



## THE IMPACTS OF INTRA-TRADE ON INDUSTRIALIZATION: EVIDENCE FROM COMESA



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### ABSTRACT

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This study examines the impact of intra-export on the industrialization in the Common Market for Eastern and Southern Africa (COMESA) over the period 2000 – 2018. The study used a heterogeneous dynamic Autoregressive Distributed-lag (ARDL), namely Pooled Mean Group (PMG) and Mean Group (MG) estimators. The results reveal that intra-export (lnEXT), internet (lnINT), and Human Development Index (lnHDI) have significant positive effects on the industrialization (lnMVA) in the long-run. The financial development Index (FD) exhibits a significant adverse impact on the lnMVA in the long-run, while only the lnINT confirms a significant adverse impact on the lnMVA in the short-run. The results support the established theoretical framework, particularly the endogenous approach, as well as the supply-side and demand-side capacities. These findings may provide some guidance on policies and strategies harmonization to address the supply-side and demand-side capacities, namely, the infrastructure (e.g. INT), human development and to promote industrialization in the region, ceteris paribus.

**Contribution/ Originality:** This study is one of very few studies which have investigated the impact of Intra-trade on industrialization through including both some major supply-side (i.e. HDI, Internet) and demand-side (i.e. Financial Development) multidimensional-measurements factors. We control individual heterogeneity by using most robust econometric technique i.e. the pooled mean group (PMG).

## 1. INTRODUCTION

Towards realizing the vision of the African Union Agenda 2063<sup>1</sup>, the African Continental Free Trade Area (AfCFTA) is signed amongst 45 of the 55 African countries. According to the United Nations Economic Commission for Africa (UNECA), the AfCFTA is expected to boost the intra-African trade to 52% by 2022. The AU Agenda 2063 aims to bring in significant structural transformation outcomes, i.e., to create regional industrial hubs and effectively linked to the global value chains and commodity exchange by 2013.

The development and industrialization objectives have become a core issue for the policy and decision-makers at national and regional levels in Africa. Therefore, The AU places sustainable and inclusive economic growth as well as industrial development at the top priority of the what is known as “*the First Ten-Year Implementation Plan (FTYIP) of Agenda 2063 (2013 -2023)*” (African Union, 2019b). In line with this vision, the AfCFTA will contribute to addressing some structural barriers to promote intra-African trade, development of sectors industrialization, and promote regional value chains for the prosperity of the continent. It worth noting that industrialization as a process will much be flourished with both supply and demand-side capacities, *ceteris paribus*.

Since the adoption of industrialization policy in 2015, industrial development became predominant on COMESA’s agenda, and the core issue of this policy is to improve the supply side capacities through boosting the value-added of its potentials (Woolfrey, 2017). The current COMESA’s Medium Term Strategic Plan (MSTP) (2016 -2020) interprets this policy by emphasizing that industrial development is considered as a top priority in the developmental integration agenda of the region. Recently, the momentum for industrialization has operationalized to more tangible actions by having the COMESA Industrial Strategy been approved by 21 member states<sup>2</sup> in Nairobi on June 21, 2019. Since then, the region has entered into a new era of well-detailed implementation action with cost, milestones, and responsibilities for both national and regional levels. The expected targets for this “*sustainable and inclusive industrialization*” according to the Implementation of COMESA Industrial Strategy (2017-2026) are:

*“to increase value-added products and exports as a percentage of GDP from the current estimate of 9% to 29% by 2026; increase the share of manufacturing to GDP to at least 20% by 2026 and increase intra-regional manufactured exports relative to total manufactured imports to the region from the current 7% to 20% by 2026”* (Common Market for Eastern and Southern Africa, 2019).

There is a considerable potential for intra-regional trade on promoting industrialization processes. Rekiso (2017) perceives the success of any regional agreements should be measured against the performance of economic growth and industrialization, not against neither “*trade creation*” and “*trade diversion*” nor “*static welfare effects*.” Most importantly, the industrial policy after the 2008-Financial crisis, or in another word after the Washington Consensus, is targeting a niche area industrialization upgrading, and that China acknowledges the importance of regional production network and some countries in Latin America have materialized their regional arrangements on enhancing supply-side capacities (Milberg, Jiang, & Gereffi, 2014). However, the Africa performance intra-trade in intermediate goods only counts to 33% of the value of extra-regional trade (Ahmad & Primi, 2017). Therefore, it is crucial for African countries to expedite their economic growth and development through industrialization (Na, 2019). The author emphasizes that the effective way for learning and technological spillover is through the manufacturing sector, where intra-export can enable trading partners to develop their capabilities, which in turn are

<sup>1</sup> “*Agenda 2063 is the blueprint and master plan for transforming Africa into the global powerhouse of the future. It is the strategic framework for delivering on Africa’s goal for inclusive and sustainable development and is a concrete manifestation of the pan-African drive for unity, self-determination, freedom, progress and collective prosperity pursued under Pan-Africanism and African Renaissance*” (African Union, 2019a).

<sup>2</sup> Ethiopia is a signatory to COMESA, however does not participate in any preferential arrangements on Africa. Even though, the country accords preferential access to major suppliers of goods from the continent, about 15% of total intra-Africa imports enter at MFN rate tralac, 2019. Ethiopia: Intra-africa trade and tariff profile. In: Trade Data Analysis..

the foundation for productivity upgrading; hence, intra-export can be considered as a conducive start-up for advance industrialization scheme.

However, adopting a regional approach to promote industrialization policy remains very challenging as this process of transformation is very sensitive between the regional objectives to promote regional cooperation and competition in one hand and national concerns to protect “*sensitive sectors*” on the other hand. In line with the establishing agreement, the COMESA’s mission is to achieve sustainable economic growth and industrial development through building the capacities of different field of development: transport and telecommunication; industrialization; energy; health; science and technology; agriculture and rural development; tourism; and peace and security. Given the fact that COMESA industrial sector is characterized by weak “*backward and forward linkages*,” though the sector remains the backbone for economic diversification and provides an opportunity to minimize the entire dependence on raw material trading (Owino & Oiro, 2017). Even though the share of COMESA’s manufacturing value-added in GDP has shown lower performance compared to its peers see Figure 1, the manufacturing sector performance remains the second amongst other economic sectors in the region Table 1. Being the lowest trade performance within African’s RECs, the intra-trade remains an effective economic catalyst to promote industrial policy in COMESA, where the agro-industry potential is predominant.

According to the African Economic Outlook (AEO) Report (African Development Bank Group, 2019) the deficit of external finance will be settled in the long-run due to the promising expectation of increased association in capital formation, manufacturing, and tradable industries in value-added, an upgraded performance in global value chains, and an improved settlement on external debt obligations. The expectation of the report based on the continuous improvement for GDP annual growth from 2.1 % in 2016 to 3.5% in 2018, and projected to reach 4% and 4.1% in 2019 and 2020, respectively. However, the report emphasizes that the economic situation will be most promising once the industry leads to growth. The AEO 2019 revealed a road map of five-trade policy to flourish the economies of the continent through improving GDP growth to 4.5% (USD 143 b a year), creating more decent jobs, and industrialization. Africa recorded one of the fastest economic growths in the last twenty years; however, providing decent jobs remains the most challenging task as the youth working population projected to increase from more than seven hundred million in 2018 to one billion by 2030. That means the growth was no “*pro-employment*” hence the annual rate of employment opportunities was below 1.8% in comparison to the annual labor force increase (3%), this trend will create hundred million unemployed people by 2030, meaning an expansion for informal sector, where low productivity and wages prevail, which ultimately making the task of eradicating extreme poverty by 2013 unattainable (African Development Bank Group, 2019). Therefore, promoting industrialization within the region can be considered, amongst other measures, a solution for creating decent jobs and contributing to poverty alleviation schemes. Notably, COMESA’s formal economy represents 37.4 %, and the industrial sector employed %13.2 of the total employment, while the labor force estimated at %65.7 (World Development Indicators, 2019)<sup>3</sup>. The challenge is how such an economic structure serves the industrialization of the region in a way that can contribute to the ultimate objective of the region.

As the industrialization is a “socio-economic process” that contributes to increasing the gross domestic product (GDP) through integrated activities of the industrial sectors and manufacturing industries (Gui-Diby & Renard, 2015) this process is often apt to influence of national and regional actors. Therefore, the purpose of this study is to analyze the industrialization development of COMESA through the share of manufacturing value in GDP. Hence, as per the AU Agenda 2063 aforementioned, this is the right time to analyze the impact of intra-regional trade on industrialization in the COMESA region. Additionally, Commission on Growth and Development (2008) emphasizes the role of manufacturing on development through evidence from thirteen countries that managed to sustain substantial growth at least 7% for more than two decades after World War II. That gives motivation for this

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<sup>3</sup> The estimated indicators were calculated based on data from the World Bank Indicators.

study to address unnoticed phenomena, having considered COMESA is the most representative REC in Africa in terms of market size. Moreover, there is an association between a country's level of integration into the global value chain (GVC) and willingness of liberalization with export performance and industrial competitiveness (World Trade Organization & OECD, 2017).

