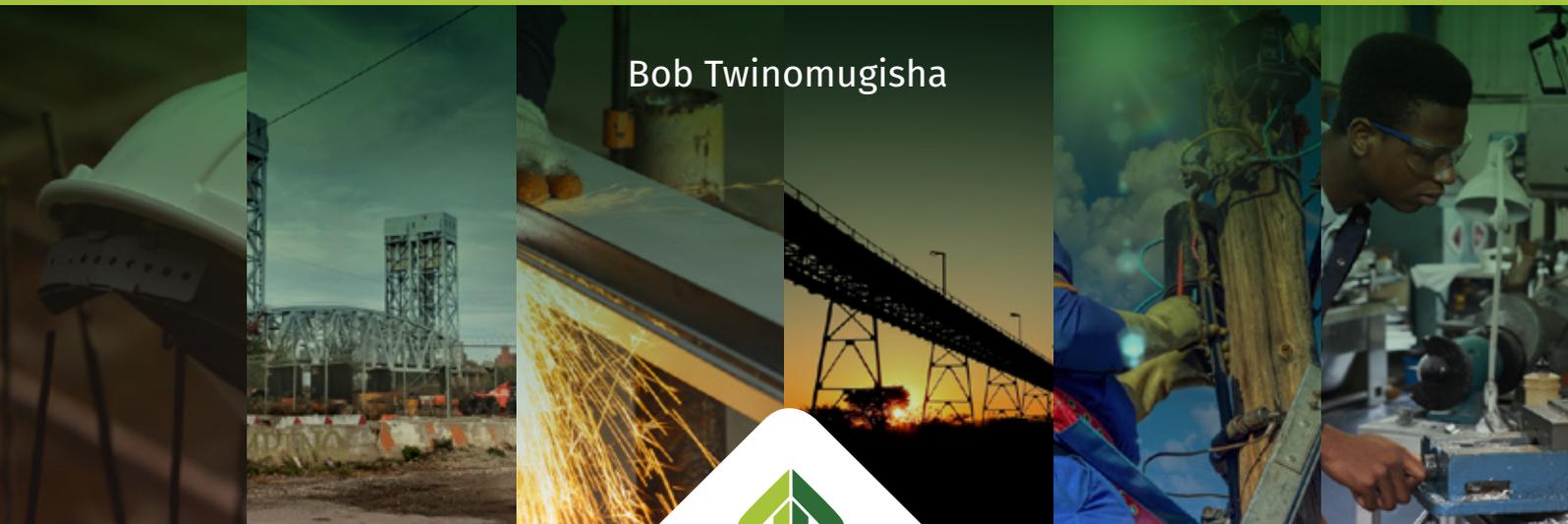




The Analysis of Uganda's Industrial Development journey in relation to industrialization in Malaysia, South Korea, Singapore and Kenya

Bob Twinomugisha



LIST OF ACRONYMS

BOU	Bank of Uganda (BOU)
BPKSM	Bank Perusahaan Kecil & Sederhana Malaysia
BPMB	Bank Pembangunan Malaysia Berhad
BUBU	Buy Uganda Build Uganda
CPS	Cyber-Physical Systems
DBS	Development Bank of Singapore
EAC	East African Community
ECA	Economic Commission for Africa
EDB	Economic Development Board
EIBK	Export-Import Bank of Korea
EIBMB	Export-Import Bank of Malaysia Berhad
EMA	Energy Market Authority
EOI	Export-oriented Industrialization strategy
FPA	Federal Planning Authority
FTZs	Free Trade Zones
GDP	Gross Domestic Product
IBK	Industrial Bank of Korea
ICA	Industrial Coordination Act
IMDA	Infocomm Media Development Authority
IRAS	Inland Revenue Authority of Singapore
IRBM	Inland Revenue Board of Malaysia
ISIS	Import Substitution Industrialization Strategy
KCGF	Korea Credit Guarantee Fund
KDC	Korea Development Bank
LMWs	Licensed Manufacturing Warehouses
MBC	Malaysian Business Council
ME	Ministry of Education
MEF	Ministry of Economy and Finance
MENR	Ministry of Energy and Natural Resources
MIDA	Malaysia Industrial Development Authority
MIDA	Malaysian Investment Development Authority
MIGHT	Malaysia Industry-Government Group for High Technology
MITIM	Ministry of International Trade and Industry
Malaysia"	The ministries of Energy and Mineral Development
MNCs	Multinational Corporations
MoEMD	Ministries of Energy and Mineral Development
MOF	Ministry of Finance
MoICT	Ministry of Information, Communication and Technology
MoLHUD	Ministry of Lands, Housing & Urban Development



MoPED	Ministry of Finance, Planning & Economic Development
MoPED	Ministry of Finance, Planning & Economic Development
MoSTI	Ministry of Science, Technology and Innovation
MoTIC	Ministry of Trade, Industry & Cooperatives
MoWT	Ministry of Works and Transport
MSMEs	Micro, Small and Medium Enterprises
MTAC	Management Training and Advisory Centre
MTCS	Medium Term Competitiveness Strategy for the Private Sector
MTDC	Malaysia Technology Development Corporation
MTI	Ministry of Trade and Industry
MTIE	Ministry of Trade, Industry and Energy
NEP	New Economic Policy
NITA	National Information Technology Authority
NPA	National Planning Authority
NTS	National Tax Services
OPM	Office of the Prime Minister
OP	Office of the President
OWC	Operation Wealth Creation (OWC)
REA	Rural Electrification Agency (REA)
SIRIM	Standard Industrial Research Institute of Malaysia
SMEs	Small and Medium Enterprises
UBOS	Uganda Bureau of Statistics
UDB	Uganda Development Bank
UDC	Uganda Development Corporation
UEGCL	Uganda Electricity Generation Company
UEPB	Uganda Export Promotion Board
UETCL	Uganda Electricity Transmission Company Limited
UFZA	Uganda Free Zones Authority
UIA	Uganda Investment Authority
UIRI	Uganda Industrial Research Institute
UMA	Uganda Manufacturers Association (UMA)
UN	United Nations
UNBS	Uganda National Bureau of Standards (UNBS)
UNCST	Uganda National Counsel for Science and Technology
UNCTAD	United Nations Conference on Trade and Development
UNRA	Uganda National Roads Authority
UPMRA	Uganda Plastics Manufacturers and Recyclers Association
URA	Uganda Revenue Authority
USSIA	Uganda Small Scale Industries Association (USSIA)
WHO	World Health Organization
WTO	World Trade Organization

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1.0 Background

1.1 Introduction

Industrialization is defined as a socio-economic process that includes a rapid transformation in the significance of manufacturing activity in relation to all other forms of production and work undertaken within a country (Wim Naude et al.2013). On industrialization path, a country moves from the economy dominated by agricultural output and employment to one dominated by manufacturing (Mwanguzi et al, 2018). The factories are often established to turn raw materials into finished products. This has been achieved in most of the existing developed countries, mainly in Europe, America and Asia. Globally, China leads the world in terms of manufacturing output, with over \$3.8 trillion followed by the United States (\$2.1 trillion), Japan (\$1trillion), Germany (\$747 billion) and South Korea (\$416 billion) in



output (World Bank, 2019). Fundamentally, industrialization requires a strong development-oriented state with a long-term vision of structural transformation, a highly committed political leadership, and effective transformative institutions. In Uganda, Vision 2040 emphasizes the manufacture of consumer, investment and Hi-Tech goods, and value addition to agricultural products. The National Development Plan (NDPIII) looks at industrialization as one of the key avenues to move the country towards upper middle-income status by 2040 and eventually to a first world economy (NPA, 2020).

Transformative institutions have been established including Uganda Development Bank (UDB), Uganda Development Corporation (UDC), Uganda Manufacturers Association (UMA), and Uganda Investment Authority (UIA), Uganda National Bureau of Standards (UNBS) among others. Specifically, UDB that was established in 1972 continues to accelerate socio-economic development through sustainable financial interventions in key growth sectors of the economy (UDB, 2020). Relatedly, Uganda Development Corporation (investment institution) was established on 12th June 1952 as a wholly owned government entity with the mandate to facilitate the industrial and economic development of



Uganda. Uganda Development Corporation (UDC) started with the initial capital of £5 million, provided by the Uganda Government as equity capital. Although the scope of activity of the UDC is not limited to industrial development, there is reason to assume that originally the Corporation was designed to assist primarily in Uganda's industrialization. In 1963, the UDC subsidiaries (firms) employed in total 3,905 persons, and this number increased to 4,019 in 1964. In those years, comparing these figures to total employment in manufacturing industry of 19,220 and 20,838 respectively, the UDC companies accounted for approximately 20 per cent of total employment in manufacturing industry in both years (E. J. Stoutjesdijk, 1967). These companies include; the Uganda Cement Industry, the Uganda Metal Products and Enamelling Company, Nyanza Textile Industries, Tororo Industrial Chemicals and Fertilizers and the East African Distilleries. Currently, the corporation's current investment portfolio is spread across two (2) main sectors including Infrastructure and social services (Kalangala Infrastructure Services (45.7% ordinary and convertible)) and Agro-manufacturing/agro-based industrialization (Soroti Fruit Factory (subsidiary-80% for UDC), Kigezi Highland Tea Ltd (lease financing), Atiak Sugar Factory (40% for UDC) (UDC, 2020).



The government of Uganda is committed to industrial development, to this effect, it continues to capitalize and revitalize the transformative institutions to support industrial development. For instance, in early 2020, Uganda Development Bank (UDB) and Uganda Development Corporation (UDC) were capitalized to a tune of Ushs 2 trillion and Ushs 100 billion respectively (Republic of Uganda, 2020).

The review of the development paths of developed and emerging economies shows that, except for a few oil-exporting countries, there is a strong positive correlation between industrialization and rapid development (Uganda's Vision 2040). A strong and competitive industrial base is important to create employment, advance technology and create a resilient economy. Industrialization also offers more export earnings, wider tax base, increased purchasing power, increased integration with agriculture, product diversification, greater efficiency, and technical modernization and higher productivity throughout the whole economy.

Uganda was among the few African countries that had a thriving industrial sector prior to independence ranging from small to large scale industries. However, most of the established industries produced consumer goods and thus failed to create the necessary meaningful forward and backward linkages with other sectors of the economy and more so the agriculture sector, which employed the biggest percentage of the population. Notably, the industries relied heavily on foreign raw materials and technology and did not alleviate the unemployment problem in the country. Currently, unemployment is estimated to impact three out of four Ugandan youth (NPA, 2015). Over the years, the industries failed to create the desired impetus for economic take off for national development.





In 1990s, political stability in Uganda created favorable environment for industrial development. To this effect, a number of measures were put in place to boost the industrialization drive including the industrialization Policy and Framework (1994-1999), development of industry and industrial support institutions like Uganda National Bureau of Standards, Uganda Industrial Research Institute, and Uganda National Council for Science and Technology, Uganda Investment Authority, among others. These measures and institutional capacity building paid off such that between 1994 and 2000, industrial GDP contribution increased from 12% to 21%, (World Bank, 2000). The United Nations Industrial Development Organization report 2007 revealed that the number of industrial establishments increased from 1,320 to 11,968 between 1992 and 1998.

In 2000s, these measures were followed with other policies in the 2000s; Medium Term Competitiveness Strategy for the Private Sector (MTCS)—2000-2005, 2005-2009, Poverty Eradication Action Plan (PEAP)—2004-2008, the National Industrial Policy—2008-2018, and the National Industrial Sector Strategic Plan 2010/11-2014/15 (Republic of Uganda, 2018).

As noted above, the interventions used to boost industrial development before 2000 saw industry contribution to GDP grow from 10% in 1990 to 21% of GDP in 2000 (World Bank, 2000). However, interventions applied thereafter to boost industrial development did not register as much success as industrial contribution to GDP in the years between 2000 and 2018 oscillated between 18% -26% (World Bank, 2018). This level of industrial contribution to GDP is below the targeted mark of 35% for countries aiming to achieve middle-income status (NPA, 2018). Uganda's industrial growth somehow stagnated over the last 19 years with its contribution to GDP standing at 19.8% in 2018. This trend may have been partly due to a lack of an integrated plan that integrates the efforts of all sectors towards industrialization and build on the gained advantages prior to 2000 and provide a sequenced path for industrialization of the country (Mwanguzi et al., 2018).

Relatedly, the world is racing the increasing spread of Corona-virus disease (COVID-19) that was declared a pandemic on 11th March 2020 by World Health Organization (WHO), reaching Uganda on 21st March 2020. As a result, Uganda's industry sector was negatively affected as manufacturing sector declines on account of disruptions to the inflow of raw materials attributed to COVID-19 mitigation measures (PWC, 2020). It should be noted that Uganda must emphasize import substitution as it becomes expensive to import essential items (goods) due to the COVID-19 mitigation measures implemented by its trading partners in the region and beyond. To this effect, Uganda Development Bank (UDB) has been capitalized and revitalized in order to avail adequate funds for industrial development, mainly Micro, Small and Medium Enterprises (MSMEs) in the industry sector (Republic of Uganda, 2020). As Uganda strives to close the economic gaps created by COVID-19 pandemic, working towards attaining middle income status and becoming a developed economy by 2040, industrialization has been looked at as one of the avenues to achieve these.

