "anomie," social instability or the collapse of traditional values and attitude as peasants break with the village in which they were bonded by what he called "mechanical solidarity"—unintentional camaraderie established by people living in small groups. In small rural settlements, the individual conscience shares much in common with the communal conscience. In contrast in modern, urban, society the division and specialization of labor creates, "organic solidarity" between individuals but not on the basis of their likeness but by the interconnections and interdependence of their functions (Klarén & Bossert 1986; Carls, n.d.; Encyclopedia of Marxism: Glossary of People.

n.d.).Durkheim felt that “anomie,” the alienation experienced by individuals in modern society could be relieved by their “organic solidarity” established by the state and by their new institutions. According to Klarén and Bossert (p.7), Durkheim was an early proponent of corporatist theory which has a long historical root going back to Aristotle and others. Durkheim also proposed that the social order should be studied as a sort of collective conscience which has its own laws different from the conscience of individuals ((Klarén & Bossert; Carls).Durkheim could not have escaped Nkrumah, a leader in a country and on a continent which even today has the largest population of peasants among all the major regions in the world. Further, as a state leader who launched some of the most ambitious infrastructure development projects on the continent Durkheim’s sociological thinking would have influenced his urban planning and institutional development thinking. Whereas Durkheim was not the only theorist to have written about the “social conscience”, he is credited with coining the term. It may be a useful research to determine what influence if any he had on the book by Nkrumah. (1970).*Consciencism*. London: Panaf Books.

Weber’s (1864-1920), concern in development was in explaining the West’s exceptionality. Hewas a German sociologist and political economist who stressed that the distinction of Western capitalist development was characterized by its logic, science and empiricism. Among Weber’s most famous opus is his 1905, *The Protestant ethic and the spirit of capitalism*. He opposed Marx’s conception of history and tailored his works to explaining the exceptionality of the modern West in contrast to Feudal society or in the African context the way of life of its peasantry (Weber, 2005 February).Weber explained theWest’s development as evolved from a chaotic process amid epochs of “bureaucratic management and spurts of illogical charismatic leadership” (Weber& Eisenstadt, 1968; Klarén & Bossert, 1986).

Marx (1818-1883) contended that the West’s advanced capitalist development basically was derived from the seizure of the surplus value of labor. He explained that human society, like nature, is interconnected and interdependent, with a drawn-out history conditioned by a process of incessant movement and transformation which ultimately is determined by the “production and reproduction of life.” The basis of the process of transformation in society is its economic condition of society, but not solely economics but also multiple elements of the social order. The formation of social classes and the dialectical process of conflicts between them transform the social the order. The old system devolves, undergoes bifurcation and the new order evolves. So fundamental changes in the system of production transforms society. In Marx’s view modern capitalism emerged from the system of European feudalism which itself was heralded by slavery and before it, tribal society. Marx believed that from the class struggle in capitalist society will emerge socialism more democratic society—which is not the direct (Switzerland), presidential (USA, France) and parliamentary (Ghana, Jamaica, UK,) democracies of the capitalist class or the dictatorship of the bourgeoisie (Engels, n.d.). In Marx’s analysis, the next phase would be the struggle of the working class to attain power, and democratize the social order. Following the democracy of the working class would be the classless global order,

communism in which all classes would be abolished in which no individual or social class exercises exclusive power but contributes to society on the basis of their human development capacity, and are provided for according to their requirements (Encyclopedia Of Marxism; Trotsky, 1969).

