EFFECT OF FOREIGN DIRECT INVESTMENTS, HUMAN CAPITAL AND INFRASTRUCTURE DEVELOPMENT ON KENYA'S MANUFACTURING EXPORTS TO COMESA REGION

BY

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DECLARATION

DECLARATION BY THE CANDIDATE

I hereby declare that this thesis is my original work and has not been previously presented for examination in any other university.

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I dedicate this thesis to my dear wife Emily and children Solo, Peter and Mary.

ABSTRACT

Kenya's manufacturing value added as a percentage of GDP (Gross domestic product) continues to decline over years for example from 12% in 2008 to 9.2% in 2016, this could be attributed to heavy reliance on agricultural exports. Manufacturing sector could be improved by enhancing manufacturing exports to regional trade blocs; such as COMESA (Common Markets for Eastern and Southern Africa). Kenya is an active participant in regional trade and the main exporter to COMESA. Many studies have been conducted to establish the determinants of general exports in relation to population, GDP and exchange rates. However, the studies fell short of considering the importance of macroeconomic variables such as human capital development (HCD), foreign direct investment (FDI) and infrastructure development (ID). The purpose of this study was to explain the effects of human capital development (HCD), foreign direct investment (FDI) and infrastructure development (ID) on Kenya's manufactured exports to COMESA region. The specific objectives were to determine the effect of foreign direct investments on Kenya's manufacturing exports to COMESA, to analyze the effect of human capital development on Kenya's manufacturing exports to COMESA and to determine the effect of infrastructure development on Kenya's manufacturing exports to COMESA region. Gravity model anchored on the theory of international trade was used and adopted a correlational research design. Panel data was sourced from World bank and African Development Bank for eighteen COMESA members for the period 2005–2016. Unit root tests were estimated using Im-Pesaran and Shin, and Levin-Li-Chu tests. Hausman Test was used to choose between fixed and random effect models. Results of fixed effect model indicated that FDI was positively significant (β_1 = 0.0774) determinant of Kenya's manufacturing exports (p – value 0.0380< 0.05) the regression results further documented that HCD had positive and significant (β_2 = 2.4183) effect on Kenya's manufactured exports (p –value 0.0000 < 0.05). The research results further proved that manufactured exports were positively determined significantly (β_3 = 0.4989) by infrastructure development with (p – value 0.0010 < 0.05). This study recommends that Government of Kenya and other stakeholders should invest more in infrastructure, improve human capital through education, training, health, nutrition and housing to increase labor productivity and enhance production of manufacturing exports. Policies aimed at increasing net FDI inflows such as generation of good investment climate and provision of subsidies to exporters will foster Kenya's manufacturing exports.

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LIST OF ABBREVIATIONS AND ACRONYMS

AGOA	**:**	African Growth and Opportunity Act
ASEAN	**:**	Association of Southeast Asian Nations
CET	**:**	Common External Tariffs
COMESA	**:**	Common Market of Eastern and Southern Africa
DOLS	**:**	Dynamic OLS
DVCC	**:**	Dummy Variable Common Colony
DVNC	**:**	Dummy Variable Neighboring Countries
EAC	**:**	Eastern Africa Community
EPPO	**:**	Export Promotion Council ant the Export Promotion Programmes Office
EPZs	**:**	Export Processing Zones
EU	**:**	European Union
FEE	**:**	Fixed Effects Estimator
FEM	**:**	Fixed Effects Model
FTA	**:**	Free trade Agreements
GDP	**:**	Gross Domestic Product
GEE	**:**	Generalized Equation Estimation
GoK	**:**	Government of Kenya
H-O	**:**	Hecksher – Ohlin
HTM	**:**	Haussmann Taylor Model
ICT	**:**	Information Communication Technology
ID	**:**	Infrastructure Development
JB	**:**	Jarque-Bera
KAM	**:**	Kenya Association of Manufacturers
KETA	**:**	Kenya Export Trade Authority
KNBS	**:**	Kenya National Bureau of Statistics
LM	**:**	Lagrange Multiplier
MENA	**:**	Middle East and North Africa
MICs	**:**	middle-income countries
MNEs	**:**	Multinational Enterprises
MUB	**:**	Manufacturing Under Bond
MXP	**:**	Kenya’s Manufacturing Exports

NICs	**:**	Newly Industrialized Countries
NTB	**:**	Non-Tariff Barriers
OECD	**:**	Organization for Economic Cooperation and Development
OLS	**:**	Ordinary Least Squares
PMG	**:**	Pooled Mean Group
PTA	**:**	Preferential Trade Area
REE	**:**	Random Effects Estimator
REM	**:**	Random Effects Model
RTAs	**:**	Regional Trade Agreements
U.K	**:**	United Kingdom
UNCTAD	**:**	United Nation Conference on Trade and Development
US	**:**	United States
VAR	**:**	Vector Autoregressive
VEC	**:**	Vector Error Correction

OPERATIONAL DEFINITION OF TERMS

Manufacturing Exports- Manufacturing is the value added production of merchandise for use or sale using labor and machines, tools, chemicals and biological processing. The term is commonly applied to industrial production where raw materials are transformed into finished goods on a large scale. Manufacturing exports is the shipping of value added goods and services out of the jurisdiction of a country.

Distance (D): This denotes the topographical space quantified in kilometers (km) between the various economic zones in Kenya as well as its trading partners, as the bird flies.

Export Flow: The term export flow means the shipping of goods and services out of the jurisdiction of a country. In relation to the study it was used to refer to how trade is carried out in terms of good exported from one country to another.

Foreign Direct Investment (FDI) Inflows: This is the total annual inward flow of FDI. Foreign direct capital refers to capital that leads to long lasting manageable profits of (over 10 percent on the starting assets) on locally owned businesses from the entrepreneur from a different nation. These forms of financing include the total share value, expense returns on incomes, lengthy finances, shorty finances recorded on the remainders of payments as well as great global debts.

Human Capital Development HCD: This measures the standards of living in a country in terms of Health, Education and Life Expectancy. A healthy population with higher wages and higher standards of living are likely to buy and produce more goods and services especially manufactured goods

Infrastructure Development (ID): This refers to the stock and quality of roads, streets, and highways, rail lines, airports and airways, ports and harbors, waterways and other transit systems to facilitate the movement of goods and enable people to access internal and global markets. This was proxied by the percentage which includes habors, airways, ports, paved roads. A higher rating indicates a better infrastructure. Better infrastructure should lead to higher trade and therefore more exports from Kenya.

Regional Trading Bloc: This term is used in the title refers to Regional integration of trading partners.

COMESA: Common Market for East and Southern Africa this is a trading bloc which began in December 1994 when it was formed to replace the former Preferential Trade Area (PTA) which had existed from the earlier days of 1981. COMESA (as defined by its Treaty) was established as an Organization of free independent Sovereign states which have agreed to cooperate in developing their natural and human resources for the good of all their people' and as such it has a wide ranging series of objectives which necessarily include in its priorities the promotion of trade, peace and security in the region

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Manufacturing is the value-added production of merchandise for use or sale using labor and machines, tools, chemicals and biological processing (Lundvall, Johnson, Andersen, & Dalum, 2002). The term is commonly applied to industrial production in which raw materials are transformed into finished goods on a large scale (Lundvall *et al.,* 2002). Manufacturing exports is the shipping of value-added goods and services out of the jurisdiction of a country Kenya Association of Manufacturers (KAM, 1988). The transition from agriculture to manufacturing is still the route to higher productivity and rising living standards for developing economies. In advanced economies, manufactured goods stand as the tangible expression of innovation and competitiveness (Banga, 2006).