1.2 Problem statement

Currently, the industrial sector's contribution to GDP is 19.8% (World Bank, 2018); with mining and quarrying contributing 2.0%, manufacturing 15.4%; water 2.3% and construction 6.6% of GDP (Republic of Uganda, 2019). This level of industrial contribution to GDP is below the 35% mark for countries aiming to achieve middle-income status (NPA, 2019). Uganda's economy has been driven by the services sector at the expense of the industrial sector. As a result, income inequality has risen (Gini coefficient stood at 0.42 in 2016/17 which is an increase from 0.40 registered in 2012/13) and job creation has been lackluster. Notably, manufactured imports (% of merchandise imports) in Uganda were reported at 63 % in 2018 while manufactured exports (% of merchandise exports) at 22.5% during the same year and the employment in industry (% of total employment) was at 6.6% in 2019, according to World Bank statistics. These prompted the research study to examine Uganda's industrial development journey in relation to industrialization in Malaysia, South Korea, Singapore and Kenya in order to generate information to inform Uganda's industrialization corrective actions.

1.3 Objectives of the study

The main objective is to examine Uganda's industrial development journey in relation to industrialization in Malaysia, South Korea, Singapore and Kenya in order to generate information to inform Uganda's industrialization corrective actions (strategies) and specifically answer the following key questions regarding Uganda's path to industrialization;

- 1) How has been Uganda's industrial development journey from 1960s to 2020?
- 2) What are the lessons learnt from Malaysia, South Korea, Singapore and Kenya that can aid Uganda adopt appropriate industrialization strategies in her journey towards middle income status?
- 3) Which strategies should Uganda adopt to stimulate industrialization to a desired level?

1.4 Methodology

This study relied on an extensive document review; Industrialization policies and strategies, National development plans and other relevant articles on industrialization. The study also considered the analysis of quantitative secondary data obtained from various sources including World Bank, Bank of Uganda and Uganda Bureau of Statistics. Descriptive analysis was adopted to analyze the quantitative data on the same. The study focused on Uganda, two East Asian countries (Malaysia, South Korea, Singapore) and Kenya in East Africa for the period 1960 to 2020.

1.5 Contribution of the study

The information generated by this study shall enable Uganda to learn from the past and guide industrialization policies as we strive to achieve upper middle-income status by 2040. Additionally, this paper forms the basis for more research on Uganda's industry sector.



2.0 Uganda's Industrial Development Journey, 1960 to 2020

2.1 The Evolution of Industry in Uganda

By the time Uganda obtained political independence from Britain in 1962 with a population of about 6.9 million, her agricultural sector accounted for 50% of GDP (World Bank, 1962). During the same period, less than 25% was in wage employment. Mining and industry were small sectors in the economy (Obwona et al, 2016). Relative to other post-independent African nations, the extent of manufacturing activity was not insignificant, but the level of value-added industrial manufacturing was low (12% of GDP). Living standards were also low; less than 15% of the population lived beyond 45 years, and roughly 50% of children died before the age of 15 (World Bank, 1962).

The spirit of state-guided capitalist development, which started in the dying years of colonial administration, continued in the post-colonial era. While the First Five-year Development Plan for independent Uganda (1961/62–1965/66) focused on agricultural development, industrialization featured prominently in the Second Five-year Plan (1966/67–1970/71). The goals of this latter plan were consistent with the views of the Economic Commission for Africa (ECA). The ECA Conference held in



Zambia in 1965 underscored the need for industrialization and economic transformation in the whole of eastern Africa, with priorities including the textile, wood and cork, rubber products, and iron and steel industries.

As a result of the initiatives of the 1960s, GDP in 1966 prices grew by 4.8% from 1963–70, while the population increased at an estimated rate of 2.9%. Uganda's domestic savings averaged 13%, a level that permitted implementation of an ambitious investment programme without undue pressure on domestic prices and the balance of payments. In the 1960s, the terms of trade for Uganda's exports were favourable and public finances were relatively healthy.

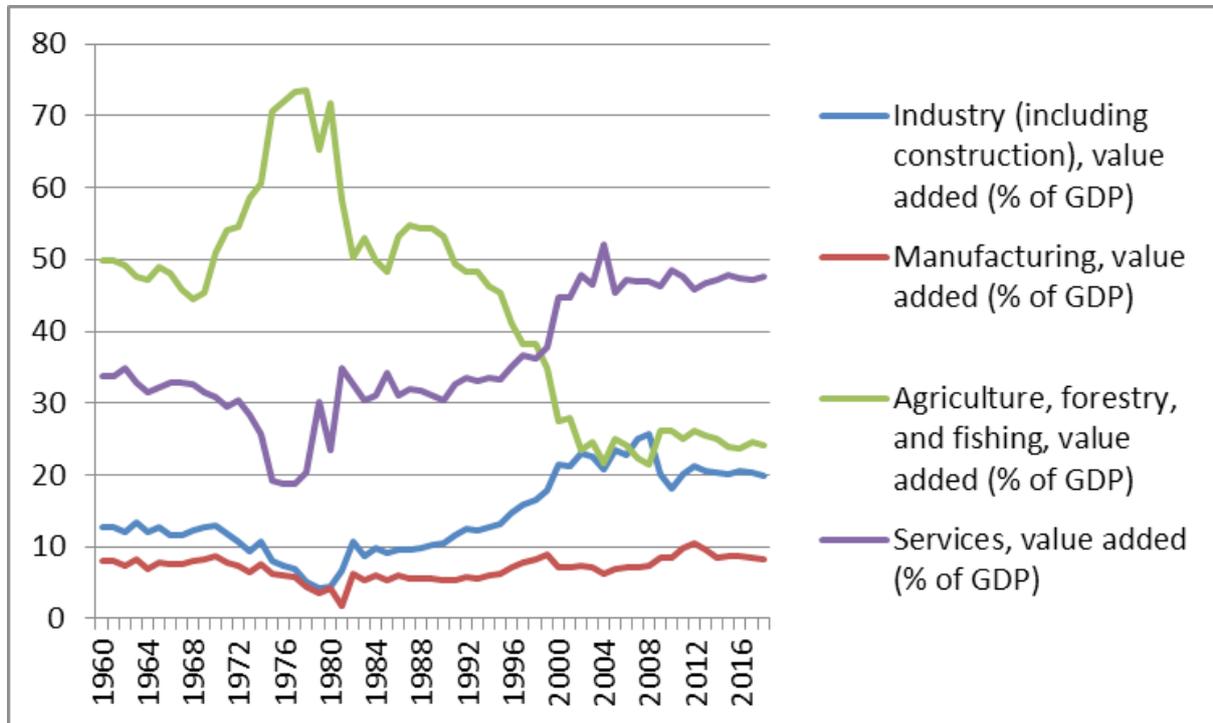
The development crisis in Uganda began in the 1970s with the rise to power of Idi Amin. Amin's administration destroyed the economy and disorganized industrial infrastructure. The statistical records of the 1970s and 1980s show a virtual absence of heavy industry. The bulk of manufacturing activities in Uganda (at a stage of development comparable to Taiwan in the 1950s and 1960s) were light industries characterized by low value addition.

The availability of cheap labour and the high cost of imported technology meant that light industries were a natural starting point on the path to industrialization. However, output substantially declined in virtually all sectors after 1970. For example, in the machinery sub-category (which would serve as a basis for heavy industrialization), steel ingots declined by over 90% from 19,500 tons in 1970 to only 1,900 in 1980. Superphosphate production (a potential growth pole of chemical industries) declined from 24,800 tons in 1970 to no production at all in 1980 (Newman et al., 2016). At a stage of development when other countries in Asia were undergoing industrial transformation, Uganda registered declining output in both light industries and the growth poles for heavy industrialization. In 1980, Uganda's economy contracted by 5.2%.

Following the virtual collapse of what was a very promising industrial sector in the 1970s and early 1980s, Uganda embarked on a broad range of policy and institutional reforms in the late 1980s and early 1990s as revealed by Siggel and Ssemogerere report of 2004 . The main thrust of the reform process was to reduce the role of government in the economy and to promote the role of the private sector. Generous incentives (through the tariff code, for example) continued to provide support to both local and foreign investment.

Despite these efforts, the manufacturing sector in particular has continued to play a peripheral role, between 5 and 10 percent share in GDP over the last 6 decades. The share of the whole industry sector improved from 12% in 1960 to 25% in 2008, before declining to about 19.8% in 2018 while the share of agriculture in GDP declined from over 70% in 1980 to about 25% in 2018. Relatedly, the share of services sector in GDP increased from 18.8% in 1976 to 47.6% in 2018, according to World Bank statistics. Figure 1 illustrates Uganda's sectoral contribution to GDP for the period 1960 to 2018.

Figure 1: Sectoral contribution to GDP (%), 1960-2018



Source: World Bank Development Indicators, available at www.wb.org, accessed April 2020

Notably, the share of services sector in GDP surpassed the contribution of agriculture sector in 1999 and up to now, it still takes the highest share of the same (Ref: figure 1 above). This is mainly due to the good performance in trade and repairs, transportation and storage, accommodation and food services, financial and insurance activities, real estate activities and human health. While Uganda has attained rapid growth, real manufacturing sector outcomes are still modest (less than 10% of GDP).

2.2 Profile and Structure of Uganda’s industry sector

The industrial sector in Uganda consists of construction, mining and quarrying, formal manufacturing, informal manufacturing, electricity supply, and water supply (utilities). Industry sector contributes 20.6% to Uganda’s GDP (Background to the Budget, 2019/20). During the recent past, construction has dominated the industrial output, contributing between 10 and 16% to GDP since 2000, followed by manufacturing, averaging 7% of the country’s GDP over the past decade (Republic of Uganda, 2019). However, from 2014/15, manufacturing took over from construction as the leading contributor to industrial output until 2018/19 when construction regained its position as illustrated in table 1 below.

Table 1: Sub-sector contribution to industrial output (current prices), Bill shs, F2014/15-201

Year	2014/15	2015/16	2016/17	2017/18	2018/19
Industry	15,311	17,142	18,652	19,961	22,640
Mining & quarrying	528	562	603	444	545
Manufacturing	6,660	7,239	7,881	8,305	8,743
Electricity	637	796	899	1,029	1,246
Water	1,898	2,270	2,557	2,925	3,077
Construction	5,588	6,274	6,713	7,258	9,030

Source: Background to the Budget, 2019/20 (Republic of Uganda)

Currently, the industrial sector's contribution to GDP is 20.6%; with mining and quarrying contributing 0.5%, manufacturing 8.0%, electricity 1.1%, water 2.8% and construction 8.2% (Background to the budget 2019/20: page:203). As noted earlier, according National Planning Authority report 2018, this level of industrial contribution to GDP is below the targeted mark of 35% for a country aiming to achieve middle-income status. The services sector makes the biggest contribution to GDP, standing at 48.7%, with agriculture taking the second place at 22% (Republic of Uganda, 2020). However, the service sector, which now makes the biggest contribution to GDP, employs highly skilled labour force; it currently employs 24% of the population (UBOS, 2018). Jobs are essential for Uganda's development because they determine the living standards of individuals and households. The industrial sector employs about only 6.6% of the population and yet a well-developed industrial sector has a big multiplier effect on the other sectors and a bigger potential for job creation and economic development. There is need therefore to develop a mechanism of boosting it.

The industry sector is dominated by small and medium enterprises (SMEs). These are usually not able to reap the benefits of economies of scale and, given the strong correlation between firm size and export capacity, consequently, have difficulties competing internationally. Of the top 500 firms in Africa in 2017, Uganda had only three companies on the list, and pointedly, none are in the manufacturing sub-sector (NPA, 2020).

2.2.1 Manufacturing sub-sector in Uganda

The manufacturing sub-sector is composed of food processing, manufacture of beverages and tobacco, textiles clothing and footwear, paper and printing, chemicals, petroleum and other chemical products, non-metallic minerals, basic metals and metal products among others. Of these, food processing, beverages and tobacco industry, saw milling, paper and printing, bricks and cement, steel and metal products, and textile clothing and footwear industry, comprise the biggest share (Ramathan Ggoobi et al. 2017) Specifically, industries include: 11 operational Sugar factories, 25 tea processing, 5 cement, 2 vertically integrated textile mills, 7 leather tanning and 23 involved in the iron and steel industry (NPA, 2020). Heavy investments by foreign companies are more pronounced in textiles, steel mills, tanneries, bottling and brewing, and cement production.



