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Making medicines in post-colonial Ghana: State policies, technology transfer and pharmaceuticals market

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ABSTRACT

The COVID-19 epidemic has highlighted the risks of shortages resulting from dependence on medicine imports. Today's situation where a few companies in the Global North control COVID-19 vaccine production is having dire consequences on African countries' access. However, the challenges surrounding local production of medical products in Africa are long-standing issues dating back to independence. Using Ghana as a case study, this paper looks primarily at how the dependence on medicine imports can be understood as the result of policies implemented since independence, as well as the changes that the Ghanaian State has undergone in reaction to international events and the evolution of the structure of global pharmaceutical capital. It examines the policies associated with the Ghanaian State's project to promote local pharmaceutical production, from independence to the present, and the role that non-state actors such as pharmaceutical companies have played. Based on an historical political economy approach, it highlights how the roles of the State and its forms of intervention have evolved over time, from planning (right after independence), to implementing (during the global crisis of the 1970s–1980s), and finally to regulating (from the 1990–2000s onward). This paper draws on 14 months of PhD research fieldwork (2014–2018). It consists of interviews (n = 50) with Ghanaian actors in the pharmaceutical sector, observations in a pharmaceutical plant in Accra, and research into archives at the Public Records and Archives Administration Department (PRAAD) of the Ministry of Industry.

1. Introduction

On March 16, 2020, with the outbreak of the COVID-19 crisis, Ghana's President Akufo-Addo convened stakeholders from the banking and pharmaceutical industries to discuss how best Ghana could begin to reduce its dependency on medicine imports (Kyerematen, 2020). Ghana had started making pharmaceuticals right after its independence in 1957, to meet its growing public health needs and economic challenges. Today there are thirty-six active local pharmaceutical companies in Ghana, located primarily in Accra. They manufacture (formulation and packaging) mainly over-the-counter medicines, consisting of tonics and combination analgesics (Harper and Gyansa-Lutterodt, 2007). Some firms nevertheless stand out by producing prescription drugs, antimalarial or even antiretroviral drugs for HIV, such as Danadams. But faced with strong foreign competition from Asia, Europe and the United States, local industries supply only 30% of the medicines sold on the private domestic market, and few of them manage to export some of their local products to neighbouring countries (Chaudhuri, 2015). In Ghana, the COVID-19 crisis raised public health concerns due to supply

disruptions resulting from the organization of the global supply chain. Heavy dependence on imports and on a few international suppliers presents risks for population health security. African health systems were also damaged during the pandemic due to the low purchasing power of African States in the bidding process and their lack of local pharmaceutical manufacturing capacities (Banda et al., 2021). This has made it clear that African countries cannot remain so dependent on imported medicines and other health technologies such as vaccines. Yet the challenges and debates around the local production of medicines in Africa are not new; they have been a topic of discussion since post-colonial times. The history of local production in Ghana is embedded in debate about the value and viability of producing drugs locally versus importing them (Banda et al., 2021; Cassier and Baxerres, 2022; Horner, 2022; Mujinja et al., 2014; Shadlen and Massard da Fonseca, 2013). This paper aims to contribute to this debate as the impact of COVID-19 in Africa has demonstrated the dangers of siloed health systems' planning and funding that focuses on a few existing infectious diseases and immediate health policy priorities. This siloed approach tends to overlook the implications of local medical technologies' manufacturing

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capabilities for the resilience of local health systems (Banda et al., 2021) and therefore of their adaptability to local pharmaceutical needs, including in cases of emerging diseases or variants. These factors highlight the fact that importation may not be sufficient to adjust quickly to changing demands, and that local production may be better at identifying and responding to local health needs (Shadlen and Massard da Fonseca, 2013).

To understand why the economic and social issues of local drug production in Ghana today – in terms of investment to increase production capacity and upgrade quality – are hardly compatible with the structure of global pharmaceutical capital, it is necessary to consider the country's policies to promote local drug production since independence. Based on an “historical political economy lens” (Mackintosh et al., 2015: 7), which offers a view of the industry's evolution in its full context. I highlight the changing roles of the Ghanaian State and its forms of intervention, from planning (right after independence), to implementation (during the 1970s–1980s global crisis), and finally regulation (from the 1990s onwards). The time frame I am using to articulate my narrative witnessed major global events that had direct consequences on the State of Ghana and its ability to conduct political reform. It includes the postcolonial era in the 1950s–1960s, the debt crisis that caused the oil price shocks of the 1970s, the enforcement of structural adjustment programmes (SAP) in the 1980s, corresponding to a period of deindustrialization, followed in the mid-1990s by a resurgence of local private industrial investment. The role of the State thus evolved in response to structures of power relations embedded in the international configuration of actors and the global political agenda.

This article draws on recent studies on pharmaceuticals in the Global South which have shown the role of multinational companies, global pharmaceutical capital, distribution intermediaries and international donors in the organization of the supply and the construction of the medicines market in the Global South (Baxerres and Cassier, 2022; João Biehl, 2007; Peterson, 2014; Petryna et al., 2006; Quet, 2018; Kaushik Sunder Rajan, 2017). Other scholars have shed light on policies developed to acquire and disseminate technical know-how and to access the market, where means shortages and resource-scarce innovation are major concerns (Cassier and Correa, 2008; Chorev, 2019; Mackintosh et al., 2015). From 2000 onwards, the concept of “global health” became widespread in the Global South. It characterizes the unprecedented increase in financial means and the emergence of a new type of actor – such as the Global Fund – and intervention that redefined States' policies (Biehl and Petryna, 2013; Birn, 2014; Sridhar, 2009). The above scholars' analysis of the arena in which these transnational players act and interact paid too little attention, however, to the role of the postcolonial States and their more contemporary version, especially in Sub-Saharan Africa. Global South countries are often seen as places of extraction for clinical trial subjects (Petryna et al., 2006; Kaushik Sunder Rajan, 2007) and local knowledge (Comaroff and Comaroff, 2012), except in Pollock, 2014 where postcolonial Africa is a place for the production of alternative knowledge, value, and the construction of markets.