Finally Pan-Africanism in the development of Kwame Nkrumah's worldview. Whereas Durkheim, Weber and Marx were concerned with explaining the issues and processes involved in the West's advanced capitalist development, Pan-Africanism's is fundamentally concerned with the unification of continental Africans, and African Diasporans for their collective security, development and self-determination. While its purpose is not to argue with the West's theorists, it responds to establish historical clarity and to establish the framework in which Pan-African development should be pursued. It contends that Africa's underdevelopment and the West's modern capitalist development (from the 15<sup>th</sup> century to the present) are intertwined in their historical and economic relations from which the established social order has emerged. The West's modernization and Africa's underdevelopment it argues, to a great degree evolved from Western colonialism in Africa (and Asia), and African labor appropriated as slave labor by Western capitalists which led to the emergence of the West's industrialization and modern capitalist development. One of Pan-Africanism's most important texts is Walter Rodney's (1981) *How Europe underdeveloped Africa*. Washington, D.C: Howard University Press. Carmichael and Thelwell (2003) affirmed that "Kwame Nkrumah was always and to the end a true Pan-Africanist" (Carmichael & Thelwell, 2003). Nkrumah's intellectual contributions to the philosophy, and its methods are outlined in his multiple publications, speeches and in his practice. Among his many books are the follow: a) Nkrumah. (1961). *I speak of freedom: A statement of African ideology*. New York: Praeger; b) Nkrumah. (1963). *Africa must unite*. New York: F.A. Praeger; c) Nkrumah (1966). *Neo-colonialism: The last stage of imperialism*. New York: International Publishers; d) Nkrumah, (1970). *Class struggle in Africa*. New York: International Publishers; and e) Nkrumah. (1965). *Consciencism: Philosophy and ideology for decolonization and development with particular reference to the African Revolution*. New York: Monthly Review Press. In addition to Nkrumah, among the other most important theorists and practitioners were W.E.B. DuBois and Marcus Garvey. There are multiple variations in the definition of Pan-Africanism, as one would in the evolution of any philosophy influenced by the political of its particular political tendencies—Black Nationalism, continental African Nationalism or Pan-African internationalism all demarcated by the spectrum of thought between the two polarized and antagonistic world economic systems, capitalism and socialism. Notwithstanding, Pan-Africanism as a philosophy had its origins in the core values and vision of ordinary African-Diasporans and Native Africans and was formalized by their intellectuals and political agitators from 1900 after the First Pan-African Conference. Its idea is to establish organic and concrete socio-political unity among African people the basis of their common African roots, the historical exploitation of their labor and national resources by African invaders and global capitalism, and their vision of political and economic self-determination.

Although the modern development and projection of Pan-Africanism into the international arena of modern political thought had its roots in the Caribbean dating back to the 15<sup>th</sup> century, where Africans were firsts forcibly taken and had their labor ruthlessly exploited by European capitalists, the 19<sup>th</sup> century imperialists scramble for Africa, partitioning and lumping of different people and ethnic groups together under colonialism ignited the consciousness and desire of average Africans to struggle for liberation on the strength of continental unity. Ntantambu (1998) made a credible claim however that African continental nationalism predates the 15<sup>th</sup> century, having its origin in Africans organized resistance to multiple invasions by Europeans and non-Europeans going back to the reign of Pharaoh Aha (known to the Greeks as Menes) around 3200 BC. Pan-Africanism today as expressed in the internationalist thought and practice of Nkrumah entails three principles. First is the principle that the Pan-African Movement is for democracy led by the majority classes. Thus for Nkrumah (1966, Conclusion) in the era of neo-colonialism a basis of the philosophy of Pan-Africanism is that only the pro-liberation African masses (workers and peasants) can “make, maintain or break” the democratic and the socialist revolutions. Nkrumah in *Neo-colonialism, the last stage of imperialism* argued that neo-colonialism replaced colonialism in the former colonized countries of the world and is the primary tool used by modern global capitalism in its empire building and imperial exploitation of the oppressed nations and people of the world (Nkrumah, 1966, Introduction). Under the system states that have some superficial appearance of sovereignty, have little or no control over their policies (Nkrumah, 1966, Introduction). The second tenet is Pan-African Solidarity. Carmichael explained how the tenet was exemplified by Nkrumah in Guinea, 1958. Prior to the French’s withdrawal from Guinea they pillaged the state coffers, sabotaged important infrastructure in an effort to destabilize the administration of the incoming government and establishing the conditions or the state to fail. Carmichael wrote that Nkrumah dispatched a technical team to support the new government and wrote them a check in the sum of ten million pounds (£10M) sterling (Carmichael, S., & Thelwell, 2003, p.612). Third is the tenet that the Pan-African system of opposition to economic empire-building is the only viable means of ending the continued exploitation of Africans by modern capitalism. Nkrumah felt that in the post-war and post-independence period, African unity and self-determination cannot be achieved solely by negotiations on the condition of international goodwill because the evidence shows that capitalism has strengthened itself in the advanced countries, using the same methods of that they have used in the past (in the West and globally by: a) subjugating the working class, and b) eliminating state control of capitalist ventures. Furthermore foreign investors which are involved in the exploitation of the continent have long recognized the merits of doing so on a continental scale (Nkrumah, 1966). For Nkrumah that opposition to imperialism must range from peaceful political agitation by the African majority classes to revolutionary warfare, not on a tribal, national or racial level, but all African. He concretized his idea of the latter method in his work, Nkrumah. (1969). *Handbook of revolutionary warfare: A guide to the armed phase of the African revolution*. New York: International Publishers. Stokely (Kwame Ture) Carmichael (2003, pp.612-613) wrote that Nkrumah gave him a copy of the

first draft of the text in 1968 with the mission of organizing the establishment of an All African political party.