Uganda's manufacturing sub-sector consists predominantly of last-stage (end-product) assembly and raw material processing. All these are low value-added activities and when it comes to export, such products are very sensitive to market price fluctuations which makes foreign exchange earning very unpredictable. There is thus a need to move away from this pattern if Vision 2040 is to be realized. Furthermore, manufacturing value-added per capita remains low at around USD 27 compared to USD 57 for low-income countries and USD 1,277 for the global average. In addition, medium and high-technology activities do not play a major role in manufacturing exports, constituting just 13.8% of total exports, lower than regional neighbours Kenya and Tanzania (NPA, 2020). Uganda's manufactured exports as a percentage of merchandise exports stood at 22.5% in 2018 against a 30-year vision target of 50% (World Bank statistics, 2018).

Manufacturing is essential for economic growth. It has a high potential for enhanced economies of scale, factor productivity and deeper, more dynamic and stronger forward and backward linkages with other sectors. In addition, it has a greater diversification into a variety of economic activities. With a huge agricultural and mineral potential, good weather, a young and expanding population and a strategic location at the heart of regional trading blocs, development of a robust manufacturing sector is expected to accelerate Uganda's industrialization agenda.

2.2.2 Mining and Construction sub-sectors in Uganda

The mining activities include mining of iron ores and non-ferrous metals, quarrying of stones, sand and clay as well as activities such as extraction of salt. The construction sub-sector includes general construction and refurbishment of structures, civil engineering works, plumbing, installations, plastering and glazing, among others.



3.0 Uganda's National Development Plan (NDPIII) and Industry Policy frame work

3.1 National Development Plan (NDPIII)

Manufacturing is one of the 18 programs that have been identified by NDPIII to promote sustainable industrialization for inclusive growth, employment and sustainable wealth creation as the country strives to attain upper middle-income status by 2040. The goal of the manufacturing programme therefore, is to increase the product range and scale for import replacement and improved terms of trade. This program targets light and heavy manufacturing industries; textiles and



“The objectives of the BUBU policy is to promote consumption of local goods and services and the use and conformity to standards to guarantee quality goods and services and to provide capacity building programs to local suppliers of goods and services (MTIC, 2014).”

apparels, shoes; assembly of electronic items; paper and paper products; chemicals, petro-chemicals and pharmaceuticals; and cereal and cereal products and heavy manufacturing industries; iron and steel; cement; tiles; sanitary ware, plumbing, fixtures and fittings and automobile assembly. This combination of light and heavy industries will facilitate job creation and production for both the domestic and international markets.

3.2 Policy framework for industrialization in Uganda

The Uganda National Industrial Policy (2008) provides a clear framework for Uganda’s transformation, competitiveness and Prosperity by emphasizing most of the fundamentals for economic development through industrialization including; (i) exploitation and development of natural domestic resource- based industries such as petroleum, cement, and fertilizer industries; and promoting competitive industries that use local raw materials. (ii) Agro-processing; focusing on food processing, leather and leather products, textiles and garments, sugar, dairy products, and value addition in niche exports. (iii) Knowledge-based industries such as: ICT, call centres, and pharmaceuticals that exploit knowledge in science, technology and innovation and (iv) Engineering for capital goods, agricultural implements, construction materials, and fabrication / Jua Kali operations. Like other member states of EAC, Uganda is committed to adopt the EAC Industrialization Strategy (2012). However, the EAC relies on member states to implement this strategy because it lacks financial and technical capacity.

The National industrial policy is supported by the Procurement and Disposal of Public Assets (PPDA) regulation (2013) that allows the government to take affirmative action to encourage the procurement of goods, works or services from local small-to-medium size industries and the Buy Uganda Build Uganda policy (2014) that supports the production, purchase, supply, and consumption of local goods and services. The objectives of the BUBU policy is to promote consumption of local goods and services and the use and conformity to standards to guarantee quality goods and services and to provide capacity building programs to local suppliers of goods and services (MTIC, 2014). The key challenge to industrialization has been poor implementation of the policies and regulations (Ggoobi, 2017). Policy documents alone will not produce the desired results; they must be actionable and backed up with the necessary financial resources.

3.3 Government bodies involved in industrial policy implementation in Uganda

The Office of the President (OP) and the Parliament are the players with the “overall authority, resources and influence over other actors” in implementing industrial policy (Centre for Development Alternatives, 2020). All ministries report directly to the Cabinet, which is responsible for all ministerial agendas, and the Cabinet in turn reports to the OP. At the ministerial level, the ministries of Energy and Mineral Development (MoEMD), Works and Transport (MoWT), and MoFPED are relatively well-resourced and have strong ties to the OP, making them the strongest ministries involved in industrialisation. While industrialisation is not their main mandate, these three ministries have been somewhat successful in coordinating key projects for industrialisation, including the construction and management of roads, dams, and industrial parks. These ministries oversee key agencies and parastatals such as UDC, UDB, UFZA, UIA, Uganda National Roads Authority (UNRA), and URA. The NPA is positioned above all the ministries and sits in the cabinet, which provides it with some power to coordinate planning across MDAs. However, NPA also reports to MoFPED, creating tension as NPA seems to answer to various power centres without clear authority (Centre for Development Alternatives, 2020). The CDA report also identifies several other actors that are powerful but less interested in industrialisation because of competing priorities within their mandates, including the Ministry of Agriculture, Animal Industry and Fisheries (MoAAIF) and the Ministry of Lands, Housing & Urban Development (MoLHUD). Finally, he identifies a group of key actors that are highly interested in industrialisation but lack the power to influence implementation; local suppliers, local government leaders and, crucially, MoTIC, which carries the official mandate to promote industrialisation and owns the National Industrial Policy. While the ministry responsible for industry, MoTIC, is underfunded and lacks significant technical capacity, other more dominant bodies like MoFPED do not consider the entire gamut of industrialisation policies in their agenda and lack a technical understanding of industrial sectors (Ref: Appendix C and Table 2).

“...local government leaders and, crucially, MoTIC, which carries the official mandate to promote industrialisation and owns the National Industrial Policy.”



4.0 Main Challenges affecting Uganda's Manufacturing Sector

Uganda's industry sector is still small, uses basic technology and generates limited quality and gainful jobs. The sector is mainly affected by the following challenges;

The limited access to affordable finance: The limited access to affordable finance constitutes a major constraint on Ugandan companies' ability to grow and develop new products. Without access to affordable credit, the industry sector, mainly manufacturing will continue to struggle to grow. Currently, the manufacturing sub-sector accounts for 12.6% of the private sector credit. However, the government continues to capitalize and revitalize Uganda Development Bank (UDB) in order to improved access to affordable and long-term credit for the development of the manufacturing sector.

Limited availability of technical and managerial skills (relevant skills): Uganda continues to face inadequate relevant skills for industrial development. While government has made significant efforts towards the development of Uganda's workforce to meet the challenges of industrialization, enterprises still suffer a shortage of critical skills. Notably, some progress has been made with TVET graduates reaching around 42,000 a year (Republic of Uganda, 2017). But the current scope of vocational training remains limited to traditional courses like



carpentry, civil work masons, and electrical foremen. Many enterprises in Uganda lack the requisite technical expertise for industry. Ugandan firms do not compensate for the low level of education and skills by providing significant on-the-job training. Currently, 4 and 8 courses are in short supply and trainings are not available in the country. Agro-industrialization and manufacturing have technical skills deficit of 3,877 and 33,352 personnel respectively. Agro-industrialization courses include Agricultural Lawyer (896), Horticultural Therapists (1,135), Hydroponics 795 and Taxidermy specialists (1,051) while manufacturing courses include; 627 electromechanical equipment assemblers, 197 manufacturing / Production Engineers, 430 Manufacturing Production Technicians, 538 Material Engineers, 179 Machinists, 448 Ophthalmic laboratory specialists, 574 Plastic Technology specialists, 359 Manufacturing Robotics Technicians and specialists (NPA, 2020, Appendix; A & B).

Limited finance for research and development (innovation): The Research and Development (R&D) in Uganda accounts for only 0.4% of GDP (NPA, 2019). This finance for R&D is inadequate to support the country to develop technology of her own to meet her specific needs of economic and social development. Continuous global technological shifts require a greater priority on innovation and a more adaptive Ugandan industry. Uganda does not currently have enough productive capabilities to produce high and medium technology exports.

High cost of doing business: This is mainly attributed to high cost of infrastructure, high power tariffs (USD 0.16 per kW), high taxes among others. In 2019, Uganda was ranked number 116 out of 190 countries in the world in terms of easiness in doing business (Trading Economic, 2020)..

Inefficient public institutions: Despite the adoption of good practices in economic planning, such as sector-wide approaches (SWA) and coordination of the Ministry of Economic Planning, government institutions are still challenged by problems such as duplication, poor capacity and political pressures at the planning phase, cost overruns, implementation delays and poor monitoring capacities, according to UN Economic Commission for Africa report 2017. Thus, for instance, the World Bank (2016) stresses the need to improve public investment management to yield better return from investments in infrastructures and other government's projects. One example suggestive of inefficiencies in public sector investment is the cost of Bujagali dam, which was budgeted at \$862 million, to produce 250 megawatts of energy. This is equivalent to USD 3.5 million per megawatt. This is a lot more expensive than the Grand Ethiopian Renaissance Dam (formally Millennium dam) that cost USD 6.4 billion, to produce 6,450 megawatts equivalent to USD 992,000 per megawatt – in other words, four times more expensive per megawatt produced (UNECA, 2017).



5.0 Summary of Key findings from Assessing Uganda's Industrial Development Journey



- Political instability affected industrial development in Uganda in 1970s and 1980s especially heavy industries
- lack of an integrated plan that integrates the efforts of all sectors towards industrialization and build on the gained advantages prior to 2000, and provide a sequenced path for industrialization in Uganda
- The policies that were applied in the 1990s to boost economic development that focused majorly on reconstruction have not been modified much beyond 2000 to now focus on driving industrialization through boosting manufacturing
- Dominance of services sector has affected job creation in the country (industry employs 6.6% of the labour force)
- Lack of clear mechanism to appropriately sequence industries has affected industrial development and frustrated efforts to alleviate poverty and income inequality. With high unemployment rate, the country needs increased investment in light labour intensive industries
- Limited expenditure on Research and Development (0.4% of GDP) has affected industrial innovation and technology development
- Inadequate relevant industrial technical and management skills have affected the development of the industry sector
- Lack of a single body under Ministry of Trade Industry and Cooperatives (MoTIC) in charge of industrial policy implementation (empowered to coordinate the delivery of an industrial strategy with high levels of technical capacity and political power)
- Uganda mainly produces consumer goods
- The private sector is still weak due to limited access to affordable finance for industrial investment: The state should lead the industrialization process and ensure that it makes Uganda's private sector stronger
- High importation (63% of merchandise imports) and low exportation of manufactured goods (22.5% of merchandise exports): This has led to deterioration of trade balance from a deficit of USD 316.2 million in 1993 to a deficit of USD 2.8 billion in 2019 (Bank of Uganda, 2020).

5.1 Areas of industrial Development intervention (Fundamentals) and Key institutions in Uganda

Table 2 illustrates areas of intervention in Uganda’s industry sector and responsible institutions and ministries.

Table 2: Areas of intervention vs Key Institutions/Ministries

	Areas of intervention in the industry sector	Key Institutions/ministries
1	Promotion and coordination of industrial development (owner of national industrial policy)	MoTIC
2	Resource mobilization	MoFPED, UDB, UDC
3	Affordable Long-term financing and credit guarantee instruments	UDB, BOU, MoFPED
3	Investment institution	UDC, UDB,UIA
4	Tax incentives and other MSMEs formalization financial incentives like blended finance (grants)	URA, MoFPED, UDB,UDC
5	Industrial skills Development/Technical capacity	MoES, MTAC, MoTIC
6	Research and Development (R&D), Innovation & Technology	MoSTI, MoES, UNCST, UIRI,
7	Infrastructure Development (Energy, ICT, Roads, Industrial Parks)	MoWT, UNRA, MoICT, NITA, MoFPED, MoEMD, OWC, UEGCL, UETCL,REA,
8	Local Investors and foreign Direct Investors (FDIs) participation	UIA, PSFU, MoTIC, UMA, USSIA, MoPED (PSDU)
9	long term vision of structural transformation	NPA, MoTIC
10	Establishment of Manufacturing Warehouses, free zones, industrial parks (clusters)	UDB, UDC, MoTIC, UFZO,UWRSA, MoFPED
11	Incentives for Green industry	MoTIC, UIA, UDB, UDC, UPMRA, NEMA
12	Quality assurance (standards)and export promotion	UNBS, UEPB,UPMRA, MoTIC
13	Digital transformation of the industry (Transformation towards Industry 4.0)	MoTIC, UIA, UDC, UDB, BOU, MoSTI, UNCST, UIRI, MoICT, NITA, MoFPED



6.0 Light industries vs Heavy industries

The preference for light and heavy industries.