Therefore, as industrialization being a priority for AU and COMESA in particular, and due to the commodity performance on economic growth in Africa, this study examines the effects of intra-export on the industrialization of the COMESA region over the period 2000–2018. Unlike previous findings, the study contributes to regionalism-industrialization nexus through empirical evidence on the following aspects. **First.** The study controls individual heterogeneity by using most robust econometric technique; the panel autoregressive distributed lag (ARDL), viz. the pooled mean group (PMG) and Mean Group (MG) of dynamic heterogeneous panels, which developed by Pesaran, Shin, and Smith (1999) which applied to an augmented Cobb-Douglas production function. This technique enables the study to consider country-specific heterogeneity by relaxing the long-run coefficients to remain the same over the cross-section, but it varies in the short-run. **Second.** Most of the past industrialization nexus studies were confined to the developed economies or Newly industrialized countries (NICs) for example Tban and Ng (1995); Kurt (2019); Basri, Karim, Ismail, and Sulaiman (2018) and Tsang and Au (2008). Even in some cases of developing countries, in Africa, per se, though they have apparent contribution in intra-trade performance fields; however, their findings either limited only on demand-side or macroeconomic variables (Abdoulganiour, 2017); (Tinta et al., 2018) both demand-side and supply-side but at country level (Jones, Lartey, Mengistae, & Zeufack, 2019) or analyzing one sector, i.e., trade in services (Owino & Oiro, 2017) hence, this study targeted the area (trade in goods) with potential and performance in economic growth in the content (Lalu, 2018) as well as the representativeness of COMESA as the most significant market size amongst African's RECs. **Third.** The study used intra-export as explanatory variable instead of dummy variables, which were previously used in analyzing the effects of regional arrangements; however, such regional agreements are merely functional shifts, therefore sometimes, it is advisable that effects can be measured either through the slope of dummy variable or to use the outcomes of such agreements, and that the study did (intra-export). **Fourth.** For research design and methodological purpose, particularly in heterogeneous developing countries, where data availability and reliability is a big challenge; the suitability of measurement matters most; hence, the study used the most recent multidimensional measurements; Human development index (HDI) and Financial development index (FD). For instance, Many previous studies employed either education or human capital index (HCI) to conclude inference on countries' investments in education and health (Kraay, 2018). Thus, by employing the HDI, the study can by extending HCI to incorporate per capita income instead of using several indicators. Also, the complex multidimensional nature of a specific index provides more flexibility as for an example we can implicitly account for market size through the per capita income (Okafor, Piesse, & Webster, 2015) welfare (Gohou & Soumaré, 2012) and contribute in addressing requirements of supply-side capacity (Hartog, 2000) and at the same time, it economizes the analysis, instead of using different set of indicators. **Final.** Most importantly, this study contributes to the empirical literature through the insertion factors that can contribute in highlighting some factors for industrial reform policies on both supply-side (INT, and HDI) and demand-side (FD, and EXT), which supports the theoretical foundation of endogenous growth (Romer, 1990; Walz, 1997).

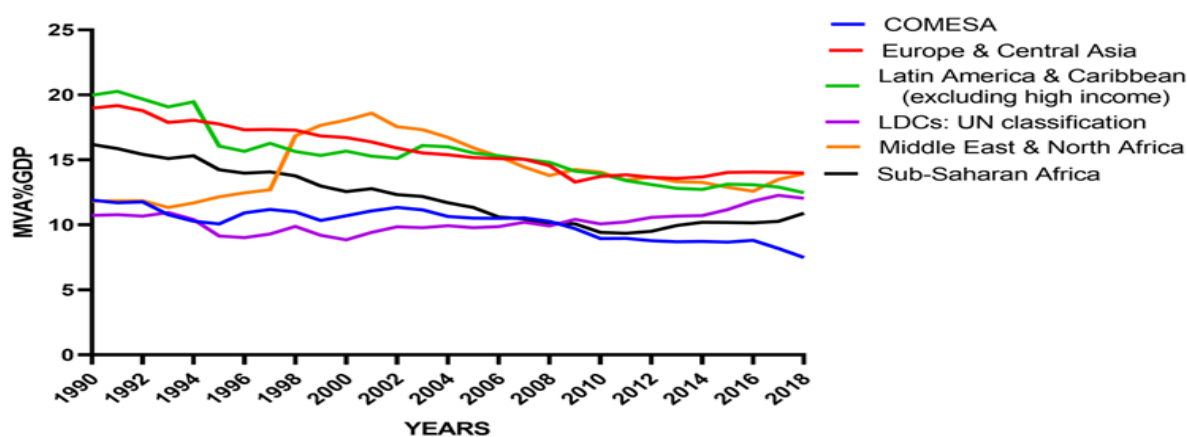


Figure-1. Share of manufacturing value-added in GDP (1990 -2018).

Table-1. Average sectoral manufacturing value-added variables in GDP, COMESA, 1990 – 2017.

GDP per Sector	% per annum
Manufacturing, value added (annual % growth)	4.193521
Manufacturing, value added (annual % growth)	4.196751
Agriculture, forestry, and fishing, value added (annual % growth)	2.369829
Services, value added (annual % growth)	5.12662

The paper is organized as follows: Section 2 provides the theoretical and empirical literature reviews of the related variable on industrialization. Section 3 discusses the Methodology: data, analytical framework, model specification, and estimation technique. Section 4 presents the results and discussions, while the last section provides the conclusions.

## 2. LITERATURE REVIEW

### 2.1. Theoretical Framework

Generally, developmental literature argues that the main answer behind why some countries are rich while others are remaining poor is the income gaps or growth gaps, which can be answered through the total factor productivity. To answer this question some literature highlights the importance of supply-side (e.g., productive capacity) determinants, like technology, infrastructure, while other recent studies have emphasized the importance of demand-side factors that known as a consumer spendings such as rise in consumer spending, market access, real wages, exchange rate demographical changes, investment, government expenditure, or export ( $AD = C + I + G + X - M$ ), can increase demand and in turn increases economic growth, Figure 2 and 3 show how a positive shift in demand-side factors can affect economic growth (Chemmanur & Fulghieri, 2013; Di Stefano, Gambardella, & Verona, 2012; Kalcheva, McLemore, & Pant, 2018; Shane & Ulrich, 2004).

According to Aghion and Howitt (2008) all growth theories, new classical and AK models are emphasizing that growth is entirely dependent on investment on both capital accumulation of physical and human as well as technological progress, which all can play key role in industrialization. Romer (1990) explains the endogenous property of technological changes and economic growth in three premises that together are established around the fact that technological change is either as a result of profit-seeking FDI or arises from research and academic activities, which the later altogether interpreted into economic activities run by profit-seeking firms. Similar to Solow (1956) Romer argues that technological progress provides motivation for persistent capital accumulation, and altogether, capital accumulation and technological progress explain much of the growth in output per hour worked. Hence, Romer emphasizes through the spillover of the technological, human capital is a key determinant for economic growth, as a little human capital dedicated to research and integrated into the global market chain can positively stimulate the economic growth to extend that a large population cannot. However, the long-run economic growth is determined by factors that can boost the growth in the long-run aggregate supply (LRAS), such as

infrastructure (e.g., roads, transport, ICT), human capital, which measure the productivity of labor (e.g., education, training), technology, and labor market flexibility. Other factors that affect economic growth in the short-run are commodity prices, political instability, or weather.

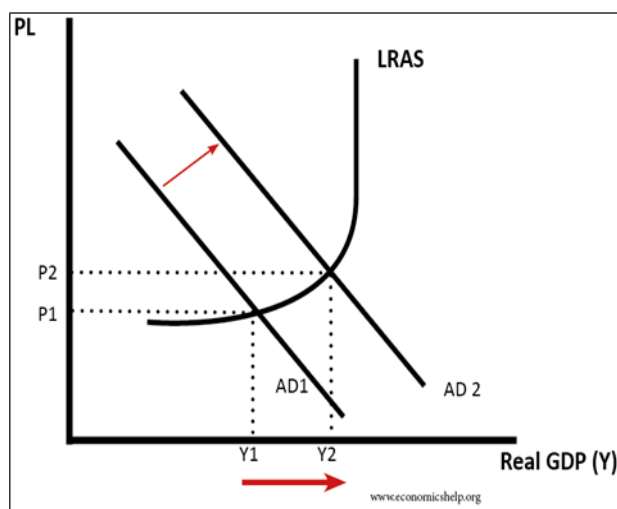


Figure-2. Rising in demand-side with inflation.

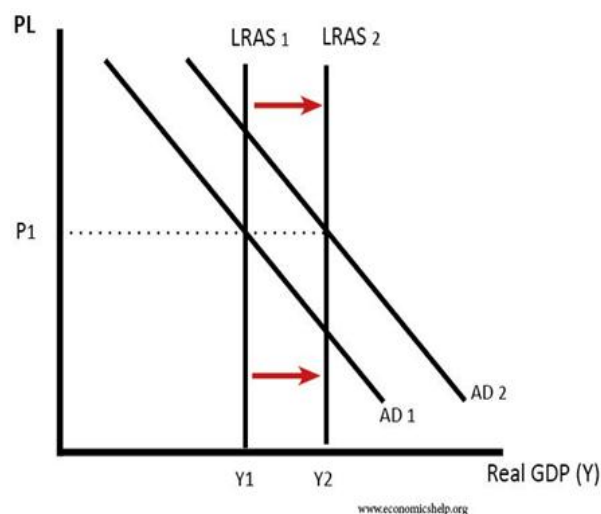


Figure-3. Rising in demand-side without inflation.

