

Toward a National Innovation Strategy: A Critique of Ghana's Science, Technology and Innovation Policy

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ABSTRACT

The science-centric nature of Ghana's Science, Technology and Innovation (STI) framework could be expected but the fact that it places innovation only in the realm of science and technology (S&T) means that Ghana needs a broader national innovation policy or strategy. This should be a strategy that embraces a wider conception of innovation and as such include solutions that are not necessarily science-based. These non-science innovations could prove to be equally crucial to national development as the S&T-based ones. In a situation where a lot of commitments (financial and beyond) must be sacrificed to strengthen the structural foundation for science and tech innovations, it is important that non-science innovations and their pursuit are promoted. The rewards could be massive as can be seen in the examples of the National Friday Wear and Chocolate Day programmes instituted by the Ghanaian government.

Key words: Ghana, Science, Technology, Innovation, Policy

Introduction

This paper takes a critical look at Ghana's Science Technology and Innovation (STI) Policy and argues that the conception of innovation therein is partial. Innovation basically is a new approach to resolving existing challenges or forestalling potential challenges. However, Ghana's STI policy framework largely conceptualizes innovation as an offshoot of science and technology. Although this is not necessarily wrong, it is essentially parochial as it cuts out innovations that are not based on science and technology (S&T). The paper argues that in the wake of such a narrow definition of innovation, Ghana will have an under-emphasis on innovation; for example, in the public sector and in the domestic economy. This is because the resolution of a number of challenges in the Ghanaian public sector and the domestic economy may actually depend on the generation of new processes and other solutions that are not necessarily science-based.

Even in circumstances where S&T may be appropriate tools for resolving challenges in the public sector, the pro-innovation culture and leadership required to occasion the commissioning of such tools may have little to do with S&T. The principal methodology for this paper is a content analysis of Ghana's Science, Technology and Innovation Policy. This analysis finds that Ghana's STI Policy framework is actually, and functionally, an Innovation through Science and Technology document and not a Science, Technology and Innovation framework. To correct this discrepancy or to improve on the existing framework, the author recommends that

there should be a stand-alone national innovation policy/strategy framework that promotes the pursuit of innovations particularly in the public sector based both on S&T and otherwise.

A cursory comparison of published country innovation indices reveals that innovation and national development have a positive relationship. For example, the first 20 countries on the 2014 Global Innovation Index (GII) are all developed countries while all of the last 43 countries on the list are developing countries (Dutta, 2014). This buttresses the fact that developing countries need to mainstream innovation more in the pursuit of development and in this regard, Ghana is no different. Ghana on the GII is ranked at 96 out of 143 countries (Dutta, 2014: XXV). In the case of the 2014 Global Competitiveness Report (GCR), Ghana is ranked 114th out of 148 countries (Schwab, 2014: 15). However, when it comes to the variable of innovation and sophistication, Ghana is ranked at 72nd (Schwab, 2014: 17). Further scrutiny reveals that Ghana is classified as a factor-driven economy on the GCR (Schwab, 2014: 11). In other words, Ghana is still at the lowest stage of development on the five-stage schema used in the report, the highest of which is the innovation-driven economy. In between the two stages, in an ascending order, there are the Transition from Stage 1 to Stage 2; Stage 2 or the efficiency-driven stage followed by the Transition from Stage 2 to Stage 3 (Schwab, 2014: 9-11).

The harsh reality of the state of innovation in Ghana is brought home more when the country is compared in the 2015 Bloomberg Innovation Index to South Korea which topped the index's ranking on Research and Development. In the comparison, it is pointed out how Ghana at the time of its independence had a GDP which was similar to that of South Korea yet lags behind South Korea by far today (Bloomberg Innovation Index, 2015). Ghana's Science, Technology and Innovation (STI) Policy cites South Korea in the same context as the Bloomberg report does and seeks to take inspiration from the Asian country (Ministry of Environment, Science, Technology and Innovation [MESTI], 2010:8).

Conceptualising Innovation

Innovation has been conceived in many different ways and as such, has remained theoretically ambiguous (Adams, Bessant and Phelps, 2006). This provides a challenge to the designing and implementation of innovation as it hinders a fulsome understanding of the concept (Zairi, 1994; Cooper, 1998). However, there have been two major schools of thought when it comes to defining innovation: the narrow and broad schools (Sanchez, 2014). The narrow school conceives innovation in the domain of S&T while the broad school thinks of innovation as, basically, a new idea.