Nkrumah's ideology was formed by his synthesis of European social theories, African and African Diasporan liberation philosophy, and his personal observations and encounters with the chaotic transformation of Africa and the world by modern capitalism. Of the theorists and practitioners that he studied he was most strongly influenced by t Karl Marx and Marcus Garvey (1887-1940). Garvey was the intellectual and political agitatorwho founded theUniversal Negro Improvement Association and African Communities League (UNIA-ACL) and led the world's largestBlack Nationalism and Pan-Africanism mass movement in the 1920s. The influence of Garvey on the UNIA on his thought are reflected in some of the cultural symbols of the Garvey movement which he adopted for Ghana such as his naming of Ghana's shipping line "the Black Star Line, the same name Garvey had given to his shipping line... the Black Star Square and the Black Star...placed in the center of [Ghana's] national Flag," all symbols of Pan- African internationalism (Dodoo, 2012 January). He once declared that he was a Marxist and a socialist but not a Leninist. Leninism he felt was applicable to the Russian milieu, as Maoism was to the Chinese but not to the African Milieu. He later went on to develop his theory of how to achieve scientific socialism within the context of African culture with his theory of Conciencism (Nkrumah, 1965).

To summarize the philosophy of the interconnection of the ideology of socialism with modern science and technology, African development, and Pan-Africanism, Nkrumah writes: ""socialism in Africa introduces a new social synthesis in which modern technology is reconciled with human values, in which the advanced technical society is realized without the staggering social malefactions and deep schisms of capitalist industrial society. For true economic and social development cannot be promoted without the real socialisation of productive and distributive processes. Those African leaders who believe these principles are the socialists in Africa" (Nkrumah, 1967). From a Max Weber's theory of leadership and development in the Pan-African development process, Marcus Garvey and Nkrumah are its first and most important charismatic leaders of the 20<sup>th</sup> century, while the bureaucratization of its evolution is the Organization of African Unity and its current successor, the African Union.

### **Science and Technology Strategy and the African Unions Development Thought**

In pursuit of its vision the African Union launched an eye-catching planning process which led to the adoption of science and technology as one of its key initiatives to achieve the organization's goals (Nanjing, 2013). The AU published a 72-page *Africa's Science and Technology Consolidated Plan of Action* [2005-2013] ("CPA") in 2005 (Mugabe, Ambali, New Partnership for Africa's Development, & South Africa, 2006), which the African Union (2013) advised, has since been succeeded by the *African Union Science, Technology & Innovation Strategy for Africa 2024* (STIS). The belief of the AU



leaders and planners is that overcoming the global technology gap is a remedy needed to heal some of the development ills which have afflicted the continent for multiple decades (Zachary, 2002). The AU termed its approach, “part of the long-term people centered AU Agenda 2063 which is underpinned by science, technology and innovation as multi-function tools and enablers for achieving continental development goals” (African Union, 2013). The Science and Technology Strategy (STIS) which succeeded the 2005-2013 plan (CPA) targets six program areas entitled: a) Eradicate hunger and achieve food and nutrition security; b) Prevent and control diseases and ensure wellbeing; c) Communication—physical and intellectual; d) Protect our space—land, water and air; e) Create wealth—industry, technology, and innovations; and f) Live longer—governance, culture, popularization of science and technology and participation.

According to the African Union (2013:15), the new strategy takes into account the challenges, accomplishments and new insights gained from the implementation of the 2005-2013 Consolidated Plan of Action (CPA). Challenges encountered were identified as: “(a) over-reliance on external financial support, which is often targeting short-term activities and solutions, (b) limited scope of human and sustainable development; (c) inadequate linkage of the CPA to other continental frameworks and strategies”. The noted accomplishments of the plan highlighted included: “(a) establishment of Networks of Excellence; (b) African Union Competitive Research Grants; (c) capacity development; and (d) improved policy conditions and building innovation mechanisms” (African Union, 2013: 14). Significantly while inadequate funding is cited as an impediment to plan implementation, it was reported that a recent AU inquiry found that illegal capital flight from the continent is approximately US\$5 billion annually or US\$40 billion in loss of revenue during the period when implementation of the plan was hindered by the organization’s dependence on foreign funding which was both inadequate and restrictive to the scope of the initiatives (Seseane, 2015, February 11).