In the 21st century, the role of manufacturing in the global economy continues to evolve and developing countries are likely to drive global growth in demand for manufactured goods through foreign trade (Rothstein, 2015). Foreign trade is the transaction on funds, products over global regions in legally acceptable ways. (Hill, 2008). A nation's trade with others consists of buying and selling products across other nations respectively. International market arises from the lack of any nation that is completely self-sufficient (Deardorff, 2015). Exports are important for the process of growth (Bosworth, Collins, & Reinhart, 1999). Exports produce money transactions that facilitate a country's buying behavior, enrich its manufacturing and production sector as well as other economic endeavors that multiply its profit-making extension. Exports also enable them to expand their selling arenas hence identify opportunities that result from production, selling of products, as well as regional markets (Giles & Williams, 2000)

The monetary gains resulting from global sales encompassing manufactured good rose to over sixty seven percent for nine years since 2005 attaining a value of approximate $12.3 trillion at the end of the nine years. Despite this, the rise of international productive failure together with recessive extension ratios for rising and established manageable resources nations international markets declined by less than 2% annually from 2011 to 2014 (Hoekman & Nicita, 2008). More to that, declining yearly extensive means on manufactured sales from 2011 together with recessive percent of producers on the sum of product markets by 5% proved this decline. (Rothstein, 2015). The total income resulting from selling of locally manufactured goods from established nations multiplied during this period approximately attaining a total of $5.4 trillion by the end of this period. Most of this extension was facilitated on the growth of international sales by producers based in Low income countries as well as developed nations (Hoekman & Nicita, 2008). International sales extension of locally produced of low income nations has also been great with a mean expansion frequency ranging over 12.5%. As a group, developing countries (little-, middle-, and great-earning advanced nations including China) had a value of approximate sixty percent of the global product sales by 2014 compared to fifty percent in 2005.

The world merchandise has witnessed momentous growth , and the worldwide trade pattern has also observed theatrical shifts, as emerging and developing economies have progressed to major centers of global trade from peripheral players (Rault, Sova, & Sova, 2009). Trade was in the early 1970s, largely restricted to only a few developed economies, particularly Japan, Germany, and the United States and which in combination dominated a majority of global trade (Cherunilam, 2010). The worldwide trading landscape by 1990 had been more varied to include numerous emerging and developing well managed resources mostly on eastern part of Asia. By 2011, the sum of international sales of these nations reached 42.75% of world exchange, steadily rising from 24.17% in 1990 (Davies, 2012).

Whereas advanced countries continue to be a considerable export market from the South, a noticeable characteristic of this extraordinary degree of trade diversification has been the increasing prominence of commerce conducted among emerging economies (South-South trade), at a pace faster than the global average (Gumede, 2009). By 2011, 54.9 percent of the international sales were absorbed by developing nations, compared to 40% in 2000, 42.55% in 1995, and less than 25% in 1960. On the other hand, the proportion of the products bought among other well resource managed nations also grew steadily by 10.16% between 1970 and 2000 and then to 38.33 percent by 2011 (Davies, 2012). One more significant characteristic is the proliferation of fast-growing and large emerging countries, particularly China, as the chief commercial ally of a growing quantity of emerging economies. At the international scale, the share of Africa in international exports has also grown from 2.9% in 2007 to 3.24% in 2011 after taking a downturn from 5.53% in 1960 to 3.02% in 1990 and further down to 2.4% in 2000 (Davies, 2012).

For Kenya, industrial growth has stagnated with a GDP contribution of 10 % over the last 10 years, and a further reported decline to 9.2 % in 2016. Hence the need to promote the competitiveness of local industries should be prioritized in the rejuvenated endeavor to focus on the manufacturing sector as a country. Most of nations termed to have flourished resources achieved this mark via the phases of industrial revolution (Sheena, 2008). Industrial enterprise consists of work force changes as well as income generated from farming revolving to manufacture section thus resulting in the growth of industrial income summed up with the country's GDP. However, Kenya has had a reducing manufacture to GDP ratio of 3.4% between the years 2005 and 2016. The ideal situation for manufactures should be 15% of GDP as exhibited by the newly industrialized countries (NICs).

Due to this, the government strategizes in turning round the reducing manufacture to GDP ratio with the help of well policed plans. Among them is the Big Four Initiative that focuses to uplift the local production of goods and services. This Initiative stipulates that the production portion will grow to 15% of the Gross Domestic Product by 2022. Kenya aims to bridge the difference by 6.6% once the aim set by this initiative is realized. Due to this, the Manufacturing Priority Agenda (MPA) terms its goals as "Ending of production difference via the Big Four Agenda to achieve equalized growth". KAM (2018b) Observed that since 1980s, the manufacturing sector's contribution to gross domestic product has been fluctuating, stagnating at 11 per cent over the past five years to decline to 9.2 per cent in 2016.

Manufacturing sector value addition outputs has seen continuous growth, meaning as its pie expanded other sectors gained more space. In 2011-2017, its value grew from Sh438 billion to Sh648 billion and is projected by the Integrated National Exports Development and Promotion Strategy to hit Sh2,235 trillion by 2022 for Kenya to achieve a 15 per cent share of GDP as envisaged in the 'Big Four' agenda. Industrial transformation would require 60 per cent of outputs, especially from manufacturing, to be exported. Africa presents an opportunity of a 17 per cent share of the world market for Kenya with others being Asia (6.0 per cent), the European Union (nine), Middle East (2.9), Latin America and Caribbean (8.3) and the Nafta bloc (5.9). Vision 2030 economic pillar the country's quest for industrial transformation. Improved healthcare, housing and food security are a prerequisite for a productive human capital necessary for a competitive manufacturing sector.

The deliberate focus on manufacturing subsectors such as leather, textile and agro-processing will enable Kenya to achieve targets and, by extension, value added exports, realizing the objective of 1.3 million jobs. A healthy economy anchors exports as an ingredient for

manufacturing sector expansion. The public and the private sectors need to partner to foster competitiveness towards an export-oriented economy (KAM, 2018b). Over the years, the government has created a robust infrastructure network including the standard gauge railway (SGR), lowered energy costs, improved customs services and eased the cost of doing business. Kenya is ranked 80th in the ease of doing business index and aims to be ranked below 50. The government's bid to continually improve the business environment is a show of commitment to improving the wellbeing of Kenyans.

One of the key areas of focus to take advantage of the market access opportunities is to enhance our productive capacity. The realisation of the 15 per cent share of the manufacturing sector would require massive investments in the production of raw materials and value addition and fully taking advantage of the infrastructure to reach the world with the 'Made in Kenya' brand. Kenya being a member of COMESA and EAC may realize increased manufacturing exports. Economic history shows improving productive capacity and enhancing market access to neighbouring countries builds a nation's or region's base for economic transformation. The history of the EU, where about 28 countries created a monetary union, invested in massive infrastructure such as SGRS and affordable energy, can be emulated. In addition, they have created efficient labour and services frameworks.

1.1.1 Regional Integration and Manufacturing

The advent of globalization has sparked renewed interest in regionalism in Africa amidst fears of African marginalization (Agbodji, 2008). African countries believe that their coming together under a regional body would be an effective means of asserting their economic independence (Huff, 2000). There is also consensus that developing countries have a great deal to gain from free trade. Regional integration in Africa has been seen as a vehicle for promoting trade and securing economies of scale and market access, and pave way for sustainable growth and development (Ogunkola, 1998).

There are five levels of regional integration schemes. First, the most basic being preferential trade area (PTA) where member states offer each other favorable terms of trade through lower tariff and NTBs compared to third countries. The second is free trade area (FTA) where trading partners eliminate all barriers to trade with member states but where each country is free to elect its own protective measures against imports from third parties. Third is a custom union where countries in addition to FTA adopt a CET on imports from third parties. Fourth is a common market which is a FTA and also has free movement of factors of production. Finally, is the economic and monetary union that incorporates features of a common market plus common supranational or intergovernmental policy making body. It is at this stage that a RTA adopts a common currency and a common central bank, a good example being the EU (Githuku, 2010).