Finally, economists have analysed the role of the State for the development of the pharmaceutical industry from facilitator to producer and buyer in South Africa (Horner, 2022), or from market-fixer to biopharmaceutical innovation, towards market-shaper (Mazzucato and HenryLi, 2021:12). However, local production as a component of national pharmaceutical sovereignty (Hayden, 2007) remains overlooked. The central question that I want to address is how the dependence on medicine imports can be understood as the result both of policies implemented from independence until today, and of the changes that the State of Ghana has undergone in reaction to international events and the evolution of the structure of global pharmaceutical capital.

2. Methodology

This study builds on original empirical material from fourteen

months of PhD fieldwork (2014–2018), made up of interviews (n = 50) conducted in Accra with representatives from the Food and Drug Authority-Ghana, the Pharmacy Council, the Ministry of Health and Industry, Ghanaian pharmaceutical firms, the Pharmaceutical Manufacturers Association of Ghana-PMAG, the United-Nations Industrial Development Organization (UNIDO), and the World Health Organization (WHO). The themes addressed during the interviews were about the history of the pharmaceutical sector, relations between the State, non-state and transnational actors, the medicines supply including regulatory aspects, and the history of pharmaceutical and industrial policies. The interviews lasted on average one to two hours and were recorded with the participants' consent. The material also consists of 60 hours of observations in a pharmaceutical factory in Accra, and research into archives of the Public Records and Archives Administration Department () of the Ministry of Industry. These archives consist of extensive correspondence between the postcolonial Ghanaian Ministry of Trade and Industry, the Development Commission, foreign embassies, multinational companies, and the Hungarian government. They also include numerous memoranda from the Ministry of Trade and Industry, minutes of meetings of the policy committee for the establishment of pharmaceutical industries in Ghana, and expert reports such as the ‘Report on Industrialization and the Gold Coast’ (Lewis, 1953). Transcription of interviews, field observation notes and archives were analysed using NVIVO software, which allows for a thematic analysis of the data. Triangulation of theoretical perspectives, sources and data collection tools was used to validate the results.

By relying on illustrative historical evidence and ethnographical data, I look at several tools employed by the Ghanaian State to enable public policy action in favour of local production of medicines. I first look into the formation of a State apparatus dedicated to the creation of pharmaceutical industries and the production of technical knowledge. To do so, I analyse postcolonial industrial development policies and technology transfer agreements with various partners (multinational companies, the Republic of Hungary, UNIDO), traces of which I found in the national archives (I). The second part of this paper acts as a transition as it focuses on the 1980s and the debt crisis which resulted in the narrowing down of the State's role. Under severe economic challenges, the Government of Ghana had no choice but to adopt and implement SAP (II). The third part is dedicated to the return of the Ghanaian State (Eboko, 2021) as a regulator. It examines how local businessmen took back the pharmaceutical industrial sector from the 1990s onwards after multinational companies had left due to the global economic crisis. It shows how the State, through its National Regulatory Authority, adopted a new form of support for local production of medicines by guiding local firms to comply with international quality standards (III). To conclude, I discuss the avenues for further research that this contribution offers in the context of COVID-19 (IV).

2.1. The Ghanaian post-colonial state as a planner

2.1.1. Leadership in public policies for industrial development

Ghana had little industry when it acquired independence in 1957. During the British rule, agricultural commodities like cocoa and rubber were mainly exported in bulk without any local processing. In 1957, Ghana's manufacturing sector accounted for 7.4% of the GDP (Amankwah-Amoah, 2016). Consumer goods were all imported, including pharmaceuticals, which came from Western Europe and the United States. Postcolonial Ghana was therefore heavily dependent on imports to meet its population's needs.

The Gold Coast Industrial Act-1947 marked the beginning of Ghanaian industrial policy. It established the Industrial Development Corporation-IDC to provide development finance and ensure the implementation of industrial development projects (Ewusi, 1981). In 1951, Kwame Nkrumah, then Prime Minister of the Gold Coast, a semi-independent State under British trusteeship, defined the First Development Plan (1951–1956). During the 1950s and 1960s, Ghana

had several plans. The Seven Year Plan for National Reconstruction in 1964 was the most ambitious industrialization programme. It included the construction of the Volta River dam for a hydroelectric power plant providing electricity to emerging industries. It also involved the nuclear reactor project, an emblem of Nkrumah's worship of science and equal access for all newly decolonized nations (Osseo-Asare, 2019). During that time, science and technology were seen as the route to rapid economic development and industrialization.