Faridah Djellal and Faïz Gallouj (2002) discussed these two strands of definitions and traced the science-based definitions to the OECD's Frascati Manual. They explain that at the heart of the Frascati Manual's conception of innovation is an emphasis or even, over-emphasis on the kind of research and development often conceived as possibly the pursuit of innovation through the scientific process; a corollary of 'lab-like' observation and experimentation. Sanchez identifies the narrow conception as Schumpeterian. To Schumpeter, innovation is manifested in the newness of; the product, how the product is produced and how the product is supplied

(Schumpeter, 1934). Also included under the forms of innovation is the utilisation of new markets as well as new approaches to conducting business (Schumpeter, 1934).

Here, Schumpeter leaves innovation primarily in the realms of the market and economics. Malerba and Orsenigo (1996) have argued that Schumpeter's conception of innovation is technology-specific. To some extent, Fagerberg (2004) backs Schumpeter's definition by conceiving innovation as when a new idea is first commercialized. Effectively, the narrow conception suggests more or less that the output of innovation must be tangible or physical and implemented by specialists.

A broader definition of innovation effectively scales these conceptual hurdles as it sees innovation simply as a new approach to doing things. For example, Adair posits that innovation is about bringing into being "some new idea, method or device" (1990: 5). Thompson (1965:2) defines innovation along a similar trajectory.

Sanchez (2014: 4) places the Oslo Manual's conception of innovation under the broad school as it has evolved to include innovations that are not necessarily technology-based. The Oslo Manual provides four broad categorizations for innovation; Product innovation, process innovation, marketing innovation and organizational innovation (Statistical Office of the European Communities, 2005:47-52). Such a conception of innovation immediately recognizes the differences in innovations and embraces for example, new approaches to organizing business, organizing the workplace as well as conducting relations with parties external to an organisation (Statistical Office of the European Communities, 2005: 52).

The broad conception ensures that innovation is not only expected of scientists and technologists and from the fields they belong to, but of everybody and all agencies or institutions in all sectors of the economy. This is immensely helpful as a mainstreaming of innovation promises a general uplift in performance across all sectors. Innovation as conceived in Ghana's STI policy falls more into line with the narrow definition. This paper favours the broader definition of innovation, because it informs the argument herein that Ghana must develop a national innovation strategy that encompasses the present STI policy yet goes beyond that to include the promotion of non-science or non-technological innovations.

Ghana's STI Policy

The STI Policy launched in March 2010 is the primary document guiding Ghana's efforts to mainstream Science, Technology and Innovation in its pursuit of development. More specifically, the framework seeks to: ensure a boost in the national capacity to utilise science and technology for development (MESTI, 2010: 2). Ghana from the early days of its independence sought to pursue development through S&T. The policy shows how Ghana can utilize S&T in almost every sector of its economy as well as the need to train more people in the fields of S&T.

Impressively, there is also a sense of realism about the framework which ensures that the demands therein are viable in the context of Ghana and not merely idealistic. For instance, the authors of the STI Policy point to how funding innovation is expensive and consequently, even the proposal to promote the interest of the private sector in investing in research and

development is followed by a caveat that it should be done in a way so as to avoid depleting the national tax base (MESTI, 2010: 48). Also, the realities of brain drain are not ignored (MESTI, 2010: 14, 43). Such laudable realism is made more vivid when the policy suggests that the critical mass of the expert labour relevant to the field implementation of its vision should be Ghanaian although it admits that where necessary, foreign specialists can be utilized (MESTI, 2010: 9).

Even more impressively, the policy allocates responsibilities for the implementation and oversight of implementation to specific agencies. This makes it easier for the implementation of the framework to be tracked and accountability to be sought. The policy suggests the institution of an STI apex body for monitoring implementation. The framework commendably provides a reminder of how Ghana can tap into the expertise of its nationals domiciled in the diaspora who are engaged in S&T. The ultimate responsibility for implementation is allocated to the MESTI.

Notwithstanding these positives, as it stands, Ghana's STI framework on its own is not enough, policy-wise, to undergird the country's efforts to mainstream innovation because the country's quest for development would then be founded on the premise that Ghana's STI policy only considers innovation as an offshoot of S&T. Indeed, the framework fails to treat Science, Technology and Innovation as viable individual units first before treating them as inextricably intertwined. If innovation is conceived of as a new/different approach towards resolving or forestalling challenges then Ghana's STI policy cannot be treated as a national innovation framework, as it cuts out all such new/different approaches that are not science or technology-based. This assertion is supported by the STI Policy document itself. For example, the policy's suggestion of an apex STI body is followed by an instruction that the members of this body should be from S&T backgrounds or bodies (MESTI, 2010: 40). This immediately cuts out all others in fields unrelated to science and technology from the innovation space. Also, regarding funding, the STI policy calls for the S&T sector (and not any other sector) to be allocated a minimum of 1% of the national gross domestic product. Thus there is a need for a national policy document that for instance calls for similar investments in innovation, whether such innovation is science and technology-based or not.

