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Innovation in the backward linkage firms in Ghana's gold mining sector

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ABSTRACT

This contribution illustrates how Freeman's ideas, concepts and approach, helped me build my framework of thought for my paper on innovation in supply firms to the gold mining firms in Ghana. Freeman's theory of the National System of Innovation helped me to better understand the importance of government policy in developing the innovative capacity of firms. My research discovered that Ghana's local content policy had increased local participation in the gold mining industry. Yet the lack of investment in the development of the technological capacity of firms and research institutions had led the firms that supply to the gold mining companies to import most of the items on the procurement list without adding any value.

KEYWORDS

Innovation; local content; mining; Freeman

1. Introduction

Freeman (2001), recognized the importance of innovation research in policymaking. Specifically, he acknowledged that policy must be continuously adapted and reformulated as technology evolves. He contended that major technology waves must be identified, and its features studied in order to produce policy that facilitate the diffusion of the new technology in the economy. Freeman collaborated with other innovation economists such as Lundvall to develop the concept of National Innovation Systems. This concept posits that it takes a coordinated national effort between government agencies, research institutions and industry for firms to develop the necessary innovation capabilities that would make them competitive in the international market. Thus, Ghana can use its local content policy to encourage this coordination and enhance the innovation capability in firms that supply to the mining industry. This thesis alludes to the fact that an understanding of the relevant systems of innovation is important to develop innovative capacity and ultimately aid in the diffusion of the innovative technology that emerges as a result.

The National System of Innovation is a theory that places emphasis on knowledge as the most important resource of a country and learning as the most important production process. This theory believes that a country's history of knowledge development and absorption explains its level of innovation in the industry. The theory posits that the

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innovation process is an intricate interplay between micro and macro phenomena where macro-structures condition micro dynamics and vice-versa. Thus, there is the need to understand how macro-structures such as state institutions and national policy leads to the development of the capacity and skill needed for technological innovation in any given industry.

2. Background

In the case of the mining sector of Ghana's economy, I looked at the history of mining policy in Ghana. According to Ghana's Minerals Commission, Ghana has been mining gold for a millennium (Minerals Commission of Ghana 2011). Centuries before Portuguese sailors reached the shores of West Africa, gold was mined in what became the present-day Ghana and transported across the Sahara Desert to North Africa. It was this gold mining activity that led the Portuguese to name it The Gold Coast. It is estimated that Ghana accounted for 36% of world gold output between 1493 and 1600 (Minerals Commission 2014). After Ghana attained independence from the British in 1957, the state owned all mineral resources in the country. In the early 1960s, the Government of Ghana bought out several privately owned gold mines and formed the State Gold Mining Corporation. Ghana went through an economic downturn in the mid-1960s mainly as a result of an over-zealous investment in a capital-intensive industry, mismanagement of natural resources, inflationary effects of import restrictions and a fall in the price of cocoa (World Bank 2007; Jedwab and Osei 2012). The deterioration of the economy coupled with unstable political climate led to negative growth in 1967, 1972, 1975–1976, 1979, and 1980–1981 (Baah-Boateng, Nketiah-Amponsah, and Alagidede 2013). After 1967, the Government of Ghana begun to attempt to attract Foreign Direct Investment in the mining sector. Yet the Ghanaian economy was characterized by political upheavals, external shocks in the commodity market and poor policy coordination in the mining sector (Minerals Commission 2014; Baah-Boateng, Nketiah-Amponsah, and Alagidede 2013). Thus, gold output fell from 1960 to 1990. Falling from about 915,217 ounces in 1960 to about 250,000 ounces at its lowest point in 1985 (International Council on Mining & Metals 2015; Minerals Commission of Ghana 2011).

Ghana embarked on the Economic Recovery Programme (ERP) in 1983. This was sponsored by the World Bank and the International Monetary Fund. As occurred in many African countries at the time, the ERP was a structural adjustment programme that urged the government to secure the confidence of foreign investors through institutional and legal framework reform of the economy including the mining sector (Bourgouin 2011). Hence, the economy became liberalized and government policy was set to attract FDI and led to the divestiture of state-owned firms including mines (Baah-Boateng, Nketiah-Amponsah, and Alagidede 2013). Mining companies were allowed 20–45% of foreign exchange retention accounts, improved access to mining inputs through export rehabilitation credits and small-scale mining of gold and diamond was legalized (Ayee et al. 2011). In 1986 the Minerals and Mining Law was introduced, and the Minerals Commission was established under this law. This Minerals and Mining Law (1986), did not connect mining to other sectors of the economy nor the macroeconomic objective to develop the economy. There were no provisions in the law for mining investment to lead to the development of backward linkages or

forward linkages. Such linkages have the potential for value-addition to the supply of mining inputs or through mineral processing (Bourgouin 2011). The revised Minerals and Mining Regulations in the Legislative Instrument (L.I.) 2173 and L.I. 2174, were enacted into law in 2012 but enforced in 2014. These regulations are to clearly define the Minerals and Mining Act 2006 (Act 703). These regulations provide fiscal incentives to attract foreign investment as well as ensure local content in the use of labour in the mines and the sourcing of mining inputs (Nickerson and Geipel 2018).