The economic advisor to the United Nations, William Arthur Lewis, was appointed adviser to the Ghanaian Prime Minister, from 1957 to 1963 (Lewis, 1953). He recommended import-substituting industrialization (ISI) policies. "These policies sought to promote the accumulation of skills, capital and knowledge for the production of manufacturing goods by limiting imports of selected manufacturing goods through a variety of trade restrictions and subsidizing domestic manufacturing enterprises" (Simonetti et al., 2015: 26). This type of approach to industrial policy that combined public sector investment and import substitution was widespread across Africa at the time, in response to postcolonial industrialization and growth challenges (Banda et al., 2015). To catch up and attract capital, Lewis encouraged the State to resort to private capital and foreign direct investment (FDI) for industrial production, while maintaining the leading role of the public sector. Contrary to the idea that socialist States are hostile to private investment, most post-colonial African governments pursued "industrialization by invitation" strategies in which foreign capital played a central role (Mkandawire, 2001). Industrial protection measures were often part of the incentives requested by foreign capital or offered to attract it. They included exemption from income taxes and import taxes on raw materials, machinery and equipment. These conditions were articulated to the status of "pioneer industry" granted by the Ghanaian Ministry of Industry and Commerce in line with the Pioneer Industries and Companies Act No. 63, 1959. It was reserved for companies with priority areas of activity such as textile manufacturing, road construction, soap and medicine manufacturing (PRAAD RG 7/1/214/11, July 18th 1959). Pharmaceutical industries all benefited from this status, which exempted them from import taxes and income taxes in application of several acts such as Local Industries Act 71, 1959, Income Tax Act 66, 1959 and Capital Investments Act, 1963. In return, investors were required to develop local capabilities by training Ghanaian staff and maintaining a high level of employment (Lewis, 1953). Ghanaian development plans thus placed manpower at the centre of their priorities, and training and education in science were a central part of their policies (Osseo-Asare, 2019). The government also decided to set restrictions on imports, to improve market access for locally produced goods. This model of educational protectionism allowed infant industries to develop their technologies and know-how while being protected for some time from international competition (Arrow, 1962).

Local pharmaceutical production therefore made it possible to meet the growing needs of public health and economic development, since medicines produced in Ghana were also exported in the region. Development became a central concern for the new government, which in many ways took the form of a developmental State "whose ideological underpinning is 'developmentalist' in that it conceives its 'mission' as that of ensuring economic development, usually interpreted to mean high rates of accumulation and industrialization" (Mkandawire, 2001: 290). By facilitating FDI and investing in education to train technicians, engineers and scientists, the Ghanaian government played a decisive role in the country's industrial and economic development. These policies resulted in relatively high growth rates in the 1960s, significant social gains, and manpower development.

During the same period, the Pharmacy and Drugs Act 64, passed in 1961, created the Pharmacy Board, which was responsible for overseeing pharmacists' profession and granting licences for the production and distribution of medicines in Ghana.

2.1.2. Technology transfer agreements with multinational companies

Since pharmaceutical technologies were located in the former colonizing countries, the Ghanaian government called on investors from the United States and Europe to develop a local industrial base (Swainson, 1987). But not all agreements with multinational corporations resulted in the development of local pharmaceutical production; the archives contain evidence of many failures, which shed light on the complexity of implementing such collaboration. The fact that Ghana's archives do not include all such projects and that some are more detailed than others explains the difference in analysis and the focus given to only some of them. The following section provides a non-exhaustive inventory of projects, some of which are still ongoing today.

Correspondence dated November 22, 1957, between D.C. Ferguson, Permanent Secretary at the Ghanaian Ministry of Trade, and the Israeli Ambassador to Ghana (PRAAD RG 7/1/39, November 22nd, 1957), shows that from 1950 onwards, the Israeli Labour Party developed several collaboration projects with socialist States in Africa (Marie-Aude Fouéré and Yonatan Gez, 2022). At the Ambassador's request, the Ghanaian Chief Health Officer sent a list of the most commonly consumed drugs in Ghana to Dr Jacobson, an Israeli pharmaceutical expert. A meeting was then held on November 3, 1957 in Tel Aviv between Reverio Ayeh, Ghanaian Minister of Trade, and executives from the Israeli thirty-year-old pharmaceutical company, Sana Ltd. The Sana representatives offered to share their technological knowledge with Ghana with a view to supporting local production of medicines so that the country would no longer depend on imports. A month later, in December 1957, Sana's CEO sent Reverio Ayeh an official proposal for the creation of a pharmaceutical industry in Ghana. The deal included a five-year period of equal financial participation by the Israeli investors and the Ghanaian government. The Ghanaian State would then be able to buy all the shares and become the owner of the firm. Sana experts would be responsible for building the premises and managing the company. They would supply equipment, machinery and raw materials, and recruit and train Ghanaian technicians in all areas of production. The Ghanaian government would provide the land and industrial protection measures, including exemption of taxes and improved market conditions by supplying public health facilities with drugs produced by Sana Ltd (PRAAD RG 7/1/39, December 2nd, 1957).

A year later, at the end of 1958, R.W. Oxtoby, a representative of the English firm Evans Medical Services Ltd., visited Ghana and Nigeria. Evans had already contributed to the establishment of a pharmaceutical company in Burma. Its executives made an offer similar to that of Sana Ltd. The three-year agreement included technical assistance for a total investment evaluated at £385,000. The business plan was to manufacture tablets, infusion solutions, and ointments for the local and regional markets (PRAAD RG 7/1/39, August 24th, 1959).