The economic development is a “*process of cumulative causation*,” strengthening and increasing growth, whereby industrialization creates jobs, incomes, and demand as long as productivity, investment and profitability are in increasing trend through the proposition of “Kaldor-Verdoorn” (Storm, 2015). This argument supports the Kaldor-Verdoorn model, which assumes that there is a robust correlation between the increase in manufacturing sector output and the growth of the GDP (Thirlwall, 2015). The argument of this study on industrialization is based on some propositions referred as Kaldor-Verdoorn law: The more rapid rate of the industrialized sector, the more rapidly will be the rate of growth of the domestic product (GDP), this only because the manufacturing sector of the economy is the “*engine of growth*”; ii) the higher rate of growth of manufacturing output, the higher rate of growth of labor productivity in manufacturing sector due economies of scale. The key idea behind this rationale that the return of scale as “*macroeconomic phenomena*” which is associated to the relationship of the elasticity of demand and supply of the manufactured products to the extent that there is a positive association between “*manufacturing output*” and “*productivity growth*” (Timmer & Szirmai, 2000) which is consistent with Verdoorn’s Law iii) The higher growth of manufacturing output, the higher rate of labor mobility. Due to the labor reduction in the primary sector, productivity will increase. Consequently, by increasing returns in the manufacturing sector on the one side and stimulating the productivity growth in the primary sector output, on the other hand, we expect the higher rate of growth in the economy at large; iv) The manufacturing output is determined by demand of agricultural sector in the “*early stage of development*” and exportation in the later phases; iv) According to Harrod trade multiplier<sup>4</sup> the level of manufacturing output is adjusted to the “*level of export demand in relation to the propensity to import*.” Interestingly, the economic history has remarkably explained the emphasis of the industrialization and its role on the development to the extent that it is hard not a single country been developed without establishing a sound manufacturing base; hence the term “*industrialized country*” and “*developed country*” are often used interchangeably (Chang, Andreoni, & Kuan, 2013).

According to Rekiso (2017) who conducted a comprehensive study on SSA RECs, the key factor on evaluating any regional agreement initiative should anchor on the economic growth and industrialization of the member economies not based on neither of its “*trade creation*” and trade diversion” nor its “*static welfare effects*.” Trade

<sup>4</sup> For further elaboration of Harrod trade multiplier, see Kennedy and Thirlwall (1979).

contributes to industrialization processes in different sectors through technology spillover and economies of scale. To this end, the relationship between trade liberalization and productivity has been addressed by different studies through producer theory. Kim and Kim (2003) and Arnold, Javorcik, and Mattoo (2007) analyzed the relationship between trade liberalization and productivity and the value-added of manufacturing sectors. The production theory explains how sets of inputs associated with a certain amount of output in a specific industry. However, conceptually, the term production stands for a process of making, increasing, manufacturing, or developing goods or services with the ultimate goal to satisfy the economy wants, while the productivity measures the efficiency of production through the amount of output produced (i.e. goods) per each unit of inputs, as explain by Cobb-Douglas (i.e. capital, labor, and equipment). Therefore, service trades, as well as intermediate goods (high quality), become main inputs in manufacturing advancement through creating high value- addition. Chakraborty and Remington (2011) find that US industry processes such R&D, product design, and assembling were located in countries characterized with low input production costs (labor and energy) such as China and India, whereby the US manufacturers maintain the competitive edge of the “high quality manufactures.”

The ultimate goal for the producer is to minimize the cost and maximize the profit by applying a specific production function to produce a target level of output with a given set of inputs (i.e., labor, capital, and technology) (Nechyba, 2016). The most straightforward production function determines the output by two-factors of production; labor and capital (Cobb & Douglas, 1928). However, in reality the production requires more inputs alongside labor and capital. Therefore, the general form of the input-output relationships are extended to include service and/ or intermediate goods, which can be expressed as  $q = f(x_1, x_2, x_3, \dots, x_n)$ , where  $q$  is the output,  $x_1, x_2, x_3, \dots, x_n$  are the various inputs used (Crinò, 2009; Uppenberg & Strauss, 2010). In industrial upgrading processes, value-added is the competitive-edge that producers target to capture.

The concept and importance of value-added<sup>5</sup> in the GDP are perceived as an aggregate of firms’ value-added across industrial upgrading at a macro level. According to Romer (1990) human capital can contribute to economic growth through boosting productivity. Based on Romer’s premise, labor as an input can involve in research to develop a variety of products, as illustrated in Figure 4. Therefore, the endogenous growth theory predicts that an economy through regional integration can achieve a long-run steady state of growth with the help of humans without technological progress (Walz, 1997).

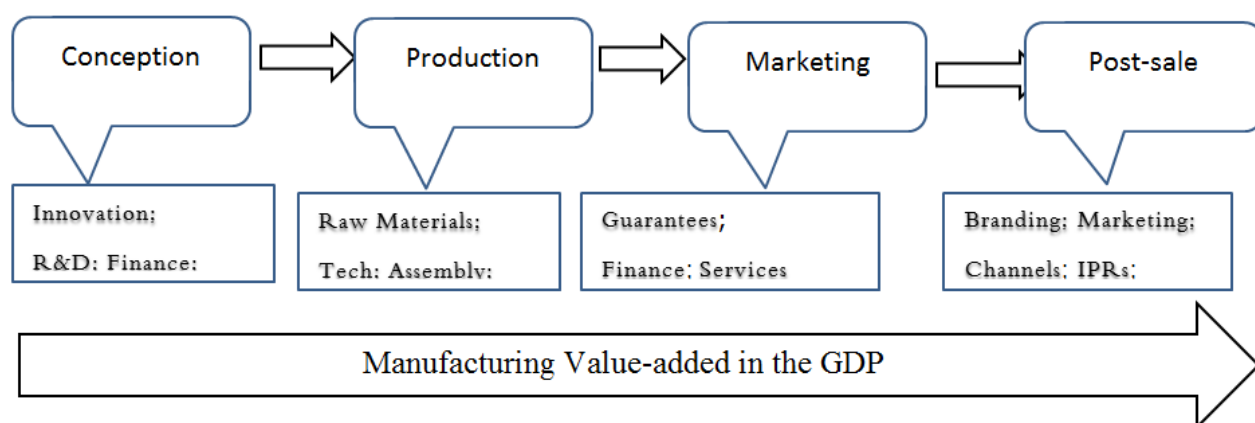


Figure-4. The concept and importance of value-added.

Shi and Yang (1995) conceptualized the relationships and causations amongst the layers of the valued-added hierarchy that concur in industrialization processes phenomena. The authors perceive a positive association between

<sup>5</sup> Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3.

productivity, trade, division of labor, and specialization that ultimately results in new producers at different layers, increase the layers itself, promotes economic diversification, and the capital. Thus, the term of the value addition, as an improvement in particular industry (good or service) from the original status (raw materials or primary stage) creates a “*competitive edge*” or higher value addition compared to “*its original status*,” and here is the role where the intra-trade can play (Mwinyihija & Quisenberry, 2013; Ngore, Mshenga, Owuor, & Mutai, 2011). However, theoretically, literature proves contradicting impacts, while some offshoring “manufacturing activities” boost innovation (i.e., a patent); others might result in adverse outcomes (Valle, García, & Avella, 2015). That means such engagement into global value-chain markets provides opportunities for learning, technology spillover whereby home industries may improve and upgrade their quality of industries (good or service), and ultimately the contribution of manufactures in GDP will increase as a result of productivity enhancements. So, to grantee the positive spillover, governments should adopt policies that create a crowd-in effect on domestic economies.

In general, trade provides a theoretical justification for outward orientation, especially concerning manufactured export. Smith (1976) elaborates on his book of the “Wealth of Nations” on how the positive correlation between productivity and division of labor matters, and this assumption supported by the possibility to penetrate the significant “technology-induced scale economics” global markets (McCombie, 1987). Such external new demand creates incentive innovation and technological spillover (Clerides, Lach, & Tybout, 1998; Greenaway & Kneller, 2007). Regardless of the absolute advantage that any economy may hold, the dynamic nature of the global economy enables all trading partners to position the scope of opportunities, providing that they specialize in their comparative advantage industry (Ricardo, 1817). In this context, Kaplinsky and Morris (2008) explain how the processes of outward export-oriented of the manufacturing sector in SSA being influenced by the demonstration effects of China and India.

Empirical results affirm a robust relationship between offshoring activities and innovation (i.e., R&D) with manufacturing outcomes (product and process) (Nieto & Rodríguez, 2011). Authors perceive that such overseas activities provide learning opportunities to position a niche in local and global markets by developing competitive products and/ or to engage in advance processes of new products benefiting from knowledge gained from overseas partners. However, geographical distance may stand as a barrier for streamlining such business (Stringfellow, Teagarden, & Nie, 2008). Even though such obstacle can be facilitated through knowledge-based inputs that minimize the cost of “transmitting codified” output through internet facilities (Narula & Zanfei, 2009). Also, the revolutions in telecommunication have played a substantial role in knowledge transfer and disaggregation of doing business (Ellram, Tate, & Billington, 2008; Mudambi, 2008; Murtha, 2004). According to Johanson and Mattsson (2015) network model theory, the analyses in the fields of international trade, investments, and industrialization affirm interdependencies as well as different results for its aggregation levels.