The lessons learned, obstacles encountered, and successes realized is a clear reminder that the AU’s visioning, planning and program implementation process is not occurring on an ideal-type socio-politically level development plane but within the framework of an established dynamic global order in which the continent and its individual states exist. “The vision of this ‘Science and Technology Consolidated Plan of Action’ is that of an Africa well integrated into the global economy and free of poverty,” writes the AU (Mugabe, et al., 2006). The statement suggests that the continent is not thoroughly incorporated into the global economy, and that Africa’s poverty and level of development bears no relationship to its historical role in how the world’s global order has emerged. On one hand it ignores Africa’s foreign relations and contributions to European capitalist development since the fifteenth century and the dynamic, zigzag historical development process from which its current social and economic order has emerged (Rodney, 1981). It also dispenses with Nkrumah’s (1966) analysis of post-independence developments in which he explained that the former colonized states are only independent theoretically because in actuality their economic system and political policies are externally controlled. What Nkrumah describes as neo-colonialism

in 1966 is precisely the methods of the post-Cold War system widely known as globalization (McCarthy, 2007, pp127-159). On the other hand the CPA's the ahistorical vision statement suggests that African planners have accepted uncritically the neoliberal thought expounded by the New York Times foreign affairs columnist, Thomas Friedman (1999: xiii) who wrote that, "The World Is 10 Years Old: It was born when the Wall fell in 1989...the world's youngest economy—the global economy—is still finding its bearings."! In a state such as China which cherishes its history and values the knowledge to be derived from its experience, Friedman is quickly dismissed. Chinese planners are inclined to examine their science and technology planning and policy making by reaching back a 1000 years (Zang & Xie). The AU's oversight suggests that some African 21<sup>st</sup> century planners may be willing to be guided in their policy making by Western neoliberal thought alone, dispatching with philosophies of its own people, such as the principle of Sankofa ("reach back and get it"). Although Nkrumah, a socialist, was influenced by the Western sociological thoughts, particularly that of Marx he did not accept them without questions. It is for this reason that he felt some European concepts such as Leninism may not fit well in the context of Africa because the continent's history and values of its people were not the same as those of the people of Russia, India or China. Nkrumah's insight led him to develop his theory of Consciencism (Nkrumah, 1965).

### **Democratization, S&T for All Africans or Ruling Elites Power Concentration**

Based on the ambition of the plan and its vision for the social transformation of the continent with science and technology, what better support could African leaders and planners receive than the power of a billion Africans strong, mobilized and organized to support its implementation? Unfortunately even from a planning process standpoint, popularization of science and technology, and making an undefined statement of participation as proposed by the S & T strategy ranges from nonparticipation, through outright manipulation, to tokenism (Arnstein, 1969). Although the African Union stated that its vision will be "driven and managed by its own citizens"—a clear reference to the continent's managerial and professional types and the exclusion of foreign consultants—nowhere is the role of the African working class or its vast peasantry clearly outlined. Africa is the second-largest continent, after Asia, of approximately 11.6 million square miles and an estimated population of 1,138,230,000 people (United Nations, 2014). For comparison, North America is approximately 7.4 million square miles while China is about 3.7 million square miles with a population in 1,355,692,576 of people (Central Intelligence Agency, World Fact book). Africa is one of the fastest urbanizing regions in the world. In 2014 forty percent (40%) of the people on the continent were living in urban areas, with 56% expected to be urbanized by 2050 (United Nations, 2014). By 2030 approximately forty eight percent (47.7%) of the population will be living in urban areas—representing an 8.1% increase from 2011. For comparison, a 4.3% increase in urbanization for the period 2011-2030 is forecasted for Latin America and the Caribbean which is currently 80%

urbanized and a 10% increase for the said period in the faster urbanizing region of Asia, currently 48% urbanized.

If African planners accept that under 21<sup>st</sup> century neocolonial conditions, the African majority classes are the inevitable leaders of the democratic transformation of the continent then why not the take the opportunity to create the democratic culture and institutions among the population which will be further strengthened by urbanization? Opposition to democratization may indicate a desire of elements within the African ruling class and the petit bourgeoisie to use the continent's science and technology strategy to advance their power at the expense of the continent's workers and peasants. In such a case they merely reinforce the fear of science expressed by Bertrand Russell in his *ICARUS or The Future of Science*, when he wrote: "I am compelled to fear that science will be used to promote the power of dominant groups, rather than to make men happy"( Russell,1924). As Nkrumah pointed out, when it comes to planning for continental transformation, the African majority must be involved because they alone can guarantee the plan's success or its failure (Nkrumah, 1966). To ignore them is to ensure that the plan will be relegated to a bookshelf and quickly forgotten.