3. Firm interviews and policy analysis

To inculcate Freeman's assertion that policy must be continuously adapted and reformulated as technology evolves, this case study interviewed the management of backward linkage firms that supply to the mining companies. These interviews were to get a first-hand impression of the firms operating under the local content policy for the mining industry that has been enforced since 2014. The interviews were mainly based on the local content policy and examined the STI policy in Ghana to ascertain its efficacy in developing the innovative capacity of the industry. A total of six firms were interviewed. These firms fall into the categories of supplying capital goods and construction materials, consumables and non-core goods. Three of the firms are completely Ghanaian owned. Two are foreign-owned manufacturing companies with different degrees of Ghanaian participation and one is jointly owned by Ghanaians and foreigners.

In the L.I 2173 in sub-regulation (10), it is stated that *the Commission shall have a local procurement list and specify in the list the goods and services with Ghanaian content which shall be procured in Ghana by the holder of a mineral right, a licence to export or deal in minerals or a person registered to provide mine support services.* Now in sub-regulation (11), it is stated that *a holder of a mineral right, a licence to export or deal in minerals or a person registered to provide mine support services who fails to comply with sub-regulation (10) is liable to pay to the Commission the full customs import duty in respect of the goods imported and a penalty as provided in the local procurement list.* This list was expected to be reviewed annually but according to the Minerals Commission, the list that was begun in 2014 with eight items was revised in 2015 and then in 2018. It now contains 27 mining inputs that must be procured from either Ghanaian owned companies or companies with the highest level of Ghanaian participation in terms of ownership, management and employment. The procurement list is a legal grey zone and could be abused by bureaucrats. It could also entrench local industry interests and lead to inflated prices (Hansen 2014). The definition of a locally owned company as defined by the L.I 2173 is a firm that contains the highest level of Ghanaian participation in terms of ownership and management by Ghanaians and employment of Ghanaians. This definition is very vague, and it leaves room for mining firms to use their discretion. Mining firms pay concessionary duty on imported goods except those on the procurement list. Also, Ghanaian owned supply firms that import goods on the procurement list do not pay any duty on these mining inputs.

The L.I 2173 and L.I 2174 do not have provisions for value-addition and hence none of the firms interviewed had engaged in innovation activity. This may be because many of the locally owned firms are yet to develop the capacity and skills needed for value-addition. The locally owned supply firms that were interviewed expressed an

interest in developing the capacity to engage in value-addition but bemoaned the difficulty in obtaining low-interest loans. They intimated that it would be easier for them to engage in value-addition and establish manufacturing plants if they were extended similar benefits as allotted to firms declared Free Zone Developers especially the exemption from payment of income tax on profits for 10 years. At the moment, the mining sector does not fall under priority areas in the free zone according to the Ghana Free Zones Authority. For a manufacturing firm to qualify for the incentives of a free zone at least 70% of the annual production of goods and services produced must be exported.

An analysis of the interviews with the suppliers shows that supply firms have benefitted immensely from associating with Multi-National Corporations (MNCs) in the mining sector. There is a very strong link between local supply firms and MNCs that either produce the output the local firms supply or used to supply the output to the gold mines before the products were placed on the procurement list for local content. There are some MNCs that collaborate with Ghanaian supply firms but have not established a manufacturing plant in Ghana. The local content policy has greatly enhanced the use of Ghanaian suppliers of inputs that are not on the procurement list and often in collaboration with MNCs. These can be firms that acted as local agents of an MNC and supplied to other areas of the economy but added the mining sector to its portfolio as local content was encouraged compelling the mining companies to source these inputs locally. From the interviews, we can see that the Ghana government's local content policy in the mining sector has enhanced the business of supply firms with Ghanaian content and increased Ghanaian participation in the mining sector. The development of local backward linkages to the mining sector has also enhanced the capacity of these supply firms to supply to other sectors of industry.

There is potential for the growth in that sector to be directed by policy to lead to a growth in the manufacturing of mining equipment in Ghana. Freeman pointed out that government policy in the development of innovative capability and the diffusion of innovative technology is important because political regulation is needed to limit negative externalities that may emanate from new technology. It is hoped that better policy formulation will encourage the local suppliers to the mining firms to develop manufacturing capabilities. It is expected that this would increase innovative capacity in the sector.