Similar selling arenas for the eastern and south part of Africa termed as (COMESA) was established in December 1994 with an aim of replacing the later Preferential Trade Area (PTA) which had been formed in the early 1980's. COMESA comprised of countries which had attained their independence and had a common goal of exploiting and growing the available resources resulting from nature and people for the benefit of the citizens. It also had a variety of goals set within its objectives with its main being promoting peace and security within the area (Luke et al., 2015). The member states includes: Republic of Kenya, Federal Democratic Republic of Ethiopia, Union of the Comoros, Kingdom of Swaziland, Republic of The Sudan, Republic of Zimbabwe, Republic of Seychelles, Republic of Zambia, Republic of Rwanda, Republic of Uganda, Republic of Mauritius, Republic of Malawi, Republic of Madagascar, Libya, State of Eritrea, Arab Republic of Egypt, Union of the Comoros, Democratic Republic of the Congo, Republic of Djibouti and Republic of Burundi. As a result of COMESA'S resourceful background, the major aim was aimed at setting a huge

well managed resourceful area with huge markets with the capability of solving major challenges affecting each unit nation.

COMESA's rolling out plan can be concluded as an aim to achieve 'Well resource managed region achieved by territorial incorporation'. It consists of 19 nations with a total population of more than 389 million with a yearly buying expense of 82 million US dollars. This body also builds an important buying and selling arena enhancing local and international trade. It covers a geographical region of 12 million square kilometers. The body's achieved objectives to day have been crucial more so in the area of bilateral trade (Alemayehu & Haile, 2002).

The East African Community (EAC) is a regional intergovernmental organization of 6 Partner States: The Republics of Burundi, Kenya, Rwanda, South Sudan, the United Republic of Tanzania, and the Republic of Uganda, with its headquarters in Arusha, Tanzania (Ligami, 2012). East Africa Community is part of COMESA because all its members belong to RTA safe for Tanzania. The East African Community houses 158 million people with 22 percent of this population being comprised in towns. It has geographical coverage of 2.42 million square km with total GDP of 169.5 US Dollars (EAC Statistics for 2015). The organization's realization results in tremendous well planned geopolitical importance in the wellbeing of the reborn and rejuvenated EAC (Makame, 2012).

Its specialized objectives are within its co-founding agreement. This agreement was signed on 30th November 1999 and came to use in 7th July, 2000 following its approval by the cofounding countries including; Kenya, Uganda and Tanzania. Other countries including Rwanda and Burundi joined the community on 18th June 2007 and assumed active roles on 1st July 2007 (Braude, 2008). Other countries including The Republic of South Sudan familiarized with the agreement on 15th April 2016 and shall become an active and full organ of the immediately the contents of agreement are accredited and submitted to the Secretary

General of the body. Being the leading well managed resource area in terms of growth, the East African Community is providing an opportunity in expanding and deepening its incorporation with other member countries in several important areas to help achieve equitable and beneficial advantage. Some of the areas comprise of social, political and economic aspects

1.1.2 Foreign Direct Investments (FDI) and Manufactured Exports

The expansion of international production is determined by economic and technological forces along with ongoing trade liberalization, Foreign Direct Investment (FDI) and trade policies. In this context, globalization suggests a unique opportunity for developing countries to attain quicker economic growth by trade and investment. Khan (2007) found that the significance of FDI has risen by transferring technologies, acquiring channels and establishing marketing for efficient production and global trade (Khan, 2007). From the year 2000, the Kenya government has implemented a number of initiatives to improve both economic performance and stimulate foreign direct investments. The government joined the Free Trade Area of the Common Market for Eastern and Southern Africa (COMESA). Kenya's Foreign Direct Investment (FDI) inflow showed a striking bounce back that attained outstanding Ksh 68.9 billion (0.67 Billion dollars) in year 2017. Despite this boomerang, emerging international reporting showed that this extension had no appealing results in terms of its magnitude as it was behind other major East African countries. According to the global capital 2018 announce by the United Nations Conference on Trade and Development (UNCTAD) merited Kenya among the top four highest FDI users in Eastern Africa behind Ethiopia, Tanzania, and Uganda.

By comparison Ethiopia, among the swiftest enlarging countries, soaked up approximately half of the $7.6 billion (Kshs 760 billion) FDI in Eastern Africa, enticing a sum of $3.6 billion (Kshs 360 billion) similar profit making ventures. Tanzania and Uganda got an

amount of $1.2 billion (Ksh.120 billion) together with $0.7 billion (Kshs. 70 billion) in that order. However, despite falling behind fellow East Africa's growing countries, Kenya had FDI income grow by $0.29 from $0.39 billion (Kshs 39 billion) in year 2016 thus rebelling against an international tendency and in Africa where incomes submerged resulting from a decline in the value of items obtained as well as worth from over territorial combination and territorial addition. UNCTAD (2017) Kenya's FDI income presentation is affected by a good local need as well as income targeting the nation's Information Communication Technology sectors.

Kenya's government has been implementing a series of measures to attract foreign investors that included among others manufacturing under bond (MUB) in 1987, Export Processing Zones (1990) and accession to the African Growth and Opportunity Act (AGOA) in 2001 (Abala, 2014). The last measure however led to significant FDI inflows from Asia whose investors used Kenya as a platform for quota-hopping to access the otherwise restricted US market, particularly for clothing manufactures (Rossman & Greenfield, 2006). FDI inflows in Kenya helps in the productive capacity of manufactured exports and for importing countries, the FDIs' could help absorb more manufactured exports from Kenya because some of the manufactured goods are used in industries for value addition.

Several researches aimed at determining results of FDI to manufacturing around the world have been done. For example (Soliman, 2003), (Sekkat, 2012), (Wongpit, 2014) and (Wang, Buckley, Clegg, & Kafouros, 2010) conducted studies in MENA countries, South Mediterranean countries, Thailand, China among others. However, the studies focus area falls outside the COMESA region thus the results cannot be generalized to the region hence the need to determine the effect of FDI on Kenya's manufacturing exports to COMESA.

1.1.3 Human Capital Development (HCD) and Manufactured Exports

The Global economic forum gave out the International Human Capital Reference early in the year which merited Kenya as number 78 amongst 130 other nations showing an improvement from its previous 2016's performance of number 120. Four references were considered in concluding the marks of the considered nations. The variables put into consideration were storage space, logistic measures, and how they were familiar with economic growth. Kenya's improved performance to among the 100 best was facilitated by the nation's growth of its improved learning value in conjunction with tangible centralized expertise in its job sector. However, her performance mark of 60% in storage space and 53% in economic growth middle valued references was small compared to other nations which led the group including Norway and Finland with more than 85% (Layard, Layard, Nickell, & Jackman, 2005). This showed that although the country's education value was considered healthy, the values indicated crucial areas that needed more attention including in order to compete and keep the record of a good investment destination then the country needed to make more immediate investments

Human Capital Development was explained as the main locator of tomorrow's labour force. Currently, a lot of countries are moving in the direction of ensuring that their money is channeled towards growing the number of their available labor group. This diversion of funding and improving their learning outcomes from the disadvantages caused by technology and need for automatic systems is important in ensuring that the country's fundamental processes meet tomorrows international market quality. Therefore, it is important for the country to identify and act swiftly towards achieving this goal.

The country's 2017 record of 58% in its total potential labour taskforce was lesser than leading nations including Mauritius with 67%, Ghana with 64%, and South Africa with 63%s showing that 30% of employers were complaining of insufficient expertised labour group

which hindered the country's business growth. Therefore, a section of the country's education development agenda should focus on ensuring that its learning outcomes are inclusive and equal across the board. The fundamental causes of little to no beneficial gain from the location advantage is because a large group of youths have no access to quality education. This relies on the fact that a large section may easily only acquire the knowledge of getting employed but fail to acquire the necessary skills that improve their talents and help in protecting their relevance in future job markets.

For effectual change to be realized, the country needs to focus on improving and reinstating its Technical, Vocational Education and Training (TVET) departments. This will see Kenya gain economically and help it realize its Vision 2030 goals through consistent and robust increase in its industrial output through which its other departments can gain (Layard *et al.*, 2005). Industrial revolution is key factor that ensures sustainable and continuous extension of a country's available resource management that enables it achieve its individual economic independence. In spite of this, Kenya is unable to solve this menace with its key goals in education focusing on solving the current problems and ignoring other employment requirements that may be unforeseen in the upcoming future.