Industrialization generates job opportunities, provides learning opportunities, promotes innovation, and technology spillovers. Hence, industrialization development becomes crucially valuable for policymakers at both national and regional levels. Industrialization, particularly in service trades, played a key role in ASEAN economic miracle (Yue, 1998). Walton (1987) perceives industrialization as a “continuous process” is driven by “wit and contradiction” factors and relocate labor force in response to sector “shifts from agriculture to manufacturing and services” (Phillips, 1966). hence, the export of non-primary products has become the main objective for industrialization phenomena (Fafchamps & Helms, 1996). Therefore, to conceptualize the linkage between trade and other factors with industrialization phenomenon, Figure 5 illustrates these relationships considering the contradicting motivating factors, in our case, trade, Infrastructure, and factor of production (labor), and the overall consequences that can be positive or negative; however that beyond the scope of this study and so do the environmental factor.



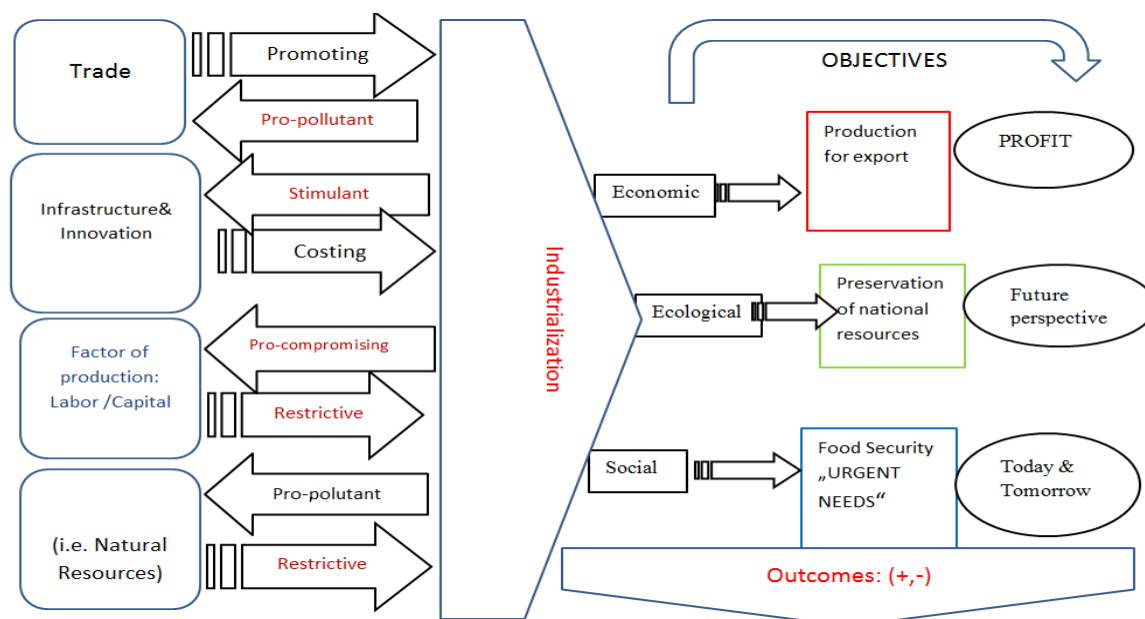


Figure-5. Conceptual framework.

Though the foreign direct investment (FDI) and trade relationship between Africa and Asia have registered increasing records, the performance of the manufacturing sector still lingered compared to the after the colonial period from the 1960s to the 1980s (Shirati, 2019). To attain sustainable and pro-employment growth, amongst others measures, African countries recommended to diversify their exports from highly dependent on raw commodities, encourage private investment, improve institution quality, implement tax incentives, and infrastructure investment towards most productive sector that “drive a trade balance reversal,” upgrading labor capacities as well as encouraging urbanization and resources allocation towards “export-intensive” areas that can easy be integrated into the global value chains (African Development Bank Group, 2019).

From the demand-side point of view, and at an industry level, Syverson (2004) argues that “imperfect product substitutability” given high transportation cost deters consumers from enjoying a costless shift amongst producers. Consequently, the efficient industry (lower cost) cannot be able to attract the aggregate demand from their less efficient competitors by merely offering lower prices, which provides an opportunity for such industry to survive, even in the long-run, regardless they maintain low productivity. Likewise, Melitz and Ottaviano (2008) emphasize that transportation costs can “reduce the scale of market selection,” as they developed a “competitive model of trade” for heterogeneous industries. Importantly, they affirm the applicability of the model for further “multiple asymmetric” economies with heterogeneous environments at both country and regional levels.

### 2.3. Empirical Literature

A range of empirical studies analyzed the impact of liberalization in goods and, to some extent, in services on manufacturing from either supply-side or demand-side perspective. Researches emphasize the role of industrial growth on economic growth, the standard living of people or economic development at large compared to the primary growth, as industrialization does not only provides forward and backward linkages, but can shortening the economic transformation stages bypassing the “broad-based agricultural revolution” (Diao, Hazell, & Thurlow, 2010).

Countries can boost their economies by adopting either demand-side or supply-side policies, or both, as relevant to their prevailing circumstances or future policy objectives; however, supply-side policies have are relative, not easy to be implemented and take a long time to pay-off. Following the financial crisis 2008, the China’s “new normal” policy adopted then, was targeted 7% growth rate in the medium and long-run through implementing comprehensive economic reforms in different fields particularly by adopting some monetary measures and encouraging demand-side, benefiting from colossal market size to boost productivity and innovation as well as to

address income inequalities and environmental issues (Morrison, 2013). However, the “*new normal*” policy was criticized as it was perceived to promote China export due to devaluation of the RMB, which makes export more competitive and import relatively expensive, and thereby the country can maintain higher economic growth in the long-run.

Jones et al. (2019) used a dynamic GMM panel estimator to analyze the determinants factors of supply-side and demand-side for the Ethiopian manufacturing sector over the period 2000-2010. Under specific monopolistic production model, their findings reveal consistency with model predictions of all three factors, which are market size, transport cost, and licensing fees, except for the cinder blocks manufacturing, where the market size has positive association with the total factor productivity, whereas rises in transport cost and licensing fees shrink it. However, they conclude mixed results; for instance, in some industries, increasing licensing fees reduces the total factor productivity revenue (TFPR) of that industry even though it would raise the average physical total factor productivity (TFPQ) due to the lowering in average product prices by mass production.

Rowden (1995) studied the role of human resource development (HRD) in small and mid-sized manufacturing companies (SMEs). His findings show a positive association between the HRD activities and the manufacturing businesses of the studies SMEs. Similarly, Anwar (2008) finds a significant cointegration relationship between foreign direct investment (FDI), human capital, and value-added with the growing manufacturing sector in Singapore during the period 1980 – 2005. However, using time series data for the period 1976 -2016, (Yahia., Haiyun, Khan, Shah, & Islam, 2018) find a crowd out effect for FDI on Sudan domestic investment, meaning that the FDI mode implemented during that period did not support domestic investment. This crowd-out effect had to contribute to domestic investment in Sudan’s GDP meager, which implies weak performance for the GDP component sectors, including the manufacturing sector.

Variety of previous studies identified common determinant factors for trade flows, like GDP, per capita GDP, population, exchange rate, dummy variable like FTA; however, a review study for such determinants conducted by Chu, Chan, and Cheung (2018) with the focus on Chinese’s “Textile and Clothing (T&C)” manufactories expansion to the world, in consideration to the One Belt One Road (OBOR) initiative, concludes that the determinant for trade flow is “inconsistent and fragmented in the literature.” Additionally, the study indicates essential factors for “today’s global T&C industry” like “sustainability, CSR issues,” and human labor issues were either absent or limited in the previous empirical literature. However, Lau, Chan, and Nguyen (2017) studied the competitiveness of China’s T&C manufacturing over other Asian countries to EU-15, US, and Japan during the period 1990-2015, using panel two-stage least squares and ordinary least squares. Their findings confirm labor costs, and a number of women in the workforce of the exporting country have negative and positive impacts, respectively.

Na (2019) used the “technological classification” of trade developed by Lall (2000) to examine the effect of intra-regional trade on the industrialization of the East African Community (EAC). His result reveals that intra-trade as a promoting factor for industrialization in EAC. Tinta et al. (2018) studied the potential of the Economic Community of West African States (ECOWAS) on economic growth and food security. Amongst other factors, they find that intra-export is robust in promoting economic growth through engaging in global value-chains. Also, Abdoulganiour (2017) studied the determinant factors of participation in global value-chain (GVC) taken ECOWAS as a case study. However, Tinta finds intra-trade was not supportive in GVC, so he suggests the insertion of intra-trade into industrialization of the final goods. Nzau (2010) examines the debates of Africa’s quest for industrialization. However, the author sees the potentials of human and natural resources as enabling forces for catching up with the industrialization process.