One of the major problems facing developing economies Uganda inclusive as on their way of industrialization is the preference of light, medium and or heavy industries. It is known that capital density in heavy industry is relatively high w.r.t. (with respect to) labour density (I.M. Sharkass, 1979). Light industries include; Industries producing consumption goods such as spinning, weaving, shoemaking etc. 2 - Food industries such as sugar, oil, soap, production food canning etc. 3 - Light engineering industry such as households, radio-television sets, watches. Heavy industries include: 1 - Mining industries. 2 - Production & processing of metals (production of iron, processing of steel, rolling of steel to sheets). 3-Petrochemicals). 4 - Power generation. 5 - Heavy engineering industries such as (locomotive, automotive, turbine, tractor, construction machines).



Starting with light industry depending on the following issues:

- 1 - Necessity of intensive labour, this has the privilege of changing agriculture labour suffering from disguised unemployment. Employment in agriculture (% of total employment) in Uganda was reported at 70.38 % in 2019, according to the World Bank collection of development indicators.
- 2 - Moderate capital investment which allows developing countries to depend on self-financing or short-term loans for such projects.
- 3 - Light industries in early stages of development are compatible with the market demand (local and export).
- 4 - Light industry does not need intensive training of manpower, or high qualified levels of managers or administration.
- 5 - Operating and maintenance of light industries equipment is not complicated, appropriate skills could be easily created.
- 6 - Spreading light industries in rural areas does not need intensive infrastructure, from the other hand this is a good start of industrialization associated with soft changing of the social structure from an agricultural society to an industrial one.

As highlighted by I.M. Sharkass in 1979, it might be hard for developing countries to jump for heavy industries without passing the childhood in light industry schools. Economists States that starting with heavy industries will cause the emergence of economic inflation. Developed countries applying heavy industries already started industrialization in the last two centuries ago.



Starting Heavy Industries depends on the following issues

1-Presence of heavy industries is equivalent to self-dependence. However, starting with light industries have the meaning of continuous dependence on developed countries for purchasing machines needed for operating such light industries, this means to be mastered always by developed countries.

2-Economists supporting this point of view states that on short term basis, both light & heavy industries will have deficiencies on balance of payments. Since in case of light industry machines, they will be imported in addition to the consumption products which will be imported but on long term. Light industry will continue importing its machinery. However, in the other case when it will be possible to implement light industry and built its machines, imports will be stopped.

3-The most efficient industrial plans are the ones able to attain high and rapid rates of economic growth. This is because of accumulated increased production, with high value, which leads to increase of income consequently savings and reinvestment (Sharkass, 1979). This only can be achieved by advanced technology of high capital heavy industries.

4-Manpower productivity in heavy industries is higher w.r.t. (with respect to) light industries. The surplus of this product is re-circulated in further investment causing increased rates of economic development.

Categories of manufacturing industries in Uganda

A combination of both light and heavy manufacturing industries has been prioritized over the NDPIII period in order to build a resilient, integrated, and independent and self-sufficient economy. These fall in two categories of (1) Light Manufacturing: Textiles & Apparels; Shoes; Assembly of electronic and medical items; Paper and paper products; Chemicals, petro-chemicals and pharmaceuticals; and Cereal and cereal products; Tiles, sanitary ware, plumbing, fixtures & fittings; (2) Heavy Manufacturing: Iron and steel; cement production; Tractor and Automotive manufacturing and assembly.

7.0 Industrial Development in Malaysia, South Korea and Singapore

This section presents the economic situation and industrial development intervention strategies adopted by Malaysia, South Korea, Singapore and Kenya mainly from 1960 to 2020 i.e. colonial and after independence industrialization.

7.1 Malaysia industrial development

Malaysia went through colonial industrialization phase (1897-1957), after independence industrialization (1957-1969), export-oriented industrialization (1970-1980), import substitution industrialization phase II (1981-1986) and market globalization phase (1987 and beyond) as explained below;

a) Colonial industrialization (1957-1897)

Before independence in 1957, tin and rubber were the main exports commodities from Malaysia. They both accounted for 85% of export earnings and 48% of GDP (Bethuel, 2009). The high economic growth increased the purchasing power, rising demand for manufactured goods in the country. The world view economic system facilitated foreign direct investors who operated freely and repatriated revenue back to their countries including China, India among others. Unfortunately, the increase in competition from Chinese synthetic rubber industry significantly affected the prices for Malaysia's natural rubber. The decline in rubber prices and the anticipation of the inevitable exhaustion of tin deposits made the diversification of the economy imperative. A World Bank mission was sent to Malaysia in 1955 to assess its economic future, which reported the inability of tin and rubber to sustain employment due to population increases in future. This team recommended the diversification into other forms of export agriculture into manufacturing. It particularly recommended Import Substitution (Bethuel Kinyanjui Kinuthi, 2009). As recommended by the World Bank, the possible gloomy economic future of the prosperous Malaysian economy led to the adoption of import substitution industrial strategy (ISIS) in the 1955.

Interventions Employed by Malaysia during colonial industrialization (1957-1897)

The government used the revenue generated from mainly tin and rubber to develop infrastructure which would later be crucial in the development of the manufacturing sector. The entry of Chinese and Indian technology in Malaysia led to spillover of foreign expertise to the local industry. The government pursued tariff protection and



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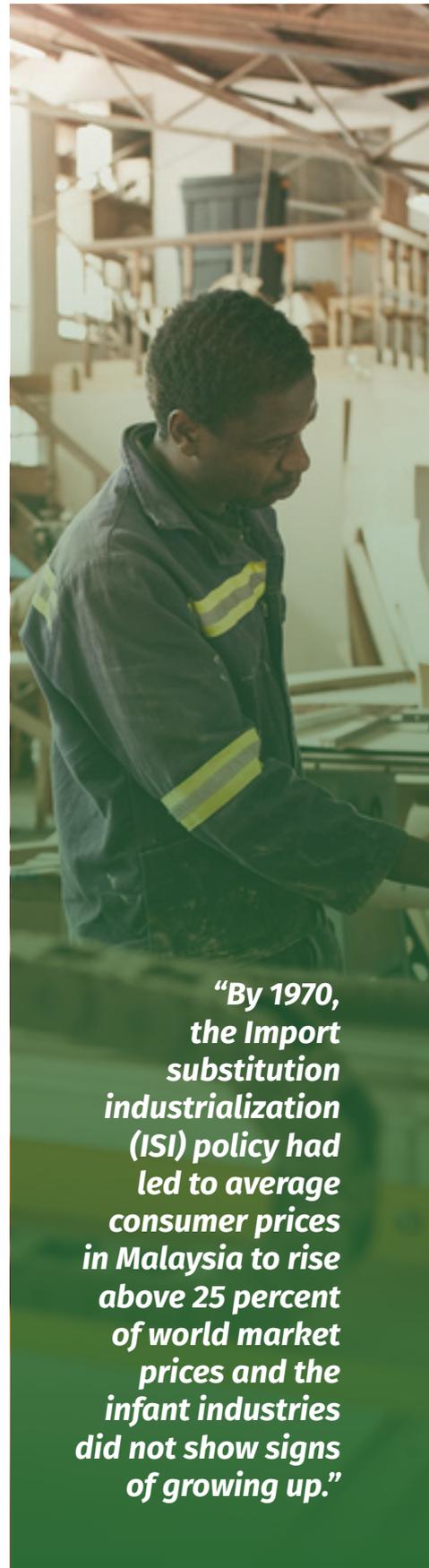
encouraged local entrepreneurs, attracted foreign capital and provided industrial estate facilities and infrastructural development. During this period, the import substitution industrialization was also encouraged through tariff protection and quotas on imported goods.

b) Industrial developments after independence (1969-1957)

The political independence in 1957 also marked the turning point for significant structural changes in Malaysia's economy due to serious government intervention through various industrial policies to promote the industrial sector. In 1957, the government embarked on the import substitution strategy aimed at developing industries largely in a protected domestic market aimed at producing goods that had been previously imported. During this period the government pursued an Industrial policy that was aimed at protection of domestic industries while at the same time providing incentives to attract foreign firms. By 1970, the Import substitution industrialization (ISI) policy had led to average consumer prices in Malaysia to rise above 25 percent of world market prices and the infant industries did not show signs of growing up. The government was forced to loosen its ISI industrialization policy. It was apparent that Import Substitution strategy failed. Most of the Malaysian firms were foreign owned and thus repatriated revenue from Malaysian economy back to their home countries. The local Malays only controlled 1.5 to 2% of manufacturing and production industry (Bethuel, 2009). There was also a massive rise in unemployment as foreign firms, majorly Indians and Chinese, employed their nationals. This social and economic imbalance resulted in much anger and eventually led to the ethnic riots in 1969. The government was then forced to review its development strategies.

Interventions Employed by Malaysia during the after independence industrialization

During this period, the government employed economic realism by developing an industrial policy, which protected the local industry while providing incentives for foreign firms on a smaller scale. The government also adopted market liberalism by developing new industrialization policies that provided a favorable investment climate to the private sector. Malaysian government directly and indirectly subsidized the construction of new factories and offered domestic market protection in a bid to promote local industrialization. The Malaysian government enacted the Pioneer Industries Ordinance (PIO) in 1958 to promote industrial development (promoting industrial growth by offering income



“By 1970, the Import substitution industrialization (ISI) policy had led to average consumer prices in Malaysia to rise above 25 percent of world market prices and the infant industries did not show signs of growing up.”



tax relief to industries). The Malaysian Industrial Development Finance Corporation (MIDC) was established in 1959 with the aim to develop industrial estates and providing investment capital to spearhead industrial development. During this period, the industrial development incentives attracted labor-intensive production and manufacturing industries in the Malaysian domestic market. In 1966, the government created Malaysia Industrial Development Authority (MIDA) to promote and monitor manufacturing development and growth. Following the riot in 1969, the Malaysian government repealed its industrial development policy from import substitution to export-oriented industrialization. In the same spirit, the government reduced tariffs and quotas on imported goods in a bid to reduce the cost of living in the country.

c) Export-Oriented industrialization (1980-1970)

The ethnic riot and high unemployment that existed in 1969 coupled with reduced revenues from rubber and tin, forced the government to review its development strategies. The Malaysian government pursued economic realism by promoting export oriented industrial development through Investment Incentives Act of 1968. The government in response to the social tension of 1969 launched the New Economic Policy (NEP) which coincided with the change in the direction of the industrial policy from import substitution industrialization (ISI) to export-oriented Industrialization strategy (EOI) a switch that gave fresh impetuosity to industrial growth. During this period, manufacturing sector was deemed the most effective in eradication of poverty through the provision of employment. Accordingly, to the proponents of NEP, increased manufacturing and this was expected to spur economic growth through foreign export exchange. In response to this, Malaysia Industrial Development Authority (MIDA) advocated for the relocation of foreign Multinational Corporations (MNCs) to Malaysia to engage in production for export. To this effect, the following firms were established in Malaysia: Clarion, National Semiconductor Electronics, Microsystems International and Litronix among others). The increased industrialization resulting from the influx of foreign MNCs in Malaysia led to the creation of employment opportunities and economic growth.

Interventions Employed by Malaysia during the export oriented industrialization phase

The Investment incentives act widened the range of firms eligible for growth inducements such as exemption from payroll tax. In response to the social



tensions that led to ethnic riot of 1969, the Malaysian government launched the New Economic Policy (NEP) in 1970 to eradicate poverty in Malaysia. By mid-1970, the Malaysian government established Licensed Manufacturing Warehouses (LMWs) and Free Trade Zones (FTZs) to facilitate and encourage Malaysian manufacturing production for export using imported equipment and materials based on targeting foreign firms. Through MIDA, the Malaysian government also integrated global economic view by encouraging foreign Multinational Corporations (MNCs) to relocate to Malaysia to enjoy economic incentives provided by the protected market. The existing infrastructure, political stability, large supply of trainable labour force, a friendly government and financial incentives were important factors that led to the foreign firms relocating their operations in Malaysia. In 1976, the Malaysian government enacted the Industrial Coordination Act (ICA), which mandated the Ministry of Trade and Industry to control industrial development in Malaysia and issue trade licenses to firms that complied with the goals of New Economic Policy (NEP). Malaysia continuously improved her education system to supply the needed human resource at various levels of economic development.

d) Phase II of ISIS industrialization (1986-1981)

By the end of 1980, the economy of Malaysia relied heavily on Foreign Direct Investments (FDIs) as 76% of the country's Gross Domestic Product (GDP) came from MNCs. There was an urgent need of embarking on import substitution industrialization. The period 1981-1986 was very dynamic with the government embarking on heavy investment industrialization strategy with a view of enhancing linkages between multinationals and local industries. The Increased linkages between local and foreign firms led to technological spillover of expertise from foreign to local firms. Spillover of foreign expertise enhanced competitiveness of the Malaysian local industries with foreign multinational corporations (MNCs). Prior to this, the local industry faced a higher competition from foreign firms that were using technology as a competitive advantage. Technological spillover gave the Malaysian local industry a higher competitive edge as they had easier access to raw materials than their foreign counterparts did. This period also saw increased relocation of Indian, Japanese, American, and Korean corporations to Malaysia attracted by the availability of raw materials, favorable investment conditions, and availability of cheap labor force.