Even in terms of how pro-STI advocacy can be promoted, the framework interestingly suggests that the President and Ministers of State should be seen interacting and working more with scientists, engineers and technologists in order to help remove stumbling blocks in the mainstreaming of STI in Ghana. Additionally, as a long-term objective, the policy seeks to help create a culture of resorting to science and technology in the pursuit of solutions to social, cultural and economic challenges both at the individual or micro level and the national or macro level (MESTI, 2010: 15). The framework also indicates that the strength of the STI base is dependent on the quality of science and maths-related education at the lower educational levels intended to groom young people to pursue STEM courses at the tertiary level (MESTI, 2010: 25).

This is not to say that such an emphasis on S&T is not right. It means essentially that, in terms of policy guidance towards mainstreaming innovation, Ghana has only done part of the job. Instead of a science, technology and innovation policy, the framework incidentally contains a better description of what it exists for: "scientific and technological innovation" (MESTI, 2010:

34). This is quite different from the holistic promotion of science, technology and innovation. S&T can lead to innovation but innovation is not always their product. A narrow approach does not cater to the many people and institutions that are not in science and maths fields. The language of the framework could even be seen to suggest that the described conceptual tensions have been created because the framers sought to construct a S&T policy or at best, an innovation through S&T policy.

The science-centric nature of Ghana's STI framework is expected. Like any STI policy, Ghana's STI framework is generally developed to emphasise science and technology and how they can be exploited to increase productivity and also contribute to national development.¹ However, the fact that Ghana's STI framework identifies innovation as exclusively in the realm of science and technology suggest a conceptual deficit which has practical implications as it means that other avenues for innovation that are not science and technology-related have been conspicuously discounted. As such, Ghana needs a broader innovation policy or strategy that embraces a wider conception of innovation and which includes solutions that are not necessarily science-based. These non-science innovations could prove to be equally crucial to national development as the S&T-based ones. In a situation where a lot of commitments (financial and beyond) must be made first, to strengthen the structural foundation for science and tech innovations, it is important that non-science innovations and the pursuit of them are also promoted. The rewards of this approach could be massive as can be seen in the examples of the National Friday Wear and Chocolate Day programmes instituted by the Ghanaian government.

The National Friday Wear programme was launched in November 2004 with a cardinal objective to get all government and private sector workers (the latter to the largest extent possible) to wear a dress made with Ghanaian print on Fridays (Modern Ghana, 2004). Faced with the challenge of a dying textile manufacturing industry in Ghana, the government created the arrangement to create a local demand for local prints. This is innovation though not science-based. In effect, the government encouraged the acceptance of a dress code as a solution to a national challenge and on the basis of practical evidence; this innovation strongly boosted domestic demand for Ghanaian prints and fabrics and brought increased revenues to fashion designers (Dogoe, 2014: 49). Positively sighted evidence shows that many Ghanaians, not necessarily 'workers' have warmed up to its underpinning idea. Although the policy emphasis was on dresses, the programme has also succeeded in creating a market for bags, phone cases, book covers, files and laptop bags among others that are made of African print. Ghana's unique cultural identities have also been promoted through the programme.

A second example of such a non-science innovation is the institution in 2007 by the Government of Ghana of February 14th as National Chocolate Day. Traditionally, the day is celebrated as St. Valentine's Day around the world. The government took development-promoting advantage of the immense press hype surrounding the day in Ghana. As such, it officially made the day National Chocolate Day so that chocolate and other cocoa products would be used to celebrate the 'love' that St. Valentine's Day connotes (Modern Ghana, 2007).

¹ For more on the general objectives of STI Policies, see The Innovation Policy Platform, STI e-Outlook 2014, <https://www.innovationpolicyplatform.org/content/national-strategies-science-technology-and-innovation-oecd-sti-outlook>

Again, this laudable innovation was not science-based yet had positive implications for cocoa-based industries in Ghana—circa February 14th of every year, the sale of cocoa products is boosted.

Neither case reviewed is the result of S&T. They emanate, rather, from the desire of public sector agents to come up with ideas that break the normal patterns for doing things and try out new approaches aimed at boosting the local demand for fabric and chocolate products, respectively. An innovative solution from S&T tackling the chocolate challenge might, for example, have introduced a production or packaging technique that reduces the cost of producing chocolate. This example shows how S&T-based innovations are different from non-science innovations though they both are likely to have positive ends.

