Economic Complexity and Employment

for Women and Youth:

The Case of Ghana

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List of Acronyms

1D1F	One-District One-Factory
ACEP	African Centre for Energy Policy
AGI	Association of Ghana Industries
BAF	Business Assistance Fund
CNBM	China National Building Material International
CSIR	Council for Scientific and Industrial Research
CWIQ	Core Welfare Indicators Questionnaire
ERP	Economic Recovery Programme
EU	European Union
GDP	Gross Domestic Product
GIPC	Ghana Investment Promotion Centre
GLSS	Ghana Living Standards Survey
GSE	Ghana Stock Exchange
ICT	Information and Communication Technology
IDC	Industrial Development Corporation
IMF	International Monetary Fund
ISI	Import Substitution Industries
ISSP	Industrial Sector Support Programme
LIFO	Last-In-First-Out
NBSSI	National Board for Small-Scale Industries
NEET	Not in Employment Education and Training
PCI	Product Complexity Index
PSIs	Presidential Special Initiatives
SMEs	Small and medium scale enterprises
SSA	Sub-Saharan Africa
UAE	United Arab Emirates

Section 1: Introduction

1.1 Background and issues

Ghana's growth performance can appropriately be analysed within three distinct periods: 1960-1983, 1984-2006, and 2007-2017. The country's growth performance prior to 1984 can best be described as erratic with negative growth in six out of 24 turbulent years. Most of the years of negative growth coincided with a period of intense political instability and external shocks (Alagidede et al., 2013). After experiencing its first coup d'état in 1966, the country recorded four[1] other successful military takeovers prior to 1983, and each of these regimes witnessed abandonment of policies and projects pursued by their predecessors. Agriculture was the country's major economic activity, accounting for over 60% of GDP and constituted the main foreign exchange earner through cocoa exports. The major thrust of the country's policies, particularly within the first decade after independence and in most part of the 1970s, was inward looking and public sector led economic strategy. Essentially, the economic policy of Ghana after independence was dominated inter alia by the promotion of import substitution industrialisation (ISI), backed by administrative control[2] aimed at greater employment and potential for self-sustained growth. The negative economic growth performance in the 1970s was linked to poor response to the oil price shocks from 1973, as Ghana could not access the international capital markets to bridge the fiscal and Balance of Payments gap (Alagidede et al., 2013). The country's economic woes over the period were deepened on account of serious drought that hit in the early 1980s, coupled with the repatriation of over one million Ghanaians from Nigeria.

In search of solutions to the country's economic challenges, the government bought into the Breton Wood's liberal and export led economic strategy in April 1983, with the private sector as the engine of economic activity. This was a swift paradigm shift in economic policy from the control and inward-looking strategy, with a strongly positive response of 8.6% growth in 1984. This has continued since then with an average annual growth of about 5.0% over the 1984-2006 period. The manufacturing sector picked up strongly from negative growth in the early 1980s, to hit about a 10.0% growth rate over 1984-1990. The growth of the manufacturing sector however slowed down from the mid-1990s, as a result of high cost of credit, and rapid depreciation of the domestic currency, which tends to affect costs of imported input and creates an inability to compete with rising imported manufactured products. The export oriented economic strategy led to some diversification of export commodities to include processed agriculture and timber products.

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[1] Military coup d'états in 1972, 1978 palace coup, 1979 and 1981.
[2] The goods, money and capital, exchange rate and the labour markets were subjected to administrative controls.

In 2006, the country rebased its national accounts, pushing it from a lower income country to a lower middle-income country in 2007. The country also began extraction and export of crude oil in 2011, culminating in 14.0% growth in that year – the highest in the country's history. Ghana's economic growth has been remarkably strong, averaging 6.8% annually since 2006. The high growth performance has however been tainted by the country's limited employment generation effect. Aryeetey and Baah-Boateng (2015) estimated employment elasticity of output of 0.5 over the 1983 to 2013 period, suggesting 0.5% employment growth for every 1% economic growth over the period. This weak employment generation effect has been blamed on the nature of growth. The country's economic growth has been driven largely by high capital but low labour intensive and natural resource-based activities, such as mining and crude oil extraction. At the same time, agriculture and manufacturing, considered to have high labour absorption potential, have performed below par, averaging 3.7% and 3.1% respectively on an annual basis over the same period. The poor performance of agriculture and manufacturing has culminated in their dwindling shares in GDP, from 30.4% and 10.2% respectively in 2006, to 18.9 and 4.6% in 2016. It is worth noting that labour intensive growth activities have been dominated by low productivity activities in informal, urban-based service enterprises. The services sector expanded annually by 8.0% on average, translating into improved contribution of the sector to GDP from 48.8% to 56.9% over the same period.

The shrinking size of agriculture and manufacturing against rising prominence of the services sector is not peculiar to Ghana, as similar patterns have been observed in Sub-Saharan Africa (SSA) and across the globe. Thus, despite Ghana's rapid economic growth, the country's agriculture and manufacturing base needs to facilitate the transformation of the country, to make it competitive in the fast changing and technologically driven global economy. Indeed, the emergence of the so-called "fourth industrial revolution" raises concerns about the future of work for the rising labour force in Ghana, and Africa. In the current fast changing technologically driven economic environment, the adoption of a dynamic economic growth strategy in both agriculture and manufacturing sectors would be a major step towards achieving inclusive growth and improved livelihoods, through the generation of sustainable employment in Ghana.

At the heart of the inclusive growth strategy is the promotion of economic growth with export oriented agriculture and manufacturing as key elements in economic policy. These will promote inclusive growth and generation of productive and sustainable employment, without leaving youth and women behind. This can be achieved within the framework of economic complexity and allied metrics, drawn from the innovative work of Hausmann and Hidalgo (2011). Generally, an economy will generate economic complexity through building of capabilities in the segments of the product space densely populated with many

products, and products closest to those it currently produces (existing capabilities). For example, Ghana currently exports about US$200 million worth of wood logs and other rough wood products, and can take advantage of global trade in other rough wood products such as wood crates, particle board, and wood barrels, which require productive knowledge similar to that already existing in the country. The complexity framework is utilised in this study, to identify manufacturing (including agro-processing units) with structural transformation potential and higher propensities for the generation of quality jobs for young people.

1.2 Objectives of the Study

The main objectives of this study are to:

- Provide a detailed analysis of the degree and extent of economic complexity and product space in Ghana, as a guide for the country to move from low productivity to high productivity, high growth sectors for the generation of sustainable employment opportunities for all, including women and youth;
- Use economic complexity tools to identify products (together with firms that produce these products) close to and within Ghana's existing capabilities;
- Undertake a field survey to generate new evidence on the skills gap, and how this could be a constraining factor for the attainment of inclusive growth and greater labour market participation of women and youth.

1.3 Methodology

The study adopts an analytical framework and empirical tools based on the *Atlas of Economic Complexity* developed by Hausmann et al. (2011). The first part is a desktop study, where we focus on two complementary components of the analytical framework – (i) the analysis of Ghana's economic complexity; (ii) an analysis of the country's product space – to identify potential products for structural transformation. This is followed by an analysis of findings from field surveys, based on interviews with key informants (mostly Human Resource and Operation Managers), to unlock some of the issues identified in the desktop analysis.

1.4 Structure

This report is structured into eight sections, divided into two major parts. Part A covers: The desktop analysis of Ghana's growth path over the years; employment and unemployment; gender and youth dimensions in the Ghanaian labour market; and analysis of economic complexity in Ghana linking it to job creation for women and youth. Part B discusses the findings and observations from the field surveys. Specifically, this section, i.e. Section 1, introduces the report and captures the background, objectives and the methodological approach adopted for the study. Section 2 offers an overview of Ghana's growth path since independence, followed in Section 3 by a discussion of job creation and the structure of employment in Ghana, with an emphasis on gender and youth dimensions

of employment and unemployment. Section 4 outlines Ghana's industrial policy since independence. A detailed analysis of Ghana's economic complexity, and identification and selection of products for economic transformation, are carried out in Section 5. This is followed by Section 6, which examines the linkages between economic complexity and employment generation, as the last section in Part A. Part B begins with the discussion and analysis of the findings from the field surveys in Section 7, followed by conclusions and policy recommendations in Section 8.

Part A

Section 2: Ghana's Growth Patterns and Structure of the Economy Since Independence in 1957

2.1 Patterns of Economic Growth

Ghana was the first African country south of the Sahara to attain independence from British colonial rule, in 1957. At the time of independence, the country was the largest producer and exporter of cocoa globally, and accounted for at least 10% of the world's gold exports, with substantial foreign exchange reserves. The country could boast about its well-trained and skilled workers, and had a relatively better infrastructure base. Indeed, Ghana's per capita income put it in the middle-income category, comparable with that of South Korea. However, by the mid-1960s, growth had dropped to a low of –4.3% in 1966 (Figure 1) – the year the country experienced its first military coup d'état. Ghana's abysmal and erratic growth performance continued throughout the 1970s and early 1980s, with an average annual growth of 0.29%, between 1966 and 1983.

Figure 1   Growth and structure of the Ghanaian economy (%)
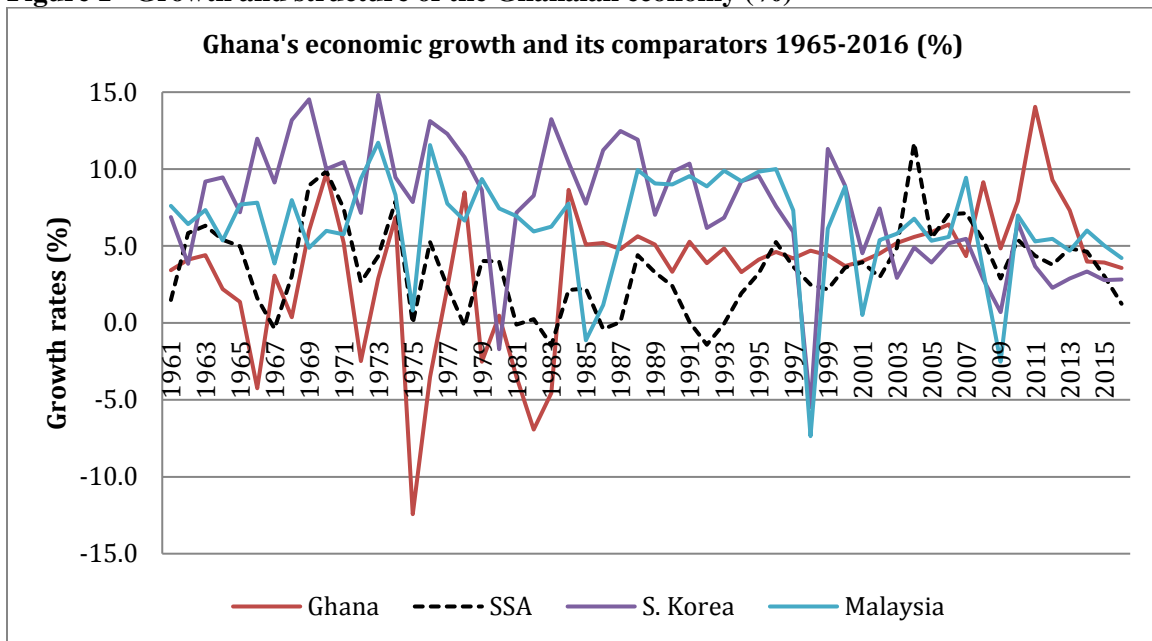
Source: Computed from National Accounts, Ghana Statistical Service & WDI of the World Bank

Essentially, Ghana's growth performance was inferior to that of Malaysia and South Korea, countries that also attained political independence around the same time as Ghana. The country's average economic growth of 3.6% over 56 years (1961-2016) is less than half of the average growth South Korea (7.5%), and a little over half of the average growth of Malaysia (6.3%). Ghana's inferior growth performance relative to that of South Korea and Malaysia can be traced back to Ghana's mostly negative growth in the late 1970s and early 1980s, as well the coup d'état years. Ghana recovered strongly from economic recession

in 1984, on account of the implementation of Breton Wood sponsored economic reform that was characterised by a shift from a state dominated and state controlled economic regime, to a private sector-led and liberalised economic regime. Growth has remained strong and positive since that period, averaging 5.5% over 33 years (i.e. 1984-2016) compared to 6.2% for South Korea and 5.8% for Malaysia over the same period.

Ghana attained lower middle-income country status after rebasing its National Accounts in 2006, pushing per capita gross domestic product (GDP) of the country to US$1,099 in 2007. The 1993 rebase of the national accounts excluded a number of vital economic activities such as telecommunication and forestry. The 2006 rebasing enabled the national accounts to capture a rapid growing telecommunication sector, and adopt improved methodology and new classification of industries. The country's economic growth performance has been quite strong over the last decade, averaging 6.8% between 2006 and 2016. The growth rate reached its peak at 14% in 2011, on the back of the commencement of commercial oil production, making Ghana one of the fastest growing economies across the globe during that year. Despite this, growth has continuously slowed down since 2011, although Ghana's growth has largely been faster than the Sub-Saharan African (SSA) average (see Figure 1).

2.2 Structure of the Economy

The Ghanaian economy is services-dominated, with 56.8% of national output emanating from the services sector. Agriculture is the lowest contributor to GDP. A rebase of the national accounts at 2006 constant prices, culminated in a shift from agricultural dominance of national output to services[3] – with industry remaining the lowest contributor to GDP, reflecting the reality of economic activity. The change in the relative sectoral share of GDP is a result of change in the methodology, which incorporated new data sources and improvement of existing data sources. For example, an improved measure and data on telecommunication activity to account for mobile telecommunication and internet activity, boosted the contribution of service to GDP.

The services sector continues to sustain its dominance, rising from 48.8% in 2006 to 57.7% in 2017. This indicates that the rising share of services in GDP goes beyond the rebasing of the national accounts (see Figure 2). Strong growth in information and communication, financial intermediation, and trade, constitute the driving force in the growing size of the services sector. In contrast, agriculture continues to decline in size, reaching its lowest point of 17.6% of GDP in 2017. The poor show of agriculture has been linked to the continued reliance on rain-fed agriculture, and limited modernisation (including

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[3] The share of agriculture and industry in GDP dropped from 38.8% and 28.3% respectively based on the old series (i.e. 1993 series), to 30.4% and 20.8% (new series) in 2006; while that of the service sector appreciated from 32.9% (old series), to 48.8% (new series) in the same year.

mechanisation of farming) of agricultural practices – thus accounting for the dominance of peasant farming with limited large-scale agricultural activities.

Figure 2   Structure of the Ghanaian Economy 1965-2017
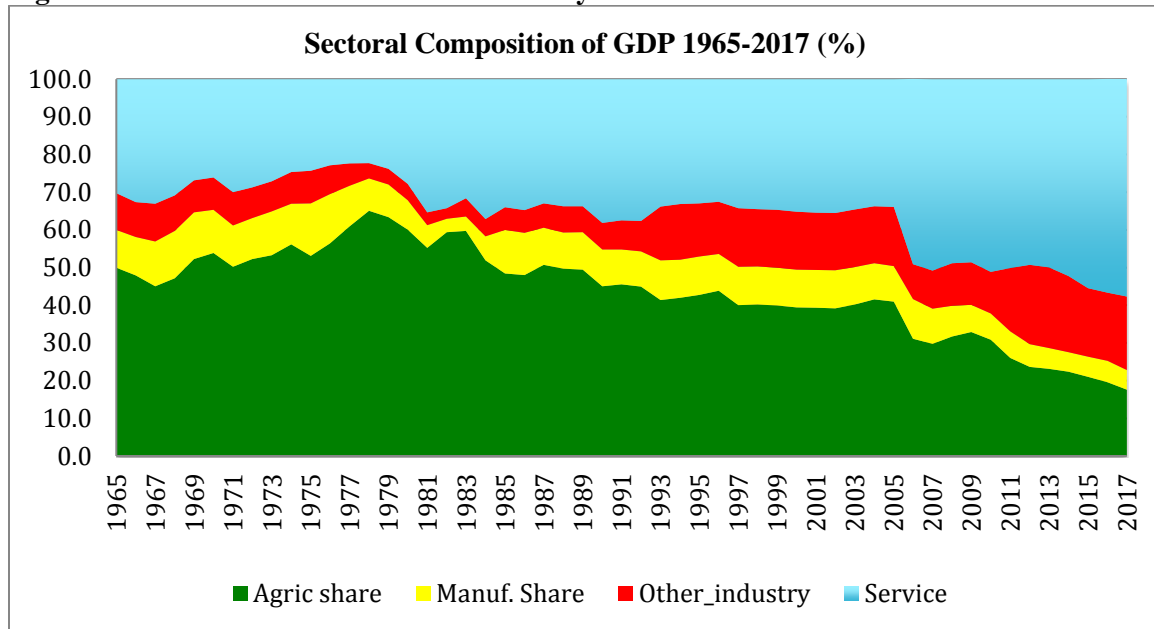
Source: Computed from National Accounts, Ghana Statistical Service & WDI of the World Bank

The share of the industrial sector in GDP continued to decline from the 2006 figure of 20.8%, to 19.1% in 2010, before rising sharply to 25.6% in 2011, as a result of the commencement of commercial production of crude oil. This shot the industrial sector's growth to 41.6%. The industrial sector in 2017 accounted for 24.7% of GDP, dominated by construction activities, which account for 56.6% of total industrial output. The last decade has seen a dwindling manufacturing share in GDP, a characteristic that was also observed prior to the rebase exercise. After recovering in 1984 with a growth rate of 12.9%, the share of manufacturing in GDP rose from 6.4% in 1983 to 11.5%, and remained virtually at about 10% until the early years of the millennium in 2003, when it began to fall to 9.5% in 2005. The rebase exercise pushed manufacturing's share up to 10.5% in 2006, but its share then continuously dropped, standing at 5.2% in 2017. Over the last two decades, the manufacturing sector has been constrained by high lending rates, rapid exchange rates with implications for high costs of imported raw materials and machinery, infrastructural bottlenecks, and over liberalisation of external trade, leading to an influx of competing imported commodities, particularly from China.

Ghana's manufacturing was comparable to that of Malaysia in the early 1960s (Figure 3) but lost out particularly in the 1970s as a result of political instability, domestic economic mismanagement (characterised by an inward looking and State controlled economic strategy), as well as adverse external pressures. The recovery in the mid 1980s was not

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enough to catch up with Malaysia, and the gap continued to widen even when the size of Malaysian manufacturing began to shrink in the early years of the new millennium. The size of Ghana's manufacturing has, over the years, been lower than Sub-Saharan Africa (SSA), indicative of the poor performance of manufacturing in Ghana.

Figure 3   Manufacturing share in GDP of Ghana and comparator countries
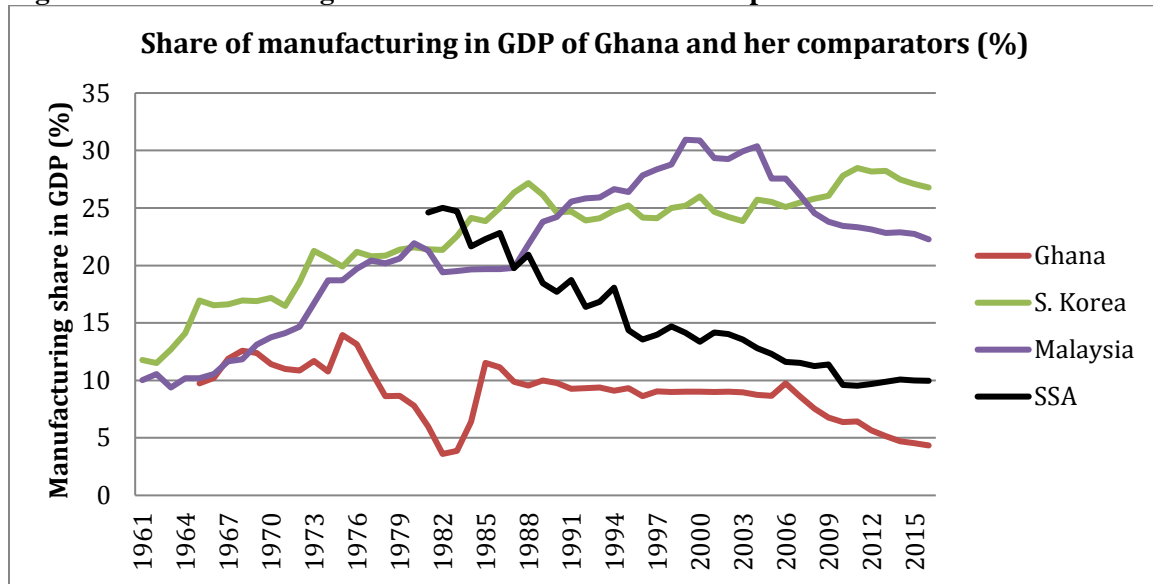
Source: Constructed from the World Development Indicators 2018, World Bank

Essentially, the shift of economic activities from agriculture to services, and a decline in manufacturing performance in GDP, has implications for sustainable employment generation. These sectors are known to have relatively high labour absorption capacity, and a boost in agriculture and manufacturing through proper and appropriate linkages could address the employment generation challenges of the country. The application of a new approach in identifying specific high-value products not distant from Ghana's productive structure, for employment generation, is discussed in the sections that follow.

2.3 Overview of Exports in Ghana

Ghana's export performance in aggregate terms falls short of that of Malaysia but is comparable with South Korea and hovers around the SSA average, particularly since the mid 1980s (Figure 4). The share of Ghana's export in GDP over the 1986-2016 period averaged 30.9%, compared with 31.1% for SSA, and 36.9% and 91.2% for South Korea and Malaysia, respectively. The major difference however, is the varying composition of exports. While South Korean and Malaysian exports are dominated by manufacturing products, Ghana's are dominated by mineral products and cocoa.

Mineral exports account for at least two-fifths (45.8% in 2016) of total export earnings (Table 1). Gold is the major mineral export product, constituting over 97% of total mineral

export earnings with bauxite, manganese and diamonds accounting for the remaining 3%. Cocoa is the second single largest export commodity, contributing about one-fifth to total export earnings. Ghana is the second largest producer and exporter of cocoa globally, after Cote d'Ivoire. Cocoa exports are primarily made up of cocoa beans, which account for three-quarters of the total value: essentially, Ghana processes less than a quarter of processed cocoa, suggesting that the majority of cocoa output is exported as raw materials.

Figure 4   Ghana's exports share in GDP against its comparators 1960-2016 (%)
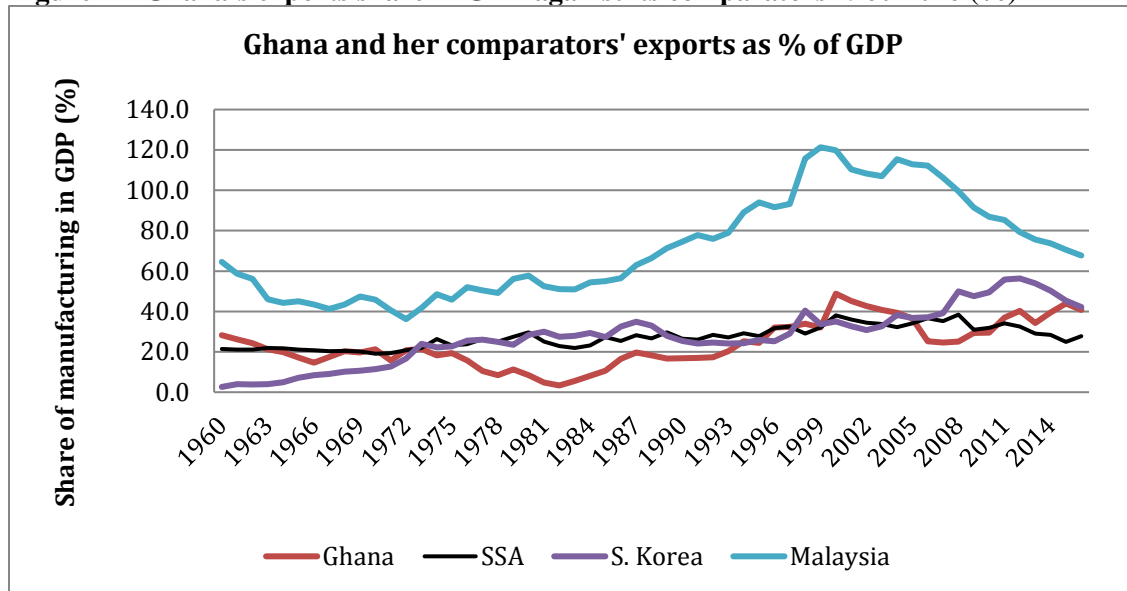
Source: Constructed from the World Development Indicators 2018, World Bank

Export of timber logs constitutes a very small proportion (less than 3%) of total export earnings. Other merchandise otherwise referred to as non-traditional exports, constitute about a third of total export value. This includes agricultural products (particularly food crops), handicrafts, and processed/semi-processed products. The top five agricultural products within the non-traditional export category are: cashew nuts, bananas, medicinal plants and parts, fresh or chilled tuna, and shea nuts. Processed and semi-processed export products from Ghana comprise mainly cocoa paste, articles and plastic, canned tuna, lubricating oil, and medicaments. Handicrafts are dominated by hides and skins, basket ware, batik/tie and dye (i.e. locally printed garments), ceramic products and *kente* products (special woven cloth particular to Ghana). The composition of Ghana's exports provides a foundation for analysing and identifying the product space, and frontier products for the country, within the framework of economic complexity analysis.