Basri et al. (2018) used a dynamic heterogeneous Pooled Mean Group (PMG) model to analyzed the impact of “industry-specific variables” (training, IT, and R&D) and wages on the productivity of manufacturing industry in Malaysia over the period 2000-2015. Their results confirm a robust association between the “industry-specific variables” and labor productivity in the short and long-term. That means that human capital (training) encourages

labor productivity. In this connection, Hartog (2000) emphasizes that investing in human capital is an effective policy to enhance supply-side capacity, as human capital is principally a supply-side characteristic. The author deems human capital as a “valuation of peoples' skills,” and reflecting a “person’s productive and marketable skills.”

Khodeir (2017) studied determinant factors of technological progress of Arab countries over the period 1995 – 2014 by using Microfit Software 5.0 and ARDL Bounds Test. His result confirms the role of intra-trade on productivity performance. Fan, Ismail, and Reza (2018) used the ARDL bound test to analyze the innovation, infrastructure, and industrial growth in Bangladesh over the period 1974 to 2016. The result documents a positive impact on infrastructure on industrial development. Owino and Oiro (2017) used the dynamic generalized method of moments (GMM) utilizing panel data for the period 2005–2014 and analyzed the performance of services trade on manufacturing (proxied by manufacturing value-added per capita) of COMESA member states. They found that factors like communication and transport services imports, business services exports, GDP growth rate, and fixed capital formation demonstrated positive impact, while financial services and business services imports, construction, and transport services exports had an adverse association with manufacturing. However, the study highlighted some areas like infrastructure and the Public-Private Partnership (PPP) as encouraging factors for sustaining the regional development objectives. The authors elucidate the ramification of adverse effects of offshoring of aforementioned services outweigh its positive effects, as the financial and business services imports tend to lesser employment; thus, aggregate demand, which ultimately has an overall adverse effect on manufacturing value-added. These consequences provide substantial justification that such services should be granted from within the region as long as the objective is to promote industrialization, authors argue. In this connection, Adeleye, Osabuohien, and Bowale (2017) underline the substantial effect of an institutional framework on the performance of financial development and how that can affect individual and firm through, amongst other controlling the growth of financial intermediaries in credit lending and its associated impact in the long run of economic growth. The role of financial development and financial liberalization on promoting investment and productivity were widely studied through different time span (Adeleye et al., 2017; Ahamed & Mallick, 2019; Aziz, 2018; Gehringer, 2013; Mishkin, 1999). Tban and Ng (1995) analyzed the impact of Honk Kong’s industrial policy on the manufacturing sector. They find that unlike other Asian Newly Industrialized Countries (NICs) the Hong Kong manufacturing was driven as labor-intensive, trade facilitation, and infrastructure rather than the capital base, and “with no public intervention in R&D in private sector.”

Despite the recognized failure of the regional integration in SSA Geda and Kebret (2008); Rekiso (2017) industrialization and development of manufacturing sectors have taken priority at the policy of development in African countries and RECs. African countries are known as resource-based economies where the agricultural sector (crops and livestock) has great potential; however, the growth of GDP is much more tend to be related to the growth in the industrial sector than to the agriculture and service sectors (Wells & Thirlwall, 2003). The rapid economic growth in Africa over the last thirty years was partially due to commodities performance; however, industrialization, where Africa can “value-adding manufacturing sector” along with “infrastructure development,” and intra- trade are indispensable to attain “self-sustained and inclusive economic growth and development”(Lalu, 2018). Additionally, the importance of industrialization provides opportunities for Africa to expand its value-addition potentials beyond the content to non-traditional markets as anchored on the AfCFTA (Oloruntoba & Tsowou, 2019) which implies that structural change and diversification of economy that favor industrial sector than agricultural or service sectors would matter most on accelerating the growth of GDP and development in large. Such challenges in economic transformation posit some debate on the effectiveness of regional integration arrangements. Yeats, Amjadi, Reincke, and Ng (1997) critically argues that weather such RTAs can bring benefits to African countries. However, the author believes that trade can stand as an “engine of growth” through industrialization and further integrate the SSA with global value chains. Moreover, Yeats encourages African countries to tailor industrialization proposals based on some of the international conventions like Cartagena

Commitment approved at the conclusion of UNCTAD VIII. Such agreements can provide preferential treatment for labor-intensive industries such as textile, agro-industries, leather and leather products, natural resource-based where Africa and COMESA per se has great potential.

Notwithstanding, the South-South RTAs are predominated by labor-intensive production with capital intensive importation, the potentiality of African intra-trade is promising as more than 50% intra-Africa exports are products exported to Southern African countries, and intra-COMESA exports are accounted for 55 (Tralac, 2019a). However, theoretically, regional integration arrangements, such as COMESA Free Trade Area (FTA) is merely a functional shift. Therefore, it is argued that sometimes such intended changes of economic transformation, in the case of this study, the share of manufacturing value-Added in GDP (MVA)<sup>6</sup> may go beyond the effect of such functional shift to other factors, in our case the intra-regional trade, labor, infrastructure, human and financial development. So, the question imposes itself, which industrial policies COMESA should adopt? Supply-side? Demand-side? Or both? That the concern this study answers.

Having considered that most of the previous studies do not assess the effect of regionalism on economic growth; however, some conclude inclusive findings with different interpretation based on the methods used, timing, and targets (Kamau, 2010). Nonetheless, the ultimate goal for forming, enlarging, or extending existing regional arrangements, amongst others, is to increase the level of productivity. However, from the previous literature, the study identified some information gaps. First. Most of the past industrialization nexus studies were confined to the developed economies or Newly industrialized countries (NICs), for example Tban and Ng (1995); Kurt (2019); Basri et al. (2018) and Tsang and Au (2008). Even for some cases in developing countries, in Africa, per se, though they have apparent contribution; however, their findings either limited demand-side or macroeconomic variables Abdoulganiour (2017) and Tinta et al. (2018) or one sector, i.e., trade in services (Owino & Oiro, 2017) hence, this study targeted the area (trade in goods) with potential and performance in economic growth in the content (Lalu, 2018) as well as the representativeness of COMESA as the most significant market size amongst African's RECs. Second. Unlike other previous studies, which most used dummy variables to analyze the effects of some regional arrangements; however, the study used intra-export as explanatory variable instead, because such regional agreement is merely functional shift, therefore sometimes, it is advisable that effect either through the slope of dummy variable or to use outcomes of such agreement and that the study. Third. For research design and methodological limitation, particularly in heterogeneous developing countries, where data availability and reliability are significant challenges. Hence, the study used the most recent multidimensional measurements; Human development index (HDI) and Financial development index (FD). For instance, Many previous studies employed either education or human capital index (HCI) to conclude inference on countries' investments in education and health (Kraay, 2018). However, HCI could hardly guarantee that education is a priority within a country's budget (Edwards, 2018). Thus, by employing the HDI, the study can economize the analysis by extending HCI to incorporate per capita income instead of using several indicators. Also, we can implicitly account for market size through the per capita income (Okafor et al., 2015) and welfare (Gohou & Soumaré, 2012). **Final.** Most importantly, this study contributes to the empirical literature through the insertion of both supply-side (proxied by infrastructure, i.e., internet) and demand-side through HDI, by which we can cater to both market size and welfare of an economy.

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<sup>6</sup> COMESA is planning to current value added and export as percentage of GDP for 9% to 29%, the share of manufacturing to 20%, and "the intra-regional manufactured exports relative to the total manufactured import from 7 to 20%" by 2026 Common Market for Eastern and Southern Africa, 2019. Implementation of comesa industrial strategy is now on course. In: e-COMESA Newsletter pp: 1-2.

### 3. METHODOLOGY

#### 3.1. Data

The study employed an annual panel data for examining the effect of COMESA intra-trade on over the period 200 - 2018. Based on data availability, the study selected 13 countries, which are Burundi, Djibouti, Egypt, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Sudan, Uganda, Zambia, and Zimbabwe. We selected the manufacturing value-added (MVA) as a dependent variable for industrialization (Na, 2019; Owino & Oiro, 2017). Labor force, total (LF), Individuals using the Internet (INT) from the World Bank WDI. Intra-exports (EXT) data were sourced from UNCTAD's trade in goods database. Human Development Index (HDI) and Financial Development Index were obtained from the United Nations Development Program (UNDP), and the IMF, respectively. The study favored using the two indices; the HDI and financial development index (FD) for their multidimensionality natures<sup>7</sup>. Many previous studies employed either education or human capital index (HCI) to conclude inference on countries' investments on education and health (Kraay, 2018). However, HCI could hardly guarantee that education is a priority within a country's budget (Edwards, 2018). Thus, by employing the HDI, the study can economize the analysis by extending HCI to incorporate per capita income instead of using several indicators. Also, we can implicitly account for market size through the per capita income (Okafor et al., 2015) and welfare (Gohou & Soumaré, 2012). The UNDP renders the HDI in the annual base. The index is a geometric mean that covers life, education, and per capita income indices. Thus, the index underlines the role of people and capabilities as well as economic growth as an indicator for the development of a nation (Programme, 2018). The IMF developed the FD as an advanced step in financial sector analysis (Svirydzenka, 2016). The multidimensional nature of the FD enable to address the shortcomings of the conventional financial indicators; the ratio of domestic to GDP or the stock market capitalization to GDP, which were widely used in the previous studies. The FD was used in some recent works (Islam et al., 2018). The FD is disaggregated into nine indices; the financial institutions (FI) and financial markets (FM), which are further extended into "depth, access, and efficiency." The indices FI and FM are jointly composed "overall index," the FD index (Svirydzenka, 2016).