Toward a National Innovation Strategy

In the light of such innovations, this paper argues that Ghana's STI policy should not be treated or seen as a singularly efficient blueprint for the promotion of innovation in Ghana. There should be a broader policy framework that is dedicated to the promotion of innovation whether S&T-based or not. The obvious benefit of such a framework is that it would provide a home for the solutions that are not S&T-based and encourage their generation and mainstreaming. It is important to have a framework that engenders the pursuit of new ways of doing things, particularly in the public sector. Given the less encouraging scientific culture in Ghana admitted to in Ghana's STI Policy, non-science innovations could even be more practical in terms of their generation and adoption.

Ghana needs to establish a national innovation strategy that reasonably focuses on non-S&T-based innovations, especially in the public sector. The suggested emphasis on the public sector in this paper is informed by the fact that the government cannot coerce the private sector or to put it more mildly, determine for the private sector, a particular way of doing business. Moreover the government has more control over its agents and agencies than the actors in the private sector. Notwithstanding, an attractive governmental innovation policy agenda can attract the private sector to invest in innovation and even collaborate with government. Going forward, two positives can aid Ghana's development of a national innovation framework that embraces broader sources of innovation and pursues the mainstreaming of innovation in the public sector. First, as shown earlier in this paper, non-science innovations that have had appreciable utility and contributed towards advancing the cause of development have already emanated from Ghana's public sector. Secondly, Ghana can learn from innovation frameworks that other countries have instituted. The idea here is not to call for a blind 'hook-line-and-sinker' adoption of what other countries have done, even when they have been successful. Due to the particularities of contexts, learning from other countries must follow an "adopt and adapt" approach.

In terms of the mainstreaming innovation for national development, a strong contemporary model is the United Arab Emirates (UAE). The UAE has in recent years the mainstreaming of innovation with dedication, particularly in its public sector, and has achieved remarkable results. To the Emirati government, the pursuit of innovation is meant to ensure the

development of a national economy in which all its various sectors collaborate in a bid come up with new approaches to doing things (Khaleej Times, 2014).²

The UAE is ranked 36th on the 2014 Global Innovation Index. According to the Vision 2021 roadmap of the UAE, by 2021 the UAE seeks to be part of the top ten countries on the Index (UAE Government, 2014). To do this, the country has put in place measures to strengthen its macro innovation system. For example, the UAE has a National Innovation Strategy with four tracks.

Track 1 is basically about government putting in place innovation-fostering laws (Khaleej Times, 2014). Track 2 is concerned with the promotion of innovation in all public institutions (Khaleej Times, 2014). Track 3 seeks to promote innovation in the private sector while Track 4 concentrates on the promotion of Science, Technology, Engineering and Mathematics (Khaleej Times, 2014). Additionally, the UAE in 2015 created the office of the CEO of Innovation for every government department (Nagraj, 2015). The Muhammed Bin Rashid Center for Government Innovation (MBRCGI) comes close to serving as a think tank and idea laboratory to solicit/create new ideas and test them before helping to implement them in government departments. In collaboration with the United Kingdom's University of Cambridge Judge Business School, the UAE government has also designed a graduate programme in public sector innovation for its public servants.