In the course of 1960, other proposals came from European companies such as Consorzio Neoterapico Nazionale, an Italian company, and Voluntas Ltd., an Indo-European firm based in London (PRADD RG 7/1/39/76, March 4th, 1960; PRADD RG 7/1/39/90, October 18th, 1960). As with the Sana Ltd. and Evans projects, Consorzio and Voluntas executives demanded a significant equity stake from the Ghanaian government. While the latter was not in a position to invest directly in the firm's capital, the support it provided under the pioneer industry status was nevertheless very significant. Yet despite these fiscal advantages, the foreign partners decided to give up on the installation of production units in Ghana.

The British firm Major & Co. was the very first one to set up in Ghana, in 1957 (PRADD RG 7/1/39/104, November 26th, 1960). It began producing medicines in a factory located in Tema, 18 miles from Accra (Poku Boateng, 2009). Major & Co. also had commercial and distribution activities in Ghana on behalf of multinationals, which generated enough capital to start production. During the sixties, other multinationals such as J.L. Morrison & Sons (UK), Sterling Products Ltd. (USA), Kingsway Chemists Ltd. (UK), and Dumex Limited (Denmark) also opened subsidiaries in Ghana to produce drugs locally (PRADD/RG

7/1/39/104, 1960). Like Major & Co., J.L. Morrison & Sons distributed medicines on behalf of other multinationals, and Kingsway Chemists Ltd. did re-packaging. Ghanaian law allowed the functions of manufacturer, wholesaler, retailer, and representative to be combined, thus making it easier to set up a company. The fact that these companies could do both manufacturing activities and wholesaling helped to make them economically viable (Pourraz et al., 2022).

During this period, companies with Ghanaian shares also started production. Thus, Ghana Laboratories Ltd. Pioneer Companies Relief Incorporation, with twenty-five employees, began manufacturing medicines and cosmetics in August 1958 with UK equipment. Prospecting was also underway for exports to Nigeria and Congo (PRAAD RG 7/1/203/1–8, March 5th, 1959). Pharco Production (Ghana) Ltd. Cosmetic Industry was established in 1959 to manufacture medicines, cosmetics and hygiene products. Pharco was 60% owned by a Ghanaian pharmacist associated with German and UK traders who facilitated the purchase of equipment from their countries (PRADD RG 7/1/214, no date). From May 1960, the twenty or so employees (up to 90 in 1961) operated four manufacturing lines. A large part of the production was exported to Nigeria, while the rest was sold on the local market (PRADD RG 7/1/214, June 7th, 1960). Netherlands African Manufacturing Company (NAMCO), owned by a Dutch national and a Ghanaian wholesaler (Baxerres, 2018), also began producing drugs at this time.

Ghanaian policy also deliberately limited the role of Ghanaian private entrepreneurs to small-scale ventures in favour of the public sector (Martin, 1973). As a result, there were only two Ghanaian private initiatives at this time, one of which, Ayrton, was created in 1965 by a Ghanaian pharmacist trained in the UK.

In addition to industrial protection measures, limited imports of medicines, and collaboration with US and European multinationals, the Ghanaian government also established bilateral programmes with socialist States. The next part of this paper looks at the Agreement for Economic and Technical Cooperation signed with the People's Republic of Hungary for the creation of a State company (GIHOC Pharmaceuticals Ltd.), which has not been analysed so far, unlike more contemporary South-South collaboration (Russo and de Oliveira, 2015).

2.1.3. Bilateral cooperation agreement for the creation of a state company

In December 1960, IDC Chairman, Ayeh-Kumi, visited Hungary at the invitation of the Minister of Foreign Trade, the Minister of Foreign Affairs, and the Chairman of the Council of Ministers (PRADD RG January 7, 2187, December 13th, 1960). The Hungarian government offered technical, material and financial assistance to the Ghanaian government to develop its industrial infrastructure. In exchange, Ghana should export agricultural resources such as cocoa, coffee, fruit and wood to Hungary. Shortly prior to that, Ayeh-Kumi, on behalf of the Ghanaian State, had signed the first economic and technical cooperation agreement with the Soviet Union for mineral processing and prospecting (Osseo-Asare, 2019).

This visit led to the signing of two bilateral agreements on April 20, 1961. One of them was a £2.5 million loan from Hungary to Ghana, for the establishment of State enterprises to locally manufacture medicines, light bulbs, and aluminium cables (after the discovery of bauxite deposits) (PRADD RG January 7, 2187, December 10th-13th, 1960). This agreement led to the creation of the Ghana Industrial Holding Corporation-GIHOC, a State-controlled industrial consortium with several subsidiaries in distillery, clothing, footwear, cans and drug production by the Ghana Pharmaceutical Corporation-G.P.C., which would eventually become GIHOC Pharmaceuticals Ltd (PRADD RG January 7, 1833/93, April 4th, 1962).

The agreement required the pharmaceutical company to be State-owned (PRADD RG 7/1/39/127, January 9th, 1961), and the machinery and equipment to be supplied by Hungarian companies (PRADD RG January 7, 2187, no date). The Hungarian Plant Trading Company, Komplex, submitted a project through Medimpex Hungarian State Trading Co. for Pharmaceutical Products. Medimpex was in charge of

foreign pharmaceutical technology transfer agreements on behalf of the Hungarian Ministry of Foreign Trade (PRADD RG 7/1/39/144, July 10th, 1961). The collaboration contract was signed on June 21, 1961, between Komplex executives and the Ghanaian government (PRADD RG January 7, 1833/2, November 21st, 1961). It stipulated that Komplex had to supply technical expertise, equipment, machinery, and training for the local staff. The total cost of the project was estimated at G£500,000 of which G£136,000 were for the purchase of equipment (PRADD RG January 7, 1834/161, May 19th, 1962). The Ghanaian Minister of Industry appointed as G.P.C. director, E.W.K. Nyinaku, then deputy manager of the Ghana Distilleries Company Limited.