### **A "Technological Resurgence" or Enriching and Empowering Global Corporations**

Neither global corporations nor international loan and aid agencies are capable of implementing the vision of Africans, as expressed by the AU, and indeed Nkrumah, because they are not Africans or share the values of the African majority. Foreign investors and aid agencies are motivated by their economic and political interests which defines the limit of their investment in the continent. Investors seek profit. Aid agencies work to promote the interests of the nations and investors that they represent. In January 2011, the United Nations Economic Commission for Africa released a study suggesting that the continent was experiencing a "technological resurgence." The study stated that "Africa's rapid acquisition of industrial technologies is an indication that the continent is joining other developing regions in building a sound manufacturing base likely to support the production of value-added goods and services, including high-tech products (United Nations, 2010). "[T]he findings reveal an impressive turnaround from the slow growth in Africa's share of the number of patents, peer-reviewed scientific publications and technology exports and imports which grew very slowly in the 1980s to 1990s,"said Abdoulie Janneh, Executive Secretary of the United Nations Economic Commission for Africa (United Nations News Center, 2011, January 21).According to the report, during the period 2000 to 2008 global technology transfer to Africa increased by over 800 percent including acquisitions for use in important economic sectors such as automotive, electronics, steel and pharmaceuticals (Africa (United Nations News Center, 2011, January 21).

Foreign Direct Investment (FDI) is regarded by some African S&T planners as the primary economic conduit through which to exponentially increasing the rate of global technology flow to the continent. FDI allows global corporations to make major investments and acquire controlling interests in companies in Africa, as opposed to the practice of buying stocks on African exchanges. While FDI may indeed facilitate the transfer of technology, and even allow foreign companies to invest in African science & technology ventures, the foreign companies may retain and control the rights to both the scientific knowledge and technologies they brought to Africa as well as taking control of those in which they have invested. The FDI approach is regarded as a major driver of American led capitalism, coined “globalization.”

There are signals however, that African leaders and S&T planners may be reevaluating their enthusiasm for foreign direct investments as the leading driver for the deployment of technologies that will raise the social and economic condition of the continent. “Recent statistics from UNESCO and ASTII show that the current level of investment in R&D by Africa as a continent (of which more than half is internationally funded) puts Africa at a strategic disadvantage,” writes the African Union (2013). Further, an AU finding that capital outflow from the continent outweighs inflow from FDI and aid by 2:1 worries some African leaders as it should, and would be a considered a major problem for Nkrumah. According to Seseane (2015, February 11), former South African President, Thabo Mbeki speaking at the launch of an African Union report on capital flight from the continent, “contrasted the estimated US\$50 billion annual outflow to the total inflow of US\$25 billion in aid and foreign direct investment” (Seseane).

The AU study estimated the illegal capital flight from the continent to be about US\$5 billion annually, representing approximately US\$40 billion in revenues lost (Seseane). It is becoming clearer, therefore, that Africa’s reliance on foreign aid and foreign direct investments to direct and propel science and technology innovation and deployment for the continents development is neither reliable nor sustainable. Foreign direct investments may create some local employment and provide limited spin-offs to the domestic economy, transfer some scientific knowledge and technological know-how but investors seeks high returns on their investments, and are not inclined to relinquish control of their technologies brought to the continent. In fact they are predisposed to acquire control of the native technologies in which they have invested.