In comparison to Singapore which holds a global potential benchmark for other countries in connecting real monetary gain through funding its TVET, Kenya should also start to prioritize her goals in ensuring economic growth. Singapore focused in funding its TVET programmes as early as 1960's and 1970's. This helped them realize the need to refurbish the industrial sector through evolving its education syllabus and more so TVET to help her address the dynamics of the job employment sector(KAM, 2018b). Through this Singapore has grown to be the leading example of the advantages of achieving industrial growth through creation of numerous opportunities in production and becoming the fastest growing

economies and the best investment destination. Still, manufacturing continues to be key in the country's economy and is attributed to this economic stability. In 2017 the manufacturing sector increased by 15.5% in the third quarter compared to 8.3% same quarter in 2016.

In Kenya, there have been progressive steps towards achieving economic goals with focus on the symbiosis between TVET development and Industrialization. For instance, KAM in partnership with the State Department for Vocational and Technical Training launched a TVET Program, in 2017, that aims to increase economic and employment opportunities for the youths in Kenya while at the same time, ensuring that local industry is poised to take advantage of the fourth industrial revolution with skilled manpower. So far, this initiative has placed 450 technical skills graduates for apprenticeship programs in industries across the country and an additional 500 graduates have been taken through work readiness training. These are just initial steps to a larger vision shared by Industry and Government to invest in the TVET sector in a bit to catalyse Kenya's industrialization. Human capital development improves Kenya's exports; a healthy and high income population would be more productive in production of high value manufactured goods which increases manufactured exports. HCD for the importing country helps in absorption of manufactured goods from Kenya since in those countries their population would be having a high income and standards of living, therefore buying high valued manufactured goods.

There are a number of studies that attempt to control for the individual characteristics of workers employed by exporting firms by using matched firm and worker data. For example, (Baumgarten, 2013) analysed the role of exporting establishments in explaining rising wage dispersion, (Schank, Schnabel, & Wagner, 2007), (Munch & Skaksen, 2008) examined the export wage premium, Blanchard (2015) looked at globalization and Human Capital Investment: Export Composition Drives Educational Attainment, (Fonchamnyo, 2014)

examined the determinants of export propensity and intensity of manufacturing firms among other studies. From the analysis, most studies looked at education attainment on exports and little has been done on HCD which encompasses education, Health and standards of living. This makes it impossible in conclude what relationship exists between manufactured exports and human capital development. This justifies a study to examine the effect of human capital development on Kenya's manufactured exports to COMESA region.

1.1.4 Infrastructure Development (ID) and Manufactured Exports

Infrastructure forms the basic physical systems which include roads, highways, railroads, airports, sea ports, electricity, telecommunications, water supply and sanitation that countries rely on to foster development (Shinyekwa & Ntale, 2017). This infrastructure plays a positive and significant role in the growth performance of countries to the extent that countries that have developed economic infrastructure have reaped significant benefits and the opposite is true. For the purposes of trade, trade enablement is touted as the next key option to reduce trade costs in developing countries (Shinyekwa & Ntale, 2017). Kenya as country in collaboration with neighbouring countries in the last one decade embarked on rigorous infrastructure development to spur growth. For example, according to Shinyweka and Ntale (2017), the EAC road infrastructure development plan highlights and identifies a total of five transport routes or corridors covering up to 12,000 km that will be upgraded to facilitate trade.

Infrastructure development has significant multiplier effects through linkages with other sectors of the economy. Significant efforts have been made in development of Kenya's infrastructure–transport, energy and information technology–with a view to enhancing efficiency in production, trade and investments. In 2016, the transport, energy and communications sectors contributed 8.4 per cent, 9.1 per cent and 9.7 per cent to GDP, respectively. So far electricity installed capacity has expanded, access to electricity increased,

and electricity tariffs reduced. Despite the significant reduction in electricity tariffs, they remain relatively high at regional level and this could undermine the country's industrial competitiveness. In the transport sector, there is increased kilometres of paved roads, air passenger traffic, and improved port performance in cargo tonnage and reduced dwell time. Similarly, the Information and Communication Technology (ICT) sector shows growth in cellular mobile services, data and internet usage as well as acquisition of television and radio frequencies and transceivers. However, to be a regional hub, Kenya needs to market a package of infrastructure services.

Regional infrastructure development has been critical in facilitating regional trade. In this respect, Kenya hosts the Northern Corridor Infrastructure Project (NCIP), which constitutes a multimodal transport corridor consisting of surface transport modes that include the Port of Mombasa, road, rail, inland waterways and oil pipeline networks. A modernization programme has improved productivity and efficiency of the Port of Mombasa. For instance, container traffic has increased from 903,463 twenty-foot equivalent-unit (TEU) in 2012 to 1,091,371 TEU in 2016 over the same period, while dwell time has reduced from 10 to 4 days. This has aided the manufacturing exports to the regional markets. Infrastructure development ID aids Kenya's manufactured goods to reach its destination with a low cost thereby increasing the productive capacity. For importing countries better infrastructure will encourage absorption of Kenya's manufacturing exports.

Several studies to analyze the relationships between infrastructure developments have been undertaking in different countries. For example,(Tong, Yu, & Roberts, 2014) in United States, (Hernandez & Taningco, 2010) in East Asia, (Shepherd & Wilson, 2008) in Southeast Asia, (Wilson, Mann, & Otsuki, 2003) for 124 developed countries among other researchers. The results from various studies indicated consistency. However, the studies are based majorly on the developed economies such as United States, Germany and China which have

highly developed infrastructure with none having been conducted in the COMESA region. The results on the effect of ID on manufacturing exports could be varying as one move from the developed world to less developed and developing world, thus the findings in one region cannot be generalized to another region. This therefore calls for the need to determine the effect of infrastructure development on Kenya's manufacturing exports to COMESA region.

1.2 Statement of the Problem

The transition from agriculture to manufacturing is globally considered the route to higher productivity and rising living standards for developing economies. In the current empirical literature manufactured goods stand as the tangible expression of innovation and competitiveness for advanced economies. Almost two decades into the 21st century, the role of manufacturing exports continues to play pivotal role in global economic development and developing economies continue to aspire for higher manufacturing growth especially through exports. However, Kenya's manufacturing value added as a percentage of GDP (Gross domestic product) continues to decline over years for example from 12% in 2008 to 9.2% in 2016 and this indirectly affect the manufacturing exports. Under vision 2030 blue print, economic pillar, Kenya's aim is to have a robust diversified and competitive manufacturing sector to transform the country into a middle income economy. Manufacturing sector and by extension manufacturing exports, has been identified as the key driver for economic growth and development under the big four plan in Kenya. Its overall goal is to increase its contribution to GDP by at least 15 Studies in the current body of knowledge to explain growth of manufacturing exports in different countries and regional trade blocs for example those that investigated how FDI(Foreign direct investment), HCD (Human capital development) and ID (Infrastructure development) impacts on exports focused majorly on developed and newly industrialized countries. However, for studies involving African countries none has been conducted in the COMESA region. Therefore, the results from the

studies on how FDI, HCD and infrastructure development affects manufacturing exports cannot be generalized to COMESA region. This makes the effect of FDI, HCD and infrastructure development on manufacturing exports in the COMESA region to remain unknown a justification for a study to estimate the effects of Foreign Direct Investment, Human Capital Development and Infrastructure Development on Kenya's manufacturing exports to COMESA region

1.3 Objectives of the Study

1.3.1 General Objective

To estimate the effects of Foreign Direct Investment, Human Capital Development and Infrastructure Development on Kenya's manufacturing exports to COMESA region.

1.3.2 Specific Objectives

i. To determine the effect of foreign direct investments on Kenya's manufacturing exports to COMESA region.
ii. To analyze the effect of human capital development on Kenya's manufacturing exports to COMESA region.
iii. To determine the effect of infrastructure development on Kenya's manufacturing exports to COMESA region.