Interventions Employed by Malaysia during the second phase of ISIS

Between 1981 and 1986, the Malaysian government embarked on heavy investment in local industrial development with a view of enhancing linkages between multinationals and local industries. There was a renewed focus on Small and Medium Enterprise (SME) investments to enhance deeper domestic industrialization and job creation than before. While pursuing the second phase of ISIS, the Malaysian government was keen not to lose its revenue from foreign multinational corporations (MNCs). The government protected foreign direct investors by instituting economic measures to control the outflow of capital and promoted relocation of many MNCs to Malaysia. In order to deepen industrialization, the Malaysian government encouraged linkages between foreign firms and local Malaysian industries. This was aimed at enhancing the transfer of foreign expertise and technological skills to the local industry. The import restrictions and strict licensing policies gave the local industry a competitive advantage domestically and overseas. During this period, the state also began to encourage foreign firms particularly those enjoying financial incentives to integrate production vertically and expand local sourcing.

e) Second Round of Export Oriented (EOI) industrialization and market globalization (1987 and beyond).

The government of Malaysia extended further financial incentives to foreign firms through the Promotion of Investment Act (PIA) in 1986. With this the government provided Investment Tax Allowance (ITA) to firms whose pioneer status had expired, and gave several generous benefits for export promotion, research and development and training. The new focus was Cluster based approach and key strategic sectors were identified for development. The emphasis was on value addition through increased productivity. Cluster based approach. It emphasized the development of the industrial clusters, their key suppliers and the requisite economic foundations such as human resources, technology, physical infrastructure, supportive and administrative rules and procedures, fiscal and non-fiscal incentives and business service support. It aimed to develop dynamic industrial clusters, and strengthen industry linkages, while promoting higher value-added activities. The clusters at various levels of evolution were of various kinds. The natural evolving clusters mainly resource based including wood, rubber, palm, petroleum and chemicals. Policy driven clusters involved mainly the heavy industries that were established during the ISI strategy and included automotive, aerospace, machinery and equipment which are largely considered strategic. The third level consisted of clusters with international linkages which included electronics and electrical appliances and textile industries.

In 1993, the Malaysian government strengthened its industrial development further by establishing Malaysian Business Council (MBC), Malaysia Technology Development Corporation (MTDC), and Malaysia Industry-Government Group for High Technology (MIGHT). Other institutions formed with the aim of strengthening Malaysian industrial development include Malaysian Institute of Micro Electric Systems (MIMOS) and Standard and Industrial Research Institute of Malaysia (SIRIM). The above institutions brought Malaysian business leaders together on a consultative platform of the future industrial development of the new industrialized Asian country. From 2005 and beyond, Malaysia emphasized market globalization through free trade policies. The country joined World



Trade Organization (WTO) in 1995 and this implies opening of the domestic Malaysian Market to foreign goods. Today, Malaysia is a home to most, if not all, of the microchip corporations in the world. Most MNCs that deals in computer technology have their production factories in Malaysia. Besides foreign corporations, many local Malaysian firms are leaders in exportation of microchip technology products.

Interventions employed during the second phase of export-led industrialization and market globalization

The government of Malaysia adopted cluster-based approach of industrialization. To this effect, three clusters were formed i.e. (i) the natural evolving clusters mainly resource based including wood, rubber, palm, petroleum and chemicals, (ii) policy driven clusters involved mainly the heavy industries that were established during the ISI strategy and included automotive, aerospace, machinery and equipment which are largely considered strategic and (iii) clusters with international linkages which included electronics and electrical appliances and textile industries. Malaysia globalized her market through free trade policies and joined World Trade Organization (WTO).

7.2 South Korea Industrial Development

Like Malaysia, South Korea attained industrialized status with economic realism. The Korean government has been on the forefront in promotion of production of industrial goods for exportation through Export Promotion (EP) policies (Surendra, 1992). In 1960, the Korean government began enacting economic policies that promoted import substitution and. In 1964, the government embarked on export promotion policies dubbed “Export Number One”. The implementation of the policy saw the government of Korea raise export subsidies to attract local industrialists to produce goods for exportation. Below are the industrial development strategies employed by South Korea from 1960 to 2020.

Industrial development Intervention strategies employed by South Korea from 1960 to 2020

In 1964, South Korean government reduced tax on export profits by 50% to encourage export oriented industrial production. In line with export promotion policy (EP), the Korean government reserved land for industrial estates and developed foundational infrastructures for industrial development. These infrastructures formed an essential foundation for rapid industrial growth in the 1970s. specialization in Light Industries (LI) was important in ensuring rapid industrialization including plywood, cotton fabric, raw silk, rubber products, potteries, radios electric appliances, mushroom cans, textiles, flour mills, breweries and bicycles were given priority initiatives for export production. These light industries have high labour density thus vital in employment creation. Technology obtained through foreign licensing and adapted for domestic production. The country invested Vocational high schools—training in craft skills for the growing labour-intensive light industries. Establishment of industries to supply basic industrial materials e.g. iron, oil & fertilizers and establishment of special purpose banks e.g. Industrial Bank of Korea (IBK).



In 1970S, the government Introduced and emphasized heavy manufacturing industries (e.g. chemical and ship building, and efforts were geared towards market-conducive environment by deregulating various sectors and liberalizing trade and financial markets. The government continued to improved quality of technical & vocational training and expanded the enrolment quotas in the fields of engineering. In 1978, the Korean government instituted Korea Credit Guarantee Fund (KCGF) for export-led production industries with 55% reduction in prevailing market rates.

In 1980s, the government of South Korea ensured tight monetary & fiscal policies to control inflation in the country and invested heavily in indigenous Research and Development (R&D) and established national R&D program and promoted indigenous high-technology innovation (pursued high value addition). During the same period, the extension of loan to public than chaebols (family businesses) was emphasized.

In 1990s and beyond, South Korea establishment of free trade zones (FTZs) and expanded Research and Development (R&D); increased R&D expenditure (from 2.3% of GDP in 1960 to 4.6% of GDP in 2018). Additionally, government initiated a Joint research program between universities and industries.

Market liberalization coupled with good public policy (economic realism) spurred rapid industrial growth of Korea. In effect, industrialization of Korea was possible through economic realism principles. Today, Korea is one of the leading exporters of electronic goods.

7.3 Industrial Development in Singapore

In 1960s & 70s, the government of Singapore put in place policies aiming at attracting foreign direct investment mainly global multinational corporations as vehicles to achieve industrial growth for job creation and economic growth through expanded productive capacity. Further, the new policies helped the country to shift away from import-substitution in favour of export-led industrialization. The government developed industrial land, put in place infrastructure facilities, reformed labour laws to promote industrial peace, and invested in basic education with emphasis on technical skills relevant to industrialization. Sound fiscal and monetary policies ensured macroeconomic stability and underpinned investor confidence in the country.

In 1980s, the Industry sector was restructured by focusing on high-tech manufacturing and high value-added services. This led to the emergence of strong clusters in higher value-added electronics, petrochemicals, component and precision engineering (Singapore became the world's leading producer of hard disk drives—an early form of memory storage used in computers at the time). During the same period, computerization of the civil service—helped to kick-start the info-communication services industry.

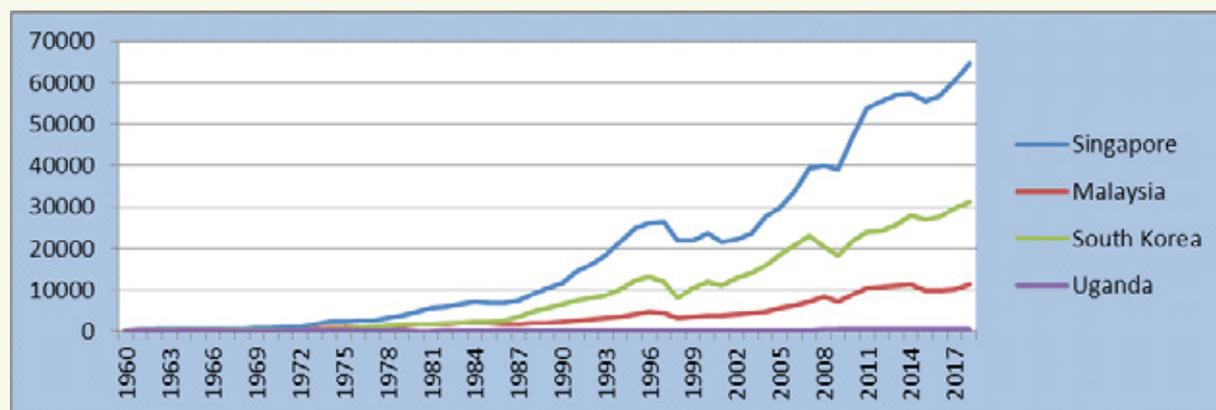
In 1990s, the country embarked on structural reforms to enhance wage flexibility in the labour market, tap more decisively into regional markets for trade and outward investment, step up the pace of industrial upgrading, and promote innovation, enterprise, and entrepreneurship in the economy and liberalization of various services sectors such as finance, telecommunications, and utilities.

In 2000 and beyond, the emphasis was put on the liberalization of the insurance and securities industries, opening the domestic banking industry to foreign competition and opening up the entertainment industry.

7.4 Comparison with East Asian Countries (South Korea, Malaysia and Singapore)

As revealed by Abraham J. B. Muwanguzi et al. report in 2018, on several occasions, Uganda's level of economic development was compared to that of the East Asian countries like Singapore, Malaysia and South Korea and expected to be at this level. This has been the case because these countries were at almost the same level of economic development in the 1960s and 1970s. According to World Bank statistics, the per capita income (current US\$) of these countries were in the range of USD130 and 400 in the 1970s and therefore the expectation is that they should at least be in similar ranges 50 years down the road.

Figure 2: Gross domestic product per capita for Uganda, Singapore, Malaysia and South Korea from 1960 to 2018



Source: World Bank statistics (2018)

As illustrated above in figure 2, the GDP of Malaysia, Singapore and South Korea tremendously increased over the time period, while that of Uganda did not make significant improvements. The trend of growth exhibited by the four countries is completely different. Twenty years down the road after 1960, in 1980, the GDPs (current US\$) of Uganda, Singapore, Malaysia and South Korea were USD 1, 12, 24 and 65 billion respectively. Currently, the GDP of the three countries are USD 27, 364, 359 and 1,619 billion respectively, according to World Bank statistics 2018.

With a population of 5.6 million currently growing at 0.47 percent people and land mass of 713.6 km², the citizens of Singapore have a higher standard of living, which is even better than that of South Korea. Among these countries studied, Uganda has the highest population growth rate of 3.72 percent while Malaysia and South Korea have the population growth rate of 1.35 percent and 0.48 percent respectively (World Bank, 2018).

The political instabilities experienced by Uganda between 1966 and 1986 slowed down her pace in economic development, yet the East Asian countries, to some extent, did not experience such



instabilities. Political instability that lasted for over 20 years destroyed infrastructure and systems in Uganda that would have delivered on the desired inputs to economic development. The analysis carried out by Muwanguzi et al. (2018) revealed that if these 20 years are offset from Uganda and the yard stick starts at probably 1990, it implies that 20 years down the road (2010) the nation's economic development should at least be at 75% the level (given that they were not at the same level of development) where the East Asian countries were in 1980, especially with Malaysia, which has similar characteristics to Uganda. However, the case presented is very different. This may imply that even if Uganda had not experienced political instability over the 20-year period, it might not have been as developed as the East Asian economies (or even halfway their current GDP).

7.5 Lessons from Malaysia, South Korea and Singapore

Below are the lessons drawn from Malaysia, South Korea and Singapore that can aid Uganda make the right decision to realize the benefits of industrialization in her journey to middle income economic status;

- Malaysia, South Korea and Singapore adopted economic realism approach to economic and industrial growth. They adopt market liberalization to attract both domestic and foreign investors and good public policies in form of tax and financial incentives for import substitution industrialization and export-oriented production.
- They balanced import substitution industrialization with export-oriented production. This increased export revenues and reduced export receipts which improved their trade balance. For instance, in 2019, Malaysia and South Korea had a Current account balance (BoP, current) surplus of USD 7.6 billion and USD 60 billion respectively compared to Uganda at deficit of USD 2.3 billion (World Bank, 2019).
- At the on-set of the industrialization drive, sequencing of industries was key; they concentrated on labour intensive, light manufacturing industries targeting the resources available to them, e.g. agricultural industries for Malaysia, in order to provide employment to their citizens.
- They focused on laying the ground for the establishment of heavy industries that were deemed to be backbone industries for industrialization e.g. iron and steel industry, fertilizer factories for boosting agriculture
- These countries focused on educating their population, equipping them with skills that were directly related to boosting industrial development.
- Adequate investment in Research and Development i.e. 4.6% and 1.4% of GDP for South Korea and Malaysia respectively. South Korea increased funding for R&D from 2.3% in 1960 to 4.6% of GDP in 2018 while Malaysia increased hers from 0.2% in 1960 to 1.4% of GDP in 2018 (World Bank, 2018).
- Joint research between universities and industries (Liaison office)
- Promoted indigenous high technology innovation



- Expanded enrolment quotas in the field of engineering (industrial courses)
- Established transformative institutions such as Industrial Bank of South Korea, Malaysia industrial Development finance Corporation (MIDFC) etc.
- Adopted cluster industrialization approach and established manufacturing warehouses and free trade zones (FTZs)
- Invested heavily in the infrastructure especially roads, energy and industrial parks for instance Malaysia used revenues from rubber and tin to develop infrastructure and South Korea reserved land for industrial development and developed the necessary infrastructure for industrial growth.
- Over protection of local industries affected the economy of Malaysia by increasing inflation in the country and this was eased to reduce the cost of living.
- The Malaysian and South Korea government provide incentives for green industry i.e. Green Investment Tax Allowance (GITA).
- Encouraged importation of raw materials for export production.
- Introduced economic measures to control outflow of capital (repatriation) by foreign investors.