The major destinations of Ghana's export products are outside Africa, with only one African country, Burkina Faso, listed among the top 10 destinations. This suggests weak regional trade. Switzerland is Ghana's top export destination, followed by (in order) India, the United Arab Emirates (UAE), China P. R, the Netherlands, and Burkina Faso. Four

countries – Italy, Belgium, the United States and France – complete Ghana's list of top 10 export destinations.

Table 1: Merchandise Exports by major products (in billion US$)

Product	2012	2013	2014	2015	2016
Minerals – Value in billion of US$	5.77	5.14	4.52	3.32	5.06
– % Contribution	*42.6%*	*37.4%*	*34.8%*	*39.9%*	*45.8%*
Cocoa – Value in billion of US$	2.83	2.27	2.38	2.76	2.57
– % Contribution	*20.9%*	*16.5%*	*18.4%*	*33.2%*	*23.2%*
Timber – Value in billion of US$	0.13	0.17	0.18	0.20	0.25
– % Contribution	*1.0%*	*1.2%*	*1.4%*	*2.4%*	*2.3%*
Other exports – Value in billion of US$	4.82	6.18	5.90	4.07	3.17
– % Contribution	*35.6%*	*45.0%*	*45.5%*	*39.3%*	*28.7%*
Total – Value in billion of US$	13.55	13.75	12.98	10.36	11.06

Source: *Bank of Ghana*

In conclusion, Ghana's service-led economy and natural resource based exports with a low manufacturing base presents some potential risk in terms of resistance to external shocks, macroeconomic stability, and the creation of quality jobs. Even though there has been a structural shift of the Ghanaian economy from agricultural dominance to service-led, the country's export composition remained unchanged until 2011 when crude oil exports entered the equation. There has not been significant change in Ghana's export composition since independence. The country's exports continue to be dominated by cocoa, and gold, and recently crude oil, with very limited manufactured exports. The reliance on the export of natural resources exposes the country to risk, and makes it vulnerable to external shocks on account of unstable external market prices of these commodities. This is evident in the unstable foreign exchange market, particularly in periods of low gold and cocoa prices on the international market.

Section 3: Ghana's Industrial Policy

At the turn of independence, Ghana embarked on ambitious industrialization. Policies pursued in this era under the leadership of Kwame Nkrumah focused on putting the new nation state on a path of rapid structural transformation. This culminated in extensive government involvement in economic activities, particularly during the first decade until the overthrow of the government through a military coup d'état in 1966. Over the past three-and-half decades, Ghana has been pursuing a private sector-led strategy in a liberalised external trade framework. In this section, we look at Ghana's industrial policy in the context of the change in approach towards industrialization, and examine the critical junctures that facilitated this transition. We finally consider the current industrial policy and programme together with other initiatives and support schemes targeting enhancement of industrial development.

3.1 Past Industrial Policies 1957-2008

Ghana's economy has witnessed some structural change, though not the kind that provides the impetus for sustainable economic development. After independence, Ghana tried to modernize its economy by turning its productive structure from agrarian to an industrialised status at a faster pace. The Nobel laureate Arthur Lewis was tasked in this regard to make prepositions for industrial take off. His recommendations informed the formulation and implementation of the first and second development plans in the first decade after independence. Many manufacturing units were established for the purpose of replacing imported products and making the new independent nation "economically independent". Strategies adopted included the Import Substitution Industry (ISI), that targeted products that could be produced locally. Implementation of these plans also saw the development of industrial zones in the capital city and other major cities in the country: Takoradi, Tema (the industrial port city), and Kumasi, where social infrastructure was put in place to provide support services for newly established enterprises – most of which were state-owned. Several products were to be manufactured, especially in phase two of the development plan: bicycle assembly, steel tanks, footwear, and many others. This state-led industrial strategy facilitated by the Industrial Development Corporation (IDC) was however fraught with many challenges: inadequate capital, lack of competent managerial expertise, difficulty in securing the needed raw materials, and the ambitious nature of some of the projects. According to Asamoah (1996), with the exception of drugs, all products (cars, radios, spirits, etc.) were largely upper and middle class consumption items, which are a luxury at the infant stage of the industrialization of a country.

Following the overthrow of the Nkrumah government, the plans formulated thereafter sought to reduce state involvement in the industrial sector. The civilian government that took over through general election from the military government in 1969, emphasised

private sector-led industrialization with a limited role for the state. An overthrow of this new civilian government through another military coup d'état in 1972, reversed the private sector-led industrial strategy and promoted industrial development mirroring the industrial policies under Nkrumah. Compared to the 1960s, little was seen of comprehensive industrial plans aimed at stimulating industrial activities from the mid-1970s to the early-80s. This transcended into most of the 1980s. The late 1970s and 80s was a challenging period for Ghana's economy due to exchange rate difficulties, high inflation, and a shortage of essential commodities. Macroeconomic fundamentals were thrown out of gear, and reform became imminent.

The economic difficulties the country went through up to the early 1980s compelled the then military government under the leadership of Jerry John Rawlings, to run to the IMF and the World Bank in 1983 for support. This culminated in a drastic shift of economic management to a pro-market reform strategy under the Economic Reform Programme (ERP) and Structural Adjustment Programme (SAP). Conditions associated with the ERP and SAP included the removal of subsidies; liberalisation of trade, the exchange rate and financial markets; and privatisation of state-owned enterprises (SOEs) – many of which were established by the Nkrumah regime. Manufacturing in particular, and the industrial sector as a whole, showed some impressive performance during and after the period of the reform. Within the first five years of the implementation of the programmes (1984-1988), there was an average annual industrial sector growth rate of 11.2% – a sharp reversal of the -12.49% experienced in the three years before the recovery programme (Ackah, Adjasi, & Turkson, 2014). From 1989, the growth rate of industry was poor, as the manufacturing sub-sector had to contend with stiff competition following the trade liberalization emphasized at that time, the removal of import licenses in 1990 (Baah-Nuakoh, 1999), and rapid depreciation of the local currency.

To create the enabling environment for the private sector in the ERP era and thereafter, governmental and quasi-governmental agencies were established with the support of bilateral/multilateral institutions. This included the Ghana Stock Exchange (GSE) in 1989, the Business Assistance Fund (BAF) in 1995, the National Board for Small-Scale Industries (NBSSI), and Ghana Investment Promotion Centre (GIPC) in 1994, as well as a host of others. Another governmental unit, the Ghana Free Zone Board (now Ghana Free Zone Authority) was also established in 1995, to provide the channel for export-led policy through the provision of free zone incentives. The key mandate of the Free Zone Authority is the attraction of foreign direct investment to help diversify exports. These institutions were incorporated to offer support to struggling industries and enhance the operations of small and medium scale enterprises (SMEs), mostly in the private sector.

The reforms from 1983 extending to the 1990s were replicated in various schemes and programmes in the new millennium. The mantra that 'the private sector is the engine of growth' became popular at the beginning of the twenty-first century. In contrast to the heavy state presence in industrialisation in the immediate period after independence, Ghana at the turn of the 21st century adopted private sector-led initiatives geared towards poverty reduction. This had been informed by the Growth and Poverty Reduction Strategies (GPRS I and II). Implementation of these programmes have led to remarkable improvement on the macroeconomic front, though did not have any desired favourable impact on the manufacturing sector.

In 2001, the new government that took over from the Rawlings administration in a peaceful transition from one democratic government to the other, for the first time in the history of the country, coined the slogan "The Golden Age of Business", as indicative of their commitment to the business community. This was reflected in some initiatives pursued to boost business activities through market-oriented policies not too different from the previous administration. Presidential Special Initiatives (PSIs) was commissioned on the following commodities: cassava, garments and textiles, salt, and oil palm. The PSIs' objectives were realized through public private partnerships. For the initiative on cassava, a starch factory (Ayensu Starch Factory) was set up in 2004 to produce industrial starch. While this was commendable, the initiative did not receive the needed commitment. For example, despite the encouragement of farmers to cultivate cassava all over the country, only one starch factory was established. In assessing government policies in the 'Golden Age of Business' era, Arthur (2006) noted that although some progress was made, private sector actors still faced difficulties in many forms: bad social infrastructure, finance, and regulatory problems. In addition, relevant industries and commercial farmers, the major stakeholders, were not actively involved by the state in the initiative's implementation (Whitfield, 2010). In hindsight, the factory that was seen as an essential move subsequently operated below capacity and faced enormous challenges: difficulties in transporting raw cassava from farm gates, and competition posed by other buyers of cassava – particularly market women who offered higher prices (Tonah, 2006). Two years after the factory was commissioned, it became defunct. A similar observation has been documented for the PSI on palm oil. According to Asante (2012), the effective implementation of such programmes depends on key capacities, financial and economic, as well as consensus between and among political elites and administrative agents.

3.2 Ghana's Industrial Policy 2009 – 2017

As the long-term strategic mission of Ghana is to attain middle-income status by 2020, in 2011 an industrial policy was launched to provide options for industry-led structural transformation (Government of Ghana, 2011). Success of this policy, that relied on extensive stakeholder engagement and consultations, was to be judged by: how high the competitiveness of Ghana's manufacturing sector would rise, and in the provision of decent

jobs. Here again, it was greatly stressed and indeed, explicitly stated, that for manufacturers to produce high quality products, government had to provide a conducive environment for the private sector. Implementation of the plan was to be effected by an Industrial Sector Support Programme (ISSP). The main objectives of the policy were to:
- expand productive employment in the manufacturing sector;
- expand technological capacity in the manufacturing sector;
- promote agro-based industrial development; and
- promote spatial distribution of industries in order to achieve reduction in poverty and income inequalities.

The policy recognised the role of the informal sector (the provider of most jobs in Ghana), and made recommendations for the formalisation of operators (small-scale enterprises) to enable them access to credit and other support schemes. One of the strengths of this policy was that it brought to the fore, challenges faced by industry, and identified what government could do to help ameliorate them. These challenges were addressed in four thematic areas in the policy document: 1) Production and distribution; 2) Technology and innovation; 3) Incentives and a regulatory regime; and 4) Cross cutting issues. However, no timelines were given for the objectives of this plan of action to be achieved.

National industrial policies from independence through to the periods thereafter (encompassing both the military regimes and democratic dispensations) have alternated from one government to another. Successive governments have formulated their own policies or programmes that they could be associated with, often resulting in the abandonment of plans initiated by predecessors. It is therefore not surprising that when Ghana went to the polls for elections in 2016, the victors, when ushered into office, put forth a new strategy. Hence, the government of Ghana in 2017 launched a flagship programme, One-District One-Factory (1D1F), aimed at ensuring a countrywide private sector-led industrialization drive (1D1F Handbook, 2017). A secretariat established under the office of the president of Ghana, would oversee the programme's implementation. This programme was to be anchored on the utilization of local resources in making products that have both domestic and global demand. The programme was to create thousands of jobs per district over a ten-year period, and contribute $6 million to Ghana's GDP annually.

The main objectives of this initiative are to:
- increase job creation;
- promote rural income generation through grass-root participation in industrial and commercial activities;
- promote import substitution for currency stability;
- promote income generation for a wide range of producers;
- increase revenues through exports;

- attract and improve profitability of investors; and
- provide necessary incentive to increase yield of domestic output.

The programme would support projects by assisting in securing funds from a minimum of $5,000 to a maximum of $5 million, with credit facilities coming in the form of trade and asset financing. Finance for projects will be from the Government of Ghana (GoG), and international and local investors. In addition to credit support, the secretariat will also match international and local investors, and offer technical assistance services of various forms such as capacity building, coaching, as well as providing network platforms and help with financial planning. In this regard, it was supposed to collaborate with Ghana Exim Bank, GIPC, Municipal and District Assemblies, NBSSI, the Association of Ghana Industries (AGI), and the Council for Scientific and Industrial Research (CSIR).

Table 2 Location of factories for priority commodities under 1D1F

Commodity	Finished Products	Market	Location
Cooking Oils	Palm, Coconut, Sesame, Groundnut, Soy Oils	Local demand	15 factories in Brong Ahafo, Western, Upper West, Ashanti and Volta Regions
Poultry (Meat & Eggs)	Dressed Meat, Live birds, Eggs and Sausage	Local demand	20 Factories in Ashanti, Greater Accra, Central, Eastern and Northern Regions
Rice	Long grain white and Brown rice, rice bran and flour, poultry feed	China and local demand	25 Milling factories in Volta, Eastern, Northern, Upper West, and Ashanti Regions
Glass from silica	Glass for windows	European Union (EU)	3 Factories in Western Region
Nutraceuticals (Herbs & Spices)	Food supplements, alternative and ayurvedic medicines	Local market	18 Factories across the country
Tiles and Bricks	Bricks and tiles for Construction	China and local market	10 Factories in Brong Ahafo, Central, Eastern, and Western Regions
Cashew	Roasted cashew nuts	EU	8 Factories in Brong Ahafo Region

Source: Adapted from the Handbook of Ghana's One-District, One-Factory Initiative

To realize the objectives of the 1D1F, several products across the 10 Administrative Regions of Ghana have been identified. The selection of the products was based on availability of essential raw materials in a given district. About 90% of the identified products are agricultural products and vegetables, implying that if the programme is successful it will pave the way for a strong countrywide agro-processing base. Under the One-District, One-Factory programme, a facility is supposed to be offered by the China

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National Building Material International (CNBM Group) for a China-One District, One-Factory Partnership. This facility intends to give support for the setting up of factories (equipment and machinery), technical management and training, working capital from partner local banks, and guaranteed markets for selected products. Table 2 (adapted from the Handbook of 1D1F initiative) provides priority commodities targeted for development and processing into finished products, as well as places where factories can be sited.

When compared to the broad communities of products to be targeted by the initiative, the list of products in Table 2 are in few product categories: input/raw material production, agro-processing and business, general manufacturing and mineral processing, textile and clothing, ICT, pharmaceutical and cosmetics, waste management and renewal energy, and arts and crafts. Given that international investors are key stakeholders, apart from the mention of the partnership with the Chinese, the programme is silent on role to be played by other investors. The objectives of this initiative may not materialize if it does not receive the required commitment – which usually wanes after programmes have been commissioned with all the fanfare.

3.3 Support and Incentives for Industrialisation Drive

One of the critical inputs for industry is readily available: a stable and cheap source of power. Industries in Ghana have battled with a severe power crisis occurring intermittently over the past three and half decades. The country has experienced severe power rationing in the periods; 1983-1984, 1997-1998, and 2006-2007. This situation became an everyday occurrence from 2012 to 2015 (Kemausuor & Ackom, 2017). The latest episode had a debilitating impact on business operations. The government of Ghana had to institute radical reforms to stabilize the power situation, especially in 2015, resulting in the change in the generation mix from a hydro-dependent supply to that from more thermal plants. In that year, emergency power barges were procured to enable industry to have access to relatively stable – though expensive – power, for them to stay afloat. Power supply has been more reliable since then, but occasionally there is limited power rationing with supply augmented by electricity from Cote d'Ivoire (ACEP, 2016).

Accessing finance is one of the major challenges businesses in Ghana face. A call for government's assistance has often been made. In heeding to this call, the government, through the Export Trade, Agricultural Investment Fund (EDAIF), provided $26 million financial support to six pharmaceutical companies, to boost local production (Press Release from the Office of the President, 2016). Other incentives in the form of Value Added Tax (VAT) exemptions on over a thousand products, and restriction on some products, have been provided to make the pharmaceutical sector competitive. The Ghana Export-Import Bank (Ghana EXIM Bank) established by Act 911 (2016), will serve as an import-export financial hub supporting exporters and investment activities. Apart from facilitating trade,

the Ghana EXIM Bank also has various short, medium and long term financial support schemes (project finance inclusive) to stimulate industrial production.

In summary, Ghana has witnessed a shift in public sector-led industrialisation to a private sector strategy. Since independence, changes in industrial policies have alternated from one government to another. At the moment, the private sector is seen as the engine of growth. Thus, various schemes and programmes have been rolled out to provide essential support, and also to create the enabling environment conducive for creating quality and sustainable jobs for the youth. The current government, in an attempt to solve unemployment and associated challenges among the youth, has launched a 1D1F initiative, which primarily seeks to build a strong agro-based industry throughout the country. Though the initiative targets non agro-based products, they were not highlighted in the list of commodities earmarked for factories.

In Section 5, we look at the economic complexity framework and use its allied analytics to list products that are within the reach of Ghana's capabilities, and can make Ghana's productive processes more sophisticated. Perhaps this may inform the inclusion of other product categories, as the analysis will consider several product ranges. It could be the new approach in the realistic assessment of capabilities of firms, which Owoo and Page (2017) proposed after evaluating Ghana's industrial policies sixty years after independence.

Section 4: Job Creation and Structure of Employment

4.1 Employment generation

Labour market conditions, measured by growth and quality of employment as well as rate of joblessness, are important signs of the health of an economy. Indeed, the labour market is the vehicle through which economic growth translates into improved livelihoods of the citizenry (Baah-Boateng, 2017). Employment generation in Ghana generally lags behind economic growth, such that the employment growth trend lies below economic growth. Indeed, total employment in Ghana rose from 2.6 million in 1960 to about 12.5 million in 2015, representing an approx. 2.9% annual average increase, compared with 3.9% annual average growth of national output over a 56-year period. Faster economic growth relative to employment in the 1960s was reversed during the 1970s until 1984 (Figure 5), on account of the country's poor economic performance, against public sector-led employment creation in the formal sector and increased informal economic activities. While economic growth averaged about 0.95% annually during the period, total employment increased on average by about 4%, with public sector employment surging from 73% of total formal sector employment to 86% (Baah-Boateng & Turkson, 2005).

Figure 5   Trend of growth of employment of GDP, 1960-2015
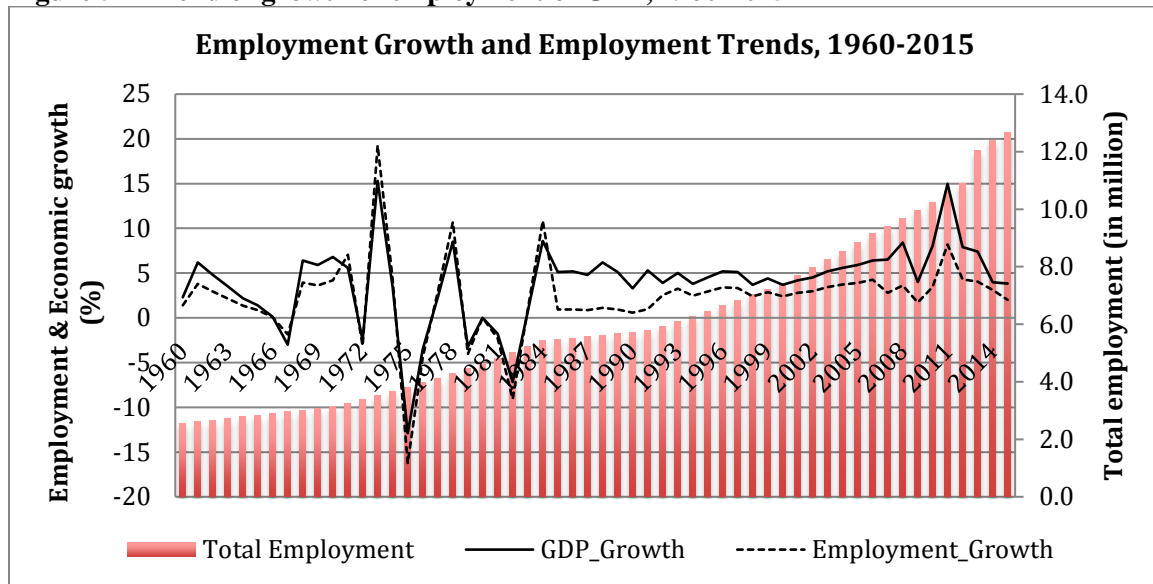
Source: Computed/Constructed from Population Census Reports, GLSS, CWIQ and WDI

The rate of economic growth overtook employment generation again from 1984, largely on account of a reduced government role in direct economic activities within a framework of Breton Woods sponsored economic reform. The GDP-employment growth gap contracted between 1984 and 2000, and began to widen after 2000, signifying faster output growth than employment (Figure 5). This is reflected in a decline in average employment elasticity of output from 0.64 in 1992-96 to 0.52, to 0.4 in 2004-2008 (ILO, 2009b), largely

due to stronger growth in low labour absorption sectors of mining and oil as against weaker growth in high employment generation sectors of agriculture and manufacturing (Baah-Boateng, 2013).

4.2 Structure and Quality of Employment

The changing pattern and structure of employment in the Ghanaian labour market largely reflects the structural change of the Ghanaian economy in recent times. Essentially, the changing distribution of employment by economic sector is directly related to the stages of economic development, such that in the development process, workers are drawn from primary economic activity into secondary, and subsequently to tertiary, employment (Aryeetey & Baah-Boateng, 2016). However, based on the available statistics, this is not the case in Ghana.

Table 3 provides statistics that indicate a shift from agricultural dominance to that of services, that has leapfrogged over industry; specifically manufacturing. This largely mirrors the changing structure of the national economy, as agricultural dominance in national output has given way to services. Employment in agriculture declined from 61.8% in 1960, to 35.9% in 2015, while services' share of employment rose substantially from 23.1% to 45.9% over the same period, to become the largest sectoral contributor to employment in the country. Employment in the industrial sector declined from 15.1% to a low of 10.0% over the period 1960-1992, before rising to 18.2% in 2015. Manufacturing has remained the major source of employment in the industrial sector since 1960, declining from 12.1% in 1970, to 8.2% in 1992, before rising to 13.5% in 2015. The rising share of manufacturing in total employment amidst dwindling manufacturing share in GDP implies a declining labour productivity (measured by output per unit of employment) in the sector.

The shift of employment from agriculture dominance to services may not reflect structural and productive transformation, since the rising services activities mostly occur in the informal sector. This is reflected in the increasing share of informal sector employment: from 83.9% to 86.7%, and declining formal sector employment, between 2000 and 2015. Thus, high pervasiveness of informal economic activities in Ghana is an indication of low quality of employment in terms of level and security of income. Vulnerable employment, which is largely associated with low and unstable income, remains high at 68.7% in 2013 and 2015, from 74.9% in 2000 (Table 2). The numerous problems confronting agriculture, including access to land, limited irrigation facilities, poor access to affordable credit, and lack of market for agricultural produce, have made agriculture unattractive. This has resulted in the migration of agriculture labour, particularly the youth, into urban informal service activity (with no entry barriers). Additionally, the Ghanaian labour force is becoming more educated, and with the continued reliance on backbreaking agricultural practices, the educated labour force tends to shun agriculture.

Table 3: Quantity and Quality of Employment (%)

Economic Sector	1960	1970	1984	1992	1999	2000	2006	2010	2013	2015
Economic Sector										
Agriculture	61.8	57.0	61.1	62.2	55.0	53.1	54.9	41.6	44.7	35.9
Industry	15.1	15.8	12.9	10.0	14.0	15.5	14.2	15.4	14.6	18.2
o/w manufacturing	*9.1*	*12.1*		*8.2*					*9.1*	
			10.9		*11.7*	*10.7*	*11.7*	*10.7*		*13.5*
Service	23.1	27.2	26.0	27.8	31.0	31.5	30.9	43.0	40.9	45.9
Institutional Sector										
Public	---	---	10.2	8.4	6.2	7.2	5.7	6.4	5.9	7.3
Private	---	---	6.0	6.1	7.5	8.9	7.0	7.4	6.1	6.0
Informal	---	---	83.8	85.5	86.3	83.9	87.3	86.2	88.0	86.7
Type of Employment										
Wage employment*	---	22.1	16.2	16.9	13.8	16.0	17.5	18.2	20.2	22.5
Self-employment										
With employees	---	3.2	4.7	4.9	5.0	5.3	4.5	4.9	6.2	5.1
Without employees		59.5	65.0	67.6	63.7	68.2	55.0	55.9	46.4	59.5
Other	---	15.2	14.1	10.6	17.5	10.6	23.0	21.0	27.5	14.2
Quality of employment										
Productive employment	---	22.1	20.9	20.4	19.8	21.2	22.0	23.1	26.3	25.3
Vulnerable employment	---	75.6	77.4	79.5	77.8	74.9	75.4	67.5	68.7	68.7

* includes casual workers

Note: *Vulnerable employment is the sum of self-employment with employees (own account work) and contributory family workers*

Source: *Computed/constructed from Population and Housing Censuses (1960, 1970, 1984, 2000 & 2010), 2003 Core Welfare Indicators Questionnaire (CWIQ), GLSS (3, 4, 5 & 6) datasets, and 2015 Labour Force Survey datasets*

Jobs considered as gainful or productive with relatively high and stable earnings, which mostly occur in the formal sector, account for 25.3% of total employment in 2015. This implies that only one out of every four Ghanaian workers is engaged in productive employment. The level and growth of productive employment[4] has been quite weak, improving by only 4 percentage points from 21.2% in 2000, to 25.3% in 2015, with a corresponding decline in vulnerable employment from 74.9% to 68.7% over the period. Thus, improvement in the quality of employment in Ghana has been quite slow.