1.4 Research Hypothesis

i. H_0: Foreign direct investments, does not determine Kenya's manufacturing exports to COMESA region.
ii. H_0: Human Capital Development does not affect Kenya's manufacturing exports to COMESA region.
iii. H_0: Infrastructure Development does not have an effect on Kenya's manufacturing exports to COMESA region.

1.5 Scope of the Study

The study focused on determinants of manufacturing exports between Kenya and 18 COMESA countries covering the period between 2005 and 2016. Rwanda and Burundi Joined COMESA fully in 2004 and that's the reason for choosing 2005 as the starting period, and data was available up to 2016. Data for Eritrea could not be fully found and that's the reason why the study has 18 members instead of 19.

1.6 Significance of the Study

Kenya like many other developing countries is involved in economic integration programmes to increase market access. Greater market size can expand opportunities for exporting products and lead to enterprise and employment growth. Economic integration eases trade friction, offers a great opportunity of fostering economic growth as was the case with the Newly Industrialized Countries (NICs) through growth of exports more so manufacturing exports. Thus, identifying factors that promote or impede regional trade is important to policy makers in designing and implementing appropriate policies meant to make Kenya benefit.

All African countries belong to some Regional Trade Arrangement. However, it is theoretically impossible for a country to belong to more than one customs union not unless they have the same Common External Tariffs (CET). COMESA member states have recognized the challenge posed by multiple memberships in their effort of accelerating inter-regional economic integration, thus creating the need of initiating the process of harmonizing and coordinating their regional integration programs so as to mitigate the problem. The study gave an insight about countries in which Kenya had less trade friction and therefore offers greater opportunity for exports growth through trade promotional activities. This reduced cost of promotion since the returns were likely to be much higher. This helps the government broaden and deepen export base and markets as is expounded in the Ministry of Trade Strategic Plan, GoK (Kamukunji, 2017).

GDP in Kenya has not been attained to the desired level due to low value agricultural exports. This could be improved if it is supplemented by manufacturing exports to regional trade blocs; Common Markets for East and Southern Africa (COMESA) which is key in achieving vision 2030. Manufacturing exports diversifies the economy and increases productivity of capital and labour, in addition to attracting FDIs. The choice of COMESA for this study is because Kenya is a member of this RTA, member countries proximity to Kenya eases market accession. In addition, it Harmonizes policies in areas of common interests (De Melo & Tsikata, 2015).

1.7 Theoretical Framework

The gravity model has often been used to explain Origin-Destination (i j) flows such as international or regional trade, transportation flows, population migration, commodity flows and information flows along a network. Reasons for the prosperity of this model are the simplicity of its mathematical form and the intuitive nature of its underlying assumptions, as (Sen, 2010) noted in their monograph.

This current research builds an extended gravity model, using static panel data with fixed, random effects, to analyze the effects of trade facilitation on Kenya's manufacturing exports between 2005 and 2016. The first authors to use the gravity model to analyse international trade were (Tinbergen, 1962), (Pöyhönen, 1963) and (Linnemann, 1966). In the studies by (Anderson, 1979), (Bergstrand, Egger, & Larch, 2007) and (Helpman & Krugman, 1985), gravity equations were derived from international trade models based on product differentiation and increasing returns to scale; and rigorous theoretical support was provided. Other researchers have provided econometric specifications e.g (Mátyás, 1997), (Wall & Cheng, 1999), (Bayoumi & Eichengreen, 1998), (Breuss & Egger, 1999) and (Egger, 2000)). In recent decades, the gravity model has been one of the most widely used to analyse international trade, migration or foreign investment flows, due to their properties, their

theoretical and empirical support, and their flexibility and adaptability to different regional realities or to that of a particular country (Fuenzalida-O'Shee, Valenzuela-Klagges, & Corvalán-Quiroz, 2018). This is the essence why gravity equation was employed in the present study.

In relation to international trade, there exists a large literature on theoretical foundations for these models (Anderson & Van Wincoop, 2011). In the regional science literature, the gravity model has been labeled a spatial interaction model (Sen, 2010), because the regional interaction is directly proportional to regional size measures. The model relies on a function of the distance between origin and destination as well as explanatory variables pertaining to characteristics of both, origin and destination countries. The principal explanatory variables used to explain trade flows are as follows. The variables with a positive effect include size of importing economy, per capita income differential of the two countries involved, their degree of openness, the existence of general trade agreements, the existence of a common official language and/or currency, a shared colonial past or the existence of a favorable exchange rate. The factors with a negative impact on trade volumes include cost of transport, which usually depends on the distance between the countries involved. Foreign direct investment, human capital and infrastructure development are expected to have a positive effect on manufacturing exports.

Gravity model is borrowed from Newton's gravitational theory and utilizes the concept of gravitational force to explain the volume of trade, capital flows, and migration among countries of the world. Newton's theory postulates that the force of attraction between two separate entities i and j is positively related to entities' respective masses and inversely related to the square of distance between the objects as shown in equation 1.1.

$$F_{ij} = \frac{GM_iM_j}{D_{ij}^2} \quad \text{(1.1)}$$

Where F_{ij}=gravitational force between j and i; M_iM_j=masses; D_{ij}=Distance between i and j; G=gravitational constant.

In the gravity model of international trade, gravitational force in Newton's law is replaced by trade flows or exports from country i to j, while GDP is used as a proxy for a country's mass, while distance is often measured using 'great circle' calculations in accordance with equation 1.1 Gravity model of international trade between countries is represented by equation 1.2

$$X_{ij} = \frac{KY_i^{\alpha}Y_j^{\beta}}{T_{ij}^{\theta}} \quad \text{(1.2)}$$

Where X_{ij}=Exports (in value) between country i and j; K=gravitational constant; Y_{ij}=economic size (GDP or Population) for country i and j; T_{ij}=trade costs between country i and j. If α=β=1 and θ=2, we get the Newton's law.

The above equation can be converted into a Log-linear form

$$LnX_{ij} = K + \alpha LnY_i + \beta LnY_j - \theta LnT_{ij} \quad \text{(1.3)}$$

According to the generalized gravity model of trade, the volume of exports between pairs of countries, X_{ij} is a function of their incomes (GDPs), their population, their geographical distance and a set of dummies. The general gravity model is specified as follows:

$$X_{ij} = \beta_0 Y_i^{\beta_1} Y_j^{\beta_2} N_i^{\beta_3} N_i^{\beta_4} D_{ij}^{\beta_5} A_{ij}^{\beta_6} DU_{ij}^{\beta_7} \quad \text{(1.4)}$$

Where Y_i (Y_j) represents the GDP of the exporter (importer), N_i (N_j) are the populations of the exporter (importer), D_{ij} measures the distance between the two countries' capitals and A_{ij} represents other factors that could aid or impede trade between countries, DU_{ij} is a vector of dummies.

In Log-linear form

$$LnX_{ij} = \beta_0 + \beta_1 lnY_i + \beta_2 lnY_j + \beta_3 lnN_i + \beta_4 lnN_j - \beta_5 lnD_{ij} + \beta_6 lnA_{ij} +$$

$$\beta_7 lnDU_{ij} \text{ ……..……..}$$

(1.5)

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Theoretical literature review is presented in this section. This sub-section reviews the concept and theory of trade. It discusses the theories of trade

2.1.1 Comparative Advantage Theory of Trade

Discontented with weaknesses in the outright benefit viewpoint, (Eltis, 1989) drew out the perception from Adam's free commerce theory into the aspect of comparative benefit to show that there exists grounds for equally advantageous trade, even when one economy is unquestionably more effectual in the manufacturing of all commodities than the other, given that their comparative prices, that is, the proportions of their real prices in terms of industry inputs, are dissimilar for two or more products. Ricardo argued that, an economy that is less industrious in two commodities still can increase from commerce by shipping the commodity in which its comparative drawback is lesser, since its comparative price of this commodity before trade will be less than overseas. An economy that has an outright benefit in both commodities gains by concentrating in the manufacturing of the good in which its comparative benefit is greater. It can increase from commerce by introducing the commodity in which its comparative benefit is smaller, owing to the foreign occasion

cost of manufacturing it is lower. As such, the model of Ricardo shows that it is the alteration in technology among economies that offer relative benefit to some economies in the manufacture of particual commodities compared to others and inspires beneficial global commerce (Suranovic, 1997), (Anderson & Van Wincoop, 2011)). Although scientific validations assure Ricardo's assertion that relative benefit is grounded on a dissimilarity in labor throughput, the Ricardian commerce theory was disapproved for its impractical fundamental expectations and its incapacity to neither elucidate the reason for the

dissimilarity in labor throughput across economies nor the effect of global commerce on aspect earnings (Suranovic, 1997).