#### 3.2. Analytical Framework

The determinants of the growth rate in any production function are associated with the factor of inputs and residuals of technology (Barro, 1996). The most straightforward production function determines the output by two-factors of production; is composed of labor and capital (Cobb & Douglas, 1928). However, Cobb-Douglas's production function can also be applied at the macro level by the aggregation of firms in similar industry activities. The general production function of Cobb-Douglas as follows:

$$Y_{it} = \int (AK_{it}^{\alpha}, L_{it}^{\beta}) \quad (1)$$

That means any output (Y) is a function of a certain amount of capital (K) and amount of labor (L). In the presence of technological progress, more output can be produced from the same amount of capital and labor; however, the production function is expected to result in constant, increasing, or decreasing returns of scale (Gregory, 2016). Also, following Owino and Oiro (2017) and Basri et al. (2018) the study employed the augmented the Cobb-Douglas Equation 2. Therefore, in the presence of technological change, the Equation 1 reads as follows:

$$Y_{it} = AK_{it}^{\alpha} L_{it}^{\beta} Z_{it}^{\gamma} \quad (2)$$

<sup>7</sup> See Figure A.1 and A.2. in Appendix Section.

Where  $K_{it}$ ,  $L_{it}$ , and  $Z_{it}$  are representing capital, total labor force, and the augmented term, respectively. The augmented term comprises the HDI, and FD in addition to the baseline model. All inputs are combined to a level of technology  $A$  to produce the output  $Y_{it}$ .  $\alpha$ , and  $\delta$ , are elasticities for capital and labor at given time  $t$ , respectively. Given that  $\alpha + \delta + \gamma = 1$  (constant return to scale). For the operational purpose, Equation 2 is linearized as Equation 3 (by taking the logs for two sides of the equation).  $\beta$  is the intercept of the equation.

$$\ln Y_{it} = \beta + A\alpha K_{it} + \delta L_{it} + \gamma Z_{it} \quad (3)$$

### 3.3. Model Specification

Following Yamarik, El-Shagi, and Yamashiro (2016); Owino and Oiro (2017) and Basri et al. (2018) however, our model is at the macro-level with comparison to the last referenced author. The model specification takes the following form:

$$\ln MVA_{it} = \alpha + \beta_1 \ln MVA_{it-1} + \beta_2 \ln EXT_{it} + \beta_3 \ln LF_{it} + \beta_4 \ln INT_{it} + \beta_5 \ln HDI_{it} + \beta_6 \ln FD_{it} + \mu + \varepsilon \quad (4)$$

Where  $MVA_{it}$  is the manufacturing value-added for per capita GDP as a dependent variable,  $\alpha$  is an intercept. EXT is intra-export as an independent variable; LF, INT, HDI, and FD are labor force, individuals using the internet, human development index, and financial development as control variables, respectively.  $\beta_1, \beta_2, \beta_3, \dots, \beta_6$  are parameters to be estimated for the lag of manufacturing value-added for per capita GDP, EXT, LF, INT, HDI, and FD for individual country  $i$  in year  $t$ , respectively.  $\mu$  is the country specific effect, while  $\varepsilon$  is the error term. The study coefficients expected to exhibit positive and significant effects on the industrialization of the region.

### 3.4. Estimation Technique

The econometric model used is a heterogeneous dynamic Autoregressive Distributed-lag (ARDL) as suggested Pesaran and Smith (1995); Hashem and Shin (1998); Pesaran et al. (1999) and augmented bounds testing, which is used when variables are integrated of different orders (Pesaran, Shin, & Smith, 2001). Also of the most recent studies that have the ARDL is most effective tools and appropriate model to examine dynamic presentation between variable (Goh, Sam, & McNown, 2017; Paramati, Ummalla, & Apergis, 2016; Sultanuzzaman, Fan, Akash, Wang, & Shakij, 2018; Sunde, 2017). Proved Unlike a VAR model that is rigorously for endogenous variables, the ARDL model is fit for the combination of endogenous and exogenous variables. Therefore, the ARDL models can be specified for the model having variables with I(0) and/ or I(1) order of integration. Hence, to examine heterogeneous dynamic panel data to evaluate the long-run relationship between the manufacturing value-added for per capita GDP, the right-side of Equation 4, where endogeneity issue is highly expected due to bi-causality relationships between  $MVA$  and right-sided equation. Moreover, the unobserved country specific effects ( $\mu$ ), which can correlate with the regressors would make other estimators like ordinary least squares (OLS), fixed effects and,

random effects models are inefficient. Hence, the generalized ARDL (p, q, q, ..., q) model is specified as follows:

$$\ln MVA_{it} = \sum_{j=1}^p \delta_i \ln MVA_{it-j} + \sum_{j=0}^q \beta'_{ij} X_{i,t-j} + \varphi_i + e_{it} \quad (5)$$

Where  $\ln MVA_{it}$  is the dependent variable,  $(X'_{it})'$  is a  $k \times 1$  vector that are allowed to be purely I(0) or I(1) or cointegrated;  $\delta_i$  is the coefficient of the lagged dependent variable called scalars;  $\beta'_{ij}$  are  $k \times 1$  coefficients vectors;  $\varphi_i$  is the unit-specific fixed effects;  $i = 1, \dots, N$ ;  $t = 1, 2, \dots, T$ ;  $p, q$  are optimal lag order;  $e_{it}$  is the error term. However, while we are going to difference the model we will lose the lags as  $p-1$  and  $q-1$ , for the lagged dependent variable and explanatory variables respectively, as in Equation 5. The error correction model is the re-parameterization of the ARDP (p, q, q, ..., q), and specified as:

$$\Delta \ln MVA_{it} = \theta_i [\ln MVA_{i,t-j} - \lambda'_i X_{i,t}] + \sum_{j=1}^{p-1} \xi_{ij} \Delta MVA_{i,t-j} + \sum_{j=0}^{q-1} \beta'_{ij} \Delta X_{i,t-j} + \varphi_i + e_{it} \quad (6)$$

**Note:**

- $\theta_i = -(1 - \delta_i)$ , group-specific speed of adjustment coefficient (expected that  $\theta_i < 0$ )
- $\lambda'_i$  = vector of long-run relationships
- Error Correction Term (ECT) =  $[FDI_{i,t-j} - \lambda'_i X_{i,t}]$ , which represents the long-run relationship in the model
- $\xi_{ij}, \beta'_{ij}$  are the short-run dynamic coefficients
- $i = 1, 2, 3, \dots, 13$  and  $t = 2000, 2001, 2002, \dots, 2018$

All variables are transformed into a natural logarithm to correct the skewness of the studied data (Ali, Wang, Morales, & Wang, 2019; Demekas, Horváth, Ribakova, & Wu, 2007; Gujarati, 2009; Kottaridi, Louloui, & Karkalakos, 2019).

Following Pesaran and Smith (1995) we started with the least informative estimator, the MG. With the MG, the coefficients of regressors are estimated separately for both short and long run estimation. That means parameters are freely independent across the groups; however, it does not recognize the fact that some parameters likely to be the same across the group. To improve the efficiency of estimation we use the PMG of dynamic heterogeneous panels, which introduced by Pesaran et al. (1999) too, as a further step to get an intermediate estimator between the MG and dynamic fixed effect estimators (DFE)<sup>8</sup>, or on another word, it comprises both pooling and averaging. Most importantly, PMG allows free differences for intercepts, short-run coefficients, and error variances across groups; however, it holds same long-run coefficients as well as providing consistent estimation for the mean of short-run coefficients by taking the simple average of individual unit coefficients (Yamarik et al., 2016). To decide between MG and PMG estimators, we perform the Hausman (1978) test, and the

<sup>8</sup> All coefficients are restricted to be equal across groups, but intercepts differ across groups.

selection decision on the efficiency of estimators is based on the following hypotheses:

- The null hypothesis  $H_0$ : MG and PMG estimates are not significantly different. So, PMG is more efficient.
- The alternative hypothesis  $H_1$ : Null is not true (estimators are not different).

Hence, the decision guiding criteria are: we use PMG if p-value > 0.05; that means we cannot reject the null hypothesis, or in case p-value < 0.05, we reject the null hypothesis, and we use MG.

The advantage of using a PMG estimator, as suggested by Pesaran et al. (1999) are: 1) Explanatory regressors can be treated as exogenous, as the residuals are serially unassociated and independently distributed. 2) A long-run association between the dependent variable and regressors. 3) Equal long-run parameters across individual countries.

## 4. RESULTS AND DISCUSSION

### 4.1. Descriptive Statistics

Table 2 Provides a data description, data sources, and summary statistics for each variable. The INEX has the highest mean of (18.939) as well as the highest standard deviation of (1.828), while the FD has the lowest mean of (-1.968), and the HDI has the lowest standard deviation of (0.244).