Early in 1962, the Ghanaian Director of Pharmaceutical Services and Nyinaku travelled to Budapest to discuss project details with Komplex executives. The pharmaceutical plant was expected to have an annual production capacity of one million ampoules and one hundred million tablets. It would be built on a 40-acre plot of land, 10 miles from Accra in Achimota, near the university (PRADD RG January 7, 1833/44, February 5th, 1962).

This collaboration agreement would result in numerous exchanges and knowledge transfers between the two parties, through meetings, study trips and experts' visits. To develop Ghanaian scientists' and technicians' skills and knowledge, Komplex organized training for 9 months at the expense of the Hungarian government, at the various departments of the Chinoin pharmaceutical plant in Budapest, one of the largest Hungarian pharmaceutical companies created in 1913.

On March 13, 1962, ten people were selected to go to Hungary, including six pharmacists, two maintenance technicians and two packaging officers. All of them were in their twenties except for one pharmacist who was in his forties. All of the pharmacists, with the exception of one woman who had graduated in London, had been trained at the Faculty of Pharmacy at the Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi (PRADD RG January 7, 1833/73, March 13th, 1962).

Production was planned to start in June 1964, but in May 1962, the Ghana Architectural and Civil Engineering Company (GAE) in charge of the plans of the future plant was already several months behind schedule (PRADD RG January 7, 1834, April 24th, 1962). This prompted the Hungarians to send a Chinoin engineer to Accra for three months to help GAE (PRADD RG January 7, 1834/207, June 18th, 1962). Despite pressure from the Ghanaian authorities to complete the plans by the end of 1962, GAE did not complete the drawings until August 1963, which resulted in strained relations between the Hungarian and Ghanaian partners. The contract for the construction work was finally awarded to a French company, the Société d'Étude de Travaux d'Outre-Mer (PRADD RG January 7, 1835/467, July 22nd, 1963).

Relations got even more tense when, on May 8, 1963, the Ghanaian pharmacists in training in Budapest noticed that the equipment intended for the factory in Ghana consisted of old machines that the Chinoin workers had repainted to make them look new. A Ghanaian memorandum mentions a widespread practice in which the Soviet Union would sign cooperation agreements with Third World countries to get rid of its old machines and sell its technical expertise at exorbitant prices. According to students, the Indian government, which had similar agreements with Hungary, systematically sent its engineers to cheque the condition of the machines before they were shipped (PRADD RG January 7, 1835/459, May 8th, 1963).

The Ghanaian government then signed a contract with the Pakistani Associated Consulting Engineers Ltd. to inspect the machines in Budapest (PRADD RG January 7, 1835/493, June 6th, 1963). Documents in the archives then reported the difficulties faced by Mr Ashiq, the Pakistani inspector, to obtain a visa for Hungary (PRADD RG January 7, 1835/517, June 24th, 1963). The Ghanaian officers moreover complained that they had never received the technical notices of the machines despite numerous requests, which proved the Hungarian attempted cover-up. On July 19, 1963, Mr Ashiq finally arrived in Budapest. Unfortunately, the documents available in the archives detail

neither the outcome of the inspection, nor the final phase of the construction of the factory. One of the last documents suggests that relations between two parties deteriorated further when, for unknown and unexplained reasons, the director of GPC was replaced in September 1963 on the request of the Ministry of Industry, without the Hungarians having been informed (PRADD RG, July 31st, 1963). The construction of the GIHOC Pharmaceuticals Ltd. factory was finally completed and operational in 1967.

Efforts by the first government of the Republic of Ghana to tackle the challenges of industrialization, local production of medicines, and economic growth were to be undermined by a military coup in 1966, which overthrew the Nkrumah government. The seventies were characterized by the global debt crisis resulting in the drop of new investments in Africa until the late '80s. This had huge consequences for the Ghanaian State, which from a planner became a mere implementer with limited autonomy.

2.1.4. Global debt and structural adjustment programmes: the Ghanaian State as mere implementer

The new Ghanaian military government came to power in 1981. Faced with a very severe economic crisis, it had no choice but to adopt the structural adjustment programmes required by the Bretton Woods institutions (Whitfield et Jones, 2007). The first economic recovery programme was implemented in 1983. Combined with trade liberalization, it brought an end to the protectionist measures and restrictions on imports implemented right after independence. Opening the market to external players highlighted the lack of competitiveness of pharmaceutical companies based in Ghana, and in the late 1980s caused multinationals to decrease, if not to cease, their activities with their Ghanaian subsidiaries (Poku Boateng, 2009).

During that decade, the trend in Africa was generally to deindustrialize, while at the same time the pharmaceutical industry was growing in India. This led to changes in the structure and circulation of global drug markets, especially with exports from Asia to Africa (Chaudhuri, 2005). Only two Indian-owned companies were established in Ghana at the time: first, Letap Pharmaceuticals Limited in 1983, and then M&G Pharmaceuticals Ltd. in 1989, when it bought the Kingsway Chemists' plant in Accra. As the Indian pharmaceutical industry became stronger and more competitive, Western multinationals had to reorganize their supply chains and look for cheaper production sites (Simonetti et al., 2015). Indian companies began to play a major role in technology transfer to the African continent and eventually to replace the European and US multinationals that had been Ghana's main industrial partners in the post-colonial era.