## Mobile and Communication Technology in Africa

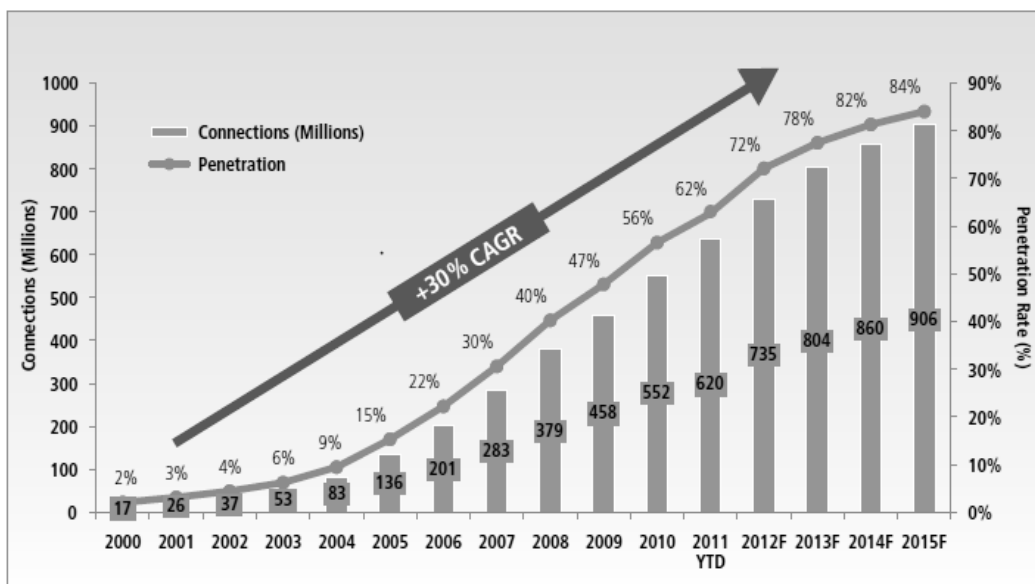
Nkrumah dreamt of linking all the states on the continent with communication systems and technology at a time when the cost was more prohibitive and the technology backwards (Nkrumah,

Pan-African News Wire, 2012, September 4). He demonstrated the priority given to the building of Africa's communication networks when he pointed out that between 1951 and 1955, even with a limited national budget his administration built, realigned/or installed the following: a) 270 miles of overhead telephone trunk routes; b) 140 miles of underground cables; c) 4,800 new telephone lines; d) Increased telephone traffic 3 folds; and e) 1, 500 miles of road (Nkrumah (1961, pp.38-39). His achievements were remarkable when one consider the complex programmatic, construction process and cost involved in building communication systems.

One of the most important 21<sup>st</sup> century S&T developments on the African continent is the rapid adoption of mobile communication technologies since 2000. Growth in the industry is influenced by global market forces and local demands much in line with traditional patterns for the adoption and mass consumption of technologies for popular information, popular entertainment and popular knowledge. A case in point is the mass production and sale of radio which began in the West in the early 1920s and television after 1940. For television the mass adoption rate was much slower in developing countries due to inadequate access to electrify. However while access to these technologies have positively contributed to human development in terms of basic quality of live variables, the economic returns have benefited primarily investors and not the users.

The African Union has prioritized the continent's communication systems for modernization and it is one of the six areas in the Science and Technology Strategy 2014. It is a program twice setback--first by colonial era policies, and second, by economic problems of the 1970s to 1990s. It's no surprise then that a major 2010 diagnostic study found that Africa's infrastructure "increasingly lags behind those of other developing countries and are characterized by missing regional links and stagnant household access" (Foster, V., Briceño-Garmendia, C., World Bank, & Africa Infrastructure Country Diagnostic, 2010). Historian, Frederick Cooper argued that, historically Africa was never an isolated continent. If anything it was extraverted, "laced with trade routes; movements of people were long extensive; and connections beyond the continent, including across the Sahara desert and Indian Ocean, go back to ancient times," writes Cooper. Colonial rulers developed only limited communication nodes which around the ports which they could control (Cooper, 2002). Since the 1990s the deployment of wireless communication networks across the African continent has made it possible for African states to bypass the need to install thousands of miles of telephone lines. The change to mobile communication technology has resulted in a stunning and exponential increase in the rate of Africans' access to telecommunication services. As shown in the figure below, from 2000 to 2011 the average annual rate of growth in Africa's mobile connections is 30%, with a forecast of 906 million connections by the end of 2015 (GSM Association, et al. 2011).

**Figure A: Total African Mobile Connections and Penetration Rate (million, % penetration)<sup>1</sup>**



Source: GSM Association, et al. (2011).African Mobile Observatory 2011: *Driving Economic and Social Development through Mobile Services*. A.T. Kearney Ltd for GSM Association London, GSMA website: Feb. 11, 2015,"<http://www.gsma.com/publicpolicy/wp-content/uploads/2012/04/africamobileobservatory2011-1.pdf>, p.8

The pace of Africa's mobile connections has outstripped that of Latin America, and is trailing only Asia. Not only is Africa's mobile connections sprinted at "Bolt's speed" since 2000, according to Cisco in a February, 2015 report on Global mobile data traffic, "The Middle East and Africa will have the strongest mobile data traffic growth of any region with a 72-percent CAGR. This region will be followed by Central and Eastern Europe at 71 percent and Latin America at 59 percent" (Cisco, 2015 February 3).