Table-2. Data description, sample statistics and sources.

Variable	Obs	Description	Mean	Std.Dev.	Min	Max
lnMVA	285	Manufacturing, value added (current US\$)	9.051	1.377	6.470	11.933
lnINEX	285	Intra-community Export (US\$)	18.939	1.828	13.219	24.490
lnLF	266	Total Labor force	3.355	0.816	1.642	4.537
lnINT	285	Individuals using the Internet (% of population)	1.400	1.804	-4.182	4.074
lnHDI	285	HDI is a measurement of average achievement in main dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living (%)	-0.674	0.244	-1.262	-0.232
lnFD	266	financial development index (%)	-1.968	0.505	-2.841	-0.794

Note: Manufacturing, value added (current US\$), Total Labor force, and Individuals using the Internet (% of the population) were sourced from World Bank, WDI. Intra-trade community-sourced from the UN Comtrade 2019 database, while HDI and FD were sourced from the UNDP and IMF, respectively.

### 4.2. Correlation Matrix

In this section, we perform correlation analysis to check whether perfect linearity or dependency relationships existed amongst the regressors, with the ultimate goal to avoid multicollinearity. A correlation of 0.80 and above between the regressors is evidence of a linear relationship between variables (Kennedy, 2003). All variables exhibit positive and significant relationships with the dependent variable, except lnEXT exhibits a positive but insignificant effect with lnMVA. Hence, there were not perfect linear relationship amongst regressors; our model has passed the multicollinearity test (Kutan, Samargandi, & Sohag, 2017). Table 3 shows the Pairwise correlations matrix.

Table-3. Pairwise correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) lnMVA	1.000					
(2) lnEXT	0.005	1.000				
(3) lnLF	0.732*	0.382*	1.000			
(4) lnINT	0.731*	0.242*	0.484*	1.000		
(5) lnHDI	0.938*	0.115	0.698*	0.751*	1.000	
(6) lnFD	0.778*	0.037	0.499*	0.575*	0.719*	1.000

Note: \* shows significance at the .05 level.



### 4.3. Panel Unit Root Tests

The results of the unit-root are presented in Table 5. As suggested by Im, Pesaran, and Shin (2003) we performed a panel unit root test using IPS while assuming heterogeneous slopes of coefficients. However, for the requirements of the better model selection, firstly, we have to confirm the presence of some tests in forms of cross-dependence (CD). Recently, there is ever-growing regional integration, which implies interdependencies amongst cross-sectional countries due to intra-connected socioeconomic networks, spatial dependence, and transboundary shocks (De Hoyos & Sarafidis, 2006; Pesaran, 2004; Pesaran & Tosetti, 2011). Hence, Table 4 shows the CD test as  $T > N$ , and according to the p-value, we cannot reject the null hypothesis of no cross-section independence. Consequently, the study proceeded to Im et al. (2003) unit root test considering cross-sectional independence. As per the critical value levels of significance using the ADF test based SIC criterion, with intercept and trend, we found the only lnFD is stationary at both level and first difference, while other regressors show mixed results of  $I(0)$  and  $I(1)$ , as presented in Table 5. Thus, the mixed results of the integration order verify the use of the ARDL Bounds test for co-integration.

**Table-4.** Cross-sectional dependence test.

Test	Results
CD Pesaran (2004)	1.577 (0.1147)
The average absolute value of the off-diagonal elements	0.339
Friedman	18.964 (0.3940)

Note: CIPS: Cross-sectionally Augmented IPS,

For CD: Under the null hypothesis of cross-section independence  $CD \sim N(0,1)$ .

test the following hypothesis:

$H_0$ : cross-sectional independence.

\*, \*\*, \*\*\* represent significance levels at 10%, 5% and 1% respectively.

**Table-5.** Im et al. (2003) unit root test.

Variables	Intercept	Intercept & trend
lnMVA	-1.7892	-2.1152
lnEXT	-1.2812	-2.0796
lnLF	-0.8014	-2.1464
lnINT	-2.6866***	-2.3234
lnHDI	-2.4274***	0.4865
lnFD	-1.9721**	-2.9972***
$\Delta$ lnMVA	-3.9596***	-4.4804***
$\Delta$ lnEXT	-4.5296***	-4.6709***
$\Delta$ lnLF	-3.4169***	-3.6596***
$\Delta$ lnNT	-3.4940***	-3.9313***
$\Delta$ lnHDI	-1.8350*	-3.4444***
$\Delta$ lnFD	-4.8393***	-4.7956***

Note: \*\*\*, \*\*, and \* denote 1%, 5%, and 10% respectively.

Based on unit root test, the study proceeded to test the cointegration relationship as recommended by Pedroni (1999); Pedroni (2004). Table 6 presents the results of Pedroni (2004) PP-statistics and ADF-statistics for within and between groups, respectively.

**Table-6.** Pedroni and Kao panel cointegration tests.

Within-dimension (panel)		Between-dimension (group)	
PP-Stat	ADF-Stat	PP-Stat	ADF-Stat
-4.2666***	-3.5964***	-3.2361***	-3.0693***
Kao cointegration test			
ADF	-2.6826***		

Note: \*\*\* denotes 1% significant level.

Also, Table 6 illustrates the results of Kao's ADF values for panel cointegration test. The results of the two cointegration tests provide evidence of cointegration relationship among variables for our model, which allow us to estimate the long-run coefficients using one of the long-run estimation techniques. Afterwards, the long-run estimators, namely, MG and PMG were performed.

#### 4.4. The PMG and MG Estimation

Table 7 shows the results of both MG and PMG estimators and the Hausman test for the baseline and augmented models. Following the MG and PMG tests, the study proceeded to identify which of these two estimators is appropriate by using the Hausman (1978) test. As per the decision guiding criteria of the null hypothesis,  $p$ -value (0.9997)  $>$  0.05, so we used the PMG estimator, which means MG and PMG estimates are not significantly different. Thus, the PMG model employed to estimate Equation 6, which allows heterogeneous short-run impacts across 13 COMESA member states, while the long-run coefficients remain the same. Therefore, the long-run association between the regressors and manufacturing value-added as a proxy for industrialization is the same across countries. In real practice, this assumption consists of the harmonization of policies and strategies that are likely to take effects on the long-run period. Fortunately, the findings of this study are consistent in terms of timing and objectives of "COMESA Industrial Strategy," as noted in the introduction (Common Market for Eastern and Southern Africa, 2019). So, the outcomes of this study can be beneficial for the policymakers, having considered the midterm implementation of the strategy has already elapsed.

The PMG results confirm the Pedroni test of long-run cointegration effects as three out of five regressors' coefficients exhibit expected results in terms of sign and value as well as the speed of adjustment. This result verifies the appropriateness of the error correction methodology for both baseline and augmented models. The results of the baseline and augmented models confirm the consistency of the model specifications, as there is a long-run association between the dependent variable and most of the independent variables.

Interestingly, as per the augmented model, amongst these positive expectations, two of the long-run coefficients of regressors are positive and statistically significant at one percent level, which are INT and HDI. One increase in intra-trade export leads to a 0.08 percent increase in the manufacturing value-added at a 5% significance level, which is consistent with the intra-trade performance effect in ECOWAS (Abdoulganiour, 2017). Also, a percentage improvement in internet usage and human capital (proxied by HDI) are associated with a 0.13 and 1.34 percent increase in the manufacturing value-added, at a 1% significance level, respectively. These positive association between the service provisions in internet and human development with the manufacturing value-added are aligning with theoretical foundation of the new growth theory of Romer (1990) as well as some empirical evidence viewed infrastructure Tban and Ng (1995) and Basri et al. (2018) and human capital as of Anwar (2008) are pro- industrialization forces, and mostly that supports the theoretical foundation of endogenous growth (Aghion & Howitt, 2008; Romer, 1990; Walz, 1997). However, the result shows that FD is not supporting the industrialization process in the region. The significant adverse effect of FD has two indications; either the financial sector is not supporting enough in terms of depth, access, and efficiency for both financial institutions and financial markets.

Consequently, can limit ability of individuals and firms get credit for personal usage of run business (Adeleye et al., 2017; Aziz, 2018) or the financial services, especially the imports services are likely to lower employment; thus aggregate demand, which ultimately has an overall adverse effect on manufacturing value-added (Owino & Oiro, 2017). Also, this to some extent consistent with the fact that in most of LDCs where countries are lacking capacities, inward FDI may cause a direct effect in capital formation, and likely to cause crowding-out effect for host country with "competitive domestic firms" working in the "same industries and market" (Prasanna, 2010). Also, the FDI-domestic investment (DI) relationship in host countries is seemingly affected by "entry mode, period, and aggregation bias," and this remarkably supports the "crowd-in hypothesis," particularly in LDCs (Chen, Yao, & Malizard, 2017).