7.6 Summary of Fundamentals for industrial Development in Malaysia, South Korea and Singapore

Table 3 illustrates the summary areas of intervention (fundamentals for industrial development) in the industry sector and some of the key institutions and ministries involved in the industry policy implementation in Malaysia, South Korea and Singapore.

Table 3: Areas of intervention vs Key Institutions/Ministries in Malaysia, South Korea & Singapore

	Area of Intervention	Institutions/Ministries		
		Malaysia	South Korea	Singapore
	Fundamentals for industrialization	Malaysia	South Korea	Singapore
1	Promotion and coordination and monitoring of industrial development	MIDA, MITIM	MTIE	MTI
2	Resource mobilization	MOF, BPMB	MEF,KDB, IBK	MOF, DBS
3	Affordable Long-term financing and credit guarantee instruments	BPMB,BPKSM	KDB,EIBK, IBK	DBS
3	Investment institution	MIDA		EDB
4	Tax incentives and other MSMEs formalization financial incentives like blended finance (grants)	IRBM	NTS	IRAS
5	Industrial skills Development/Technical capacity	ME	ME	ME
6	Research and Development (R&D), Innovation & Technology	MTDC, MIGHT	ME	ME
7	Infrastructure Development (Energy, ICT, Roads, Industrial Parks)	MENR	MTIE	EMA
8	Local Investors and foreign Direct Investors (FDIs) participation	MIDA, MITIM	MTIE	MTI
9	Long term vision of structural transformation	FPA		
10	Establishment of Manufacturing Warehouses, free zones, industrial parks (clusters)	MITIM	MTIE	MTI
11	Incentives for Green industry	MITIM	MTIE	MTI
12	Quality assurance (standards)and export promotion			
13	Digital transformation of the industry (Transformation towards Industry 4.0)	MITIM	MTIE	IMDA, MTI



8.0 The Case of Industrial Development in Kenya

Before Kenya attained independence, industrial activity was carried out in the context of economic development in the suzerain (JICA, 2008). Science and technology were harnessed only for colonial economic development as well as policy aimed at supplying raw materials to the suzerain. After independence, industrial development was conducted, based on the framework of the former East African Community (EAC).

Import substitution industrialization policy was implemented in the 1960's-1970's, which included import restriction, application of high rate of duty, exchange control, and subsidy for interest. However, bad financial assets were increased, and the competitiveness of enterprises did not come to be strengthened because the small market was dominated by monopolized enterprises with inefficient management.

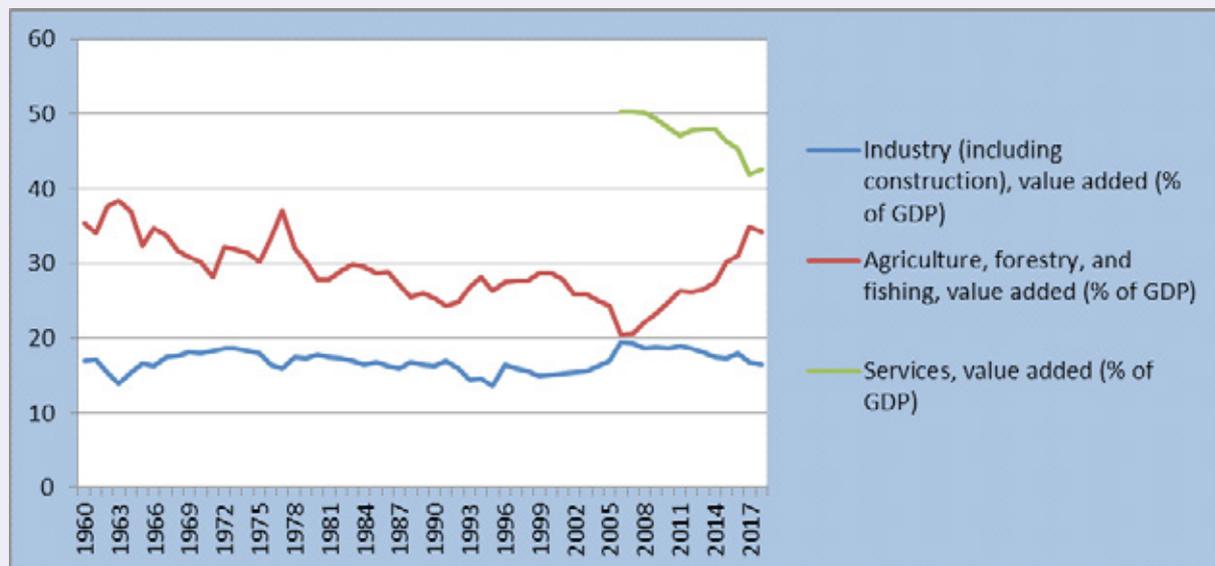


Following the dissolution of the former EAC in 1977, the necessity of industrialization was arisen, and the government was pressed to promote industrial development in the domestic economy. Then, export-oriented industrialization policy was introduced, which included the abolition of the import restriction, the reduction of the high rate of duty, the liberalization of the exchange, and the establishment of Investment Promotion Centre (IPC), the present Kenya Investment Authority, in 1982, Export Processing Zone (EPZ) in 1990, and Export Promotion Council (EPC) in 1992.

In the 1980's-1990's, the structural adjustment programmes were introduced under the development partners' framework led by the World Bank (WB) and International Monetary Fund (IMF). The policy of structural adjustment included the promotion of lifting government controls on many economic fields and reforming state corporations.

Like Uganda, Kenya's industrial output is still below the 35% of GDP mark for the country aiming at achieving middle income country. Kenya's contribution of industry to GDP has been declining over the last three years, mainly due to insufficient investment in industrial transformation (Ref: Figure 3). However, the country is establishing the foundations for industrial transformation. There has been a definite shift in government priorities to invest in both national and regional infrastructure, for roads, railways, ports and electricity generation and transmission. Kenya has focused on developing special economic zones, which provide affordable and reliable electricity and ICT and other tax incentives to establish competitive industries. For example, in Naivasha, the Government of Kenya has established a Special Economic Zone (SEZ) next to the Ol Karia geothermal power plants. Geothermal is the least expensive form of electricity in Kenya. In addition, the Standard Gauge Railway is being extended to Naivasha to transport goods more easily straight to Mombasa Port.

Figure 3: Sectoral contribution to GDP in Kenya, 1960-2018



Source: World Bank data base

8.1 Lessons learnt from industrial Development in Kenya

The weakest nature of the Kenyan industry is the fragmented business operations (Directions & Framework, 2007). To change the situation, Kenya has emphasized four types of linkage creations as Industrial Transformation Triggers including;

a) Creating Industrial Corridor (Spatial Linkage): To minimize the regional income gap, a strategy for promoting investment outside Nairobi has to be developed. Currently, industrial activities are concentrated in Nairobi. Even Mombasa area, which is advantaged by having the port, is not fully developed. This is because the industrial supporting system is very weak outside Nairobi.

b) Promotion of FDI (Foreign Linkage): FDI is essential for technological transfer to Kenya so that the Kenyan industry upgrades its technological capability to global standards. Some of the best practices utilizing FDI have demonstrated promotion of investment initiatives through public-private partnerships, resulting in the creation of dynamic clusters which have made significant spin-off effects on the local industry. Spinning effects from multinational companies usually occur for the top local manufactures through business transaction or to those who have ex-employees of the multinational companies. Then gradually, such spinning effects occur to the middle- and lower- level.

c) Strengthening industrial linkages (Sectoral Linkage): For the Kenyan industry to increase its value addition and to bring about multiplier effects to other economic sections, a strategy to strengthen the domestic linkages with other growing economic sectors have been taken up through both forward and backward linkages. The multiplier effect is also expected to make a larger impact on job creation with wider sections of the labour markets.

d) Integration of informal economy into formal economy (Economic linkage): The Government of Kenya has placed a stronger commitment in assisting graduation of the informal manufacturers to the formal manufacturers with the aim of integrating the informal economy into the formal economy. While recognizing importance of informal sector as the main source of employment, informality makes it difficult to extend public support effectively. Being informal is also undesirable in terms of income generation of the nation.





9.0 The Role of National Development Banks (NDBs) in Industrial Development

National Development Banks (NDBs) have played a role in industry development by providing short, medium and long-term credit with lower interest rates than the market rate. In Malaysia, South Korea and Singapore development banks were intensely utilized to meet the needs of growing industry by providing technical support and cheap loans.

National Development Banks (NDBs) have played an active role in mobilizing public and private sector resources to support new investments. NDBs not only finance projects that the private sector is unwilling or unable to finance, they also help to create and develop new market niches, develop innovative schemes to attract and channel private sector resources to large infrastructure projects, build capacity in public and private sector institutions, conceive and structure new investment projects, and facilitate the execution of public-private partnerships.



Development banks have engaged with the stabilization of domestic financial markets during financial crises by restoring adequate liquidity via credit allocation. Korea Development Bank (KDB), for instance, played an important role in this respect during 1997 financial crisis. Corporate lending by development banks also helped fill the credit vacuum left by private banks amid their efforts to clean up non-performing loans and restore capital bases. Korea Development Bank (KDB) also played pivotal roles in facilitating corporate restructuring through carrying out debt-equity swaps and debt readjustments.

Another policy function of a development bank is to facilitate foreign aid and to make strategies, in the absence of deep expertise within a country's domestic private financial institutions. For instance, development banks in East Asia have been highly active in recent years in making loans to countries that source raw materials.

In South Korea, Korea Development Bank (KDB) for industry, especially for manufacturing, agriculture, and mining, Industrial Bank of Korea (IBK) for the SMEs and Export-Import Bank of Korea for exporting firms, active in the export of capital goods have played a significant role towards industrialization and economic development. Relatedly, Bank Pembangunan Malaysia Berhad (for infrastructure, maritime, high technology, and oil and gas sectors), Bank Perusahaan Kecil & Sederhana Malaysia Berhad (SME Bank) and Export-Import Bank of Malaysia Berhad (EXIM Bank) for the promotion of investment and export of strategic sectors such as capital goods, infrastructure projects, shipping and value added manufactured products have played a fundamental role in Malaysia (Noor,



2017). In Singapore, Development Bank of Singapore (DBS) provides loans and financial aid to the manufacturing and processing industries and to help establish and upgrade existing industries while in Kenya, Industrial Development Bank (IDB) continues to provide affordable long, medium, and short-term finance to industrial and commercial enterprises.

In the same spirit, Uganda Development Bank (UDB) continues to support industrialization in the country and this is one of its high impact goals (UDB strategic plan, 2020/24). The Bank finances Small and Medium Enterprises (SMEs) and large-scale projects with the potential to create significant socio-economic development impact in the country.

9.1 The Case of Korea Development Bank (KDB)

Korea Development Bank (KDB) was at the centre of the development finance system that supported government policy and transformative growth. Created in 1954, it was built on the assets and facilities of the Industrial Bank, which in the late 1940s had been virtually the only provider of long-term credit in the economy. The main roles assigned to KDB were to provide medium-term and long-term loans to the industrial sector and to help develop the national economy (KDB Act, Law No. 302, promulgated on 30 December 1953)(UNCTAD, 2015).

In addition to KDB, other development finance institutions were established in the Republic of Korea. To finance the agricultural sector, in the early 1960s, the agricultural cooperatives and the Agricultural Bank were consolidated into the National Agricultural Cooperatives Federation. In the same period, the Industrial Bank of Korea was created, with the aim of providing for small and medium-sized industrial units. In 1967, the Korea Development Finance Corporation was created, with the mandate to support the development of private enterprises through the provision of medium-term and long-term financing and equity participation, as well as technical and managerial consulting services. In 1976, the Export-Import Bank of Korea was established. The institutions created to support industrial development all provided long-term credit drawing on funds mobilized through borrowing from Government, international financial institutions and foreign banks, and by issuing securities. They were not normally permitted to accept deposits from the public, especially in the form of demand deposits, a feature that distinguished them from conventional banks.