Aker and Mbiti (2010) identified five ways in which mobile phones can provide economic benefits in Africa as follows: a) Improve access to and use of information, b) Improve firms' productive efficiency by allowing them to better manage their supply chains, c) Create new jobs to address demands for mobile related services, d) Facilitate communication among social networks in response to shocks, thereby reducing households exposure to risks, and e) Mobile phone based applications and development projects—"m-development"—have the potential to facilitate the delivery of financial, agricultural, health, and educational services(Aker & Mbiti, 2010). From an economic base perspective, the mobile communications sector in Africa has not evolved into a basic industry which exports mobile communication technologies and services from the continent and

bringing in wealth from outside. It is a non-basic industry which provides services to other industries and the social sector with a tendency towards mass consumption, albeit providing much needed human development and the building of human capabilities (United Nations Development Programme, 2001). Liberalization of Africa's telecommunications sector under the global social order may indeed have facilitated the rapid adoption of the technology but it may be prudent of the African Union to evaluate how much economic and social benefits are being derived from the continent vs. the capital outflow from the continent directly linked to the telecommunications industry. Such information could contribute positively to the continent's formulation of a uniform and standardized communications policy in Africa's interest.

### **Other Critical Issues to Explore**

While Weber had examined the dialectical relationship between charismatic leaders and bureaucratic organizational management in the development process, he did not scrutinize the behavior of organizations in which the said dynamic processes are also involved, as explained by chaos and complexity theorists (Tonis and Elsner; Theitart and Forges, 1995; Murphy, 1996; Burns, 2002; Gleick, 2008; Anderson, 1999; Boal and Schultz, 2007). In the concept of Weber a proponent of the free-market, an anti-capitalist charismatic leader such as Nkrumah is irrational. Because organizations like any dynamic social systems are likewise subject to chaotic conditions due to their complexity and their exposure to complicated internal and external interactions, an organization such as the African Union requires the best of Africa's political leadership and management. As it works to develop continent-wide policies not only is the organization exposed to pressures and influences within its bureaucratic walls, the continent's business class and national political leadership as a global regional organization it increasingly comes under the influence of global corporations and powerful states in the international system. It's exposure to such multiple levels of influences will create chaotic conditions for the organization and determine its ability to successfully realize its goals, with consequences for implementation of its plans and vision. Organizations with values and vision shared by the majority of the people with their full political support are more likely to succeed, particularly when they are backed by the collective power of the majority classes. The African Union is no exception to these principles. And its future survival may demand such a setup, which is not currently the situation in which it finds itself or have demonstrated that it has in place or intend to put in place such a process. For this reason it becomes even more critical that the AU be clear about the critical issues that it must confront in the implementation of the science and technology strategy and the programs beyond 2024. With such considerations in mind, some additional thoughts are offered.

First, the AU will need to secure sufficient influence to bind its 54 member states to the political and financial obligations promised by its member states to implement the science and technology strategy and other related critical development programs. While a leader with continent-

wide power may be able to secure such support, history has shown that such a leader may only last for at best between five and ten years. As Nkrumah had pointed out only the African majority can make, sustain or break the success of such an organization. The African Union (2013:50) is clearly mindful of the risk, as it stated:

Successful implementation of this Strategy is, to a large extent, dependent on the commitment and support from Member States and RECs. The awareness levels amongst all key stakeholder groups (including media the public) of the AU STI Strategy may not be sufficient to secure necessary buy-in.

Political and economic support from the member states is indeed vital but without finding the political approach to engage the majority, the organization and its leadership will be unable to mitigate the risks that it has identified. The AU's proposal to address the risk is to "actively advocate and promote the strategy, and by supporting...awareness campaigns" (African Union, 2013:50). At the current time the AU (as seen elsewhere in the case of the European Union) do not possess the equivalent of a federal system of state power "capable of imposing and enforcing its will" (Zeihan, 2010 December 21) on member states. The United States of America or large states such as China and India have overcome such a problem and have achieved success in policy implementation. China itself is in the process of implementing a "fifteen year science and technology plan" (Cao, Suttmeier & Simon, 2006 December) which may be its third following the implementation of three five-year plans up to 1966 in which science and technology was addressed (Biao, 1966 October 1). Chinese leaders and the state have developed sufficient influence internationally and among its people placing them in a position to conduct long term science and technology planning (Cao, Suttmeier & Simon, 2006 December). In the case of the U.S. however although it has made great strides in science and technology, the burden of the cost of research and development are borne by the people, while the profits from the technology is appropriated by wealthy corporations. This is neither an ethical nor a sustainable arrangement for a continent such as Africa to follow.