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[4] Productive employment implies jobs that earn regular income and enable the worker to withstand or cope with negative income shocks. It comprises wage/regular employment, and self-employment with employees.

4.3 Unemployment

An unemployed person is someone within a given age group (usually 15+), during a reference period (indicated by the actual reference period according to Ghana's labour force data) who has remained jobless, despite being available and actively looking for work. By implication, a jobless individual who is available for work but fails to make the effort to seek work for various reasons cannot be classified as unemployed, rather s/he can only be referred to as a 'discouraged worker'. In addition, an employed person who decides to seek (additional) work can only be termed to be seeking opportunity to moonlight, rather than being unemployed. Joblessness proxied by NEET (Not in Employment, Education or Training), refers to a state where the individual within a specified age bracket and within a specified period of time is not in employment, education, or any form of training. This could also be termed as joblessness outside the school or training system, and accounts for discouraged worker effects.

Figure 6   Unemployment rates for labour force aged 15+
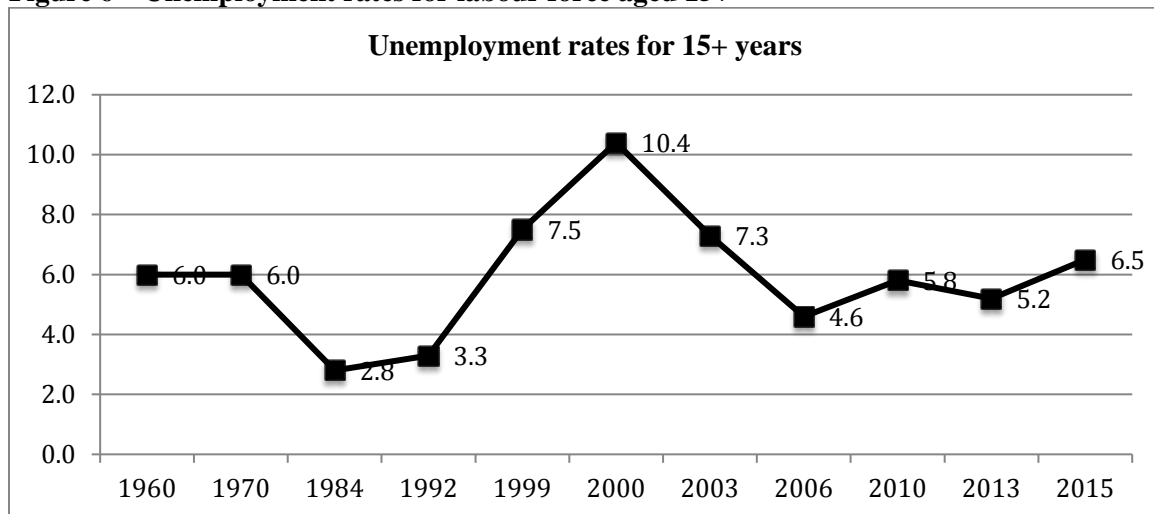
Source: Computed/constructed from Population and Housing Censuses (1960, 1970, 1984, 2000 & 2010), 2003 Core Welfare Indicators Questionnaire (CWIQ), GLSS (3, 4, 5 & 6) datasets and 2015 Labour Force Survey datasets

The overall unemployment rate, which remained at 6.0% in 1960 and 1970, dropped to 2.8% in 1984 (Figure 6), mainly as a result of economic hardship that caused migration of many Ghanaians to Nigeria, Cote d'Ivoire and other neighbouring countries, with the rest engaged in vulnerable economic activities to survive. Surprisingly, the rate accelerated consistently to reach 10.4% in 2000, when the economy had recovered and stabilised on account of economic reform and the structural adjustment programme introduced in the 1980s. This is largely explained by loss of jobs through public sector retrenchment and privatisation of SOEs, that accompanied the implementation of the programme. The educational reform introduced in 1987, that reduced the number of school years at pre-tertiary level (with the effect of pushing large number of new entrants into the labour

market), coupled with no significant improvement in the absorption capacity of the economy, also contributed to the increased unemployment rates over the period. Post 2000 saw a decline in the rate to 5.2%, partly on account of an accelerated growth performance and rising informality.

4.4 Gender Dimension of Employment & Unemployment

The gender dimension of employment, unemployment and other labour market issues are critical to the quest of ensuring equity and inclusiveness in the socioeconomic endeavours of the country. Women in Ghana appear to be at the receiving end of labour market challenges such that, gender differences in the quality of employment favour men over women.

4.4.1 Employment

A lower employment-to-population ratio of women to men is reported, suggesting that a lower proportion of women than men are employed. Employment of women relative to men improved considerably over a period of five decades, based on the substantial rise in gender parity (measured by female-male representation ratio) from 0.65 in 1960, to 0.96 in 2010. However, the decline in the parity index over 2010-2015, from 0.96 in 2010 to 0.91 in 2015, suggests a worsening participation of women in the labour market. Women are also underrepresented in better quality jobs, and over represented in poor quality jobs.

As reported in Table 4, female representation in productive employment and/or formal sector jobs is inferior to men, with a female-male representation ratio of less than 1. Female representation in wage employment, which is a dominant type of employment in the formal sector, is lower than that of their male counterparts. However, female representation in wage employment has seen considerable improvement over the last four-and-half decades, as evident in the increase in gender parity ratio from 0.19 in 1970, to 0.56 in 2015. In contrast, a higher proportion of women than men earn their livelihood in the informal sector and self-employment, translating into higher vulnerable employment rates among females than males. This is reflected in the female-male representation ratio of more than 1 in the informal sector and self-employment, as well as vulnerable employment (see Table 4).

Indeed, women are more likely than men to engage in manufacturing, as evident in the gender parity ratio of manufacturing employment of more than 1. However, the dominance of women in manufacturing mostly occurs in low valued activities in the manufacturing sector such as food processing, beverages, and clothing and textiles.

Table 4: Female-male representation ratio by type, institutional and economic sector of employment

Employment indicator	1960	1970	1984	1992	2000	2006	2010	2013	2015
Employment-to-pop.	0.65	0.79	0.98	0.98	0.95	*0.95*	0.96	0.93	*0.91*
Agriculture	0.91	0.92	0.84	0.89	0.96	*0.87*	0.83	0.86	*0.69*
Industry	0.59	0.96	1.28	0.93	0.76	*0.97*	0.78	0.63	*0.94*
Manufacturing	*1.16*	*1.56*	*1.87*	*1.40*	*1.11*	*1.56*	*1.42*	*1.34*	*1.99*
Service	1.70	1.21	1.33	1.34	1.23	*1.26*	1.31	1.39	*1.32*
Trade	*4.62*	*6.69*	*5.81*	*5.32*	*2.16*	*2.74*	*2.54*	*2.72*	*2.54*
Wage employment	---	0.19	0.29	0.36	0.44	*0.33*	0.45	0.40	*0.52*
Self-employment	---	1.38	1.22	1.21	1.16	*1.05*	1.16	1.15	*1.13*
Formal	---	---	0.29	0.31	0.45	*0.43*	0.48	0.47	*0.56*
Informal	---	---	1.24	1.16	1.13	*1.14*	1.12	1.10	*1.09*
Productive employment	--	0.19	0.29	0.37	0.48	*0.38*	0.50	0.48	*0.54*
Vulnerable employment	--	1.52	1.21	1.21	1.20	*1.32*	1.26	1.35	*1.30*
Agriculture	0.91	0.92	0.84	0.89	0.96	0.87	0.83	0.86	*0.69*
Industry	0.59	0.96	1.28	0.93	0.76	0.97	0.78	0.63	*1.06*
o/w manufacturing	*1.16*	*1.56*	*1.87*	*1.40*	*1.11*	*1.56*	*1.42*	*1.34*	*2.07*
Service	1.72	1.21	1.47	1.34	1.23	1.26	1.31	1.39	*1.32*
o/w Trade	*4.62*	*6.69*	*5.81*	*5.32*	*2.16*	*2.74*	*2.54*	*2.72*	*2.50*

Source: Computed/constructed from Population and Housing Censuses (1960, 1970, 1984, 2000 & 2010), 2003 Core Welfare Indicators Questionnaire (CWIQ), GLSS (3, 4, 5 & 6) datasets and 2015 Labour Force Survey datasets

4.4.2 Unemployment

The gender dimension of unemployment generally indicates a higher rate among females than males. As Figure 7 reveals, until 2015, unemployment rates were higher among females than males. It was only in 2015 that the female unemployment rate dropped below that of their male counterparts. The female-male ratio of unemployment rose from 1.12 in 2003 to 1.17 in 2010, suggesting a widening gap of unemployment rates by gender, or rising female unemployment rates relative to that of males. The gender gap of unemployment rates narrowed in 2010, with a declining ratio from the 2010 figure of 1.17, to 1.15 in 2013. In 2015, the ratio fell to 0.91, indicating a lower unemployment rate among females than males. Thus, in general, a higher proportion of females in the labour force are suffering from unemployment than their male counterparts over the period 2003-2015.

Figure 7   Unemployment rates by gender 1960-2015 (%)

Unemployment rates by gender

	19 60	19 70	19 84	19 92	19 99	20 00	20 03	20 06	20 10	20 13	20 15
Male	6.5	7.6	3.2	3.4	7.9	10.1	6.9	4.5	5.4	4.8	6.8
Female	5.2	3.9	2.5	3.2	7.2	10.7	7.7	4.8	6.3	5.5	6.2
Fem-male ratio	0.8	0.5	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.1	0.9

Source: Computed/constructed from Population and Housing Censuses (1960, 1970, 1984, 2000 & 2010), 2003 Core Welfare Indicators Questionnaire (CWIQ), GLSS (3, 4, 5 & 6) datasets and 2015 Labour Force Survey datasets

4.5 Employment and Unemployment of the Youth

In Ghana, the youth (aged 15-24 years) constitutes about one-fifth of the country's population, while children aged below 15 years (who are waiting to form the youth population in the next decade) account for about two-fifths. They provide an opportunity – and at the same time a challenge – for development and security. On the positive side, if they are gainfully and productively engaged, they constitute a potential resource for growth and development. In contrast, they could also become a source of civil conflict and social tension if their potential as an untapped resource is poorly managed. Indeed, disaffected youth without education, jobs or the prospect of a meaningful future, may fuel future instability, migration, radicalization, and violent conflict (Baah-Boateng, 2016a. The growing concerns about youth employment on the national and global development agenda hinges largely on the fact that young people essentially bear the brunt of labour market challenges in terms of high rates of unemployment and joblessness, as well as poor quality of employment (Baah-Boateng, 2016a). They also experience job losses in times of economic downturn, since layoffs follow the Last-In-First-Out (LIFO) framework (Baah-Boateng, 2016a). The high and increasing incidence of street hawking and migration of Ghanaians across the Saharan desert and the Mediterranean (and associated risks) are not only symptoms of labour market challenges facing them, but also reflect their sense of hopelessness (Baah-Boateng, 2016a).

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4.5.1 Employment

Essentially, the Ghanaian labour market is generally characterised by poor or low quality of employment for the youth. Clearly, the youth are the most affected in terms of poor quality of employment considering the barriers they face, including limited labour market experience. In Ghana, as in many African countries, the proportion of youth in jobs considered vulnerable and informal with little or no social protection is higher relative to adults (Baah-Boateng, 2016a). Many of these young people are engaged as contributing family workers in both rural and urban areas. This may be another sign that labour market entry difficulties exist for young people. In addition, this symbolizes low employment quality since informal jobs are generally less secure in that labour and safety regulations do not apply.

Table 5: Distribution youth-adult representation ratio of employment categories

Employment indicator	2000	2003	2006	2010	2013	2015
Employment-to-pop.	*0.58*	*0.48*	*0.47*	*0.49*	*0.60*	*0.64*
Wage employment	0.70	0.66	*0.72*	0.85	0.63	*0.68*
Self-employment	0.85	0.57	*0.39*	0.58	0.26	*0.27*
Formal	*0.53*	*0.54*	*0.51*	*0.65*	*0.48*	*0.59*
Informal	*1.05*	*1.08*	*1.09*	*1.06*	*1.10*	*1.07*
Productive employment	0.78	0.59	*0.60*	0.74	0.50	*0.52*
Vulnerable employment	1.01	1.00	*1.01*	0.94	1.09	*1.07*
Agriculture	*0.95*	*0.96*	*1.09*	*1.07*	*1.28*	*1.03*
Industry	*1.37*	*1.77*	*1.07*	*1.07*	*0.98*	*1.11*
Manufacturing	*1.49*	*2.11*	*1.10*	*1.16*	*1.06*	*1.10*
Service	*0.92*	*0.96*	*0.80*	*0.91*	*0.74*	*0.93*
Trade	*0.94*	*0.73*	*0.68*	*0.78*	*0.70*	*0.83*

Source: Computed/constructed from Population and Housing Censuses (1960, 1970, 1984, 2000 & 2010), 2003 Core Welfare Indicators Questionnaire (CWIQ), GLSS (3, 4, 5 & 6) datasets and 2015 Labour Force Survey datasets

The employment-to-population ratio, which is a crude way of measuring job creation, is lower among youth than adults (Table 5), implying that job creation benefits adults more than youth. A higher proportion of young people than adults were engaged in informal sector activities, and vulnerable employment considered to be of poor quality. The high vulnerable employment rates among the youth are driven by the large number of youth working as contributing family workers (which is one of the elements in measuring vulnerable employment).

In effect, informality remains high among young people. At least 90% of youth are engaged in the informal sector, with more "risk" to economic cycles, and where formal work arrangements and access to social benefits are lacking (Baah-Boateng, 2013, 2015). On the other hand, a lower proportion of young people are found in wage and self-employment (particularly self-employed with employees), which are mostly formal sector jobs, and

subject to labour standards. Thus, productive employment dominated by formal sector jobs is quite low among young people – particularly those in their teens and early 20s – due to their limited labor market experience and limited networks. In terms of economic sector or industry of employment, a higher proportion of youth are engaged in agriculture and manufacturing, mostly as contributing family workers.

4.5.2 Unemployment

One major challenge facing young people in the labour market is the high rate of unemployment. The youth unemployment rate stood at 14.4% in 2015. The trend over time has not followed a consistent pattern since 2003. The highest rate of 16.5% was recorded in 2003, while 2013 saw the lowest rate of 8.6% (Figure 8). The proportion of youth in NEET peaked at 27.0% in 2015, from the lowest rate of 14.2% in 2013. Essentially, unemployment rates are generally higher among the youth than adults, due to challenges young people face in the labour market relative to adults. Young people are more vulnerable in times of economic challenges than their older counterparts, on account of labour market constraints such as lower levels of education, and limited labour market experience. The youth also lack job search experience and are limited in terms of labour market information to facilitate their job search. As already noted, young people are often vulnerable to job losses in times of economic recession.

Figure 8   Youth (15-24) unemployment rates and NEET (%)
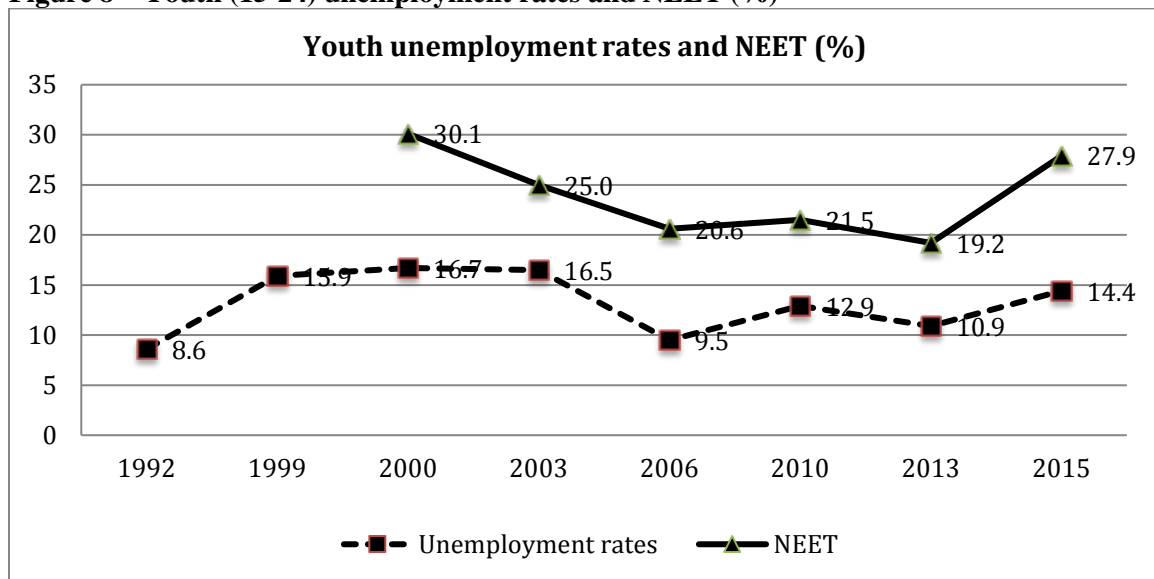
Source: Computed/constructed from Population Censuses (2000 & 2010) 2003 Core Welfare Indicators Questionnaire (CWIQ, GLSS (3, 4, 5 & 6) and 2015 Labour Force Survey datasets

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Section 5: The Accumulation of Productive Capabilities:
An Alternative Approach to Understanding Structural Transformation

5.1 The Concept and Literature

Long term and sustained economic growth has been generally linked to structural transformation and possession of higher levels of human capital. However, what this transformation entails, goes beyond resource endowments (Rostow, 1959) and innovation (Lall, 1992). Capabilities and usage of knowhow – key requirements in the structural transformation process – is difficult to measure. Pursuant to this challenge, the Economic Complexity Index (ECI), an indirect measure of these capabilities, has been developed (see Hidalgo et al., 2007, Hidalgo et al, 2009; Hausmann et al., 2014). Economic complexity simply reflects the multiple streams of productive knowledge embedded in an economy. It measures the accumulated capabilities gathered by a country that enables it to produce various products. Thus, economies that are more complex can combine vast amounts of useful knowledge to make variety of products – both simple and sophisticated products. In contrast, less complex nations only produce simple or common products. For example, making an airplane requires large volumes of embedded knowledge and only few countries have the capabilities to engage in such a venture. However, vegetables such as cabbage or carrots, among others, can be produced by several countries: these products are more common or ubiquitous. Therefore, the amount of knowledge a country possesses can be mirrored in the diverse sets of products, and the ubiquitous nature of the products, it makes. Countries possessing rare or a not-too common set of capabilities can make products that many others cannot produce. In the same vein, countries that have limited knowhow can make few products or ubiquitous products.

To generate economic complexity, diversity is corrected using a measurement of ubiquity that has already been catered for by diversity. Doing so the other way round produces a quantitative measure of complexity, which converges to the former after a few iterations. A formal exposition of this process is provided in Box 1 below. The same process can be applied to products, generating a related measure dubbed the Product Complexity Index (PCI). PCI captures the productive capabilities needed to make a product. Although economic complexity and its allied techniques have been criticized by Tacchella et al. (2012) on conceptual grounds, these metrics according to Hartmann et al. (2017) are a higher predictor of growth than human capital[5]. They correlate highly with income, versus indices that proxy for strong institutions and regulatory environments and others (Hidalgo, Hausmann & Dasgupta 2009).

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[5] Human capital is captured by years of schooling.

Box 1: A Technical Note on Measuring Economic Complexity

Let M_{cp} be a matrix, which takes on the value 1 if a country c makes product p, and 0 if the country does not. Diversity and ubiquity can be computed by summing over the rows or columns for that matrix to get:

$$Diversity = k_{c,0} = \sum_p M_{cp} \qquad (1)$$

$$Ubiquity = k_{p,0} = \sum_c M_{cp} \qquad (2)$$

For the generation of a precise measure of the number of capabilities available in a country or required by a product, the measure that diversity and ubiquity carry has to be corrected by each other. For countries, this requires the calculations of the average ubiquity of the product it exports, the average density of the countries that make these products, and so on. In the case of products, we have to calculate the average diversity of the countries that make these products, and the average of the other products that these countries make. This can be expressed as follows:

$$k_{c,N} = \frac{1}{k_{c,0}} \sum_p M_{cp} . k_{p,N-1} \qquad (3)$$

$$k_{p,N} = \frac{1}{k_{p,0}} \sum_c M_{cp} . k_{c,N-1} \qquad (4)$$

Substituting (4) into (3) and subsequently manipulating after a few iterations produces an economic complexity measure for countries: ECI, and that for products: PCI. The result is the expression below:

$$k_{c,N} = \sum_{c\prime} \widetilde{M}_{cc\prime} k_{c\prime,N-2} \qquad (5)$$

$\widetilde{M}_{cc\prime}$ in (5) is the largest eigenvalue and represents the measure of economic complexity. The Economic Complexity Index (ECI) can be defined as:

$$ECI = \frac{\vec{K} - <\vec{K}>}{stdev(\vec{K})} \qquad (6)$$

$<>$ represents the average and *stdev* is the standard deviation. $\vec{K}$ is the eigenvector of $\widetilde{M}_{cc\prime}$ associated with second largest eigen value. Similarly, the PCI can be formally defined as:

$$PCI = \frac{\vec{Q} - <\vec{Q}>}{stdev(\vec{Q})} \qquad (7)$$

$\vec{Q}$ is the eigenvector of $\widetilde{M}_{pp\prime}$ associated with second largest eigenvalue.

Source: Hausmann et al. (2014)

To this end, the methodology had been adopted for empirical studies, which sought to determine products, and pathways, that countries can move towards in their bid to structurally transform. Additionally, their use is facilitated by interactive web portals, which contain a large database and visualizations of various forms.

Employing the complexity and product space framework, Abdon and Felipe (2011) analysed the productive structures of Ethiopia, Mozambique, Nigeria and Senegal. They observed that exports of these countries are less complex and located in the periphery of their product spaces. An extension of the analysis to cover the entire Sub-Saharan Africa (SSA) region, saw a similar trend. These findings are no different from what other studies reported (see Hidalgo, 2012; and Hausmann & Chavin, 2015). Recent research has also applied them to study economies at the sub-national level (Reynolds et al. 2017).

Even though some of the studies mention Ghana in their comparative discussions, an in-depth analysis to the best of our knowledge has not yet been done. Notable is the illustration given in the Atlas of Economic Complexity put together by Hausmann et al. (2014). In the atlas, Ghana is seen to have expanded education (and not economic complexity) more intensely than Thailand from 1970 through to a period of four decades that followed. It is further observed that comparatively, Thailand achieved an increased level of economic complexity between 1970 and 1985, and income per capita in the two countries has diverged. This reinforces the claim that the economic complexity index is a good predictor of future growth.

5.2 Ghana in the Global Complexity Space

To determine Ghana's position in the complexity ranking, we first describe how it fares in comparison to other African countries, at the sub-regional level, and across other regions of the world. We also locate Ghana in the ECI-GDP per capita space and look at the implication for the future growth of Ghana. In the next section that follows, the notion of the product space, a very useful tool, is explored using visualisations provided by the Atlas of Economic Complexity (http://atlas.cid.harvard.edu/).

On average, over the last decade, Ghana's score is below that of about 100 countries. Felipe et al. (2012) ranked Ghana at 112th among 124 countries. Figure 9 provides information on the ECI of Ghana in the global space. From the bar graph, it can be observed that Ghana (-0.70) is more complex than Nigeria, but less complex than Cote d'Ivoire (-0.75) and all the other African countries considered here. ECI for Ghana is lower than the aggregate of Africa (-0.94) and Sub-Saharan Africa (-0.96). Ghana's ECI is also far lower than all regional aggregates, including Latin America and Caribbean (-0.17), Middle East and North Africa (-0.31) and South Asia (-0.56).