From this theory it's thought that Kenya would export those manufactures which produces with the lowest marginal cost.

2.1.2 Heckscher – Ohlin (H-O) Theory

To account for the source of global dissimilarity in throughput – the element that assesses relative benefit and the arrangement of global commerce –, two economists from Sweden, (Heckscher & Ohlin, 1991) and (Heckscher, 1919) drew out the model of Ricardo into the Heckscher–Ohlin (H-O) theory by presenting one more element, that is, capital, over and above labour in the Ricardian and Smithian models. Heckscher and Ohlin opined that relative benefit comes about from dissimilarities in local resource or factor benefactions. When a factor is more plentiful, cost becomes lower, offering the economy the approval of a manufacturing process that employs heavily the comparatively plentiful factor. By supposing that dissimilar products presuppose that factor inputs be adopted with fluctuating concentrations in their manufacture, the H-O model hypothesizes that economies will ship commodities that make concentrated deployment of those elements that are nationally plentiful, and bring in commodities that make concentrated use of features that are nationally rare. This is to say, capital-plentiful economies like the U.S.A, and other industrialized countries ought to export capital-concentrated commodities, and import labor-concentrated commodities from labor-concentrated economies like Ghana among others (Lu, 2011), (Hill, 2008).

According to (Leontief, 1953) contradictory observation concerning the arrangement of commerce in the US and the indecisive conclusions from many other scientific scholarly works which measured the forecasts of the H-O model in other different economies, substitute viewpoints of relative benefit have been advanced to account for the great deal of

present-day commerce (between comparable economies) that is left unaccounted for by the H-O theory. Sources of relative benefit in these new commerce viewpoints are grounded on preferences and tastes, imperfect competition, differences in technological changes, and economies of scale among economies.

This theory would guide this study by looking at Kenyans scenario where we have abundant agricultural resources which can be manufactured from abundant labour meaning that value addition can be done so that we have high valued agricultural manufactures exported to COMESA Countries.

2.1.3 Linder Hypothesis Theory

Contrary to the usual supply side perspectives, (which attempt to account for why manufacturing prices are less in one economy compared to another), (Bojnec & Fertő, 2009) advancing his correspondence of partialities (or coinciding demands) perspective, asserted that an account for the flow of commerce in distinguished productions lies on the demand side as opposed to the supply side.

Linder theorized that economies with comparable quality of life (indexed by per capita GDP) will seem to buy similar types of commodities. Since the quality of life are measured partly by factor bequests, Linder asserted that capital-plentiful economies appear to be wealthier than labor plentiful economies. As such, there ought to be a substantial amount of commerce between economies with alike features. Implicatively, wealthy (industrial or developed) economies ought to do commerce more with other rich economies, and developing or poor economies ought to trade with other developing economies. Whereas this insinuation of Linder's theory aptly breaches the forecasts of the H-O perspective (in which economies with different factor bequests would have the highest inducements to do business among each other, owing to discrepancy in pretrade comparative prices), it offers an account for the wide-

ranging commerce observed among the wealthy economies, which contributed to a considerable share of international commerce. Additionally, it offers an account for the presence of intra-industry commerce, an imperative feature of global trade which entails the concurrent export and import of comparable types of commodities by an economy. Studies like (Bergstrand, 1985) and (Thursby & Thursby, 1987) have reported indication in favour of Linder's perspective.

(Vernon, 1966) puts forth the theory that new commodities pass through an array of levels during their development, and the relative benefit of the manufacturers in the innovating economy will change as commodities advance through this commodity cycle. The hypothesis often connoted as the "Vernon product cycle," in relevant best to commerce in manufactured, compared to primary commodities (Bonuedi, 2013).

All the COMESA Countries almost have the same level of development and that is the reason for it's affinity to trade with each other.

2.1.4 Krugmans New Trade Theory

Paul Krugman advanced a new commerce perspective in 1983 in reaction to the disappointment of the conventional theories to account for why regions with comparable throughput trade comprehensively.

Krugman's new commerce perspective opines that the presence of economies of scale (or growing earnings to scale) in manufacturing is adequate to produce beneficial trade between two economies even if they possess features that are alike bequests with insignificant relative beneficial dissimilarities (Suranovic, 1997; Turkson, 2016). As accounted by (Turkson, 2016), the growing earnings commerce hypothesis, asserts that an economy can grow an industrial sector that has frugalities of scale, manufacture that commodity in huge quantity at low regular cost, and then sell those low-cost commodities with other economies.

The presence of government laws including tax, antitrust immunity, Research and Development (R&D), subsidies, trade protection policies, low-interest-loans and loan guarantees can be adequate to produce relative benefits in manufacturing of particular commodities. Protagonists argue that government ought to enthusiastically enact regulations that marshal resources to channel towards the advancement of developing, "sunrise" industries noted by strong associations with the rest of the economy, highest growth prospects and strong future competitiveness. Over time, these regulations would develop a dynamic relative benefit for the national economy, enabling it to realize a higher average productivity level of and be more effective in the global markets. Every industrialized economy today, and many emerging economies use industrial regulations to revitalize or develop basic sectors, including, transportation steel, essential manufactures, autos and chemicals. Supporters of industrial regulation typically mention Japan as an economy that has been greatly successful in piercing through achieving rapid economic growth by penetrating foreign markets and (Turkson, 2016).

Kenya trade in manufactures which produces with the lowest cost as a result of economic scale.

2.1.5 Gravity Theory of International Trade

By considering both non-trade and trade policy factors that could either facilitate or impede trade flows, which had been overlooked for long by the classical trade theorists, the model of gravity continue to be at the center of applied research on global trade and is extensively Acknowledged as the mainstay for analyzing the dynamic pattern in growing and international and trade among developing and emerging economies in Africa, Latin America, and. Asia.

Trade between two countries is positively affected by the economic mass of trading partners and inversely related to distance between them. Additional variables, such as physical area, population, indicators of cultural affinity, and sharing contiguous boarders are usually added to empirical gravity models to elaborate on the 'economic mass' and distance variables (Clarete, Edmonds, & Wallack, 2003). (Tinbergen, 1962) published the inaugural econometric study book employing the gravity equation for global commerce flows. In his 1958 study entailing data on 18 countries, the quantity commerce between two economies was particularized to be in direct proportion of the commodity of the factor of proportionality depended on quantifying measures of trade resistance between them and an indicator index of their economic size. Of the various measures of commerce resistance, dummies for British Commonwealth and Benelux memberships and included the geographic distance among them, an imitation for commodity (common borders), and. Tinbergen established that both distance and incomes possessed their signs and were statistically significant. He also established that membership and adjacency and in the British Commonwealth (Benelux FTA) were suggestively linked with 2 percent and 5 percent higher commerce flows respectively (Bonuedi, 2013).

Application of the gravity model in the context of international trade was for the first time independently done by (Tinbergen, 1962) and (Pöyhönen, 1963) who nonetheless did not make any attempt to justify it theoretically but instead referred to a simple analogy of physics (Makochekanwa & Jordan, 2008). Trade theorists have attempted to connect the gravity model to key elements in trade theory. The standard assumption of the Heckscher Ohlin (H-O) model that prices of traded goods are the same in each country has proved to be faulty due to the presence of what trade economists call 'border effects'; accounting for these costs requires prices of traded goods to differ among the countries of the world.