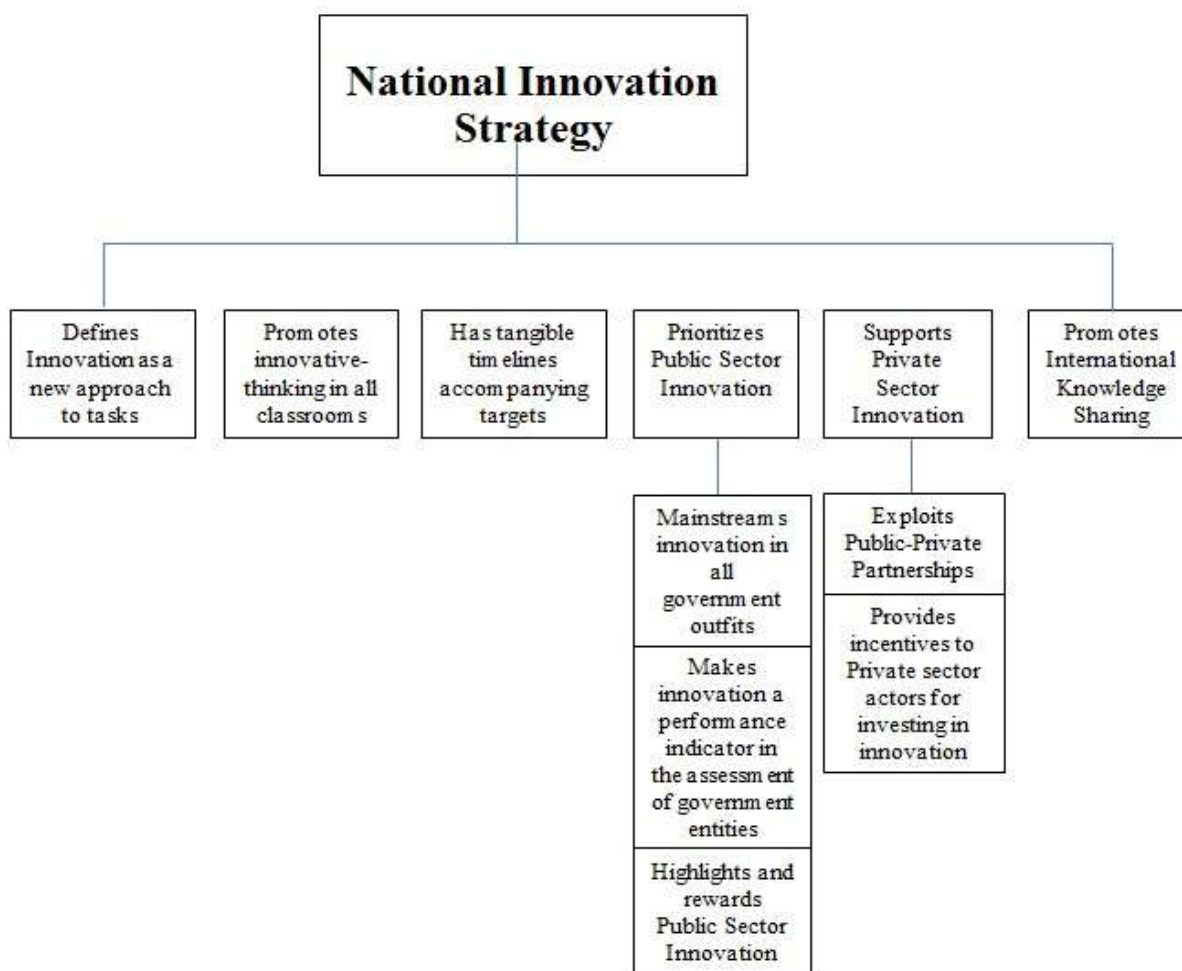
S&T constitutes only one dimension of the UAE's National Innovation Strategy despite its unarguable significance. Innovation is defined and pursued in such a way that it is conceivably attainable in all government offices and beyond. The UAE has set a timeline for itself and the target of being in the top ten on the Global Innovation Index by 2021. Going forward, the UAE's approach helps buttress the position that Ghana must develop a broader national innovation framework which co-opts but is not limited to the STI policy.

The basic framework of Ghana's national innovation strategy should have the following attributes:

- Conceives innovation as a new/different approach to tasks/challenges and not only as an offshoot of S&T
- Intends to mainstream innovation in the public sector. In this sense, all government agencies, departments and institutions should be encouraged to innovate. In assessing the performance of public offices, innovation must be a key indicator. The strategy must seek to highlight and reward innovations in the public sector.
- Promotes innovative thinking at all levels of the educational system.
- Supports creation of an enabling environment for private sector innovation. Such support could include incentives to the private sector for investments in research and development and public-private partnerships.
- Prioritizes knowledge sharing with other governments. This would mean intentionally taking an interest in the innovations pursued by other governments and learning from them.

² His Highness Shaikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai as he launched the UAE's National Innovation Strategy.

Figure 1: A Conceptual Framework for A National Innovation Strategy For Ghana



Source: Author

Conclusion

Ghana's current STI policy is significant as it provides a foundation for the mainstreaming of scientific and technological innovation in the pursuit of development in Ghana. Notwithstanding, S&T-based innovations are not the only forms of innovations. Innovations can take other forms which may not necessarily be inspired by S&T. As such, it is important that Ghana puts in place a broader national innovation framework that incorporates the STI and also captures innovations that are not S&T-based. This will help to involve everybody and every institution particularly in the public sector and help to quash the subtle or even loud impression that can be gleaned from the STI policy that innovation rigidly belongs to the arena of scientists and technologists. The attempt by the framers of the STI policy to enlist ministries and other government institutions to aid in the implementation of the STI ought not to be necessary in the

case of a national framework that seeks innovation in any form from any sector of the economy by any agent or entity operating therein.

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