Figure 9   Ghana in the Global ECI Space, 2015

Ghana in the Global Complexity Index, 2015
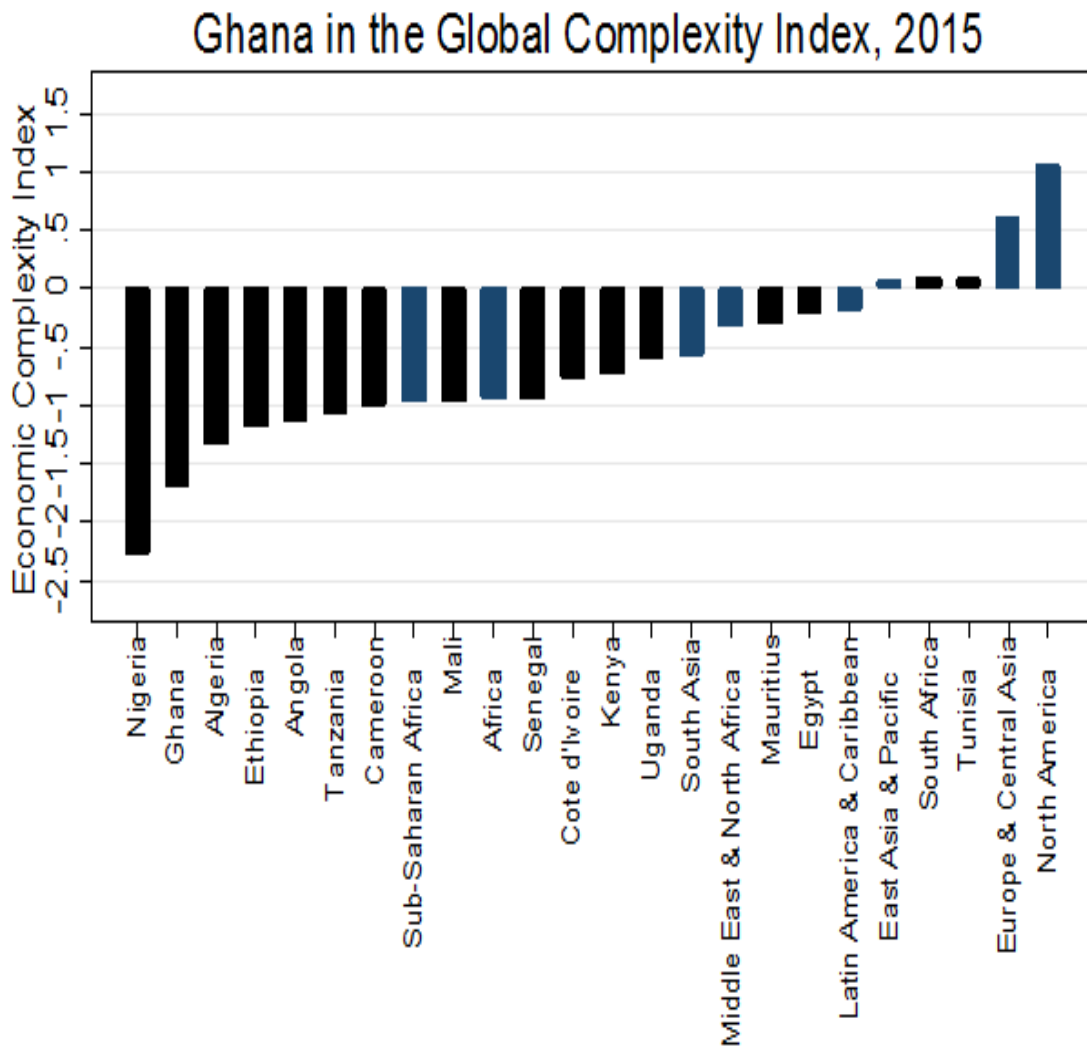
Source: Computed using data from Atlas of Economic Complexity. (Regional aggregates are shaded in navy. The average complexity for Africa was computed using the ECI of 49 African countries).

Figure 10 illustrates the strong positive relationship between the economic complexity index and the log of GDP per capita. The plot shows that more complex economies are associated with higher levels of income. Ghana's location as depicted by this graph implies that averagely compared to other countries, its level of income is relatively high given its complexity, thus sustainable growth may be threatened. Diversification of Ghana's economy must be imminent for the current positive economic growth trajectory to be maintained. It can be ascertained from the graph that among the comity of middle-income countries, Ghana is relatively less complex. South Korea and Malaysia, that had similar per capita GDP as Ghana in the early 1960s (their location in the graph are marked KOR

and MYS respectively) as at 2015, had relatively more complex economies with higher levels of income.

Figure 10   Economic Complexity Index (ECI) and the log of GDP per capita in 2015

Source: Own analysis using 2015 Economic Complexity Data (Red triangle marked with GHA is Ghana's position)

5.3 Structural Transformation: Locating the Ghana's Economy within the Product Space

5.3.1 The Product Space Concept

The product space developed by Hausmann and Klinger (2006) and Hidalgo et al. (2007) is a pictorial expression of the productive structure of a country. In a product space, products (represented by nodes), which are in close proximity to one another, have similar capabilities in terms of how they are made. That is, there exists some level of interdependency among products based on resources or inputs used in their production. To put it more formally, new capabilities are built using current know-how, what Hausmann et al. (2011) have characterised as the 'chicken and egg' problem. Thus, the process of structural transformation is path-dependent. For example, it will be much easier for Ghana, which already has a competitive advantage in cocoa production, to branch into rubber plantation – which shares similar productive knowledge – than to redeploy resources from cocoa production to car manufacturing.

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Formulated using network analysis, proximity between products is calculated as the conditional probability – based on the concept that a country that exports a product can also export a related product. In providing a simple analogy to explain product space, Hildalgo et al. (2007) used a tree to represent a product, and a forest to denote a set of all products. According to Hidalgo et al., firms – or 'monkeys' as they put it – live on and exploit these trees. Firms can more easily populate in denser parts of the forest than in sparser areas. The product space comprises the core or dense regions, and the periphery segments with loosely connected products. At the core section, which contains relatively more sophisticated products (machinery, chemicals, textiles among others), a move to new products is much easier. A country that has competencies in more products in this section can accumulate capabilities in nearby products faster. In the periphery or fringes of the product space, where agricultural products, natural resources, and so forth are found, resources used cannot be easily redeployed for many products, hence, products located here are 'distant' from one another.

Though the economic complexity and product space analytics are very useful in the description of the productive structure of economies, they do have have some drawbacks. A shortcoming of the product space framework is that it is compiled using value of recorded exports, and does not cover services. It excludes production within countries, a shortcoming pointed out by the developers. In latter sections, other metrics of the product space, 'distance', and 'opportunity gain', will be employed in marking out products with diversification potential.

5.3.2 Ghana's Product Space
We now look at the evolution of the productive structure of Ghana as captured by the product space, in specified time periods. We begin by generating the product space, drawing on visualisations on the Atlas of Economic Complexity compiled by the Centre for International Development (CID), at Harvard University. Ghana's structure is compared to that of Cote d'Ivoire, Nigeria, South Korea and Malaysia. Ghana's productive structure has not changed much over the period 1985 (as depicted in figures 11 and 12) to 2015. Figure 13 adds the location of some of the products Ghana exported with comparative advantage in 2015. The main products significant in Ghana's export mix are agricultural (cocoa) and other primary products (gold, petroleum[6] and wood). This implies that Ghana's overall complexity is low. Evidently, the poor performance of the manufacturing sector in Ghana is reflected in the few scattered nodes in the core sections of the product space in Figures 12 and 13.

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[6] Petroleum entered Ghana's product space in 2011, when commercial oil exploration began.

Figure 11   Product Space of Ghana: 1962, 1975 and 1985

1962

1975

1985
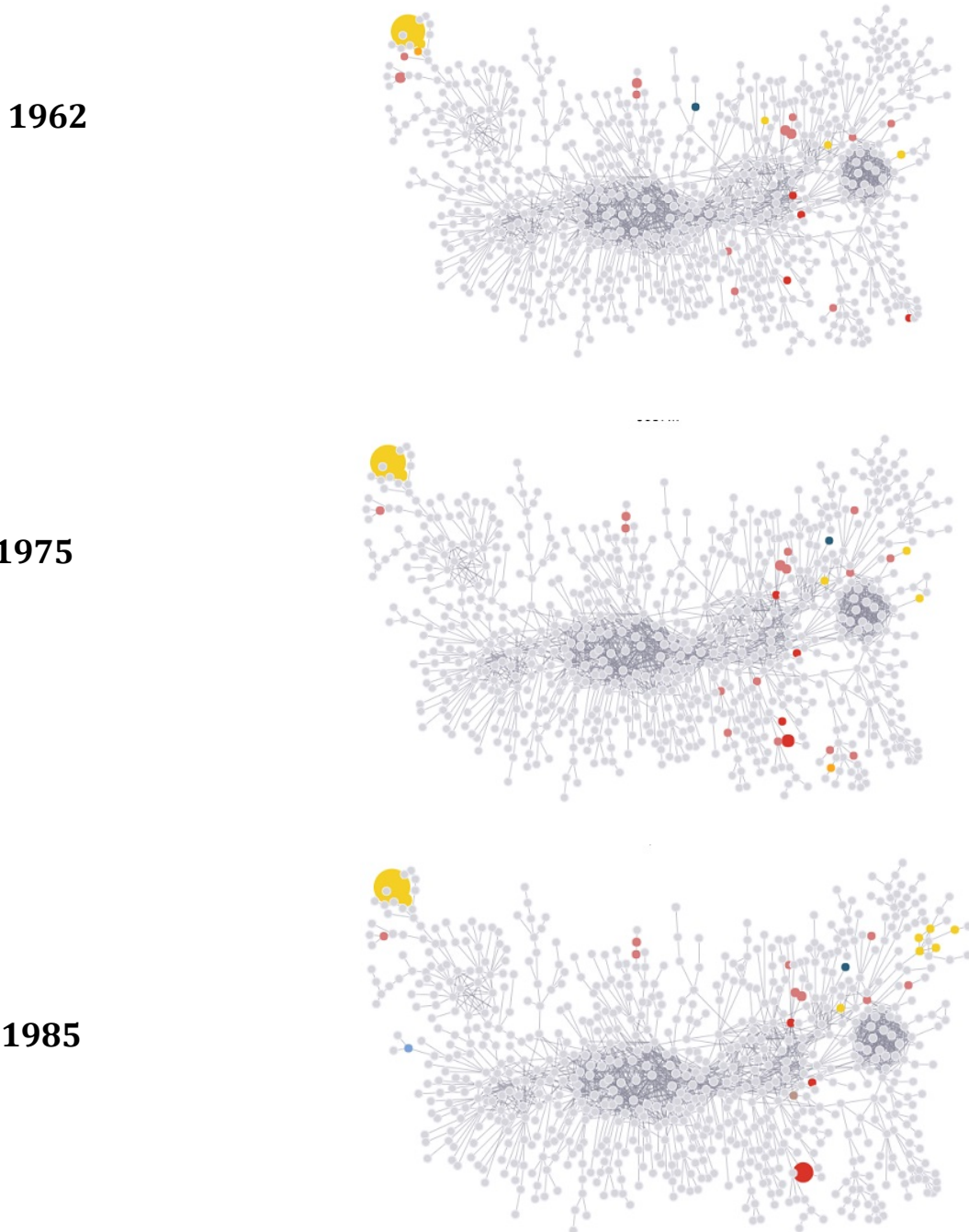
Source: Atlas of Economic complexity accessed through http://www.atlas.cid.harvard.edu
Note: Coloured nodes are the exported products for which Ghana has a Revealed Comparative Advantage, that is, RCA>1. The pale nodes are the products that Ghana has no comparative advantage in. The size of a node corresponds to a product's share in Ghana's export basket.

Figure 12   Ghana's product space in comparison to Cote d'Ivoire and Nigeria, 2015

Ghana
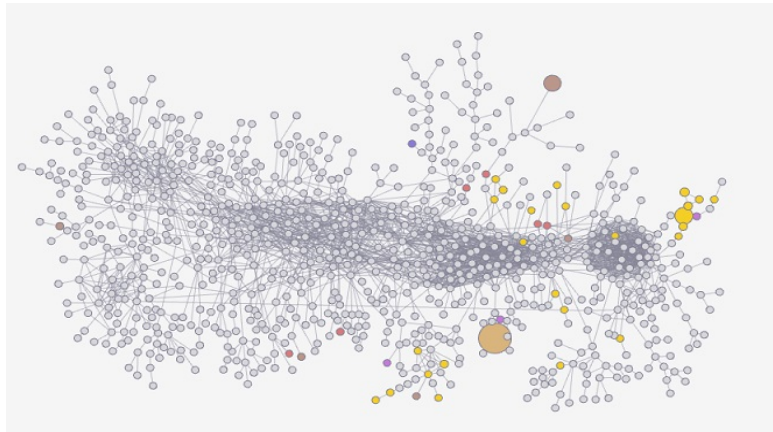
Nigeria
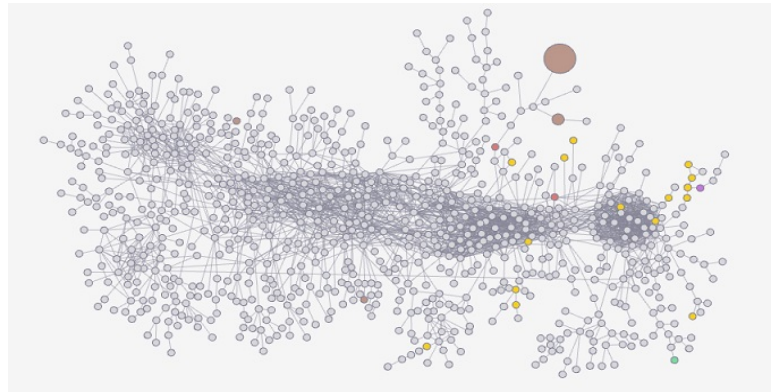
Cote d'Ivoire
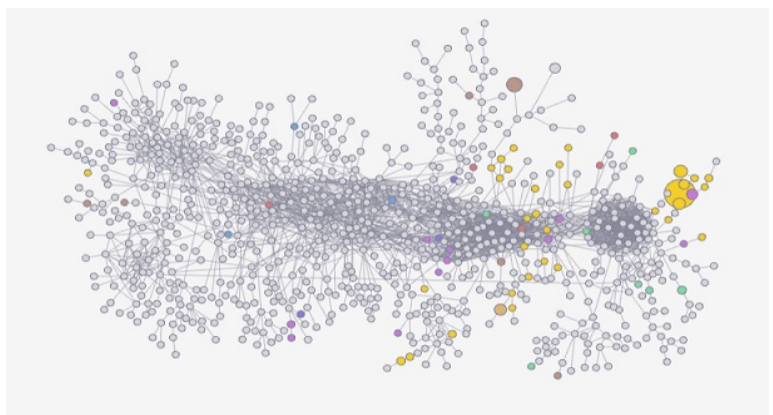
Source: Atlas of Economic Complexity Accessed via http://www.atlas.cid.harvard.edu
Note: Product categories the coloured nodes in all product spaces represent are:

	TEXTILE AND FURNITURE		VEGETABLES, FOODSTUFFS AND WOOD		STONE AND GLASS
	MINERALS		METAL AND METAL PRODUCTS		CHEMICALS AND PLASTICS
	TRANSPORT VEHICLES		MACHINERY		ELECTRONICS
	OTHERS (MISCELLANEOUS)				

Figure 13   Composition of Ghana's Product Space in 2015
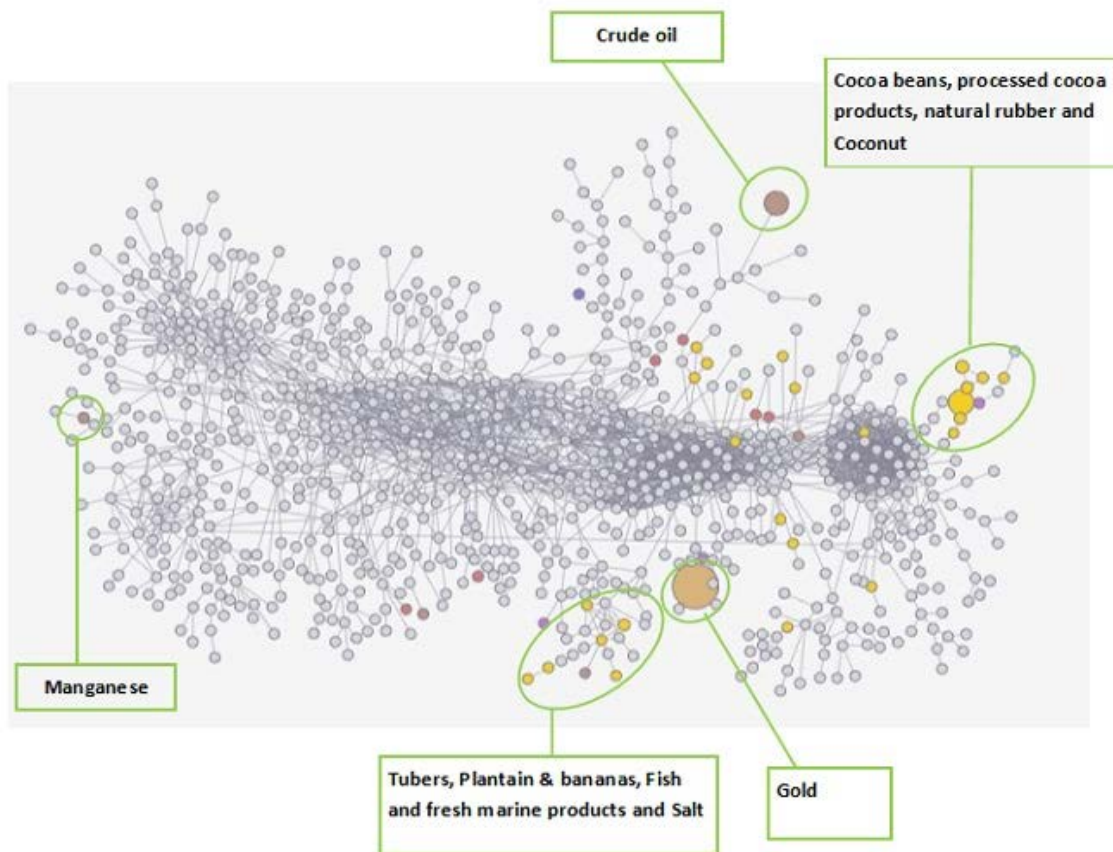
Source: Atlas of Economic Complexity, with description of location of products adapted

Over time, additions to Ghana's export mix have been in the area of the product space where products are far distant from one another. New products have largely populated around already existing products Ghana exports with RCA. Diversification into manufactured goods, which comes with structural transformation, will be difficult, as many products in the core area of Ghana's product space are far away from current capabilities. This notwithstanding, developing comparative advantage in relatively more complex products in Ghana could help sustain economic growth and provide a strong foundation for structural transformation.

Unsurprisingly, Nigeria's productive structure is more peripheral than that of Ghana. Crude petroleum and a few other products dominate. Comparatively, Cote d'Ivoire's productive structure looks more promising. It has more manufactured products in the dense areas of the product space than Ghana and Nigeria. Cote d'Ivoire may therefore be able to diversify faster into many other products. The product spaces of both South Korea and Malaysia (shown in Figure 14) reveal that the products exported in 2015 by the two countries are concentrated in the denser regions, or centre, of the product space. This in a way explains the significant transformation of the two countries over the past five decades. Malaysia, for

instance, has built competencies in the production of electrical and electronic products, whereas South Korea, in addition to electronics, are fairly represented in chemicals, motor vehicles, machines and parts.

Figure 14   Product Spaces of Malaysia and South Korea, 2015
a. South Korea
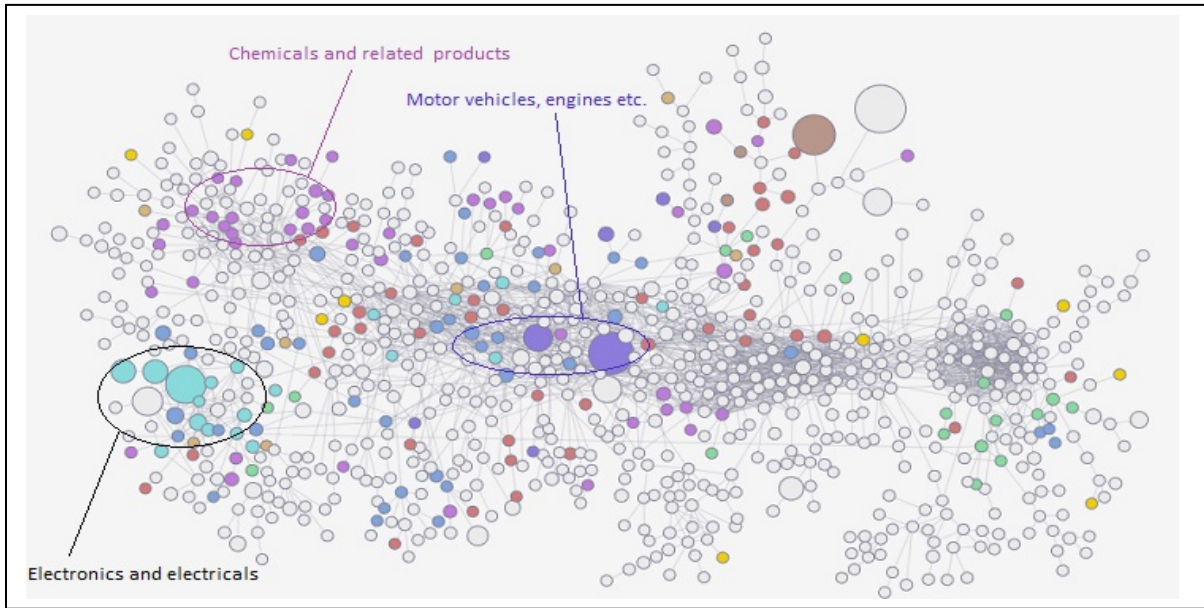
b. Malaysia
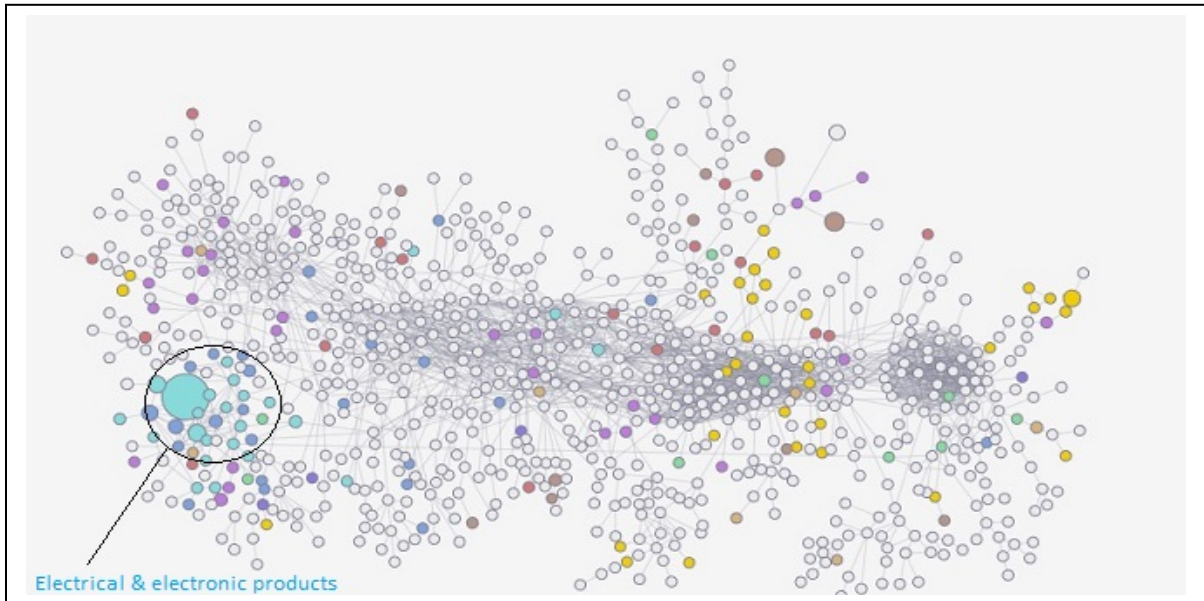
Source: Atlas of Economic complexity accessed through http://www.atlas.cid.harvard.edu (*Product category highlights are adapted by Authors*)

5.3.3 Identifying potential products for structural transformation of Ghana

As this study anchors on targeting industries, which disproportionately have greater employment potential for youth and women, we first of all leverage the complexity framework to identify new products that can make Ghana's productive structure more complex. Identification of these new products (termed frontier products) is done in such a manner as to select products that are relatively more complex and near current capabilities. This approach is partly inspired by the criteria used by Hausmann and Chavin (2015) and is restricted to Ghana's non-RCA products. Products selected are (i) on average more complex than Ghana's average complexity and (ii) not too far away from existing capabilities in terms of 'distance', and therefore have greater potential for diversification – that is, take on higher levels of opportunity gain[7]. A country can only build on and accumulate productive knowledge, and add on other products, if it already has reasonable amounts of know-how in existing products. Further, products with export values below $10,000 in 2015, are eliminated.