From the mid-eighties onwards, Ghana had to face drug shortages and could no longer guarantee health care and medicines free of charge. In 1985 the government introduced cost recovery and means-based provision of healthcare and medicines. Following the adoption of the Bamako Initiative in 1987, which encouraged the privatization of health systems, the Ghanaian government adopted a "cash and carry" approach designed to make the public health facilities more efficient and cost effective. The result was in improvement in the management of health commodities but also a deterioration of access by the most vulnerable parts of the population (Arhinful, 2003). During that time the Ghanaian government could do nothing other than implement international organizations' demands.

To resolve the issue of access to medicines, private local entrepreneurs, most of whom were pharmacists, bought back the former subsidiaries of multinationals, thus contributing to a form of *ghanaianization* of the industrial pharmaceutical sector. *Ghanaianization*, was characterized by capital input from private Ghanaian individuals, as opposed to nationalization, where capital was from the State. As in the 1950s, the private capital mobilized by this new generation of Ghanaian industrialists came from their business activities in medicine importation, promotion, and distribution.

The old pharmaceutical plants from the sixties were reactivated.

Thus, Sterling Products Ltd. became Starwin Products Limited in 1990, and Dumex Ltd. became Dannex Ltd., 60% owned by Ghanaian capital. NAMCO was also bought by a Ghanaian pharmacist, as was Major & Co. Pharco was acquired in 1995 by Kama Industries Ltd., a Ghanaian drug import and retail company, which kept the production activity until 2015 before selling it to the South African group, Aspen pharmaceuticals. Kinapharma was founded in 1991 as a drug importer and distributor and started producing drugs in 1998 after buying a former pharmaceutical factory in Accra. Likewise, Ernest Chemists, created in 1986, started its industrial activities in the early 2000s in Tema. In the early 1990s, Ayrton was saved from bankruptcy with the help of British capital.

In 1998, the Ghanaian State company GIHOC, the only one without any commercial activities outside of production, was bought by the US firm Phyto-Riker to become Phyto-Riker Pharmaceuticals Ltd. The Ghanaian government nevertheless retained a 10% stake. In addition to generic production, Phyto-Riker Pharmaceuticals Ltd. began manufacturing a traditional herbal medicine right after its acquisition in 1999 (Missodey and Arhinful, 2022).

The trajectory of Ghana thus highlights the major role played by postcolonial ISI policies to develop a sustainable industrial base, qualified manpower, and technological know-how (Simonetti et al., 2015).

2.1.5. Shifting from implementer to regulator: the return of the Ghanaian State in the light of global health

From the mid-1990s onwards the Ghanaian government also supported the recovery of industrial investment, but its action remained marginal in comparison to the ISI policies of the 1960s to attract foreign capital. In the 1990s, policies mainly consisted in improving market conditions for local firms through a list of fourteen medicines prohibited for import and reserved for local production, including paracetamol, ampicillin and aspirin, as well as a 20% discount on prices for locally produced medicines for public tenders. Fiscal advantages were also granted to local producers, such as tax exemptions on imported raw materials, machines, and equipment needed to manufacture finished products (compared to 10% import taxes on finished products), and simplified registration at the Ghana-FDA. This is known as the fast-track procedure, reserved for locally made medicines and medicines serving the interests of public health. It consists in a quicker dossier review (no more than 90 days), lower fees, and longer marketing authorization periods than for imported drugs. In 2015, strong advocacy by the PMAG representing local manufacturers' interests, led the government of Ghana to pass a VAT exemption law allowing locally produced medicines to be sold tax free and therefore cheaper, in order to be more competitive compared to imports (Republic of Ghana, 2015).

The main difference with the 1960s is the part that administrative regulation is now playing. As a monopoly of the State and its national regulatory authorities, administrative regulation relies on legal and administrative tools (Gaudillière and Hess, 2013). It is the most traditional way of regulating drugs and the most studied form of regulation, which has been analysed mainly through comparisons of national frameworks, mostly in developed countries (Hauray, 2006). What I have defined above as the *ghanaianization* of the industrial pharmaceutical sector came with an in-depth reform of pharmaceutical regulation in Ghana and the creation of new tools for the State to control the market and the circulation of pharmaceuticals and prices. Besides the need to monitor and support increased local production, Ghana's national regulatory authority had to deal with more generics coming in from Asia during the 1990s, that needed quality controls before registration. The Pharmacy Board was disbanded and was replaced by the Pharmacy Council in 1994 and the Food and Drugs Board (FDB) in 1997. The Pharmacy Council's mission was to control the practice of pharmacy and the registration of pharmacists and licensed chemical sellers. That of the FDB was to control pharmaceutical manufacturing, imports, exports, distribution, use, and advertising. In October 2012, the FDB became the Food and Drugs Authority (FDA) with greater autonomy from the

government. This reform contributed to strengthening the national regulatory authority with human resources (the FDA counts more than 50 pharmacists), tools and skills to ensure the safety and the quality of the medicines distributed.