Building the framework of thought for my paper, I wanted to study innovation and linkage development in supply firms. I approached this idea by investigating whether government policy to create local linkages in the mining sector has enhanced innovation in the firms that supply to the mines. I followed that with an analysis of government's STI policy to investigate how the government intends to build capacity for knowledge transfer in the Ghanaian economy. The Ministry of Environment, Science, Technology and Innovation is the government body in-charge of technological development in the industry. The ministry has thus drafted a national policy on science, technology and innovation to create the conditions and enabling environment for innovations to occur (Ministry of Environment, Science 2017). This is expected to cover the period from 2017 to 2020. According to the draft document, an apex STI body to ensure coordination and harmonization of the country's STI policy and programmes must be established. This apex body; The Presidential Advisory Council for Science, Technology and Innovation (PACSTI), was established in 2019. This implies that there has not been a

coordination and harmonization STI body at the national level for most of the period that this medium-term national STI policy is expected to have been implemented. The policy also pointed out that Ghana has not made adequate funding available for STI research and so STI financing would be a priority with the establishment of an STI fund. However, there were no provisions for such a fund in the 2020 budget statement. The budget statement showed that there were plans for STI projects that did fall under programmes to be pursued by the national STI policy to develop innovation in the industry, but these projects were not funded by an established STI fund. For instance, the Ghana Design and Manufacturing Centre (GDMC) yet to be established is to facilitate the incubation of new technological industries and serve as a resource for national research institutions and private industry. Funding had also been provided for the National Entrepreneurship Innovation Programme (NEIP) which was set up by the present government to provide additional avenues to self-employment opportunities for Ghanaian youth and support to Micro, Small and Medium Enterprises (MSMEs). Thus, Ghana's STI policy implementation seems disjointed with the apex body established to coordinate the many aspects yet to begin work.

A look at the Minerals and Mining Policy (2014), shows that the policy had the intention to establish a fund from the revenue accrued from mining for projects that enhanced forward, backward and side-stream linkages needed for the expansion of the Ghanaian economy. In September 2018, the Minerals Income Investment Fund (MIIF) Act, 2018 (Act 978) was passed by parliament (Government of Ghana 2019). The MIIF was created to hold and manage the mining company equity interests of the Republic, receive mineral royalty revenues due from mining operations, and provide for the management and investment of the assets of the MIIF. A board for the fund was inaugurated in October 2019. The Minerals and Mining Policy enforced in 2014, does not make any provision for government investment in research and development in the manufacture of mining inputs. The policy is expected to be reviewed every 5 years and it is about time the policy was reviewed to include incentives for firms that invest in value-addition to inputs supplied to the mining firms. The policy review could also explore the possibilities of allocating funds from the MIIF towards research and development that could be geared towards supporting backward linkage firms that seek to add value to the goods they supply to the mining companies. The firms interviewed expressed an interest in adding value through the establishment of assembly and or manufacturing plants. Local manufacturing in the backward linkage firms could increase employment in the mining industry and hence increase Ghanaian content and benefit from mining.

4. Conclusion

Although not all firms are Ghanaian owned, all the firms located in Ghana that supply to the mines have various degrees of Ghanaian content. This is largely as a result of the implementation of the Minerals and Mining Regulations in 2014. Yet according to the African Center for Economic Transformation (2017), only 52% of mining inputs sourced in Ghana was supplied by local manufacturers and service providers. It is suspected that the present Minerals and Mining regulations may have encouraged local manufacturing firms to import supplied inputs as the imports are duty-free while the manufactured output attracts a value-added tax. Thus, the mining regulations and

mineral policy have greatly enhanced the development of Ghanaian content in supply firms. Yet it has discouraged the manufacturing of inputs to the sector by providing duty-free incentives to imports of mining inputs without providing incentives for manufacturing and innovation.

It can be observed from the nature of supply firms to the mining firms in Ghana that there is not much innovation or value-addition happening in the goldmining industry. There has not been definitive government policy or investment geared towards developing the manufacturing capacity and skill of manufacturing firms and importers that supply to the mining sector. The present policy direction encourages the import of mining inputs over local manufacturing and value-addition. Meanwhile, it is through value-addition and manufacturing that the linkage firms could develop technological and innovative capacity. These backward linkages possess the potential to develop capacity for manufacturing and innovation in the supply of some of the mining inputs as they are able to repair and maintain most of the equipment they supply to the mines. They will hence need support from the government by way of incentives and investment in R&D and technical vocational education training to develop the needed human and physical capital. Government incentives such as tax relief and R&D subsidies have been known to encourage manufacturing, value-addition and innovation in firms in developed economies (Shearmu et al. 2019).

Ghana has strong institutions with qualified personnel that have been able to draft a largely effective mining policy to encourage the localization of the backward linkage firms in the sector. Thus, there is the potential to develop technological capability in backward linkage firms through a mining policy that encourages the collaboration of research institutions and the mining industry. For Ghana to become an industrialized economy, the government must invest in infrastructure and human capital. Incentives have been given to free zone firms to manufacture goods for export. With a sustainable source of energy and capital build up from natural resource exploitation, Ghana is poised to expand manufacturing with the right policy direction and investment in R&D and technological capability in the local industry. It is encouraging that governments over the years have included the development of technological and scientific skills and capacity in their medium-term plans. Yet, this has often not translated into concrete sustainable action and implementation. A lack of commitment and funding seems to be the underlying factors preventing the implementation of these plans.

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