All products exported by Ghana with RCA are first dropped (57 products are thus removed) before applying the criterion specified earlier. Next, products with PCI below Ghana's Economic Complexity Index are removed (105 products in all). To utilize the distance metric, the median distance of all non-RCA products is computed. As there is no defined cut off for this framework, the median is used as a filtering measure[8]. Products with distances above this median are dropped. This process reduced the remaining products by half (538 more products are taken out). Ninety-four (94) products with zero or negative opportunity gain values are also removed. As mentioned above, products with annual exported value less than $10,000 are excluded. Five (5) products that have seen a negative global export growth over the period 1995-2015 are eliminated. Combining all the procedures outlined above leaves us with a total of 201 new or frontier products (summary statistics are included in the Appendix). We now consider the products that Ghana produces with comparative advantage and look out for any opportunities that exist, after which a discussion on frontier products (the 201 identified products) is provided.

Table 6, which reports the products that had a significant presence in Ghana's exports (that is, had RCA), show that nearly 50% of exports were vegetables, foodstuffs and animal products. Under the vegetables and foodstuffs categories, products comprised mainly cocoa beans, coconuts, tropical fruits, bananas, palm oil and semi-processed cocoa. Seven of the products Ghana exported with RCA were mineral products (crude oil, manganese ore, aluminium ore, among others) located in the loosely connected sections of the product space – providing weak avenues for diversification.

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[7] Technical Box 2 provides an explanation of how we compute distance, opportunity value and opportunity gain.
[8] Hausmann and Chavin (2015) also used the median as the cut off.

Box 2: A Technical Note on Distance, Opportunity Value and Opportunity Gain

Countries move through the product space by developing goods close to those they currently produce. But, countries do not make just one product; they make a certain number. Proximity measures the similarity between a pair of products, so there is the need for another measure to quantify the space between the products that a country makes, and each of the products that it does not. This measure is called distance, and is defined as the sum of the proximities connecting a new product p to all the products that country is not currently exporting. Distance is normalized by dividing it by the sum of proximities between all products and product p. That is, distance is the weighted proportion of products connected to product p that country c is not exporting. The weights are given by proximities. If country c exports most of the goods connected to product p, then the distance will be short: close to 0. But, if a country only exports a small proportion of the products that are related to product p, then the distance will be large: close to 1. Formally, distance is defined as:

$$d_{cp} = \frac{\sum p'(1 - M_{cp'})\emptyset_{pp'}}{\sum p' \, \emptyset_{pp'}}$$

Distance gives an idea of how far each product is given a country's current mix of exports. It would be useful to have a holistic measure of the opportunities implied by a country's position in the product space. Countries that make products that are relatively complex, given their current level of income, tend to grow faster. Hence, it makes sense to include not only the distance to products, but also their complexity. Some countries may be located near few, poorly connected and relatively simple products, while others may have a rich unexploited neighbourhood of highly connected or complex products. Countries differ not just in what they make, but in what their opportunities are. This can be thought of as the value of the option to move into other products. To quantify the "opportunity value" of a country's unexploited prospects, the level of complexity of the products that it is not currently exporting, is added, weighted by how close these products are to the country's current export suite. We can write this mathematically as:

$$Opportunity\ value = \sum_{p'}(1 - d_{cp'})(1 - M_{cp'})PCI_{p'}$$

Where *PCI* is the Product Complexity Index of product p. The term $1 - M_{cp'}$ ensures that only the products that the country is not currently producing, count. Higher opportunity value implies being in the vicinity of more products and/or of products that are more complex. Opportunity value can be used to calculate the potential benefit to a country if it were to move to a particular new product. This is called the "opportunity gain" that country c would obtain from making product p. This is calculated as the change in opportunity value that would come as a consequence of developing product p. Opportunity gain quantifies the contribution of a new product in terms of opening up the doors to more and more complex products. Formally, opportunity gain is expressed as:

$$opportunity\ gain = \sum_{p'}\frac{\emptyset_{pp'}}{\sum_{p''}\emptyset_{p''p'}}\left(1 - M_{cp'}\right)PCI_{p'} - (1 - d_{cp'})PCI_{p'}$$

Source: Hausmann et al. (2014)

Cement, which falls in this classification, is in a strategic area of the product space and can be relied on for the building up of productive know-how. Gold, another peripheral product, also makes the list. Ghana also specialized in the export of rough wood and semi-manufactured wood products (together these constitute 97% of total value of wood products exported). Ghana could rely on these semi-processed wood products for the production of other more complex nearby products. In addition to the availability of the main input (wood), wood products can provide essential backward and forward linkages relevant for the creation of more employment opportunities. Though Ghana has seven metal products with RCA, scrap copper, raw iron bars, raw and scrap aluminium lead the list of this product group.

Table 6: Number of exports of Ghana with RCA (2015)

Category	Number of Products
Animal & animal products	2
Vegetable products	16
Foodstuffs	9
Mineral products	6
Chemical & allied products	4
Plastics & rubbers	1
Wood & wood products	7
Stone/Glass	2
Metals	7
Transportation	2
Miscellaneous/Others	1
TOTAL	**57**

Source: *Authors' calculation based on 2015 export data*

Table 7 provides information on frontier products by category groupings and the number of products under each group. Metals, chemicals and allied products located in the densely located part of the product space where redeployment of resources for the production of other manufactured goods is easier, constitute about a third of all frontier products (62 products). Metals, which have the highest number of frontier products, require the supply of cheap and stable electric power for efficient production. Ghana in the past exported a few of those with RCA (machine tools, cast articles of iron or steel and iron wires), but lost its competiveness due to prolonged electricity generation challenges the country endured for about four years. With relatively stable electric power now, metals remain one of the sophisticated product ranges in Ghana's product space. Ghana does not have RCA in most chemicals, but it exported $11.13 million of both packaged and unpackaged medicaments in 2015 as against imports in amount of $244 million. Other nearby frontier chemical and allied products such as beauty, dental products and paints, are also strategically positioned and not far from current capabilities.

Exporting a little over $200 million worth of rough wood and related wood products, Ghana can take advantage of global trade in (20) other wood products near its existing productive knowledge. Notable among these products are wood carpentry, wood crates, particleboard, and wood barrels. In terms of animal products, poultry (poultry products amounted to $111 million in 2015), meat production and closely related products identified – if developed – can be used as an anchor for additional animal products. Ghana could focus on textiles/clothing (with only five products) for structural transformation and job creation, as this industry generally has higher employment content. However, the textile product community here comprises mainly equipment and materials used in sewing. Revamping the struggling textile industry and provision of support to the apparel manufacturing industry would have a favourable impact. Relatedly, plastic and rubber products could boost Ghana's embedded knowledge, as the diverse set of products under this broad category use high manufacturing technology.

Table 7: Number of Frontier Products by Community Category for Ghana in 2015

Product category	Number of Products
Animal & animal products	7
Vegetable Products	11
Foodstuffs	24
Mineral Products	6
Chemical & allied products	29
Plastics/rubbers	16
Wood & wood products	20
Textile/Clothing	14
Footwear/Headgear	2
Stone/Glass	11
Metals	33
Machinery/Electrical	11
Transportation	5
Miscellaneous	12
TOTAL	201

Source: Author's calculation based on 2015 export data

Figure 15 is a graphical illustration of the products selected by the criteria above. The diamond shapes shaded light grey in the upper left quadrant highlight the products identified. We now look at manufacturing and agricultural frontier products, and the relationships that exist between their product complexities and distance. In the case of agricultural products, they are further grouped into bulk commodities, horticulture, semi-processed, and processed products. The latter differentiation is based on the classification by Regmi et al. (2005). Comparatively it can be seen from Figure 16 that semi-processed and processed frontier agricultural products, which are relatively more complex, are also

distant from Ghana's capabilities. The only bulk commodity under the agricultural frontier is close to a distance of 0.95.

Figure 15 Frontier Products: Location in the Product Complexity-Distance Space of Ghana, 2015
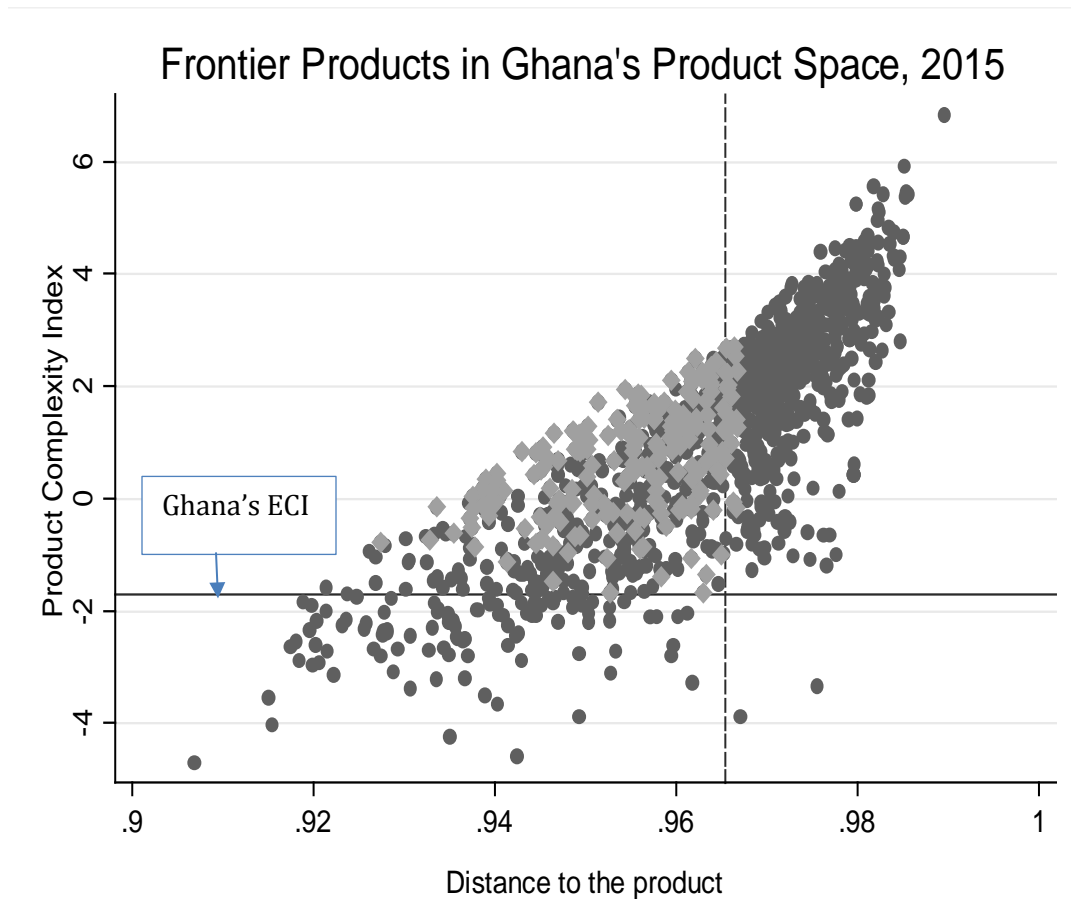
Source: Own computation using data from the Atlas of Economic Complexity

Figure 17 clearly indicates that (with regard to the manufacturing frontier) metals, machinery and chemical products, which lead all frontier products, are at a greater distance from Ghana's productive know-how. Some of the nodes for plastics/rubbers and metal products, moderately less complex, are at a distance below 0.95. Apart from two wood products, all other wood products, stone/glass and textile products are at a distance rightward of 0.95. Chemical and metal products, which account for 30% of the 201 frontier products, can be drawn on for diversification as they can provide useful linkages with agricultural products and other manufacturing industries. Additionally, within the manufacturing frontier space, plastic/rubber products (4 of which are not far from a distance of 0.93) could serve as launch pads for changing the productive structure of Ghana.

Figure 16   Ghana's Frontier Agricultural Products, 2015

Figure 17 Ghana's Frontier Manufacturing Products by Product Community, 2015

5.3.4 Choosing among the Frontier Products

In this section we further trim down the number of products identified earlier, to obtain the Top 20 products that can be targeted for industrial policy intervention in Ghana. To generate this list of the top twenty new products, we employ two approaches used by Hausmann et al. (2014). These are the 'parsimonious transformation' and 'strategic bets' weighting systems. The two methods emphasise feasibleness (closeness to current capabilities), and relatively complex products, respectively. The parsimonious transformation technique assigns a greater weight on distance, and equal weights on products' complexities and opportunity gain. This is done with the understanding that more jobs could be created within current capabilities through products near to Ghana's productive know-how. On the other hand, the strategic bets index emphasises complexity without excluding products that are a little distant from existing capabilities. As most sophisticated products are at a greater distance from the production structures of many African economies, it may therefore be necessary to add to the product mix more complex products which can generate the much needed better quality jobs for youth and women.

In the addition to the two approaches above, we use a measure called equal weights. This metric assigns the same weights to product complexity, distance and opportunity gain. Table 8 presents a summary of the three weighting systems. Twenty-one frontier products[9] that require higher levels of know-how, and have limited value added embedded in their production process under various product categories, are dropped. In addition, five[10] other products are also removed before the weights are applied.

Table 8: Weights System[11] used to identify Top 20 Products for Ghana

Weighting System	Distance	Complexity	Opportunity Value
Equal	0.33	0.33	0.33
Parsimonious	0.6	0.2	0.2
Strategic bets	0.2	0.4	0.4

As presented in Table 9, though there exist some difference in the first twenty products ranked from highest value to the lowest value between the equal and parsimonious weights,

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[9] These 21 products are:
Stone/Glass: Glass scrap
Plastic/rubbers: Scrap plastic
Metals: Utility meters, scrap waste and scrap iron
Chemicals and allied industries: Radioactive chemicals
Machinery & Electrical: Refrigerators, excavation machinery and mill machinery, video displays, audio alarms, stone processing machines, electric control boards, broadcasting accessories
Transportation: Specialised vehicles, railway cargo containers, trailers and other floating structures
Miscellaneous: Video cameras, opto-electric instruments parts and surveying equipment
[10] The five products are antiques, collector's items, cigarette paper, used clothing and synthetic non-filament.
[11] Weights are apportioned to standardized product complexity indices, distance and opportunity gain, to ensure comparison across products. The scale for each component ranges from 0 to 1.

Some commonalities are shared in plastics, beauty, and wood products. Similarity in the product rankings is stronger between the equal and strategic bets weights. Analysis beyond here is based on the equal weight. We rely on the equal weight, as the products captured are a good representation of both closeness and complexity.

Table 9: Top 20 Products by Weighting Systems [12]

Equal	Parsimonious	Strategic Bets
Large Flat-Rolled Iron	Refined Petroleum	Large Flat-Rolled Iron
Other Agricultural Machinery	Confectionery Sugar	Other Agricultural Machinery
Packaged Medicaments	Shaped Wood	Packaged Medicaments
Other Rubber Products	Plastic Lids	Other Iron Products
Other Iron Products	Flavored Water	Other Rubber Products
Other Plastic Sheetings	Baked Goods	Nonaqueous Pigments
Other Printed Material	Precious Metal Scraps	Low-voltage Protection Equipment
Nonaqueous Pigments	Soups and Broths	Styrene Polymers
Low-voltage Protection Equipment	Hair Products	Other Printed Material
Beauty Products	Concentrated Milk	Waxes
Glaziers Putty	Sauces and Seasonings	Glaziers Putty
Nonaqueous Paints	Other Lead Products	Soil Preparation Machinery
Soil Preparation Machinery	Plastic Pipes	Rubber Belting
Styrene Polymers	Bovine	Beauty Products
Raw Plastic Sheeting	Other Edible Preparations	Other Plastic Sheetings
Waxes	Frozen Fruits and Nuts	Nonaqueous Paints
Wood Crates	Plywood	Shaped Paper
Rubber Belting	Organic Composite Solvents	Raw Plastic Sheeting
Aqueous Paints	Animal Food	Whey
Shaving Products	Fermented Milk Products	Other Aluminum Products

Source: Compiled using data from the Atlas of Economic Complexity

In Table 9, more than a third (40%) of the ranked products are chemical and allied industrial products. Nearly half of the Top 20 products are in the metal (10%), plastic/rubber (25%) and wood (10%) product communities. Only 15% of the top products are machinery and electrical products. No agricultural product either processed or unprocessed is in the top frontier product list for the equal weighting system. The parsimonious and strategic bets systems however, have a few agricultural products amongst the top frontier products. The

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[12] Product complexity, distance and opportunity gain are calibrated before the weights are applied, in such a manner to make comparison possible.

top three products under the parsimonious weight technique are agricultural products, whilst the only agricultural product listed for strategic bets is in the last but two of the ranked products. This therefore demonstrates that when relative closeness of products to existing capabilities and other sophistication is stressed, agricultural products are ranked very high for Ghana.

In Table 10, we show the Top 20 agricultural and manufacturing products for Ghana. For the agricultural cluster, the majority of which are either semi-processed or processed, foodstuffs represent 75%. Those remaining are all animal products. A similar analysis for manufacturing products shows that chemical and allied industries' products stand out (45%), while 50% of the top manufacturing products are metals, plastics/rubber and machinery/electrical products.

Table 10: Top 20 Agricultural and Manufacturing Products (Equal weight)

Agricultural Products		Manufacturing Products	
Product	*Product Group*	*Product*	*Product Group*
Whey	Anim	Large Flat-Rolled Iron	Mets
Chocolate	Food	Other Agricultural Machinery	Mach
Other Fermented Beverages	Food	Packaged Medicaments	Chem
Poultry Meat	Anim	Other Iron Products	Mets
Other Prepared Meat	Food	Nonaqueous Pigments	Chem
Fermented Milk Products	Anim	Low-voltage Protection Equipment	Mach
Other Edible Preparations	Food	Styrene Polymers	Plas
Malt Extract	Food	Waxes	Chem
Animal Food	Food	Glaziers Putty	Chem
Starch Residue	Food	Beauty Products	Chem
Other Sugars	Food	Audio Alarms	Mach
Other Frozen Vegetables	Food	Soil Preparation Machinery	Mach
Prepared Cereals	Food	Other Plastic Sheetings	Plas
Butter	Anim	Nonaqueous Paints	Chem
Flavored Water	Food	Shaped Paper	Wood
Beer	Food	Raw Plastic Sheeting	Plas
Baked Goods	Food	Other Aluminum Products	Mets
Sauces and Seasonings	Food	Aqueous Paints	Chem
Bovine	Anim	Perfumes	Chem
Hard Liquor	Food	Shaving Products	Chem

Source: Computed using data from the Atlas of Economic Complexity [13]

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[13] Note on abbreviation of Product communities: Vegp = Vegetable products; Food = Foodstuffs; Anim = Animal/animal products; Skin = Raw hides, skins, leather & furs; Chem = Chemicals and allied industries; Mach = Machinery or electrical; Plas = Plastics or rubbers; Mets = Metals; Ston =Stone/glass; and Wood=Wood/wood products.

Section 6: Complexity-Employment Linkage

6.1 Complex products and Capital intensity

The major thrust of this project is employment generation – particularly for women and youth – and the quest for an economy that can move into the manufacturing and the export of complex products. The Top 20 products identified above obviously require large units of capital inputs, but their production processes may come with useful backward and forward linkages. Figures 18 and 19 explain the extent of the relationship between how complex products are measured by Product Complexity Index (PCI), and the intensiveness of capital used measured by Revealed Physical Capital intensity (RCI). Figure 18 shows that a positive relationship exists between product complexity and revealed capital intensity [14]. Indirectly, the scatter reveals an inverse relationship between product complexity and labour. A similar observation can be seen in Figure 19, which represents that for frontier products. Excluding the frontier product on the far right of the revealed capital intensity and product complexity index scatter for frontier products, there is clearly a strong positive relationship between product complexity and physical capital intensity (Figure 19).

Figure 18   Product Complexity and Revealed Capital Intensity relationship for all products
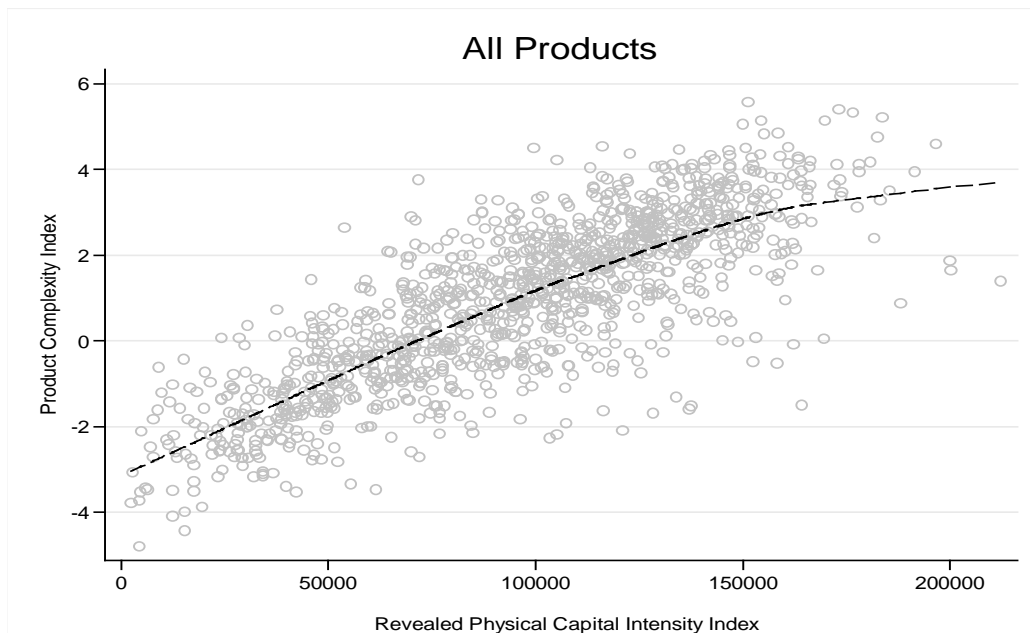
Source: Computation made using a combined Complexity and Revealed Factor Intensity datasets

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[14] The revealed capital intensity database which contains capital intensity of traded goods at the SITC-5 digit level was accessed through the UNCTAD website [http://unctad.org/sections/ditc_tab/docs/RFII_2010_Excep.zip]. Analysis was done using the 2007 RCI indexes, the most recent per the Database.

Figure 19 Product Complexity and Revealed Capital Intensity for all Frontier Products
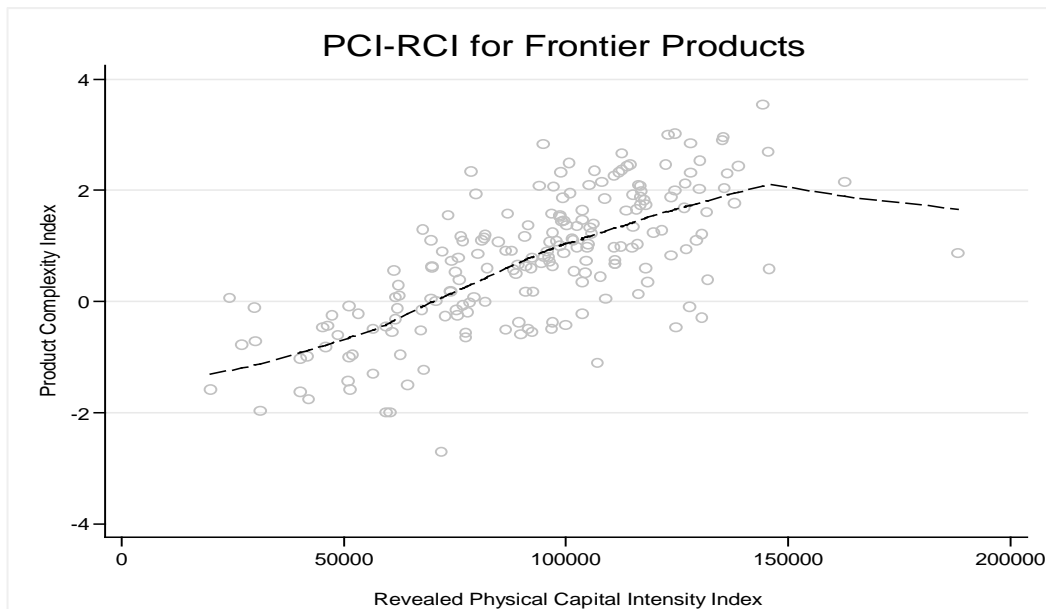
Source: Computation made using combined Complexity and Revealed Factor Intensity datasets

Treating physical capital as a substitute for labour – especially lower level skilled labour dominated by women and youth – suggests that more complex products are associated with limited labour usage; and for that matter lower employment for youth and women.

6.2 Products with high employment intensity of women and youth

In this section, we use a nationally representative household dataset conducted in 2012/13 to examine products or industries that are characterised by a larger share of women and youth in employment.