These findings indicate that countries have to consider the entry mode of FDI that can favor national economic growth (crowding-in) and create technology spillover to the extent that boosts the productivity of the manufacturing sector. Even though, in our case, this negative adverse effect of FD that in turn causes further negative effects on manufacturing, as explained before, the proved counter effect of demand-side through promotion of human development (significant positive effect of HDI) will offset this consequences, as education as an example can reflect the level of human capital development that can contribute to providing capable workers to cope with new production technological change (Jiménez, 2011). Hence, the study used HDI to cater also for market size through the per capita income (Okafor et al., 2015) and welfare (Gohou & Soumaré, 2012) and this supports the supply-side assumption of the study.

Table-7. The result of the MVA.

Specification	Baseline Model		Augmented Model	
	PMG	MG	PMG	MG
Long-Run Coefficients:				
lnEXT	0.1325** (0.0517)	0.4119** (0.1614)	0.0808** (0.0367)	0.0874 (0.0832)
lnLF	1.0252*** (0.1439)	28.6877 (31.2409)	-0.0339 (0.1489)	46.6565 (45.4403)
lnINT			0.1296*** (0.0301)	0.0660 (0.1149)
lnHDI			1.3416*** (0.5003)	3.4633 (2.6916)
lnFD			-0.3110* (0.1853)	-0.1323 (0.3887)
Short-Run Coefficients:				
Speed of adjustment	-0.2007*** (0.0503)	-0.4698*** (0.0941)	-0.2922*** (0.0812)	-0.8102*** (0.1472)
$\Delta$ lnEXT	-0.0283 (0.0215)	-0.0912*** (0.0306)	0.0020 (0.0249)	-0.0538 (0.0409)
$\Delta$ lnLF	53.5232 (43.3262)	51.6668 (40.3383)	46.5972 (39.3537)	40.4068 (33.1131)
$\Delta$ lnINT			-0.0839* (0.0484)	-0.0595 (0.0702)
$\Delta$ lnHDI			2.5099 (1.7925)	0.5830 (2.4459)
$\Delta$ lnFD			-0.1153 (0.1500)	-0.1619 (0.1834)
Constant	0.5346*** (0.1062)	-23.3697 (23.2885)	2.1960*** (0.5919)	-134.6886 (148.8911)
Maximized log-likelihood	202.6301		257.2541	
Hausman Test – Chi		3.30 (0.1921)		0.13 (0.9997)

Note: The independent variable is Manufacturing Value-added (%GDP). All variables are transformed into natural logarithms. Standard errors in parentheses where \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level respectively.

All and above, the findings of the study are not only applicable for further academic and research inferences but most importantly consistent with facts and trends of industrialization processes in Africa in general and COMESA per se, where intra-trade are perceived as an engine for economic growth (Lalu, 2018; Oloruntoba & Tsowou, 2019).

## 5. CONCLUSIONS

This study examines the effects of intra-export, labor force, internet (as a proxy for infrastructure), human development, and financial development on the manufacturing value-added (as a proxy for industrialization), in COMESA member states over the period 200 – 2018. The study used the PMG and MG of dynamic heterogeneous panels. Unlike previous findings, not only emphasizing the role of intra-trade (proxied by intra-export), which was

done before, but the multidimensionality of other variables used like human development index and financial development index give magnitude to findings of this study. There are two merits for the multidimensionality measurements; firstly, it is challenging to use one indicator as across heterogeneous countries, especially in the developing countries where availability, accessibility, and reliability of data are very challenging. Secondly, using index provide more flexibility as will get the opportunity to account for the complex multidimensional nature of a specific index like HDI and FD at the same time it economizes the analysis instead of using a different set of indicators.

Based on the PMG estimator the result confirms long-run effect intra-export on manufacturing value-added, suggesting a one in increase in intra-trade export leads to 0.08 percent increase in the manufacturing value-added, which is consistent with the finding of [Abdoulganiour \(2017\)](#) as three out of five regressors' coefficients exhibit expected results in terms of sign and value as well as the speed of adjustment. This result verifies the appropriateness of the error correction methodology. Interestingly, amongst these positive expectations, two of the long-run coefficients of regressors are positive and statistically significant at one percent level. Also, a percentage improvement in internet usage and human capital (proxied by HDI) are associated with a 0.13 and 1.34 percent increase in the manufacturing value-added, respectively. These positive association between the service provisions in internet and human development with the manufacturing value-addition are aligning with theoretical foundation of the new growth theory of [Romer \(1990\)](#) as well as some empirical evidence viewed infrastructure [Tban and Ng \(1995\)](#) and [Basri et al. \(2018\)](#) and human capital as of [Anwar \(2008\)](#) are pro-industrialization forces. However, the result shows that FD is not supporting the industrialization process in the region. The significant adverse effect of FD might be an indication for, amongst others, financial services imports likely crowded out the domestic ones, as often these services are prone to lower employment; thus, aggregate demand, which ultimately has an overall adverse effect on manufacturing value-added. This consequence provides substantial justification that such services should be granted from within the region as long as the objective is to promote industrialization ([Owino & Oiro, 2017](#)). These crowd-out effects are akin to the findings of [Yahia. et al. \(2018\)](#).

The significant adverse effect of FD has two indications; either the financial sector is not supporting enough in terms of depth, access, and efficiency for both financial institutions and financial markets. Consequently, can limit ability of individuals and firms get credit for personal use of run business ([Adeleye et al., 2017](#); [Aziz, 2018](#)) or the financial services, especially the imports services are likely to lower employment; thus aggregate demand, which eventually has an overall adverse effect on manufacturing value-added ([Owino & Oiro, 2017](#)).

In general, the results support the established theoretical framework, particularly the supply-side capacity (internet), demand-side (HDI), an endogenous approach emphasized by Romer, and Aghion and Howitt, where the human capital (here proxied by HDI) is essential in productivity enhancement.

Due to design and methodological limitations, the study was forced to restrict the analysis to only 13 out of 21 member states. However, having considered the important of industrialization on the development of the regional, amongst others factors, countries shall adhere policies and strategies that strengthening both supply-side (infrastructure, i.e., internet coverage, human development), and demand-side capacities (i.e., financial sector) at the same time address the adverse effects inward-FDI services in domestic investment ([Yahia, Sayyed, Hisham, & Md Reza, 2019](#)) especially financial services, though, ceteris paribus, adopt policies that encourage the favorable entry mode of FDI, having considered that the COMESA Free Trade Area (FTA) is significantly attracting FDI. Amongst others, the subsequent researches can address the effects of inward-FDI services by entry modes and the environmental impact of this significant intra-trade.

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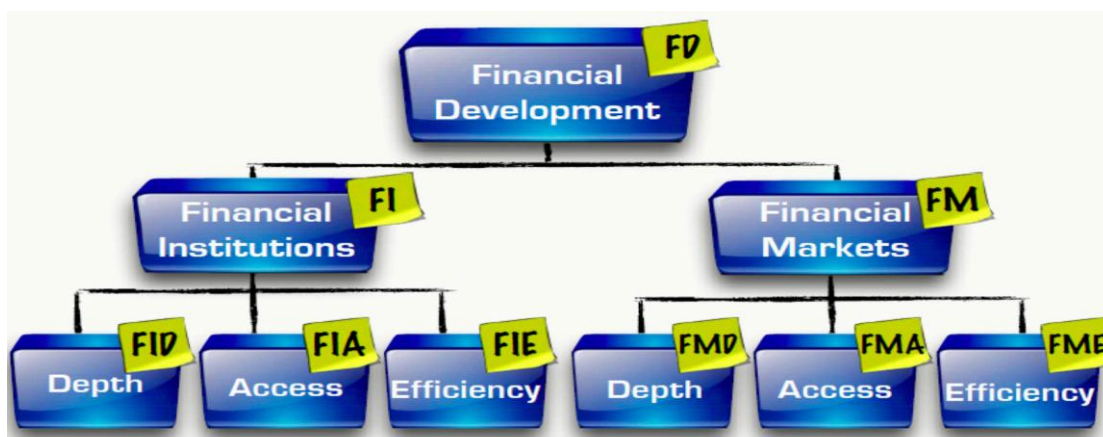
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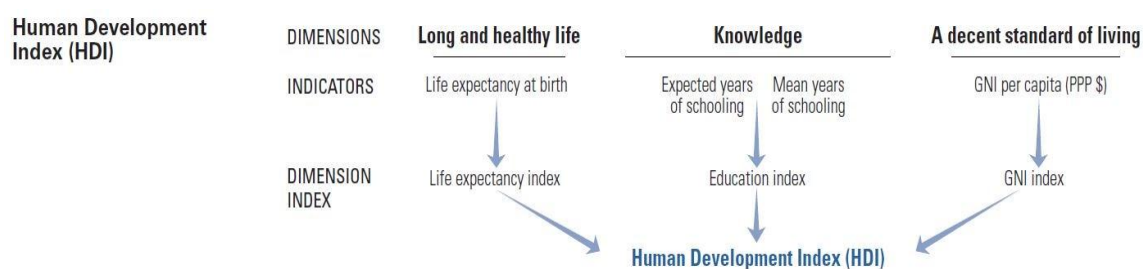
## APPENDIX

### A1. Financial Development Index



Source: IMF Staff, based on Cihák, Demirgüç-Kunt, Feyen, and Levine (2012).

### A2. Human Development Index



Source: United Nations Development Programme (UNDP) <http://hdr.undp.org/en/content/human-development-index-hdi>.

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