The pharmaceutical industry is indeed one of the most regulated sectors in the world and manufacturers are under constant pressure to bring their production facilities up to good manufacturing practice (GMP) standards, and to maintain them. Part of FDA-Ghana’s role is to make sure that Ghanaian firms are compliant with these standards to ensure the quality of a medicine at each step of its production. To do so, from 2013 the FDA-Ghana developed a roadmap to guide local companies in their process of GMP compliance. In 2015, the United Nations Industrial Development Organization (UNIDO) joined the roadmap by providing mainly technical assistance through audits. The British Department for International Development has also been supporting the FDA-Ghana by providing human resources training.

My data show, however, that until recently none of the manufacturing plants in Ghana were GMP compliant. Upgrading requires huge financial and building investments by companies, estimated at ten million dollars per firm (WHO, 2013). For instance, Ghanaian owners of old factories dating back to the 1960s cannot rely on existing structures and must consider building brand new factories. Local firms also have to deal with another challenge linked to the financial sector in Ghana, which is not developed enough to provide access to affordable capital (West and Banda, 2015). Ghanaian banks offer only very short-term loans, for small amounts, at exorbitant rates. There are no international donors to support local drug production in Africa and international programmes in this area offer technical assistance only through training and audits.

The government of Ghana has made some attempt to provide financial support. In 2015, the former President of the Republic of Ghana announced a 51-million Cedi stimulus package for the industrial pharmaceutical sector in the form of loans, with part of the interest paid by the State. Entrance Pharmaceuticals and Kinapharma were the two projects selected but they never received the money. PMAG had at the time denounced the government’s lack of political will to support the pharmaceutical sector, and the priority it gave instead to cocoa, minerals and oil. Faced with this disengagement, the CEO of Danadams explored numerous financing opportunities for the construction of a new plant, including with the African Development Bank and Proparco, a subsidiary of the French Development Agency. In 2016, after all these attempts had failed, he finally decided to seek private US investors for his project. LaGray, which was the most technologically advanced firm, went bankrupt in 2016 for lack of sufficient capital and political support.

Besides meeting the quality requirements of the FDA Ghana, this upgrading is also essential if Ghanaian firms are to explore new markets on a global scale. From 2000 onwards, African States such as Ghana have had to deal with international health partners who supply medicines for infectious diseases such as HIV, tuberculosis and malaria. Ghana depends entirely on the support of international health partners, such the Global Fund for the distribution of antimalarial treatment in the public sector. Funding is contingent on the purchase of quality drugs certified by the WHO prequalification – a certification that Ghanaian firms do not benefit from due to a lack of resources. This means that they are left on the fringes of the subsidized public markets in their own country and more broadly. In addition to GMP standards, WHO Prequalification requires bioequivalence studies to guarantee a generic’s similarity with the reference medicine. These studies are however extremely costly and have to be conducted overseas. This is why the Ghanaian government provided technical assistance for the creation of a regional bioequivalence (BE) centre in Accra, so that Ghanaian companies could conduct these studies locally at a lower cost. Unfortunately, due to lack of funding, the centre has never been operational, to this day.

By making their financial aid contingent on the purchase of WHO-prequalified medicines, the Global Health initiatives have spread norms and standards that favour multinational companies and major

generics producers exporting drugs to Global South countries, rather than local industries. Had they supported the latter, they would instead have helped to guarantee the quality of their production and the autonomy of the countries concerned. In addition to guaranteeing the quality of drugs, WHO Prequalification thus has a strong influence on the circulation and distribution of medicines in Global South countries. It acts as a barrier to entry to public subsidized markets and contributes to a hierarchy of generic manufacturers and markets. Moreover, international donors buy from the lowest bidder and therefore prefer the cheapest drugs. In the face of competition from very cheap quality assured Indian generics, more expensive and non-quality-assured drugs produced in Ghana cannot compete. This is how global health distribution policies are reinforcing the strong competition that Ghanaian manufacturers already face from Western and Asian industries, and that undermine attempts by the Government of Ghana to support local production of medicines (Pourraz et al., 2022).

To conclude, Ghanaian firms are still technologically limited. Only very few new production units have been built from scratch in Ghana since 2000, with Indian and Chinese technical assistance. The last one, Entrance, which started operating in 2015, was built in Accra with Indian technological assistance. My interviews showed that industries in Ghana are mainly engaged in formulation, that is, the conversion of bulk substances (imported active ingredients and excipients) into finished products and packaging, which requires only basic technological capabilities. They lack industrial pharmacists due to the poor training provision in Ghana, which is heavily oriented towards clinical pharmacy. As a result, Ghanaian manufacturers do not have the internal capacity to conduct research and development activities to discover molecules, develop new products, or manufacture active ingredients. Moreover, these companies have no public research laboratories with which to collaborate, unlike Big Pharma, which operates with high investments in R&D and alliances with public universities. A few companies do nevertheless stand out, such as Danadams – a joint venture created in 2004 between the Ghanaian retailer Danpong Pharmaceuticals and Adams Pharmaceutical Company Limited, a Chinese pharmaceutical group producing antiretroviral drugs for HIV.

As I have shown in a previous article (Pourraz, 2019), global health distribution policies and their conditions imposed on the Ghanaian State are one example of the many challenges local firms have to face to keep producing medicines. Therefore, to help local firms to face competition from the globalized generics market and to reduce dependence on drug imports, the Government of Ghana has joined regional initiatives, including the creation of a West African common market, to facilitate the regional circulation of locally produced medicines. The population of each of the West African countries is small, and market scale is a key factor in the profitability of pharmaceutical industries and their competitiveness. It therefore makes sense to create a regional space that will help generate sufficient economic interest and confidence for investment (West and Banda, 2015). But this will be possible only once the harmonization of regulatory frameworks in the fifteen ECOWAS member States has been accomplished. This harmonization process, initiated in 2015, is still ongoing today. Thus, where the government of Ghana failed to mobilize the necessary investments to reinforce and upgrade local capacities, regional pharmaceutical policy could benefit Ghanaian local industries.