6.2.1 Gender

Essentially, in Ghana in 2013, total employment of women engaged in various types of economic activities stood at about 6.3 million, compared with about 5.8 million men. This translates into a female-male employment composition ratio of 1.08. Consequently, any industry or product with a gender parity ratio of more than 1.08 is observed to be a female dominated industry, with potential to generate jobs for more women relative to men. Figure 20 presents a disaggregated analysis of products or industries in agriculture and manufacturing that employ mostly women.

Based on the criteria outlined, rice cultivation is the only agricultural activity that has greater potential of creating jobs for women, with other cereals and vegetables narrowly missing the mark. However, based on the female-male employment composition ratio of 0.93 in agriculture, other cereals (e.g. maize, sorghum etc.), vegetables, other crops, fruits and nuts could be classified as agricultural activities with greater potential of generating employment for women. In the manufacturing sector, women dominate men in low value

activities such as processed foods, meat/fish/dairy, clothing, fruit and vegetable processing, fats and oil, chemicals, grain milling and beverages. In these activities in the sector, women outnumber men by between 1.14 and 8.28 times (Figure 20). However, looking at the 1.45 female-male employment composition in manufacturing, this implies 'not too strong" employment generation potential for women in grain milling and the beverages industry. Essentially women and men are almost equally matched, with the ratio of women-to-men at 0.98 in textiles (in manufacturing), and 0.95 in fruit and nuts and 0.91 in tobacco (in agriculture). In contrast, men dominate high value manufacturing activities like non-metal minerals, metal and metal products, and machinery and equipment.

The participation of women is low in farming activities such as cultivation of cotton and fibre, and cocoa; rearing of cattle, poultry and other livestock; and forestry and fishing. In the industrial sector, mining, and oil and gas in the extractive sector; and leather and footwear, wood and paper products, non-metal minerals, metal and metal products in manufacturing, all engage a lower number of women than men.

Figure 20   Products with higher female composition in 2013 (ratio).
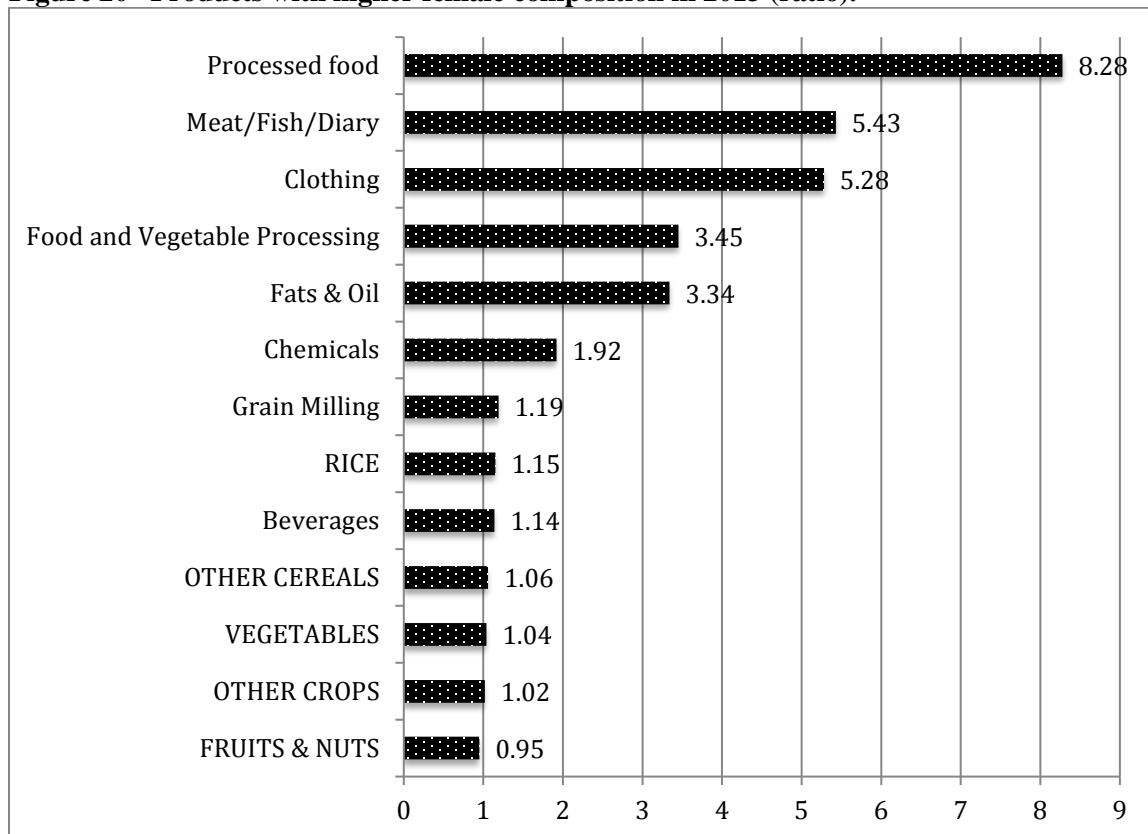
Source: Computed from GLSS VI of 2013, Ghana Statistical Service

6.3.2 Youth

The youth constitutes 2.6 million in employment as against 9.4 million of adult workforce yielding youth-adult employment composition ratio of 0.27. This implies that industries or products that are characterised by more than 0.27 youth-adult composition ratio is employment-friendly industry for youth. Figure 21 provides evidence to show that youth are more likely than adults to engage in cattle rearing, sugar cane, cotton and fibre, vegetable and tubers, fruits and nuts, cocoa and coffee, other crops, fishing and livestock rearing in the agricultural sector. However, using employment composition ratio of 0.35 in agriculture suggests that cattle rearing, sugar cane, cotton and fibbers, fishing and other crops are the products that have the potentials of generating employment for the youth.

Figure 21   Products with higher youth composition in 2013 (ratio).
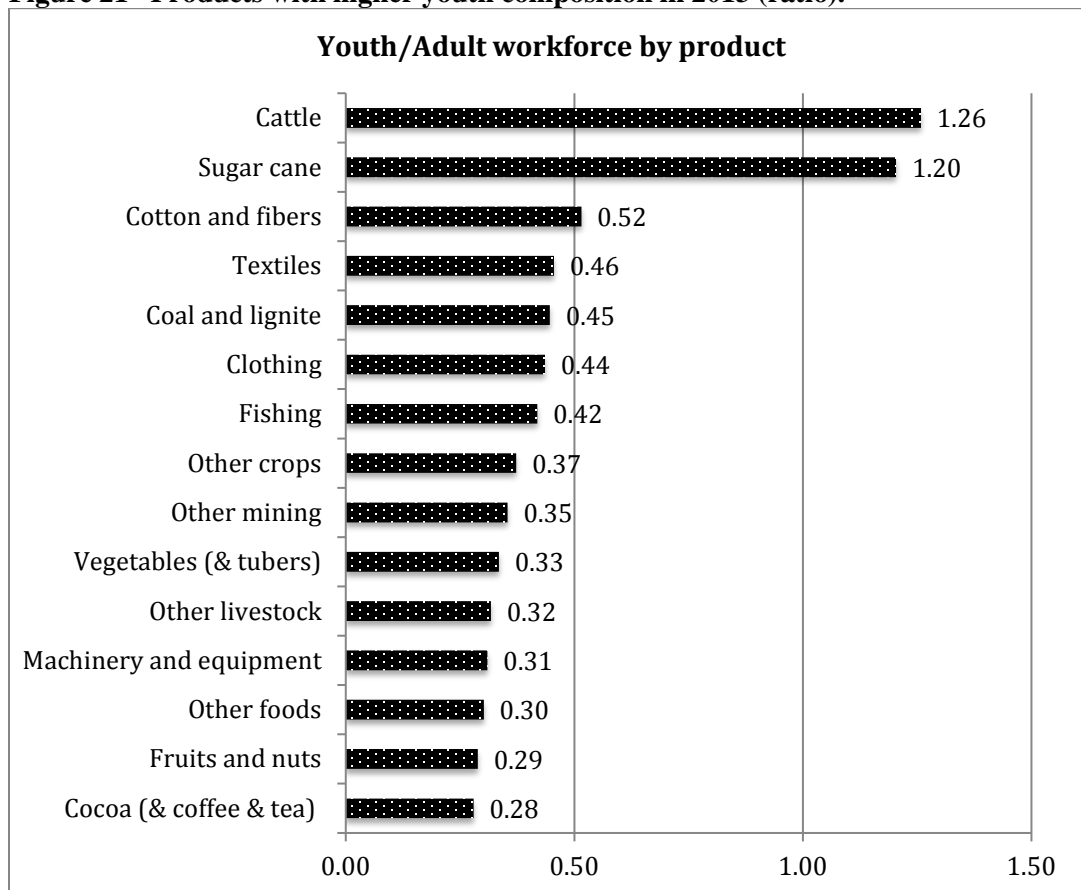
Source: Computed from GLSS VI of 2013, Ghana Statistical Service

In manufacturing with youth-adult employment composition of 0.29, industries with potential to generate employment for the youth include textiles, clothing, machinery and equipment and processing of other foods. Coal ignites and other mining are other non-manufacturing industrial products that have the potential to generate employment for young people.

6.3 Top 20 selected products with employment potential for women & youth

In this section, we look at employment potential of Top 20 products that were captured in the GLSS6 of 2012/13. A disaggregation of industry of employment captured only five products among the Top 20 selected products. Based on female-male employment composition of 1.08 and in manufacturing of 1.45 indicates that only chemicals have a strong employment generation potential with female-male employment composition ratio of 1.92 (Figure 22). Indeed, employment generation potentials of four other products – plastics, wood products, machine and electrical as well as metal products is skewed in favour of males with female-male employment composition ratio of between 0.02 and 0.15, far below the overall female-male employment composition of 1.08 and that of manufacturing of 1.45.

Figure 22 Ratio female-male & youth-adult in employment of some of the selected Top 20 products.
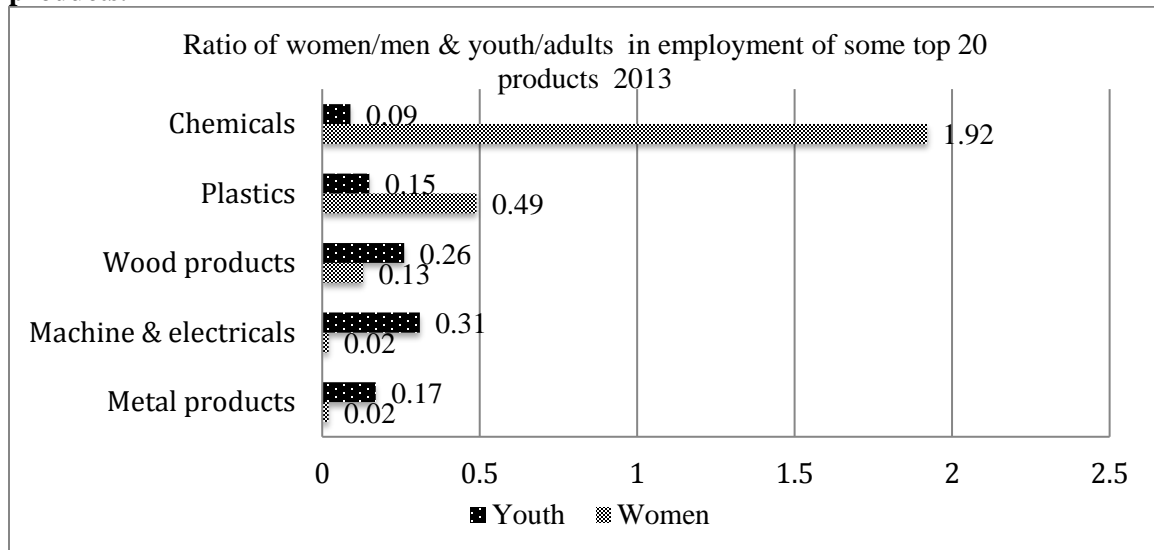
Source: Computed from GLSS VI of 2013, Ghana Statistical Service

Essentially, on the basis of the overall youth-adult employment composition ratio of 0.27 and 0.29 for manufacturing, only machine and electrical products stands out as the industry or product with high employment generation potential. A ratio of 0.26 for wood products suggests a moderate employment implication for youth with chemicals, plastics and metal products generating employment mostly for adults.

In effect, complex products do not seem to have high employment generating potential for women and youth while products or industries with high employment potential for women and youth were not selected. Thus, even though more complex products use lesser units of labour, a further investigation of the effects of the production processes of top products identified through field survey to identify capabilities and constraints would inform current policy in a more meaningful manner.

Part B

Section 7: Findings from Firm Survey and Interviews

7.0 Introduction

The second part of this study reports on findings from firm surveys that were conducted, based on analysis in previous sections of this paper. This section opens with a discussion on the type of sampling method and questionnaire utilized to generate information. In the subsections that follow, we touch on findings from the survey of firms, and interviews with industry practitioners. The findings are themed around unlocking opportunities and constraints for the employment of women and youth across various industry groupings. Policy considerations and conclusions are then drawn using a combination of complexity analysis and the breakdown of employment dynamics made earlier, together with firm findings.

7.1 Firm Identification and Sampling Strategy

The firms' selection, though not a random sample process of all medium or large scale firms in the country, provides a fair and good representation of manufacturing enterprises in Ghana. Interviews and discussions covered enterprises sited mainly in the four most industrialised cities in Ghana: Accra, Tema, Kumasi, Takoradi; and some in remote areas where firms with productive knowledge in making any of the Top 20 products, are located. In this regard, we adopted a non-random, multi-stage stratified purposive sampling scheme. This sampling procedure is adequate as the entire strategy used in the selection of firms embodies purposive sampling and follows a clearly-defined sequence: the two key features of the multistage purposive sampling method stressed by Onwuegbuzie and Leech (2007). It is also suitable for relatively smaller samples with special attributes, and utilized to achieve representativeness (Teddlie & Yu, 2007).

At the initial stage, 201 products were identified, and a list of Top 20 products generated based on product complexity, distance and opportunity gain. For the next stage where firms are selected, only medium and large-scale manufacturing enterprises that have the capacity to produce one or more of the Top 20 products are considered. The firms are carefully selected for us to obtain a balanced view of the constraints and opportunities across various product categories. Relatedly, there were instances where we resorted to expert sampling,[15] to solicit well-informed views and opinions from knowledgeable persons of certain resource industries. Great effort was brought to bear to reduce subjectivity in firm selection and avoid bias. Etikan et al. (2016) postulate that these biases could affect conclusions drawn from such studies.

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[15] According to Etikan et al. (2016), expert sampling is a sort of sampling in which well-informed persons are contacted to save time, and to gather in-depth information.

Additionally, firms which were included should have been in operation for at least five years or longer, thus, possess good institutional knowledge of industry happenings and be in a better position to give valuable information. To also forestall the weaknesses embedded in the sampling method adopted, interviews were conducted with firms whose products are not in the top ranked categories above, but meet the distance/complexity criterion and are in the top manufacturing products or agricultural products (processed agricultural product) list ranked according to the parsimonious strategy discussed earlier. This informed the inclusion of firms in the food and beverage industry (see Table 11). The heterogeneous nature of firms and associated diverse product mix (firms were drawn from the following industries: chemicals, plastics, machinery/electrical, wood and metal products, and food and beverages) enabled this study to garner insights and opinions that reflect the manufacturing sector in Ghana. In all, a total of twenty firms were selected. Table 11 below, provides details of the number of firms contacted according to product category:

Table 11: Firms contacted for Survey grouped by Product Communities

Product Community/Sub-categories	Number of Firms Interviewed
Chemicals	
Pharmaceuticals	2
Paints	3
Cosmetics (Beauty, Hair Products & Shaving	2
Rubber/Plastics	4
Machinery/Electrical	2
Metals	2
Wood/wood products	2
Food & Beverages*	3
Total	**20**

Source: Generated by Authors

7.2 Survey Instrument

A semi-structured interview guide was used to request views and responses from operational managers, human resource executives, and industry experts. This questionnaire contained questions requesting detailed information on products (or 'nearby' products) the firms make; those they can add on to their product lines; constraints and opportunities pertaining to their operations; and what limits them from launching new products. Also included in the guide was a skill review that looked out for skills requirements, and whether or not existing training offered by educational institutions is adequate. Lastly, the questionnaire sought additional views on opportunities for the employment of more women and youth (taking into consideration firms expanding into new frontiers) and the roles industry/governmental agencies and other stakeholders can play in addressing skill mismatches.

7.2 Unlocking Growth through Diversification – Survey Findings

Responses from the firm survey which answers questions on existing product lines and related products (product space), together with skills reviews, are evaluated here according to the broad product categories that make up the top products. The analysis in some cases is further extended to specific product ranges under each broad class. Thus, following previous discussions, issues related to challenges or constraints firms face, opportunities and prospects for employment of young women and youth are captioned under the following product communities:

(i)   Chemical and allied industries
(ii)   Metal
(iii)   Rubber/Plastics
(iv)   Wood products
(v)   Machinery/Electrical products
(vi)   Food/Beverages

Furthermore, under each product category, the sub-sectional areas highlighted are: (i) capabilities of firms, opportunities for expansion and constraints, (ii) opportunities for employment of more youth and women, alongside a review of skills set requirements within each industry.

7.2.1 Chemical and allied industries

A fourth of the Top 20 products are associated with the chemical and allied industry. Due to the heterogeneity of the products identified, and the important role chemicals play in any economy, the reported findings hereafter are specific to the following sub-groups: pharmaceuticals, cosmetics and paints.

▪ *Pharmaceuticals*

The pharmaceutical industry is dominated by manufacturing companies – most of them double as wholesalers. These manufacturers import almost all inputs and some final products from abroad (Sutton & Kpentey, 2012). Imported finished and locally manufactured products are sold to retail outlets across the country. The domestic market is estimated to constitute about 30%; importation of some generic products are banned, with a chunk of firms being importers who run their own distribution networks selling to wholesalers, the numerous over the counter dealers (operating in shops) and institutional purchasers (Seiter & Gyansa-Lutterodt, 2009). In 2017, a total of 49 medicines were further reserved for local manufacturers to boost domestic production (Bokpoe, 2017). A major buyer of drugs is the government of Ghana, which procures medicines on credit through hospitals and other public health centres under the National Health Insurance Scheme (NHIS). Institutions that regulate the pharmaceutical industry are the Ministry of Health, Ghana Pharmacy Council Ghana, Ghana Standards Authority, and the Environmental

Protection Agency (EPA). Licenses and permits for setting up manufacturing units and producing or introducing new products onto the market, are subject to the regulations of the Ghana Standards Authority, Pharmacy Council, Health Ministry and EPA. The Food and Drugs Authority, which operates under the auspices of the MoH, exercises control over manufacturing, importation, export, distribution, usage and advertisement of drugs in Ghana. Supplying about 19 out of 20 most used drugs on the list of NHIS approved medicines; the PMAG estimates that the industry's (inclusive of existing jobs) total number of direct and indirect jobs could hit 4,900 and 1.9 million respectively, by end of year 2018 (PMAG undated). Though the sector receives generous tax exemptions for some imported raw materials as well as other incentives, earlier studies have enumerated several challenges limiting expansion. High import duties on inputs, costly utilities, bad road networks, inadequate skilled personnel, difficulty faced in acquiring land owing to the complex land ownership regime that pertains in Ghana, and other bottlenecks that constrain export to countries in the ECOWAS sub-region, are among the main challenges faced. Another limiting factor is supply chain constraints, [16] which could indirectly affect operations of local manufacturers.

Constraints and Opportunities for Diversification
Most firms in the pharmaceutical industry produce packaged medicaments in tablets and liquid form. A firm, which also produces fruit beverages unrelated to the medicaments, said in the interview that they choose such a production line based purely on profit. It was observed that manufacturers plan to increase capacity of their plant to manufacture more drugs. One of the firms intends to invest in infusions (injectables) requiring an initial capital outlay of $10 million. According to this firm, market analysis they have commissioned shows that there is demand for this product, as the only company that produces intravenous infusions in Ghana cannot meet total demand. The main challenge firms face in regards to such expansionary motives, is the cost of capital (high interest rates).

Apart from the above constraint, attempts at expansion are also hampered by difficulties faced in entering large markets in the sub-region, such as Nigeria. Even in cases where products are approved and permitted by NAFDAC, when clearing at ports in Nigeria, they are faced with extreme drawbacks. In spite of trade protocols and free trade agreements, an exporter has to contend with so many intermediaries. In addition, the sensitive nature of pharmaceutical products requires companies to set up their own distribution systems (for sales activation and promotions), incurring high costs of warehousing – and in some cases, costs for procuring distribution vans and paying qualified marketers. One firm explained that to stay afloat in the Nigerian market, they would have to increase volumes and reduce margins on some of the products. Though there have been reported cases of harassment by

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[16] Asamoah, Abor and Opare (2011) examined supply chain problems for the pharmaceutical product artemisinin-based combination therapies (ACTs) in Ghana.

regulatory bodies such as the Food and Drugs Authority, one of the firms noted that their supervisory role, and standards requirements have enabled them to produce drugs that meet international standards. They also mentioned that pharmaceutical companies and these agencies are currently working on a technical document to make drugs produced in Ghana acceptable everywhere. Through such supervision and support, a company was able to produce for UK's DFID. Other challenges that companies face are high costs associated with obtaining letters of credit, import duties (the introduction of a paperless clearing system at the ports has resulted in higher duties), costly handling and delivery charges, the influx of imported medicines, exchange rate fluctuations, and high electricity tariffs.

Opportunities for Employment of Young People and Women
The pharmaceutical industry receives a lot of support from government, and could create a number of jobs for the youth and women. However, employers in the industry place a premium on a candidate's qualification and technical know-how, and on who has the competencies for higher productivity and efficiency – which young workers and women in Ghana usually lack. When a firm was questioned as to whether there were any hindrances in engaging more women, managers indicated that a lot of women already operate machines at their production unit, as work is structured in a flexible manner to accommodate maternity and other care giving duties, without targets being sacrificed. The total workforce for large firms in this industry ranges from five hundred to five hundred and fifty employees. On average, women constitute about 10% of the total workforce in a typical pharmaceutical firm. The proportion of total employees, who are young workers, is approximately 12%.

The pharmaceutical industry, being a highly regulated industry, requires that firms employ qualified personnel. Regulators (including the World Health Organisation) may be sanctioned companies during inspection if they fail to adhere to these standards. In one of the companies interviewed, since its inspection, expatriate plants managers are hired to augment local skills. On average, in the industry workers employed come with university degrees. One firm noted that the difficulty in thinking about new areas to launch into in the industry, is the dependency on technical know-how and skills that exist. Opportunities for more jobs for young people are generally brighter for new enterprises, as it was observed that most of the workers employed by firms were first engaged when there were relatively younger.

- *Cosmetics*
Cosmetics, one of the main consumable components of chemicals, has several products under its product range: beauty, hair, shaving, perfumes, and many related products. In Ghana, the firms that are involved in making these products are foreign-owned. Their manufacturing units also churn out soaps, food, and beverages, together with other

consumables (cleaning products amongst others), relying exclusively on imported raw materials. The local manufacturers are mostly medium and small enterprises, and are usually associated with herbal-based products making use of local inputs such as shea butter, and semi-processed cocoa products. Due to the special influence cosmetics have on individuals and societies, industry players can remain competitive by promoting their brands and launching several product ranges (Kumar, 2005).

Constraints and Opportunities for Diversification/Expansion
The production of these fast moving consumer goods (FMCGs) rely heavily on imported raw materials, and on a few local ones (namely shea and cocoa butter). Companies are saddled with higher import duties, energy costs, and delays at the ports. (An industry expert said that procedures at the ports are longer than they used to be prior to the electronic clearance system. The expert noted that in most cases, once suppliers and other bills are settled, margins have been eroded). Thus, as they find it difficult to produce locally, most manufacturing companies have their production bases in Cote d'Ivoire, and import finished products. The cheap imports from Cote d'Ivoire (produced by the cosmetic companies with manufacturing sites there) and Europe dampen demand – affecting local production. Firms also cite labour costs as 'high'. With regard to the local raw materials, a problem that impedes production is issues with substandard products which can render companies uncompetitive and take them out of business.

Companies interviewed could produce hair and beauty products. Aside from these products, firms could add cleaning and perfume items to their production lines. Though cleaning products such as hand washes do not fall directly under cosmetics, firms could easily redeploy resources to produce them. Within the past year, many of the companies have introduced hand washes and other cleaning products. While some of the firms have made inroads into the Liberian market, obstacles have hindered exports to Cote d'Ivoire and Nigeria by many others.

Opportunities for Employment of Young People and Women
Unlike the metal and other heavy industries, production techniques utilised in the cosmetics industry do not generate heat or require heavy items to be lifted. Even though large manufacturing units within this industry employ between five hundred and a little over six hundred workers, women workers are largely situated in the administrative sections (e.g. accounts, marketing and human resources), with a few working in the laboratories. Fewer women are on the factory floor. Young workers constitute 15 to 20% of the total workforce. The proportion is relatively higher in periods of increasing demand when more casual staff are recruited. Experts posit that more jobs can be created for both women and young workers if the bottlenecks (highlighted above) withholding expansion, are removed.