First attempt was made by (Anderson, 1979) who derived a gravity model from a linear model of expenditures using Armington assumption (that is, goods differentiated by country of origin). By specifying demand in these terms, Anderson helped to explain the presence of income variables in the gravity model, as well as their multiplicative (or log-linear form). Later on, (Bergstrand *et al.*, 2007) addressed the role of multilateral prices. Another attempt was made by (Helpman & Krugman, 1985) and (Bergstrand, 1985) using monopolistic competition model approach. Here, the product differentiation by country of origin approach was replaced by product differentiation among producing firms, and the empirical success of the gravity model considered to be supportive of the monopolistic competition of intra-industry trade. (Berdahl, 2010) built on the work of Anderson and monopolistic competition, but used existing price indexes instead of those derived through theory.

However, (Deardorff, 1998) showed that the gravity model could be derived from the H-O model based on comparative advantage and perfect competition if it is properly considered. According to him, absence of all barriers to trade in homogenous product causes producers and consumers to be indifferent to the trading partners, both domestic and foreign, so long as they buy or sell the desired goods. Based on this assumption, he derived the expected trade flows that correspond exactly to the simple frictionless gravity equation whenever preferences are identical (Makochekanwa & Jordan, 2008).

Anderson and van (Bacchetta & Van Wincoop, 2003) enhanced the theoretical foundations of the gravity model equation to emphasize the importance of accounting properly for the endogeneity of prices. Though elegant, the model assumed symmetric bilateral trade costs to generate an estimable set of structural equations (Bergstrand *et al.*, 2007). The most recent attempt was by (Helpman, Melitz, & Rubinstein, 2008) who derived the gravity equation from heterogeneous firm model of trade (Saing, 2009).

To Krugman *et al* (2012), the gravity model works because large economies tend to spend large amounts on imports because they have large incomes. They also tend to attract large shares of other countries' spending because they produce a wide range of products, and have large domestic market. So the trade between any two economies is larger, the larger is either economy.

From the theoretical literature the study adopted Gravity model of trade because of its ability to capture the variables of the study and its robustness in explaining regional trade agreements (RTAs).

2.2. Empirical Literature Review

2.2.1 Foreign Direct Investment

Soliman (2003) used gravity equation specification to test the sensitivity of exports to FDI inflows while examining the effect of FDI activity on manufacturing exports in four MENA countries (Egypt, Morocco, Tunisia and Turkey). The paper examined the effect of two measures of FDI activity, FDI stock and inflows on manufacturing exports in four MENA countries. The main findings of the investigation suggested that FDI activity had a positive effect on manufacturing exports. This magnitude of the effect, however, is too small to generate any significant increase in the share of manufacturing exports in total merchandise exports. Although the study focused on manufactured exports and a panel that included three African Countries, the study area falls outside the COMESA region thus its results cannot be generalized to the region hence the need for a study focusing on COMESA region.

Sekkat (2012) investigated the evolution and determinants of manufactured exports and foreign direct investment (FDI) in 11 southern Mediterranean countries over the period 1985–2009. The econometric analysis using gravity model confirmed the role of exchange rate depreciation, the openness of the economy and the quality of institutions and infrastructure in fostering manufactured exports and FDI inflows in the region. The econometric analysis

confirmed the role of exchange rate depreciation, the openness of the economy and the quality of institutions or infrastructure in fostering manufactured exports. Similarly, the estimations showed that greater openness of the economy, the availability of infrastructure and better quality institutions increase the attractiveness of countries with respect to FDI. The finding implies that vigilance with respect to the progress in reforms was crucial.

Aitken, Hanson, & Harrison (1997) estimated a probit model using the plant level cross section data on Mexican manufacturing firms for the period 1986-89 to find the probability that a firm export. They found that export activities by FDI positively influenced the export performance of Mexican firms. (Kokko, Zejan, & Tansini, 2001) examined the decision to export by domestic firms in Uruguay using a cross sectional firm level data for 1998. They found that domestic firms are more likely to export if they operate in sectors where the presence of foreign firms is relatively high. (Greenland & Lopresti, 2016), using data on a large panel of firms in the U.K to identify the possible transmission mechanism for export spillovers and its effects on the export decision of domestic firms, found positive spillover effects on U.K owned firms as well as on their export propensity. (Barrios, Görg, & Strobl, 2003) examined the importance of firm's own Research and Development activity and intra-sectoral spillovers on the decision to export and export intensity using firm level panel data for Spain for the period 1990-98. They found little evidence of export spillovers to local firms from the existence of Multinational enterprises (MNEs). Whereas this study use probit model in our study we adopted gravity model.

Wang *et al.* (2010) carried out an econometric analysis using Gravity Model and data for the period 1983-2002, while examining the relationship between inward foreign direct investment (FDI) and export performance in China. The results indicated that FDI promotes exports by foreign as well as domestically-owned firms, and that this effect is strongest for labor-intensive industries. Empirically, a number of studies found overall effects of FDI on

export performance of the host country to be positive. Studies made in China indicate that increased levels of FDI positively affect Chinese manufacturing export performance (Sun, 2001; Zhang & Song, 2001). However, this success is attributed to the fact that FDI in China has largely been export oriented. Similar findings have been observed by (Barry & Bradley, 1997) in Ireland. (Athukorala & Menon, 1995) studied the role of export oriented FDI in Malaysia's manufactured exports. The relationship between inward FDI and manufactured exports for a cross section of 52 countries was investigated by the (Bende-Nabende, Ford, Santoso, & Sen, 2003) and found a significant positive relationship. The relationship is stronger for developing countries than for developed countries and in high than in low-tech industries.

Wongpit (2014) examined the impact of FDI on manufacturing export and to investigate whether FDI substitutes or complements manufacturing export from source countries to Thailand. The extended gravity model was the main model in the paper; estimation was done using fixed effect and random effect models on pooled panel data. The results showed that FDI had a positive impact on manufacturing export from Thailand to other countries. From the analysis above, no study was found on FDIs on manufacturing exports in Africa and the many studies done were inconclusive in the results and different methodologies used.

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since many sub-groups under the manufacturing industry have comparative advantage. This study looked at FDIs in regional trade context outside COMESA.

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owned firms as well as on their export propensity. (Kneller & Pisu, 2007) also found similar results using two steps Heckman selection model. The results indicate that the decision to export is positively associated with the presence of foreign firms in the same industry and region and export oriented foreign affiliates generate stronger export spillovers. (Barrios *et al.*, 2003) examined the importance of firm's own R&D activity and intra-sectorial spillovers on the decision to export and export intensity using firm level panel data for Spain for the period 1990-98. They found little evidence of export spillovers to local firms from the existence of MNES Multinational enterprises.

A study made by (Goswami & Saikia, 2012) examined the relationship between FDI and export performance using the tobit model for the period 1996-2000 and found that liberalized regime has enhanced the export role of foreign affiliates. (Sharma, 2000) examining the determinants of export growth concluded that although the effect of FDI on export supply is positive it is not significant. (Zhang, 2005) has tried to place proper emphasis on the role of FDI in the export promotion by studying the china's economy using gravity model. He stated in his findings that China's export boom was accompanied by substantial inflows of foreign direct investment (FDI) and china brings the 32nd in 1978 to the 3rd largest exporting country in the world in 2004. (Prasanna, 2010) confirmed in his work that in a globalizing world, export success can serve as a measure for the competitiveness of a country's industries and lead to faster growth. Recently, a much optimistic view on the role of Foreign Direct Investment (FDI) on export performance in the host country has evolved. (Rahmaddi & Ichihashi, 2013) investigated the impact of foreign direct investments on Indonesian manufacturing exports using panel data for the period 1990-2008. The results showed that FDI positively affects manufacturing exports and that it is an important factor determining the rapid growth of manufacturing exports. . The above studies were done using a probit and

tobit models respectively which might not give us a true reflection of the results, this study used a gravity model of international trade within COMESA RTA.