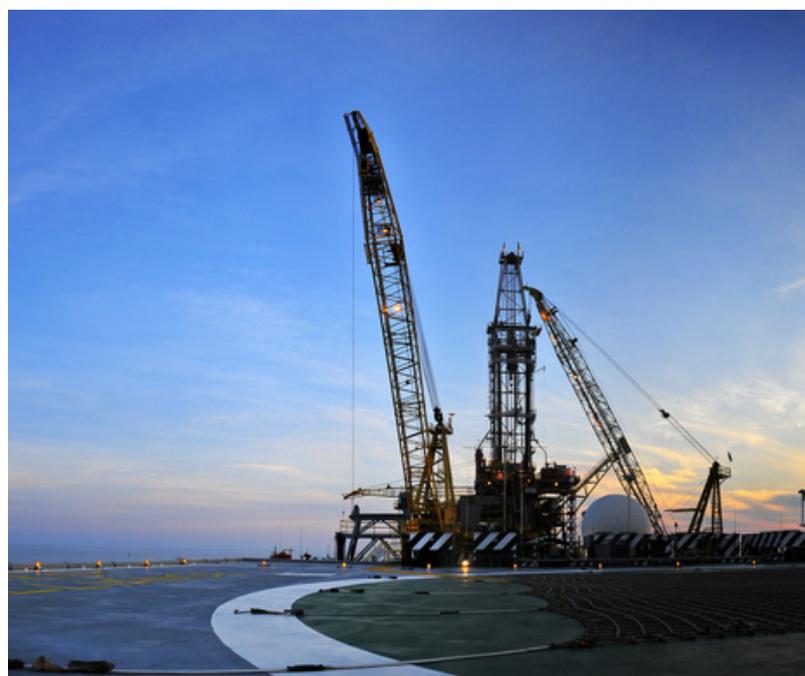
However, the development finance system that was put in place to provide financial resources for rapid economic development was not limited to such development and specialized banks. In the early 1960s, commercial banks also supported development. They did so both directly, by providing policy loans, and indirectly, by providing resources to development and specialized banks for on-lending operations. As part of the overall financing architecture, the Bank of Korea came under the control of the Government, which served as a mainstay of the whole system in its critical role as provider of liquidity and guarantees.



The main feature of the financial system of the Republic of Korea was the guarantee scheme, created in the 1960s to facilitate borrowing abroad, to support indigenous technology and industrial development as opposed to relying on foreign technology and firms (UNCTAD, 2015). KDB could borrow abroad and provide guarantees for foreign borrowing by the country's firms. Specifically, firms wishing to borrow abroad obtained approval from the Economic Planning Board, which was ratified by the National Assembly. Therefore, the Bank of Korea issued a guarantee to the foreign lender and KDB issued a guarantee to the central bank. Thus, while the borrower was committed to repaying the loan and carrying the exchange risk, the cost of the external loan was reduced due to KDB, and especially the Bank of Korea, warranting the operations (Yoon Je Cho & Joon-Kyung Kim, 1995)

The development finance system of the Republic of Korea was therefore well coordinated, with the Bank of Korea working closely with commercial and development banks and specialized financial institutions to support an agreed development strategy. Policy-based loans accounted for about 50 per cent of total credit available in the economy during the 1970s and for 30 per cent in the 1980s.

In order to fulfill its role as a provider of long-term loans for the development of the industrial sector and the national economy, KDB went through successive transformations, adapting its functions and repositioning itself in response to changing circumstances and the different stages of development that the Republic of Korea experienced over time.



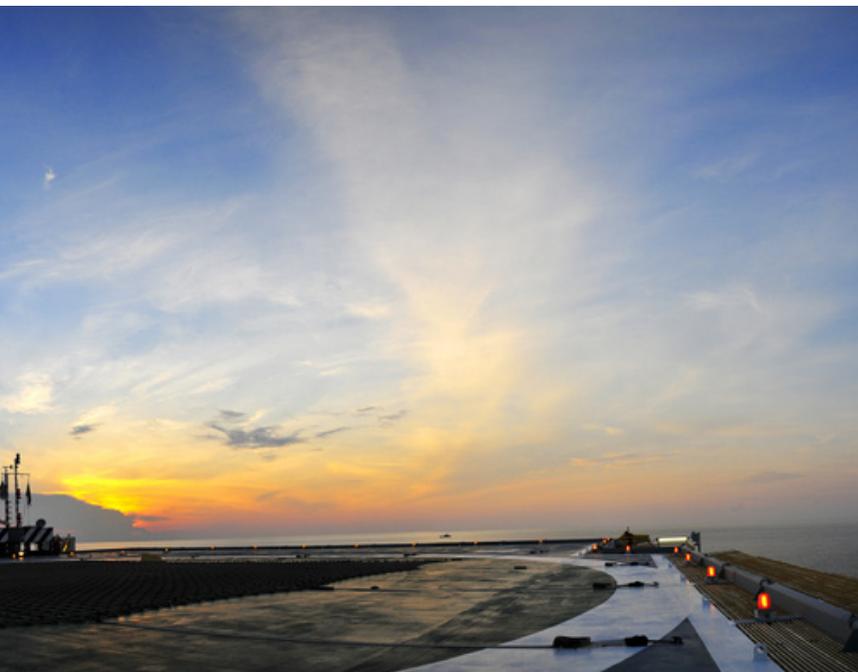
During its first years, KDB was tasked with funding the restoration of industrial facilities and reconstruction of basic infrastructure (Yoon Je Cho & Joon-Kyung Kim, 1995). In performing this task, its prominent role in the financial system of the Republic of Korea was soon established. By 1955, the bank accounted for over 40 per cent of total bank loans and, at one point, for 70 per cent of the equipment loans and 10 per cent of the working capital loans made by all financial institutions. In the 1950s, 50 per cent of KDB funds came from the Government's fiscal loans programme and another 37 per cent was raised by issuing bonds



The strategy switch from import substitution in the 1950s to export promotion from the early 1960s onwards brought about the first adaptation of the role of KDB to new policy priorities. The constitutive act of KDB was amended for the first time, to raise its capital and allow it to develop a set of policy instruments that was the core of the export credit programme. The provision of payment guarantees for foreign borrowing was one of the key policy instruments of the export promotion strategy, as it allowed export-oriented firms to access foreign capital at considerably lower interest rates (Cho and Kim, 1995). In order to fund its activities, KDB started to issue industrial finance bonds (KDB bonds)

In the 1970s, the Government's development strategy was reoriented towards the heavy and chemical industries, as noted above. To support this new strategy, it established training

centres to help form a skilled workforce and research institutes to generate research and development activities. On the financing front, it enhanced the role of development and specialized financial institutions, as vehicles that provided long-term credit at low interest rates. KDB refocused its role to finance new industries, in addition to the energy sector and export-oriented industries. To strengthen the lending capacity of the development and specialized banks, the Government created a National Investment Fund in 1974, and deposit-taking banks and insurance companies were required to lend a certain portion to this Fund. The Fund then transferred these resources to development and



specialized financial institutions, in the form of long-term loans at low interest rates. In 1974–1991, 80 per cent of its lending was allocated to such institutions. In 1974–1981, when the larger heavy industries were being established, 62 per cent of the Fund's total lending was allocated to KDB. As an additional funding source, KDB issued foreign currency bonds.

In the 1980s, the successful establishment of the heavy and chemical industries allowed for the support of new industries further up the value chain, such as the automobile and electronics industries. Once more, KDB reoriented its funding, towards these industries. In the same decade, KDB began to prioritize lending to SMEs and to support industrial restructuring.



In the 1990s, KDB was the main supplier of funds to high technology industries, and began to expand its international and investment banking business in order to become a globally competitive investment bank. The aim was to support companies of the Republic of Korea operating abroad, underwrite corporate bonds and support merger and acquisition projects. The Asian financial crisis in 1997 called for a renewed role for KDB, moving beyond its strategic role of picking winners with the capacity to add value throughout an export chain to encompass a countercyclical role in order to help the country overcome the credit crunch. In addition, it participated in the process of ample corporate restructuring in the economy of the Republic of Korea following the crisis (KDB, 2013). During the global financial crisis in 2008, KDB again played a critical countercyclical role.

More recently, plans have been designed to redirect KDB towards the future economy. In order to help accomplish this task, in 2013 and 2014, KDB launched several initiatives to support both SMEs that promote a creative economy and entrepreneurs and companies that develop new technologies. Such initiatives included a creative economy financing scheme to provide investments and loans for SMEs that promoted a creative economy, a Techno Banking fund that focused on intellectual property, a pioneer programme to provide support to future-oriented start-ups and SMEs and a growth accelerating programme to provide venture companies and start-ups not only with funding but also with networking opportunities and mentoring support. The greatest recipients of new investments in start-ups have been industries of cultural content, information technology, biotechnology and manufacturing.

9.2 Development Bank of Singapore (DBS)

The Development Bank of Singapore (DBS) was officially incorporated on 16 July 1968 and began operations on 1 September 1968. Its main function was to provide loans to manufacturing and processing industries with the aim of supporting the establishment of new industries and upgrading existing ones. The bank also supported development projects such as urban renewal and tourism schemes. In addition, the bank began commercial banking operations on 16 June 1969.

The establishment of the DBS marked the first time the private sector could fully participate in the financing of manufacturing and other industrial projects in Singapore. With a startup capital of S\$100 million, share ownership in its first year of operations comprised the following: S\$48.6 million by the Singapore government; S\$25.9 million by commercial banks; S\$7.6 million by insurance companies and other financial institutions; and S\$17.9 million by other companies and members of the public (Singapore Government Agency Website, n.d.). Following its successful share subscription exercise, the DBS's development finance operations expanded rapidly. By the end of 1969, its financial commitments had totaled S\$264.6 million with 96 companies.

To meet the growing demand for industrial capital, the DBS sought external lines of credit to increase its financial resources. A loan of S\$30 million was secured from the Asian Development



Bank in 1969 followed by a S\$15 million loan from the World Bank in 1970, while another S\$8 million loan from KfW was also approved.

In December 1971, the DBS launched its first Asian dollar bond issue, with a value of US\$10 million. The first financial entity in Singapore to do so, it signaled a step towards establishing Singapore as an international financial Centre.

9.1.3 Bank Pembangunan Malaysia Berhad (BPMB)

Bank Pembangunan Malaysia Berhad (BPMB) was incorporated on 28 November 1973 and began its operation on June 8, 1974. The bank's activities are to provide medium to long-term financing to capital-intensive industries, which include infrastructure projects, maritime and high technology sectors and making several strategic investments. BPMB landed its first significant role in the Malaysian industry by assisting entrepreneurs through the provision financing facilities, training and advisory services, particularly to the Bumiputera entrepreneurs. BPMB achieved another milestone in December 1998 by providing financing for infrastructure projects, particularly Government backed projects. Embarking further, BPMB enhanced its role in early 2002 by offering corporate advisory and underwriting services to companies that are engaged in development of infrastructure projects.

In 2019, three (3) funds were granted to Pembangunan Malaysia Berhad (BPMB) during the National budget announcement in alignment with the government national objectives including industry digitalization transformative fund (RM 3.0 billion) focused on encouraging the development and adoption of industry 4.0 related technologies with emphasis of increasing the contribution of manufacturing to the national economy, sustainable development financing fund (RM 1.0 billion) established to support the government's effort to implement the 17 Sustainable Development Goals (SDGs) under the United Nations Development and public transport fund (RM500 million) established to support the public transport services to reduce traffic congestion and travelling time within and outside urban/city areas (BPMB, 2019.)

10

The Industrial Revolution

The term industrial revolution is initially defined as the period during which work began to be done more by machines in factories than by hand at home. The advances in science and technology have continuously supported the development of industrialization all around the world. Nowadays, even though there is still no universal agreement on what constitutes an industrial revolution; four general phases have been identified from the perspective of the technological evolution (Yongxin Liao et al, 2018). These include;

- 1.) The First Industrial Revolution (industry 1.0) was based on steam, and the first machines that mechanized some of the work.
- 2.) The Second Industrial Revolution (industry 2.0) was based on the electricity, the assembly line and birth of mass production.
- 3.) The Third Industrial Revolution (industry 3.0) -In this, the main players were the Computers and Robots that started to automate the assembly lines and replace human workers.
- 4.) The Fourth Industrial Revolution (industry 4.0) is a new organization and control level that includes all the Value Chain of product from the raw materials, to manufacturing, delivery, support, maintenance and final recycling. It is based on the capture and intelligence management in real time of all the data available along the life cycle of the products and manufacturing systems. The aim is to achieve a strong customization of products under the conditions of highly flexible mass production. The speed and measure of the changes coming about by the fourth industrial revolution are not to be ignored. These changes will bring about shifts in power, shifts in wealth, and knowledge (Xu et al., 2018).