In terms of educational qualifications, a skilled worker should have completed a senior secondary education, and be trainable. A casual worker must have a basic level of education (in Ghana a BECE), and meet the minimum age of 18 years. A manager reiterated that senior secondary or polytechnic graduates are preferred to sustain succession plans, as most workers with just a basic level of education are not trainable and do not cooperate well with new workers who are more qualified. It was observed that vacancy rates for casuals can be high, but due to low turnover, for permanent (skilled workers), new jobs are created following the addition of a new department. Training provided at educational institutions should be well tailored for industry. A top executive, when commenting on the quality of graduates, said that graduates have not performed well when recruited. According to the executive, the curriculum in Ghanaian universities has to equip students with analytical skills and incorporate practical training and exposure to actual production processes.

- *Paints*

The paint industry comprises a few local manufacturers and many distributors of imported paint from Europe, South America and China. The local producers have product lines that are imported. These firms make house and auto paints, exporting to the following countries in West Africa: Togo, Nigeria, Benin and Burkina Faso. Products made by these companies extend to other architectural/masonry paints (emulsion and oil paints), carpentry paints, tile adhesives and other related products (putty filler, turpentine, wood primer, thinners and glue). This industry has distribution outlets that are heavily dominated by retailers (who also deal in hardware products) and wholesalers in the major cities. The wholesalers of paints are usually the importers themselves.

Constraints and Opportunities for Diversification/Expansion

The major drawbacks for paint manufacturers are the high energy costs and exorbitant import duties paid on imported inputs (pigments). A manufacturer mentioned that companies pay almost 30% on Free on Board (FOB) price of inputs as imports duties, and other numerous charges at the ports (this comprises 17.5% VAT, 10% import duty, a Shippers Council fee amongst others). Handling, delivery, transportation and warehousing costs before and after production increase the operational costs of companies. Other challenges enumerated are high interest rates and taxes. Imported paint is also a threat to expansion plans. A top executive noted that individuals undercut companies by making inferior paints in their homes and abandoned buildings (without paying appropriate taxes), to sell at unreasonably low prices. This executive, whose company exports to Nigeria and Liberia, cited specification differences between countries and undue delays at the entry points, as some of the drawbacks his firm faces. The executive recounted an instance where a two-day shipping of a container load of tile adhesive to Nigeria took two weeks – even though they satisfied all the regulations of the Nigerian agency stationed in Ghana that has authority to certify products even before they are dispatched. In terms of distribution, firms

reiterated the concerns of wholesalers and retailers of their products, with regard to the poor transportation network that impacts on delivery times. When asked about whether the industry has good prospects for the future, managers of some of the paint companies stressed that the increase in the construction of commercial and residential facilities could hold the magic wand. They further indicated that gains may be eroded if economic stability become unsustainable. Intense supervision of the operations of paint producing companies, and strengthening of standards approval procedures, were some of the recommendations put forth by companies interviewed.

Opportunities for Employment of Young People and Women
The highly mechanised and technologically intensive production techniques used in the manufacturing of both aqueous and non-aqueous paints makes this industry relatively not a fertile ground for employment creation. Two firms employ between 360 and 450 workers (inclusive of casual workers) when operating at optimal capacity. Young and women workers make up 11% and 5% respectively of the employees engaged in the industry. To human resource executives, the high-tech production processes require that graduates from the universities, polytechnics and technical institutes be well-versed in machine operations, maintenance and mechanical engineering to be successful in securing employment in the industry. In terms of employment prospects, one firm stated that they intend to add on solutions for preparing walls before painting and fillers, but these additions may require a mini set up. A few workers (70-100 extra hands; mostly unskilled) may be needed to dispense the solutions and fillers into buckets.

7.2.2 Metals
The main product groupings under the metal industry in Ghana are iron and steel, aluminum, and metal fabrication. Due to the closeness of firms in the three groupings – both in operational and locational spaces – constraints and opportunities cut across them all. A few large firms that make products for the construction and mining industries dominate steel manufacturing in Ghana. With large deposits of bauxite in Ghana, and mining taking place currently in only one of the three main sites, the quest for an integrated aluminum industry has, however, eluded the country for the past five decades.

Constraints and Opportunities for Diversification/Expansion
Here we will first of all look at the aluminum industry, and later extend the discussion to other metal products. The aluminum industry has been largely projected as the foundation for the massive and rapid transformation of the Ghanaian economy. Ghana has a smelter that could provide other manufacturers with critical inputs (aluminum ingots), in addition to serving as the processor of raw bauxite, which is projected to last for two centuries. The main smelter in Ghana, Volta Aluminum Company Limited (VALCO), has had to shut down and reopen several times due to electricity generation challenges over the past three decades. Due to the challenges faced by the smelter (that now runs two out of its five

plants), the operations of many manufacturers that produce aluminum products for the construction industry and hollowware, have been adversely impacted.

In addition to the high-energy costs (which make firms uncompetitive), infrastructure (a railway network), which could enhance efficient backward linkages to bauxite deposit sites is virtually non-existent. It was further noted that companies exporting from this industry to countries in the ECOWAS sub-region have to grapple with cumbersome administrative checks at the ports of entry – crippling expansion. Main products made by the metal producers are iron rods, galvanized products, and nails. The metal industries comprising iron/steel production and metal fabrication units share similar constraints. Apart from various iron products firms manufacture, steel roof trusses are another metal product which is currently in demand due to its durability as support for roofing of residential and commercial buildings, compared to timber that was previously used. A limitation for firms that produce metals is the unreliable nature of the raw material, which they source from small metal scrap dealers. Metal fabricators stated that high import duties on raw materials and machinery are a major drawback for their operations.

Opportunities for Employment of Young People and Women
With the exception of the smelter, which when fully operational can employ more than a thousand workers, the other manufacturers in the aluminum industry engage between 170 and 350 employees. The employment content for metal fabrication units, which have the capabilities to make agricultural machinery, is generally low. Fabricating firms employ on average 150-200 workers. Employment levels of firms in the iron and steel industry are relatively higher; the workforces range from 400 to 600 employees. Women workers' representation across the three sub-categories is very low – less than 5%. Young workers, though higher than that of women, is comparatively low. The proportion of workers who are young constitute between 9% and 10% of total staff strength of firms. On what could be done to raise the participation rate for young workers and women, experts and business executives suggest a reformation of TVET modules to reflect changing trends in the industry.

7.2.3 Rubber/plastics
Ghana's plastic industry manufactures packaging products for the food and beverages, building and construction, and chemical and electrical industries. Several products in the form of plastic household wares (spoons, tables and chairs, buckets, bottles) and industrial and construction pipes, are covered by the industry. The unreliable water distribution, and in some cases non-existing pipe born water systems, across Ghana have resulted in many companies manufacturing overhead plastic water storage tanks.

Constraints and Opportunities for Diversification/Expansion

Due to the diverse mix of products in the rubber/plastic industry, firms contacted stated that they could add several household items and construction related products to what they currently produce. High electricity costs, labour costs, and the unfavourable tax regime, are the main challenges limiting expansion. Others, especially firms that produce plastic household ware, mentioned that cheap imports of household plastic wares (especially from China) make competition fierce for the many firms making these items. Added to the cheap imports are higher duties imposed on raw materials – almost all of which are imported. Ghana does not have an integrated rubber industry. The raw rubber producers mainly manage plantations and enhance the capabilities of out-grower farmers exporting dry latex rubber, their main end product. Firms reported that the immediate action which may make them competitive for the domestic market and for exporting to the ECOWAS sub region, would be a reduction of electricity tariffs for industry, and a comprehensive revision of taxes.

Opportunities for Employment of Young People and Women
The pipe and construction producers that are at the high end of, and dominate, the plastic industry, employ between 400 and 1,200 workers. Young and women workers represent 10% and 4% respectively. More women however benefit at the low end of the rubber industry, and participate as out-grower farmers, constituting about 15 to 20% of the total workforce. According to experts interviewed, to increase the involvement of more women and young workers, training well-tailored to the industry has to be given – as there is no learning centre that offers programmes for the plastic industry. It was also noted that hundreds of products are covered under plastics, thus once barriers inhibiting the expansion are eliminated, several products could be introduced, necessitating an increase in employment.

7.2.4 Wood products
Revenue generated for Ghana through the export of wood and related products is a significant component of its total exports. Products traded include timber and semi-processed forest products. The Forestry Commission of Ghana categorises wood exports as primary (poles and billets), secondary (lumber, plywood, veneer and boules) and tertiary (comprising mainly processed wood products such as mouldings, dowels and floorings) (Ghana Forestry Commission, 2018). Of the three groupings, secondary wood products contribute more to revenue, followed by primary and tertiary wood products – indicating the low value addition of much of the wood products exported from Ghana. Enterprises engaged in the wood industry, especially the large companies, export mostly primary and secondary wood products. Small and medium scale enterprises though add value to wood products by moulding furniture and other household furnishings. Business owners and workers have limited technical and managerial know-how (Gokcekus et al., 2001). Wood crates were one of the Top 20 products identified. This industry utilises technology that is not too sophisticated (uses more labour) and can be relied on for the creation of more jobs.

In addition, it has strong forward linkages to the furniture, construction, and other industries. We next consider the constraints and opportunities companies that could produce one of the top products selected, i.e. wood crates, face – as well as the employment potential for young people and women.

7.2.4.1 Constraints and Opportunities for Diversification/Expansion
Processing wood requires a reliable supply of timber. Firms that make semi-processed wood lease forest concessions from which processing plants are fed. The challenge the manufacturers of wood products (commonly referred to as sawmills) face, is illegal lumbering in acquired concessions. Also related are the high stamp fees charged by the Forestry Commission of Ghana, and the bad nature of roads and social infrastructure in the towns and villages where the firms are sited. This leads to higher maintenance and transportation costs incurred in carting wood to processing sites. The firms contacted also mentioned that costly electricity is crippling operations. To them, if these constraints are dealt with, several wood products could be added to their production lines, and exports would not be limited to semi-processed wood products.

Opportunities for Employment of Young People and Women
On average, a fully functional wood processing company employs between 1,000 and 2,000 workers but these jobs have to be taken up in remote areas far from the major cities. In a typical wood-processing factory, young workers (aged 18-25) make up about 9% of total number of employees. Women constitute about 2%, showing that the industry is a male-dominated one. In terms of skills and given that most workers are engaged as casual staff, the nature of operations does not require high levels of education/training. The limited involvement of women in this is industry according to industry experts stems from the generation of excessive heat and noise in the production process (mostly mechanised production process), which is risky to their health. The adoption of automation and new technology based on digitisation devoid of generation of excessive heat in the production process could facilitate the promotion of women participation in the wood industry..

It was also observed that the industry could absorb more young people if the furniture industry (which uses raw and semi-processed wood from the wood processing companies) is revamped by the protection of local furniture makers (mostly SMEs) against imported products from China and East Asia. Within the industry, apart from management, production managers and technicians, many workers could be employed if they have completed secondary or technical education. An industry expert who was interviewed said that what is lacking is the requisite skills needed to use modern technology to produce more sophisticated wood products to compete with similar imported products, which are made using less or no wood. The expert also opined that women could also be exposed to technical aspects of secondary education, instead of the traditional vocational training

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which focuses on catering, soap making, dressmaking and hairdressing as the usual programme offerings.

7.2.5 Machinery/Electrical products

To gain insights into the opportunities and challenges in the electrical industry, which falls in the machinery and electrical products classification, we undertook an interview with a firm that has the capability to produce low voltage protection equipment, and another whose productive capacity is close to soil preparation machinery. Apart from the firm interviews, we gathered additional information through key informants and industry experts. The subsections below capture the observations made.

Overview of the Product Space and Capabilities for Diversification

An interview with the firm that produces cables and conductors, shows that they produce a variety of metals related products (aluminum wires, copper wires). Their preferred export destinations are Togo and Cote d'Ivoire. On the issue of diversification, the firm noted that addition of products to the production mix is not considered as a diversification measure, but one of cost-saving. In this regard, a plant had been set up to produce polyvinyl chloride (PVC) compound insulation to serve as a covering for raw copper. According to them, this measure was taken to reduce their reliance on imported PVC products for their industry. It was further stressed that this product has great potential and had been marked for export. At the time of the interview, negotiations with importers from Nigeria and Cote d'Ivoire were underway, following submission of samples. Water holes are another product which can also be produced using the same process as the PVC compound insulation method – but the low revenue associated with its production does not make it prudent for the firm to venture into. Through the discussions held with the company, the nature of their production process opens up opportunities for the manufacturing of products not originally planned. The know-how built for launching onto new products is facilitated through their quality control unit.

Constraints and Identification of Paths for Future Diversification

In terms of drawbacks the industry faces, especially with regard to exports to the West-African Sub-Region, the following stand out: non-adherence to favourable tariff schemes (cost of documentation in accessing), freight forwarding charges, and transportation (carried inwards). Even though the cable manufacturer noted that they are very competitive in the Economic Community of West African States (ECOWAS) region, importers of their products under a tariff exemption scheme, the ECOWAS Trade Liberalisation Scheme (ETLS), are frustrated at the ports. Clearing of goods at these ports takes close to a month instead of a maximum of a week, as goods are subjected to unrealistic checks. These frustrations adversely impact on their exports – particularly to Nigeria.

Aside from the limitations above, another challenge is cable specification differences between Francophone and Anglophone countries. A respondent remarked that it becomes difficult to get Francophone partners to understand the specification of products, as against what they are used to. Other costs related to exchange rate fluctuations, interest rates, machinery and capital, energy, hiring of skilled labour, training and duties on imported raw materials, constituted a sizable proportion of total cost to be incurred if they are to expand their product space, and impedes expansion.

Opportunities for Employment of Young People and Women
In one of the companies where an interview was undertaken, out of a total workforce of 130 workers, only 8% are male workers aged from 18 to 24. The proportion of women workers (8%) is the same as those young employees. Generally, employment in this industry is low: firms on average have 150 employees. According to executives, very young workers are disadvantaged, as a business code the company has signed onto (Ghana Business Code) enjoins them to engage only workers who are 18 years or older. On the barriers to engaging women, it was realised that the rate of leave requests was high among women (maternity leave and other privileges informally accorded for lactating mothers at the workplace). The muscular environment was another major challenge. Hence, productivity is greatly affected and when an interviewee was questioned on any incentive that could enable the firm to overcome this challenge, it was indicated that "none comes to mind".

Automation and mechanization in this industry could be unfavourable to employment prospects should the firm diversify into other products. As indicated earlier, water holes is a new product very close to the current capabilities of one of the companies contacted. But, according to them, it may generate a limited number of jobs (10 additional jobs). From discussions on the way forward in recruiting more women, it was emphasised that firms can form associations and use that platform to identify special needs for women and train them accordingly.

Electrical products and machinery production entail the usage of very technical and knowledge-intensive production systems. Indeed, for instance in the electrical industry, specific qualifications and skills are required for a company to operate fully and efficiently. In Ghana, no tertiary or technical institute offers training on cable manufacturing. Firms indicated that at the start up stage, or if a new unfamiliar product is to be added, they bring in expatriates (on contractual basis) who are understudied by Ghanaian workers. To augment these efforts, they usually recruit graduates from the technical universities and other technical/vocational training centres. A human resource executive noted that the competencies of young workers usually fall short of the skill sets required, due to lack of

experience. Another top manager reiterated that even for engineers from the universities, you cannot 'plug and play them'[17] into the production process, as they are not exposed to operations when training is being offered to them.

7.2.6 Food and Beverages

Ghana's food and beverages industry is a vibrant one. Both multinational and locally-owned firms dominate the market for alcoholic and non-alcoholic products. This highly competitive industry has manufacturers who make carbonated soft drinks (CSDs), dairy products, fruit juices, alcoholic beverages and bottled water. In this section, we report on findings based on interviews with a CSD company and a firm producing milk-based products. Though many of the firms in the industry import concentrates for production, the fruit processors use local fruits, which are seasonally available: pineapples, mangoes and oranges.

Constraints and Identification of Paths for Future Diversification

In the food and beverages industry, particularly for firms that import concentrates from abroad (Europe), their main challenge is the high import duties charged at the ports. Some of the firms cited instances where the quality of locally sourced raw materials was low. One manager remarked that they rely on imported blended ginger from Germany, as this input is not blended properly in Ghana. Another drawback to using more local inputs was the difficulty of land acquisition, together with its documentation, which inhibits large scale farming, and hence the setting up of agro-based industries. The land problem was not limited only to cultivation of raw materials, but to space in industrial areas and zones where companies could install their processing plants. Access to finance was also observed as a major challenge. A firm contacted reiterated that it is easier to obtain a supplier's credit in the UK than in Ghana, and the collateral in the form of lands and buildings which can be used to secure loans are hampered by land ownership problems. Other challenges enumerated by industry players included unreliable and costly electricity, inadequate support for manufacturers, and exorbitant taxes. For the CSD industry, aside from all the other taxes paid, currently all carbonated drinks have to be affixed with tax stamps at the firms' expense (companies have been asked by government to install and operate these machines at their own expense).

On opportunities that exist within the operations of enterprises contacted, some indicated their readiness to add other closely related products onto their production mixes. An executive of a yoghurt-producing firm stated that his company could produce yoghurt with fruits (musings), cup yoghurt, and candy from yoghurt. The carbonated soft drink producer that also makes bottled water, mentioned that barring any difficulty, they intend to set up

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[17] The phrase 'plug and play them' was used figuratively to indicate the ease with which supervisors and managers can integrate newly recruited staff into operations on factory floors.

their own fruit concentrate plant, and produce fruit juices and herbal-based drinks. These planned initiatives could produce relevant linkages to agro-based industries and provide employment.

Opportunities for Employment of Young People and Women
Due to the growing demand for products under the food and beverage industry considered as fast moving consumer goods (FMCGs), employment content should have been higher. Increased mechanization has been the bane against job creation in this industry. Medium and large-scale firms in the beverages industry employ about 500 to 1,300 workers, with about a fifth of the workforce aged below 25 years. Male workers dominate the production processes of firms, but depending on the nature of operations, more female workers may be engaged. A respondent whose firm manufactures bottled and sachet water said that women constitute about 40% of this aspect of production. About the employment potential of new products the firm may venture into, it was realised that expansion would be done through automated processes and thus, the number of workers would be reduced. Others also mentioned that if turnkey machinery is procured, it may lead to an increase in the total workforce, as more workers could be recruited to augment staff in the sales, marketing, and distribution sections.

On the labour supply side, it was noted that training offered, particularly by the universities, is inadequate. A manager, in providing details, observed that graduates from such institutions know next to nothing when they are first engaged. From the interview and discussions, business executives and other practitioners emphasised that given the right atmosphere, women and youth can take initiative and perform credibly. Firms contacted also cited instances of successful complementary training by manufacturers of plant and machinery during installation, which has upscaled skills of young technicians. Given the specificity of the training, capacities of workers are built, and in periods following the training, their competencies are brought to bear in the repair and maintenance of installed machinery.

Section 8: Conclusion and Policy Considerations

8.1 Summary and Conclusion

Ghana's economy is not too complex, though it has experienced high economic growth over the past decade. The country's product space is composed purely of products in the peripheral section, with limitation for redeployment of resources for the production of a diverse set of products. The growth path of Ghana appears to be threatened; as its income level measured by real GDP per capita is high given its productive knowledge captured by the Economic Complexity Index. Employing the complexity framework, it has been possible to identify relatively more complex products that are not far from Ghana's productive knowledge (within reach) that could speed up the diversification of the economy. In terms of employment however, most complex products were found to have limited employment generation potential; while many products that have the potential to generate employment for youth and women were not listed among the Top 20 frontier products. Following the complexity analysis, twenty firms across six product groups (chemical and allied industries, metals, rubber/plastics, wood, machinery/electrical and food and beverages) were contacted to obtain information that will assist in growing complexity and generate decent employment for youth and women.

The results of the firm survey reveal that firms do have the capacity, and in some cases have made attempts to manufacture products close to their production domain (nearby products). Firms' expansion drives to add on other products and to increase production volumes are hampered by difficulty in accessing larger markets within the ECOWAS sub-region (products that are exportable through a free tariff regime are subjected to unreasonable delays at the ports). Additionally, cost of production according to firms is extremely high. Notably, firms have to grapple with high interest rates, duties on imported raw materials, exchange rate fluctuations, taxes, electricity costs, and labour costs and associated training costs. Due to the absence of specific training institutions for key industries, firms resort to hiring expatriates to upscale the skills of workers. Furthermore, issues of the ineffective regulation and influx of cheap imports were also cited as challenges that impede expansion efforts and hence, impede increasing complexity. Also, in situations where local inputs are sourced to enhance backward linkages, especially for manufacturers of cosmetics and food beverages, it was observed that these intermediate products are not of the required standard.

In terms of employment, on the whole women and youth representation in many of firms contacted, is low. For young people, the reasons given are the lack of experience worsened by poor quality of education offered at training institutions. It was noted that most students are not exposed to workplace culture during training and hence found it difficult to perform

efficiently in real work settings. For women, the frequent withdrawal from work to attend to reproductive and related duties makes it unprofitable for employers to increase their numbers.

8.2. Policy Recommendations

The above constraints and challenges require short, medium and long-term critical interventions to reduce the cost of production. In the short to medium term, the trade liberalisation regime in West Africa has to be closely examined and reviewed. The difficulty firms face in accessing Ethe COWAS regional market within the regional free tariff regime, reinforces the concerns that Ghana and her neighbours are good at designing policies, but always face implementation challenges. It is imperative that countries in the ECOWAS sub-region show commitment to enforcing the free trade agreement within the sub-region to promote intra West Africa Trade, to facilitate the growth of manufactured exports for job creation. Additionally, and as a matter of urgency, government must show more commitment to designing and implementing measures to promote sustained macroeconomic stability (low inflation and exchange rate stability), reduce taxes and duties on imported raw materials for manufacturing, and ensure a stable supply of affordable electricity to facilitate growth of manufacturing exports. Maintaining a stable macroeconomic environment is crucial, and carefully targeted reprieves for import duties for firms should be considered – as several of them rely on imported raw materials.

The limited number or lack of specialised training schools calls for support for firms in establishing research and development (R&D) departments, and in their collaboration with polytechnics and universities. Any reforms directed at improving the quality of graduates from tertiary educational institutions have to incorporate work-based learning schemes that align industry needs to skills that are imparted. Similarly, government has to commit resources to train more girls in science, technology, engineering and mathematics (STEM) education.