Table 1 shows how policies, pharmaceutical industries and political regimes evolved over time (Table 1).

Year	National political context	Pharmaceutical regulation	Pharmaceutical industries (origin of capital)
1957	Colonial rules		Major & Co (UK)
1958	Kwame Nkrumah first independant government		Ghana Lab.LTD (Ghana, South Africa)
1959			Pharco Lab.(UK, Ghana, Germany)

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Year	National political context	Pharmaceutical regulation	Pharmaceutical industries (origin of capital)
1960		Pharmacy and Poison Board (colonial rules heritage)	J.L Morrison & Sons (UK)
1961		Pharmacy and Drugs Act, creation of the Pharmacy Board in charge of regulating pharmacists and medical products	Sterling Products Ltd (USA) Kingsway Chemists (repackaging) (UK) NAMCO (Ghana, Netherlands) Dumex Limited (Denemark) Ayrton (Ghana) Ghana Drug House Production Ltd. (GDHLP) (Ghana) GIHOC (Hungary Republic and Governement of Ghana)
1964			
1965			
1966			
1967	Military regime		
1970			Intravenous Infusions Ltd (Ghana)
1983			Letap (India)
1989			M&G Pharmaceuticals (India, Ghana)
1990			Sterling devient Starwin Products Limited (Ghana)
1992		Adoption of the Food and Drugs Law to control medical products	
1996		Adoption of the Pharmacy Act leading to the creation of the Pharmacy Council for the regulation of the pharmacist profession	
1997		Creation of the Food and Drugs Board- FDB following the adoption of the Food and Drugs Law in 1992	
1998			GIHOC-Phyto Riker (USA, privatisation of GIHOC) Kinapharma (Ghana) Eskay Therapeutics Ltd (India) Ernest Chemists (Ghana)
2000			
2004	Back of democracy		Danadams (Ghana-China)
2005			Pharmanova Limited (India)
2007			LaGray (Ghana)
2009			KAMA Industries Ltd (Ghana)
2010			Unichem Industries Limited (India)
2012			

(continued on next column)

(continued)

Year	National political context	Pharmaceutical regulation	Pharmaceutical industries (origin of capital)
		The Public Health Act transforming the FDB into the Food and Drugs Authority-FDA	
2015			Entrance-Tobinco (Ghana) Kama Industries Limited is bought by ASPEN (South Africa) Bankrupt of LaGray

2.2. Conclusion: challenges to local production in africa in light of the COVID-19 crisis

In this paper I have looked at Ghana’s policies to promote local drug production, from independence to the present. I have shown how the State, its forms of intervention and its tools have been shaped over the years by international events and various crises. After independence from colonial rule, the Ghanaian State adopted a planning strategy, consisting of development plans, import controls, protectionist measures, and the use of multinationals to establish a local production base. This allowed it to develop a sustainable industrial base that is still in operation to this day. That early post-independence period was followed by the global debt crisis due to the two oil shocks and the implementation of SAP on the African continent, which contributed to the liberalization of the economy and the shrinking of the State’s role. Multinationals that could no longer benefit from protectionist measures fled Ghana and abandoned their local production units. From the mid-1990s to the current period, we have witnessed a return of the State (Eboko, 2021), but unlike the post-colonial State, its forms and scope of action have narrowed. From a planning State, it became a regulatory State with the establishment of the FDA-Ghana, increased control of circulation and markets, and greater cooperation with local private industries to guarantee the quality of medicines made in Ghana. However, like many African States, the government relies heavily on import subsidies for the provision of drugs to treat HIV, tuberculosis and malaria, the greatest public health concerns. The availability of these drugs is conditional on WHO prequalification, but as I have shown, none of the local firms has this certification. This leaves them out of the very lucrative markets for drugs subsidized by international donors. Faced with this global health regulation, the Ghanaian State has very little leeway to support local firms to enter the global market and decrease the country’s dependency on imports. This has proved to be very problematic in situations of shortages such as those experienced over the last two years.

While Ghana has been manufacturing medicines since 1957, the COVID-19 crisis put local production on the political agenda. To reduce its dependency on medicine imports, as announced by the Ghanaian president in March 2020, the government has to take serious steps to align industrial and public health policies, and to support Ghanaian pharmaceutical firms to deal with numerous challenges. The most critical is their limited access to affordable capital, to markets – due to the lack of regulatory harmonization –, to academic partnerships, to technologies such as the bioequivalence Centre and to qualified industrial pharmacists (Cassier and Baxerres, 2022). One way for Ghana to achieved this would be to join and participate in a common regional space to counter foreign competition, encourage investments at a larger scale, gather human and technical resources to create regional hubs, and restore the value of locally produced medicines and medical products by offering them a larger market and benefits from economies of scale. The

creation of regional vaccine production platforms, as South Africa could do, is part of this idea of pooling production capacities and technical skills to reduce dependence on Northern manufacturers. This solution appears urgent, given the lack of access to COVID-19 vaccines from which African populations suffer.

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Data availability

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