Second, Africa's investments in human services areas important as its investments in the continent's infrastructure. Failure to find the appropriate approach to address both problems simultaneously will continue to impair the development. According to Foster and Briceño-Garmendia (2010), "on just about every measure of infrastructure coverage, African countries lag behind their peers in the developing world." The vastness of the continent is a factor. In the area of mobile technologies, although the rate of coverage is growing at an average of 30% annually (CAGR), the next big global leap in communication technologies will still need miles of underground fiber cables around African cities to meet Africans growing demand for high speed, high volume data traffic. In the U.S., although the process is currently being led by the major telecommunication companies, AT&T and Verizon as well as by Google, they have benefited from the public's investments in the technologies that they are



using and the profits will go directly to a handful of their investors. The ownership of the communications infrastructure by a handful of wealthy individuals in the U.S. endangers the present and future well-being of the American society, as it will for Africans. The African Union in its planning and strategy will need to find the ways and means to provide African funding the expansion of the continent's initiative without transferring the same handful of global investors that have already acquired those in the West..

Finally, a review of available publications by the African Union reveals no initiative for a unified communication technology policy. Such a strategy would achieve the following:

- a) Establish clear rules about how Africa will manage and roll out its radio frequency spectrums for wireless telecommunications Services,
- b) Harmonize spectrum management at the state, regional, and continental levels,
- c) Create a African telecommunications communications official group and telecom think tank to provide leadership, set standards and regulate practices for the deployment of telecommunication systems,
- d) Place African states on par with big economies such as the E.U, U.S, India, Brazil and China in telecommunications management standards and regulations, and
- e) Critically evaluate the practices of foreign investors in the telecommunications sector and to examine their current demands for “guidelines” on coverage bands—700 MHz to 900 MHz bands—and for capacity bands—1800 MHz to 3500 MHz.

To sum. Critical issues confront the AU for the realization of its vision, and the successful implementation of the science and technology strategy. The issues range from the AU's inability to raise taxes to fund the programs, to the lack, or absence, of a unified policy to harmonize the continent's management of its fastest growing technology sector and mobile communications.

## Conclusion

Exploring the African Union's science and technology plan and strategy using the socio-political thought of Kwame Nkrumah, a Marxist and Pan-Africanist, helps to highlight the interests of the African majority classes, and provides insight into the document's ideological conception. It raises questions about the quality of involvement in the process by African workers and peasants who will bear the cost, and are assumed to be the ultimate beneficiaries. For over 1 billion Africans the prospects of using science and technology among the strategies to uplift their human development and collective security is an inspiring political vision. It was a dream of Nkrumah with the prospects of it being realized in the 21<sup>st</sup> century. With the African Union currently as the most appropriate organ through which continent-wide planning is formulated and executed, there are multiple risks and critical issues at stake for the successful realization of the organization's vision. The organization



has identified some of its opportunities and its risks, but the solutions proposed to address the risks are far from adequate because the AU has no political power and must rely on the discretion of its member states for its resources and support. From Nkrumah's perspective the AU and its plans are more exposed to risk because they have no direct support of the people for whom they plan. Using Nkrumah's lens to securitize the science and technology plan and strategy reveals an uncritical, pro-West, neoliberal, a-historical, conception with the tendency to perpetuate what Nkrumah called neocolonial relations. Although mobile communication technology is experiencing the rapid growth across the continent no evidence was found that the African Union is developing or contemplating the preparation of a unified policy or standard for spectrums management and the implications of relinquishing control of the continent's telecommunications infrastructure to a handful of foreign investors.

In 21st century world affairs, are there no remaining space for African leaders to identify the common and collective values of the continent's people (its majority), based on their history, indigenous knowledge and dreams, to inform the core thoughts in African policies, rather than relying on the West? As Kwame Nkrumah once stated, "Never before have a people had within their grasp so great an opportunity for developing a continent endowed with so much wealth...Together, by mutual help, they can achieve much"( Nkrumah, 1961, x-xi)!

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