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Appendix

Table A: Summary statistics of all 201 (Non-RCA) products identified

No	Product Community/ Product description	RCA	Value of Ghana's export (US$'000)	Value of Ghana's import (US$'000)	World Trade (US$'m)	PCI	Opportunity Gain	Distance
	Animal & animal products							
1	Bovine	0.0049972	28.35	923.23	8,170.00	0.13253140	0.15053760	0.93978970
2	Edible Offal	0.0115911	55.50	32,300.00	7,490.00	-0.25741560	0.33419130	0.95311740
3	Poultry Meat	0.0747884	1,233.27	111,000.00	24,000.00	1.36846800	0.60082380	0.95990770
4	Concentrated Milk	0.5683846	7,092.38	49,100.00	18,000.00	-0.12677270	0.16234400	0.93865200
5	Fermented Milk Products	0.0041113	11.59	2,423.50	4,030.00	1.15557400	0.37993360	0.94659630
6	Whey	0.0322172	92.57	5,257.97	4,080.00	1.78676900	0.80477450	0.96193500
7	Butter	0.0118869	55.64	5,809.83	6,630.00	0.82743410	0.45690130	0.95832780
	Vegetable products							
8	Bulbs and Roots	0.3100869	345.92	2.18	1,590.00	-0.85112170	0.09427680	0.94644140
9	Foliage	0.5544618	436.26	37.26	1,120.00	-0.53241370	0.03838110	0.94337470
10	Frozen Vegetables	0.1123201	459.41	950.41	5,870.00	-0.33102030	0.08862610	0.94502480
11	Frozen Fruits and Nuts	0.0059524	18.00	50.73	4,290.00	-0.17362010	0.02240620	0.93765740
12	Dried Fruits	0.4044488	656.61	12.74	2,330.00	-0.47570220	0.04282610	0.94576540
13	Corn	0.0278378	588.26	18,400.00	29,800.00	-0.68822800	0.15664530	0.94885630
14	Starches	0.2423913	701.30	1,604.57	4,110.00	-0.11758260	0.34051980	0.96071800
15	Oil Seed Flower	0.0278747	21.03	2,330.27	1,080.00	-0.34766530	0.21386140	0.95646350
16	Sowing Seeds	0.0091732	40.70	2,180.68	6,320.00	-0.71550830	0.14262570	0.94524880
17	Inedible Fats and Oils	0.2363686	364.52	77.31	2,240.00	0.30178560	0.22121410	0.95433830
18	Stearic Acid	0.5930820	2,953.69	561.28	7,070.00	1.37991900	0.61654000	0.95966650
	Foodstuffs							
19	Other Prepared Meat	0.0055970	57.71	9,740.65	14,700.00	1.21958300	0.53330450	0.95485300
20	Other Sugars	0.0481097	189.98	3,504.03	5,630.00	1.17633100	0.49789550	0.96009460

No	Product Community/ Product description	RCA	Value of Ghana's export (US$'000)	Value of Ghana's import (US$'000)	World Trade (US$'m)	PCI	Opportunity Gain	Distance
21	Confectionery Sugar	0.0234818	166.59	23,000.00	10,200.00	-0.14226860	0.07414810	0.93361900
22	Chocolate	0.0458939	796.99	8,059.96	25,000.00	1.20002300	0.52353440	0.94863560
23	Malt Extract	0.8482836	10,200.00	37,300.00	18,500.00	0.86261370	0.45490380	0.94912270
24	Prepared Cereals	0.0534376	213.39	3,728.52	5,680.00	0.50941740	0.36872790	0.94515430
25	Baked Goods	0.0243160	495.17	25,700.00	29,300.00	0.18368970	0.18923700	0.93867890
26	Other Frozen Vegetables	0.0113720	56.07	1,007.63	6,970.00	0.83969890	0.60691230	0.96513370
27	Jams	0.0255759	49.40	500.95	2,750.00	0.14741150	0.11461570	0.94107450
28	Sauces and Seasonings	0.0491229	364.80	14,400.00	10,800.00	-0.07328040	0.19124780	0.93920710
	Foodstuffs							
29	Soups and Broths	0.5082827	1,045.57	12,600.00	2,930.00	-0.34790520	0.18507730	0.93723540
30	Other Edible Preparations	0.0364427	798.37	46,700.00	33,200.00	0.91176160	0.39728510	0.94528250
31	Water	0.1209876	295.40	435.39	3,600.00	-0.07587480	0.16929800	0.94688640
32	Flavored Water	0.3097726	3,711.89	54,800.00	17,500.00	0.44191040	0.28067760	0.94023460
33	Beer	0.0178064	165.62	6,352.19	13,400.00	0.42039890	0.36629530	0.95483220
34	Wine	0.0303638	673.36	16,200.00	31,600.00	-0.58110650	0.08817980	0.95545150
35	Vermouth	0.1955476	63.27	1,835.59	458.00	0.33918750	0.36687290	0.96183290
36	Other Fermented Beverages	0.1945052	186.92	1,419.08	1,370.00	1.54736200	0.56495860	0.95788250
37	Alcohol > 80% ABV	0.6172361	3,066.03	33,900.00	7,070.00	-0.86455800	0.07845880	0.93778880
38	Hard Liquor	0.1205323	2,225.51	20,600.00	28,300.00	-0.05140770	0.28459450	0.94827160
39	Starch Residue	0.0212678	87.50	0.01	5,810.00	1.31739600	0.55634090	0.96622800
40	Soybean Meal	0.0082398	155.65	11,800.00	26,700.00	-0.27835990	0.33155180	0.95465580
41	Other Vegetable Residues and Waste	0.1388797	88.35	582.68	907.00	-0.11303930	0.16700420	0.95075330
42	Animal Food	0.0878371	1,515.67	24,300.00	24,700.00	0.56917180	0.43866260	0.94542210
	Mineral Products							
43	Clays	0.0116218	14.98	557.06	1,850.00	-0.41811360	0.13448570	0.94720520
44	Lead Ore	0.0453854	193.90	0.01	6,110.00	-0.96786680	0.04125320	0.94809800

No	Product Community/ Product description	RCA	Value of Ghana's export (US$'000)	Value of Ghana's import (US$'000)	World Trade (US$'m)	PCI	Opportunity Gain	Distance
45	Non-Iron and Steel Slag, Ash and Residues	0.0128694	41.34	-	4,620.00	-0.29913320	0.34340060	0.95226220
46	Coke	0.0143731	49.31	73.25	4,850.00	-0.27124930	0.16014510	0.95841600
47	Refined Petroleum	0.1350659	49,400.00	939,000.00	572,000.00	-0.77874900	0.10360340	0.92744770
48	Petroleum Jelly	0.0168013	43.73	6,114.12	3,760.00	-0.09729390	0.26117020	0.95212450
	Chemical & allied industries							
49	Hydrogen	0.0357552	277.86	5,174.26	11,600.00	-0.17928360	0.43158130	0.96085790
50	Hydrochloric Acid	0.3808081	67.84	1,371.91	256.00	1.08414500	0.44094650	0.95599940
51	Other Inorganic Acids	0.0553707	150.69	1,522.24	4,020.00	0.57386930	0.58258170	0.96182850
52	Sodium or Potassium Peroxides	0.0839414	196.47	7,865.76	3,500.00	1.21118700	0.73950460	0.95967430
53	Hypochlorites	0.0325676	11.50	858.13	501.00	0.05477960	0.17764620	0.95100460
54	Radioactive Chemicals	0.0058070	42.35	728.93	10,900.00	-0.08472790	0.38419190	0.96183760
55	Acyclic Alcohols	0.0032252	59.31	2,657.91	29,600.00	-1.13341700	0.04741990	0.94134460
	Chemical & allied industries							
56	Glycosides	0.0287243	36.47	23.76	1,860.00	0.41969840	0.50623330	0.96488860
57	Unpackaged Medicaments	0.0045357	33.38	4,172.65	10,600.00	1.49264000	0.62637740	0.96349760
58	Packaged Medicaments	0.0472526	11,100.00	240,000.00	337,000.00	2.42515700	0.95052870	0.96443620
59	Animal or Vegetable Fertilizers	0.5445785	295.85	2,303.61	780.00	0.67110700	0.43082070	0.95315130
60	Phosphatic Fertilizers	0.0109768	14.25	18,700.00	1,840.00	-1.06515300	0.00692680	0.95239300
61	Vegetable or Animal Dyes	0.0599208	46.92	8.24	1,120.00	0.86418940	0.54804890	0.95964810
62	Nonaqueous Paints	0.1045259	911.78	23,900.00	12,700.00	1.83456800	0.74414660	0.95617320
63	Aqueous Paints	0.0748695	289.81	14,500.00	5,590.00	1.60638700	0.70531730	0.95655140
64	Other Paints	0.0389664	20.89	2,709.64	851.00	0.86888180	0.47701650	0.94882990
65	Nonaqueous Pigments	0.0152999	22.05	2,214.30	2,140.00	2.01658800	0.97288160	0.96387680
66	Glaziers Putty	0.0144621	73.78	13,800.00	7,300.00	2.07786000	0.85887620	0.96178680
67	Scented Mixtures	0.0112360	159.49	31,300.00	21,700.00	1.49128900	0.70647820	0.96083330

No	Product Community/ Product description	RCA	Value of Ghana's export (US$'000)	Value of Ghana's import (US$'000)	World Trade (US$'m)	PCI	Opportunity Gain	Distance
68	Perfumes	0.0014415	16.02	19,100.00	16,200.00	1.08978500	0.82469680	0.95933930
69	Beauty Products	0.1049960	2,513.77	44,800.00	36,000.00	1.68913000	0.85285050	0.95765340
70	Hair Products	0.0322338	281.48	11,100.00	12,500.00	0.83795740	0.35210620	0.94305550
71	Dental Products	0.3463664	1,159.39	25,800.00	4,790.00	1.12585000	0.56915010	0.95535310
72	Shaving Products	0.0328277	245.60	40,800.00	10,800.00	1.66403500	0.65606120	0.95544770
73	Cleaning Products	0.0140022	292.14	47,900.00	30,200.00	0.93340320	0.49961410	0.94959160
74	Waxes	0.0104707	17.93	858.51	2,870.00	1.95511200	0.94755570	0.96564600
75	Activated Carbon	0.0605572	95.78	4,504.43	2,240.00	-0.65095350	0.00616540	0.94940400
76	Pesticides	0.0436833	959.95	162,000.00	31,700.00	1.42663600	0.64783730	0.96099840
77	Organic Composite Solvents	0.0269473	28.71	5,262.56	1,580.00	0.77346040	0.39176230	0.94540080
	Plastics/Rubbers							
78	Ethylene Polymers	0.0017664	84.14	137,000.00	72,000.00	0.57193610	0.44333520	0.95686470
79	Styrene Polymers	0.0016404	17.45	6,074.81	18,900.00	2.24897800	0.88986160	0.96550390
80	Scrap Plastic	0.0545275	214.00	89.36	6,530.00	-0.61772190	0.06532760	0.93553750
81	Plastic Pipes	0.9000967	13,400.00	65,900.00	21,500.00	0.81960960	0.39853170	0.94455060
82	Raw Plastic Sheeting	0.0050566	178.36	54,200.00	52,400.00	1.80552600	0.71677480	0.95558310
83	Other Plastic Sheetings	0.0043029	65.95	21,400.00	22,400.00	1.93223000	0.74329660	0.95442220
	Plastics/Rubbers							
84	Plastic Wash Basins	0.0082891	19.39	6,052.29	3,350.00	1.56327400	0.58093800	0.95990630
85	Plastic Lids	0.0778998	2,476.90	107,000.00	46,600.00	0.35161940	0.26320380	0.93904300
86	Plastic Housewares	0.3694171	4,314.30	68,300.00	17,100.00	-0.79302380	0.00608420	0.94453440
87	Plastic Building Materials	0.0700020	444.72	29,600.00	9,180.00	1.40873900	0.48397620	0.95351360
88	Rubber Belting	0.0276385	99.92	6,741.38	5,260.00	2.21860500	0.83888800	0.96570160
89	Rubber Tires	0.0333508	1,642.92	110,000.00	71,300.00	1.19842800	0.43497660	0.95400810
90	Used Rubber Tires	0.1196558	200.78	9,188.05	2,430.00	1.19371000	0.65598300	0.96133490
91	Rubber Inner Tubes	0.0299538	24.71	10,300.00	1,200.00	-0.20287680	0.22014600	0.96033730

No	Product Community/ Product description	RCA	Value of Ghana's export (US$'000)	Value of Ghana's import (US$'000)	World Trade (US$'m)	PCI	Opportunity Gain	Distance
92	Pharmaceutical Rubber Products	0.3048008	251.45	2,746.37	1,210.00	0.36717580	0.43524010	0.95815610
93	Other Rubber Products	0.0206855	342.91	19,300.00	24,000.00	2.25515100	0.93638140	0.96292910
	Wood & wood products							
94	Fuel Wood	0.0449679	258.77	13.82	8,180.00	0.43548570	0.18305370	0.94429000
95	Shaped Wood	0.7754277	2,385.85	176.36	4,410.00	-0.73229250	0.03563730	0.93278740
96	Particle Board	0.0101165	47.82	990.10	6,760.00	1.22864900	0.50476190	0.94998310
97	Plywood	0.3331972	3,354.27	4,447.09	14,300.00	-0.50739150	0.07395070	0.93749030
98	Wood Frames	0.0469002	29.32	55.31	888.00	0.51590230	0.31594590	0.96460350
99	Wood Crates	0.0068698	13.46	576.66	2,820.00	1.71850800	0.58120320	0.95141420
100	Wood Carpentry	0.1456257	1,446.31	7,866.97	14,100.00	1.13645600	0.33970130	0.94936480
101	Wood Kitchenware	0.0333987	25.71	67.62	1,100.00	0.13311440	0.26679990	0.96270390
102	Other Wood Articles	0.0811617	358.36	963.34	6,290.00	-0.07757220	0.12875490	0.94726260
103	Recovered Paper	0.0227579	146.50	7.30	9,440.00	0.59598450	0.40483050	0.95071820
104	Facial Tissue	0.0042152	10.87	5,515.57	3,670.00	-0.02993650	0.04828390	0.94708320
105	Uncoated Kraft Paper	0.0020208	16.48	11,800.00	11,600.00	1.41129900	0.55286840	0.95756290
106	Cigarette Paper	0.0236755	28.42	215.00	1,720.00	1.25519800	0.63735150	0.96050890
107	Toilet Paper	0.0963999	1,744.51	117,000.00	25,900.00	1.18168700	0.43145320	0.94870800
108	Paper Containers	0.1026641	1,479.07	29,000.00	20,800.00	-0.06082660	0.13892000	0.94011250
109	Paper Labels	0.0368261	108.86	7,262.67	4,670.00	0.71821140	0.35730370	0.94590150
110	Shaped Paper	0.0063300	49.85	12,100.00	11,800.00	1.81944200	0.87456320	0.96609260
111	Brochures	0.0234610	231.26	25,100.00	14,800.00	1.43218100	0.71380250	0.96224450
	Wood & wood products							
112	Postage Stamps	0.0074456	10.28	28,000.00	2,350.00	-0.30395150	0.27036930	0.94663750
113	Other Printed Material	0.0093484	64.55	2,911.56	10,300.00	2.09887600	0.83628510	0.95947920
	Textile/Clothing							
114	Light Pure Woven Cotton	0.5977315	5,786.85	109,000.00	13,900.00	-1.35180600	0.10895900	0.96333620

No	Product Community/ Product description	RCA	Value of Ghana's export (US$'000)	Value of Ghana's import (US$'000)	World Trade (US$'m)	PCI	Opportunity Gain	Distance
115	Synthetic Monofilament	0.1749347	163.43	240.81	1,360.00	1.22894400	0.75847450	0.96521910
116	Synthetic Filament Yarn Woven Fabric	0.0142321	212.22	45,600.00	23,000.00	-0.16068470	0.22388790	0.96661620
117	Unprocessed Synthetic Staple Fibers	0.0066732	27.42	827.75	6,430.00	0.95019510	0.44600790	0.96363050
118	Light Synthetic Cotton Fabrics	0.0628215	161.03	9,643.57	3,660.00	-1.69045800	0.02015250	0.96304240
119	Wadding	0.0753829	110.28	604.20	2,110.00	0.92673500	0.50466550	0.95792440
120	Tufted Carpets	0.0025267	11.86	2,042.16	6,660.00	1.61405700	0.70046510	0.96527300
121	Tulles and Net Fabric	0.0110035	11.01	2,545.36	1,850.00	-0.20511920	0.38312550	0.96408870
122	Narrow Woven Fabric	0.0258261	55.14	3,319.94	3,530.00	0.72329510	0.59279920	0.96550050
123	Ornamental Trimmings	0.1566151	49.87	319.53	509.00	-0.90845660	0.03151620	0.95607800
124	Knit Gloves	0.0069287	20.72	2,426.27	4,260.00	-1.06712500	0.06822470	0.96174400
125	Window Dressings	0.0043878	13.76	19,900.00	4,500.00	-0.05886420	0.16271590	0.96635230
126	Awnings, Tents, and Sails	0.1778974	482.69	6,793.18	3,880.00	-0.61061690	0.08314560	0.95346940
127	Used Clothing	0.7837070	2,212.08	149,000.00	4,050.00	0.16327260	0.31537820	0.94858160
	Footwear/headgear							
128	Other Footwear	0.0239436	71.53	6,379.71	4,320.00	-0.48604620	0.08540070	0.95897610
129	Processed Hair	0.0462952	20.68	1,334.86	689.00	-1.68238400	0.08670920	0.95272210
	Stone/Glass							
130	Plaster Articles	0.0724630	96.68	11,300.00	1,900.00	0.82853200	0.41198920	0.94941430
131	Cement Articles	0.0723584	409.06	10,100.00	8,030.00	1.71384000	0.62682690	0.95866410
132	Glazed Ceramics	0.0271316	257.66	105,000.00	13,400.00	-0.03221180	0.12602660	0.95770300
133	Bathroom Ceramics	0.0297251	157.86	20,700.00	7,520.00	0.38128750	0.36941510	0.95753230
134	Ceramic Tableware	0.0089820	13.19	1,505.81	2,090.00	0.64884920	0.40297910	0.96339830
135	Glass Scraps	0.1527495	44.71	22.66	423.00	0.60475500	0.43560760	0.95526830
136	Float Glass	0.0074123	24.78	6,495.05	4,900.00	1.35078600	0.58058400	0.96033160
137	Glass Fibers	0.0015374	11.33	4,724.98	11,000.00	1.89125100	0.73948490	0.96385400

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	Chemical & allied industries							
138	Precious Metal Scraps	0.6877814	7,033.22	0.00	15,300.00	0.33394540	0.27275970	0.94022620
139	Jewellery	0.0007677	43.58	1,215.45	86,700.00	0.14108650	0.31211180	0.95781430
140	Imitation Jewellery	0.0763355	364.13	9,721.46	7,250.00	-0.18708190	0.28727920	0.96169020
	Metals							
141	Scrap Iron	0.2886947	5,416.27	33.57	27,400.00	0.03236930	0.35832300	0.93761770
142	Hot-Rolled Iron	0.1386182	3,694.32	9,007.16	39,600.00	1.28427100	0.45459440	0.95943770
143	Cold-Rolled Iron	0.0855295	821.99	34,900.00	14,400.00	1.25030800	0.56393280	0.96351770
144	Large Flat-Rolled Iron	0.0225255	58.19	1,556.23	3,740.00	2.67463400	1.09393300	0.96555720
145	Hot-Rolled Iron Bars	0.0033470	19.40	1,243.70	8,380.00	0.88350330	0.41890370	0.95022310
146	Other Iron Bars	0.5138832	784.31	279.06	2,230.00	1.41354000	0.57216330	0.95590270
147	Iron Blocks	0.2307236	1,715.06	22,500.00	11,600.00	0.67327460	0.40788620	0.94699360
148	Iron Wire	0.0374868	159.11	10,800.00	6,240.00	0.83117080	0.32974270	0.95532610
149	Iron Sheet Piling	0.1345018	119.41	2,090.22	1,840.00	0.93331280	0.55901740	0.96003130
150	Cast Iron Pipes	0.0187291	26.41	11,100.00	2,050.00	0.79109710	0.47514160	0.96421100
151	Other Large Iron Pipes	0.0150362	94.39	20,300.00	8,930.00	1.40480300	0.71960250	0.96668140
152	Other Small Iron Pipes	0.3556888	5,001.83	62,900.00	20,600.00	0.18493840	0.08069350	0.94613310
153	Iron Structures	0.0288443	906.78	118,000.00	45,100.00	1.86288900	0.59472320	0.95588150
154	Large Iron Containers	0.0460958	120.68	6,552.57	3,760.00	0.88430950	0.39670500	0.94979370
155	Small Iron Containers	0.0757466	299.50	6,645.79	5,710.00	1.13102300	0.54527830	0.95247130
156	Iron Gas Containers	0.0408135	86.70	9,574.71	3,050.00	0.71197180	0.53356310	0.95804410
157	Stranded Iron Wire	0.0262329	110.46	5,947.08	6,070.00	1.29676000	0.51853070	0.96199350
158	Iron Cloth	0.2218155	644.60	10,500.00	4,200.00	0.98562880	0.47579670	0.95784500
159	Iron Anchors	0.5641344	82.66	330.29	232.00	-0.33509720	0.15143500	0.95610200
160	Iron Nails	0.0808962	148.36	21,900.00	2,740.00	0.47521740	0.40780460	0.95540200
161	Iron Stovetops	0.0104009	69.46	18,300.00	9,550.00	1.27738800	0.59528340	0.96233730
162	Other Cast Iron Products	0.0151698	62.82	18,800.00	5,990.00	1.16090000	0.52350080	0.95471650

No	Product Community/ Product description	RCA	Value of Ghana's export (US$'000)	Value of Ghana's import (US$'000)	World Trade (US$'m)	PCI	Opportunity Gain	Distance
163	Other Iron Products	0.0252098	719.98	84,000.00	42,200.00	2.53427200	0.95159400	0.96655840
164	Refined Copper	0.0002793	10.19	76.14	54,400.00	-1.48012700	0.01968710	0.94639530
165	Aluminium Bars	0.0021061	22.76	37,300.00	15,900.00	1.39939100	0.55150400	0.95757230
	Metals							
166	Aluminium Wire	0.0278481	59.45	677.93	3,640.00	-0.09458720	0.20723130	0.94863500
167	Aluminium Pipe Fittings	0.8708348	469.83	153.25	780.00	0.98657350	0.53020590	0.96614240
168	Aluminium Structures	0.0055295	42.39	31,100.00	10,900.00	1.43075900	0.57293330	0.95646970
169	Aluminium Cans	0.0035686	11.56	3,135.50	4,650.00	1.27892500	0.48745270	0.95035270
170	Other Aluminium Products	0.0108916	108.16	6,379.97	14,700.00	1.90493600	0.71556870	0.96123270
171	Other Lead Products	0.5643382	97.77	21.49	271.00	-0.30668560	0.26309340	0.93937970
172	Scrap Waste	0.6858056	217.47	21.95	455.00	-0.15947690	0.17559190	0.93962740
173	Garden Tools	0.6559087	663.37	12,600.00	1,560.00	-0.36340830	0.19603700	0.95074050
	Machinery/Electrical							
174	Refrigerators	0.0080601	221.86	42,300.00	39,800.00	2.27289200	0.83796570	0.96673420
175	Excavation Machinery	0.4485376	16,600.00	177,000.00	55,400.00	2.48755800	1.06051700	0.96218420
176	Soil Preparation Machinery	0.0105717	47.06	2,780.16	6,340.00	2.25160200	0.78202330	0.96132730
177	Other Agricultural Machinery	0.0462133	204.67	2,975.19	6,320.00	2.69800400	1.02887300	0.96647510
178	Mill Machinery	0.0242159	35.30	3,839.46	2,120.00	0.57404470	0.37598190	0.95631690
179	Stone Processing Machines	0.1024696	1,127.87	97,600.00	15,700.00	1.51680600	0.68471530	0.96554150
180	Video Displays	0.0022181	119.10	65,500.00	77,300.00	1.26754400	0.48636490	0.96041110
181	Broadcasting Accessories	0.0072152	197.00	9,334.94	43,000.00	1.19384200	0.61931180	0.96561530
182	Audio Alarms	0.0036500	37.61	4,718.55	17,800.00	2.16611400	0.83204100	0.96374850
183	Low-voltage Protection Equipment	0.0023991	136.73	48,500.00	84,700.00	2.07522100	0.88730470	0.96187760
184	Electrical Control Boards	0.0015917	55.83	47,100.00	51,100.00	2.06385400	0.87813250	0.96382500
	Transportation							
185	Railway Cargo Containers	0.0885575	496.56	4,979.27	8,140.00	0.07551420	0.25377620	0.96266510

No	Product Community/ Product description	RCA	Value of Ghana's export (US$'000)	Value of Ghana's import (US$'000)	World Trade (US$'m)	PCI	Opportunity Gain	Distance
186	Buses	0.4000026	4,256.26	60,200.00	15,100.00	1.26255400	0.67942170	0.96682450
187	Specialized Vehicles	0.0194380	160.92	38,100.00	11,800.00	0.93637280	0.79899160	0.96049110
188	Trailers	0.0098430	155.33	25,600.00	22,600.00	2.34702000	0.90463670	0.96394510
189	Other Floating Structures	0.0550151	52.66	5,453.89	1,380.00	2.01942700	0.88017050	0.96576940
	Miscellaneous							
190	Video Cameras	0.0842482	40.41	155.50	707.00	1.73224500	0.84148680	0.96339700
191	Surveying Equipment	0.3462106	2,048.78	19,600.00	8,950.00	0.38381860	0.55466010	0.95023330
	Metals							
192	Utility Meters	0.0254541	114.97	55,700.00	6,490.00	0.47357210	0.38247490	0.96021880
193	Opto-Electric Instrument Parts	0.0066486	12.58	1,599.11	2,910.00	2.13488300	0.81268080	0.96291220
194	Seats	0.0077570	390.14	82,400.00	71,700.00	1.05299700	0.36828600	0.96149000
195	Other Furniture	0.0089205	498.53	141,000.00	80,300.00	0.94814990	0.28422610	0.95542660
196	Mattresses	0.0575783	602.01	9,085.43	14,900.00	-0.13563710	0.10651840	0.95820360
197	Prefabricated Buildings	0.5317429	2,935.12	37,500.00	7,870.00	1.03946000	0.36711550	0.95041440
198	Party Decorations	0.0049894	21.89	1,713.15	6,290.00	-1.00538200	0.01912090	0.96498100
199	Brooms	0.1136402	651.87	22,700.00	8,220.00	0.45995650	0.36363240	0.96251710
200	Collector's Items	0.0377861	50.97	74.41	1,940.00	-0.86279180	0.27339940	0.95641360
200	Antiques	0.0223407	52.40	-	3,400.00	-1.39659200	0.42717630	0.95833400

Note: The list (which Table 7 summarises), generated using Hausmann and Chavin's criteria, was relied on for the Top 20 products.