10.1 The Pros and Cons of industrial Revolution

The pros of the 4th industrial revolution

Higher productivity: This happens with each industrial revolution and apparently productivity of each industrial era goes up 50 times over the preceding age. In the next 5-10 years, it's estimated that productivity will increase by 5-8% (Apecsec, 2014). This is mainly because of increased automation.

Improved quality of life: Technology has made possible new products and services that increase the efficiency and pleasure of our personal lives. For instance, ordering a cab, booking a flight, buying a product, making a payment, listening to music, watching a film, playing a game and even controlling the lights and temperature in our homes can be done remotely.

New markets: A fusion of technologies that is blurring the lines between physical, digital, and biological spheres" will create new markets and growth opportunities (Xu et al., 2018). It will blend improvements from several fields that were often previously separated, to create a new product or a new service.

Lower barrier to entrepreneurship: With new technologies such as 3D printing for prototyping, the barriers between inventors and markets are reduced. Entrepreneurs can now establish their companies and test various products with lower start-up costs without the traditional time and cost constraints often encountered with traditional prototyping methods. The typical barriers to entry are removed from the entrepreneurship equation.

The cons of the 4th industrial revolution

Inequality: Technology is one of the main reasons why incomes have stagnated, or even decreased, for most of the population in high-income countries. The demand for highly





skilled workers has increased while the demand for workers with less education and lower skills has decreased. This could also lead to potential job losses.

Cyber security risk: When everything is connected, the risk of hacking data and tampering with it or using it for malicious intent is now more prevalent. It is not as contained as before. It's more and more frequent that we hear the dreaded news of a new data security breach. This challenges the very nature of identity and privacy, especially with the increased use of data analytics and machine learning.

Core industries disruptions: We see this already. Taxis are competing against Uber and Lyft, Traditional television and cinema compete with Netflix and YouTube, the hotel industry with AirBnB (online marketplace that connects people who want to rent out their homes with people who are looking for accommodations in that locale). I and any store is competing against Amazon. This has ramifications in the type of services being offered and the model through which they are offered as well as the jobs associated with them.

Ethical issues: With improved Artificial Intelligence (AI) technology, genetic engineering, and increased automation, there are new ethical concerns and questions of morality that already differ greatly from individual to individual. With access to more data about an individual and a group of individuals, the risk of using it for personal gain and manipulation is even greater.





10.2 Digital Transformation of the industry

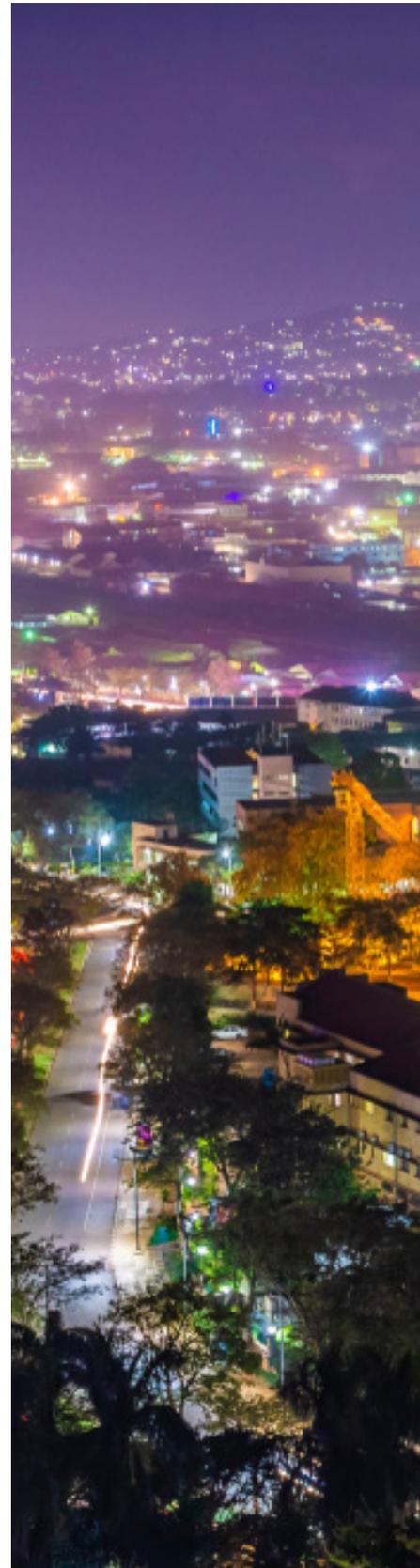
In order to improve competitiveness, the labour-intensive and traditional industry should catch up with the digitalized world. Currently, the Industry 4.0 is characterized by digitalization of the vertical and horizontal value chain, automation and integration by implementing various technological concepts such as Cyber-Physical Systems, the Internet of Things and Smart Factory, which enable communication between products, their environment and the business side. Digitalization enables industrial enterprises to; elevate productivity, increase profit margins, improve competitiveness, offer more products to clients at better prices and at a higher quality level, improve the productivity of employees and minimize periods of inactivity and decrease product development costs and cut back on the time it takes to bring a new product to the market and gain more trust among clients and thereby grow their client base (Torsten Oltmanns and Gerrit Remane, 2015).

11 Recommended industrial development strategies for Uganda

Based on the lessons learnt from East Asian countries (Malaysia, South Korea and Singapore) and the analysis of Uganda's industrial development journey, below are the strategies Uganda should adopt in order to grow and develop her industry sector to the desired level of more than 35% contribution to GDP as we strive to achieve the upper middle-income status by 2040. Some strategies need urgent attention while others can be implemented in medium to long-term;

Industrial development strategies that need immediate action include the following;

- Support industrial training programs (emphasizing skills that are in short supply)-Courses identified by NDPIII (Ref: Annex A & B) and facilitate linkages between foreign firms and local industries for technical skills transfer
- Increase expenditure on Research and Development (R&D) from 0.4% in 2019 to at least 1% of GDP, fund research in identified areas of industrial technology improvement, emphasize indigenous research (technology) and facilitate joint research between universities and industries.
- Support the establishment of manufacturing warehouses for storing goods in identified areas of all the regions in the country.
- Provide incentives for startups (MSMEs) formalizing from the informal sector in order to build their capacity such as tax incentives and blended finance (grant).
- Provide subsidies to import substitution industrialization and export-oriented production in form of reduced power tariffs and other possible forms of financial & tax incentives to lower the costs of production.





- Invest heavily in light labour intensive industries in order to provide employment to the existing labour force such as textile industries, food processing among others and support the setting up of industries that serve as the foundation for the establishment of other industries e.g. the iron and steel industry, fertilisers industry for agriculture, among others.
- Establish a guarantee instrument targeting import substitution industrialization and export-oriented production such as Import substitution industrialization and export-oriented production credit guarantee fund in order to increase private sector credit in the industry and export sectors
- Restructure the industry sector governance and establish the single body under the ministry of Trade, Industry and Cooperatives (MoTIC) in charge of industrial policy implementation (empowered to coordinate the delivery of an industrial strategy with high levels of technical capacity and political power)
- Establish Green industry finance program (scheme)
- Establish Digital Transformation of Industry Fund (DTIF) as we strive to adopt industry 4.0 approaches.

Industrial development strategies for medium to long-term implementation include the following;

- Increase investment in heavy industries for improved productivity and rapid economic growth and development such as mining industries, Production of metals, Petro-chemicals, Heavy engineering industries such as automotive, construction machines etc.
- Make loans to countries that source imports from Uganda with the aim of increasing export revenues for better trade balance by expanding export market for Uganda’s manufactured products (This can be implemented through the National Development Bank).

Appendix

A: Qualifications and Skills Needs for Manufacturing Programme

Qualifications and Skills	Status	Estimated 5-Year Gap
Electromechanical Equipment Assemblers		627
Manufacturing / Production Engineers		197
Manufacturing Production Technicians		430
Material Engineers		538
Machinists		179
Ophthalmic Laboratory specialists		448
Plastic Technology specialists		574
Manufacturing Robotics Technicians and specialists		359
Automotive Specialty Technicians		414
Chemical Plant and System Operators		556
Civil Engineering specialists		323
Electrical and Electronic Engineering specialists		538
Fabric and Apparel Patternmaker specialists		430
Hydroelectric Plant specialists		592
Industrial Machinery Mechanics		556
Mechanical Engineering Technicians		287
Metallurgy and Materials Science		215
Precision Instrument and Equipment Repairers		538

Source: NDPII-2020-2025

B: Qualifications and Skills Gaps for Agro Industrialization Programme

Qualifications and Skills	Status	Estimated 5-Year Gap
Agricultural Lawyer		896
Horticultural Therapists		1,135
Hydroponics		795
Taxidermy specialists		1,051
Bioinformatics Scientist		1,953
Agri-chemists		598
Biochemists		1,355
Agricultural Entomology specialists		1,140
Agriculture Biotechnologists		1,348
Agriculture Microbiology Specialists		1,134
Food microbiologists		1,540
Food Technology and Processing specialists		1,281
Ornamental Horticulture specialists		1,437
Soil Science specialists		1,240
Weed scientists		2,241

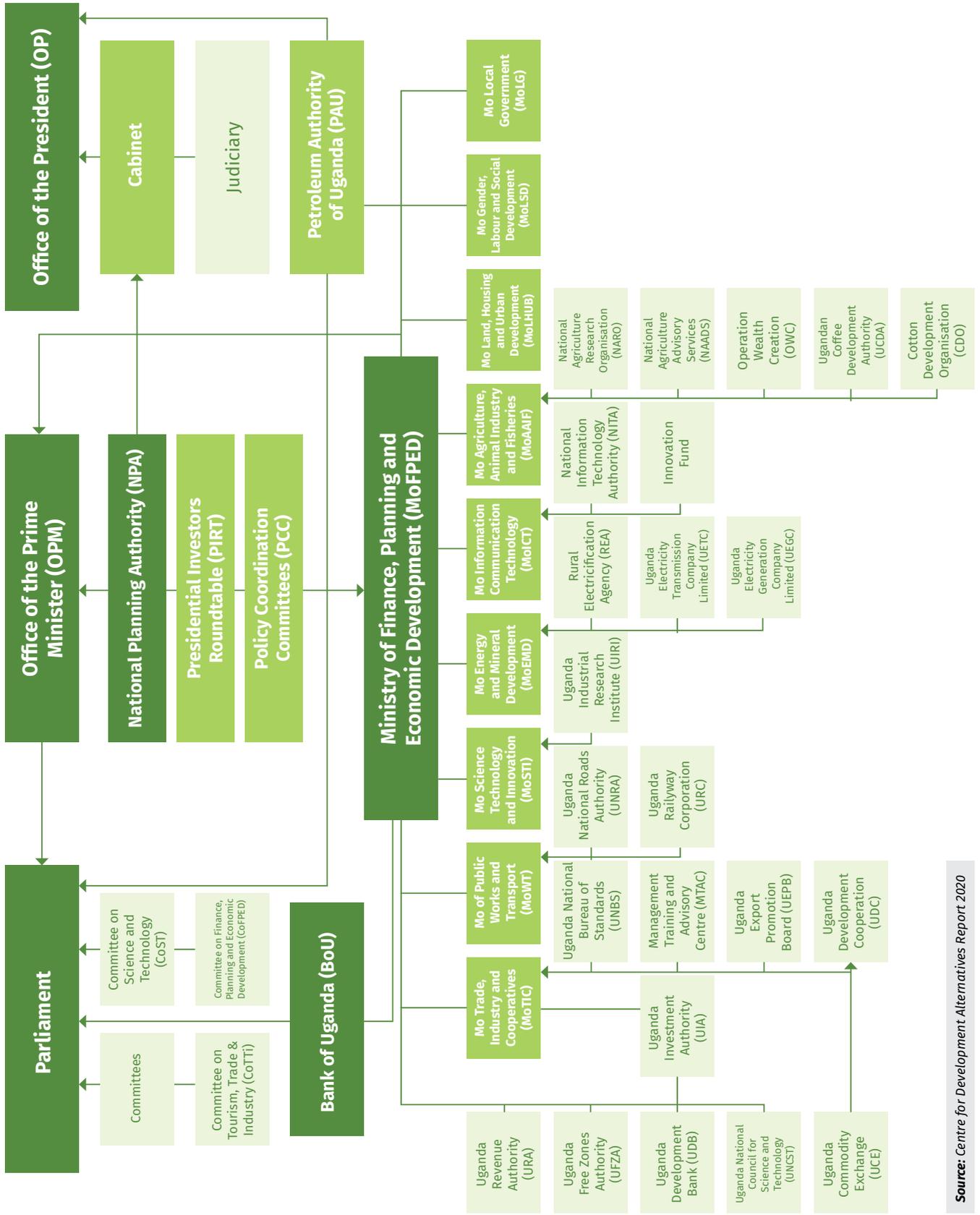
Source: NDPIII-2020-25

Key for the Table

Skills in Short supply and Training is not available in country	Skills in Short supply and Training is in country



C: Key government bodies involved in Uganda's industrial policy implementation



Source: Centre for Development Alternatives Report 2020



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