Vukšić (2005)studied the impact of foreign direct investment on Croatian manufacturing exports using the Gravity Model and panel data for 21 manufacturing industry sectors over the period between 1996 and 2002, he concluded that FDI positively and significantly affected exports, but the extent of this impact was relatively low. (Sun, 2001) looks at the different impact of foreign investment on exports in three regions of China in a period from 1984 to 1997, and thus implicitly takes the specific initial conditions of the individual regions into account. He uses a panel data econometric model and finds that the effects of FDI on export performance vary across the three regions. The impact is positive and the strongest in the coastal region. In the central part of China, it is weaker, but still positive and significant, while in the western region it is insignificant. Zhang and Song (2001) address the same research question in China at the provincial level in the period from 1986 to 1997 with a somewhat different empirical specification. Using the panel data model, they also find that higher levels of FDI are consistent with higher provincial exports. The above studies were done in Croatia and China which have high level of development. A study in COMESA would give us an idea of what happens in developing countries in relation to FDI and manufacturing exports.

Samargandi, Fidrmuc, & Ghosh(2014) examined the role of FDI on export growth of Saudi Arabia. Using Johansen's Cointegration method, the paper finds a stable long run positive relationship between FDI and export growth. The result of VEC model shows that export has positive and significant relations with FDI, GDP and price of export. This result is also supported by VEC Granger causality/Block Erogeneity Wald test. The dynamic interaction of export with GDP, price of exports and FDI has been investigated using the variance decomposition ratio and impulse response function. The result of variance decomposition

ratio reveals that during the initial years, FDI dominates to cause variation in export, but later on overtaken by change in price variable.

While the empirical evidence of FDI's effects on host-country foreign trade differs significantly across countries and economic sectors, a consensus is nevertheless emerging that the FDI-trade linkage must be seen in a broader context than the direct impact of investment on imports and exports. The main trade-related benefit of FDI for developing countries lies in its long-term contribution to integrating the host economy more closely into the world economy in a process likely to include higher imports as well as exports. In other words, trade and investment are increasingly recognized as mutually reinforcing channels for cross-border activities. However, host-country authorities need to consider the short and medium-term impacts of FDI on foreign trade as well, particularly when faced with current-account pressures, and they sometimes have to face the question of whether some of the foreign-owned enterprises' transactions with their mother companies could diminish foreign reserves.

As countries develop and approach industrialized nation status, inward FDI contributes to their further integration into the global economy by engendering and boosting foreign trade flows (the link between openness to trade and investment (OECD, 2002). Apparently, several factors are at play (OECD, 2002). They include the development and strengthening of international networks of related enterprises and an increasing importance of foreign subsidiaries in MNEs' strategies for distribution, sales and marketing. In both cases, this leads to an important policy conclusion, namely that a developing country's ability to attract FDI is influenced significantly by the entrant's subsequent access to engage in importing and exporting activities (OECD, 2002).

This, in turn, implies that would-be host countries should consider a policy of openness to international trade as central in their strategies to benefit from FDI, and that, by restricting imports from developing countries, home countries effectively curtail these countries' ability to attract foreign direct investment. Host countries could consider a strategy of attracting FDI through raising the size of the relevant market by pursuing policies of regional trade liberalization and integration (OECD, 2002).

Host countries' ability to use FDI as a means to increase exports in the short and medium term depends on the context. The clearest examples of FDI boosting exports are found where inward investment helps host countries that had been financially constrained make use either of their resource endowment (e.g. foreign investment in mineral extraction) or their geographical location (e.g. investment in some transition economies). Targeted measures to harness the benefits of FDI for integrating host economies more closely into international trade flows, notably by establishing export-processing zones (EPZs), have attracted increasing attention. In many cases they have contributed to a rising of imports as well as exports of developing countries (OECD, 2002). However, it is not clear whether the benefits to the domestic economy justify drawbacks such as the cost to the public purse of maintaining EPZs or the risks of creating an uneven playing field between domestic and foreign enterprises and of triggering international bidding wars. Recent studies do not support the presumption that lesser developed countries may use inward FDI as a substitute for imports. Rather, FDI tends to lead to an upsurge in imports, which is often gradually reduced as local companies acquire the skills to serve as subcontractors to the entrant MNEs.

The ability of FDI to contribute to developing export capabilities depends on context. Export processing zones may be a tool for closer integration into world trade, but they come at a cost (OECD, 2002).

From the literature review above, few studies have been done on the extent on the magnitude of the effect of FDI on manufacturing exports in COMESA. In most of the available literature it's the effect of FDI on general exports and not necessarily on manufacturing exports the little that has been done, shows different results, some indicate positive relationship while others negative. Some however do find it being positive but not significant. These variations therefore warrant a need for further study in the area. Furthermore, there is no study that dwells on FDI on manufacturing exports within COMESA.

2.2.2 Human Capital Development

Emily Blanchard and William Olney (2014) investigated how educational attainment (Human capital development) responds to exogenously driven changes in the pattern of a country's exports and uses the results to gain insight into how investment in human capital responds to the pattern of production across different sectors. They construct a panel data set that spanned 104 countries and 45 years and used Gravity model approach that utilizes bilateral trade data to identify the variation in exports that was unrelated to domestic factors. The results indicated that educational attainment decreased with agricultural exports, decreased with unskilled intensive manufacturing exports, and increased with skill-intensive manufacturing exports. They found that the results were strongest where it was most expected, and were robust to a variety of extensions and sensitivity checks. The findings carried important policy implications. First, while the benefits of international trade were often stressed the more complex question of what types of exports are most beneficial for human capital accumulation were examined. Since most countries were already integrated into world markets, the relevant policy question was how best to engage in trade with the rest of the world; the results suggested that exporting skill-intensive goods had important long-run benefits via an empirically demonstrated increase in human capital. Although the study

focused on panel analysis none of the Countries considered are from the COMESA region thus its results cannot be generalized to the region hence the need for a study in the region.

Accordingly, they found empirical support for the concern voiced by (Bajona & Kehoe, 2010) and others that trade may exacerbate economic differences across countries through its impact on educational attainment. The results provided evidence that less developed countries that export low skill-intensive goods may see a decline in average educational attainment. To the extent that human capital is a key driver of economic growth, as demonstrated yet again in compelling terms by Jones (2014), this mechanism may undermine the development process. The same logic suggests that developed countries that export skill-intensive goods may continue to experience an increase in educational attainment that would reinforce initial economic advantages. These implications are striking and warrant additional research.

There are studies that attempt to control for the individual characteristics of workers employed by exporting firms by using matched firm and worker data. (Schank *et al.*, 2007) and Wagner (2007) and (Munch & Skaksen, 2008) examined the export wage premium in Denmark and Germany respectively. Both found that the exporting wage premium was associated with export intensity rather than merely export participation. Munch and Skaksen (2008) find that when interacted with firm-level skill intensity much of the direct impact of exporting is absorbed. They therefore argue that exporting firms increase their use of highly educated labor force to differentiate their products and avoid intense competition in lower wage international markets.

Fafchamps (2009) investigated the export wage premium in Morocco. The study found out that although Moroccan exporters do pay more, much of this relationship can be explained by the fact that they have a larger workforce and use more capital. He further finds that there is no evidence that educated workers receive a higher education premium relative to uneducated

workers when working for exporters. He argues that this provides circumstantial evidence that Moroccan export success is linked to an abundant supply of cheap, uneducated female labour. Given that Spain and the European Union are important export markets for Moroccan goods it seems that standard comparative advantage accounts better for the Moroccan experience than trade models that emphasize human capital and technology transfer. Milner and Tandrayen (2007) found a positive relationship between export status and individual earnings among workers in firms in six Sub-Saharan African countries. However, once they disaggregate by export destination, they found that exporting outside of Africa generates a negative wage premium whereas exporting within Africa generates a positive wage premium.

They argue that one explanation for this may be that African markets are generally more protected by regional trade policy and natural barriers and are therefore less competitive. The competitive pressure in international markets keeps wages low but this disciplining effect does not occur in the less competitive regional market. (Verhoogen, 2008) and Brambilla, Lederman and Porto (2009) explore the quality upgrading hypothesis formalised in the Verhoogen paper. Using panel data at the plant level Verhoogen exploits the devaluation of the Mexican peso in December 1994 to show that quality upgrading induced by the exchange-rate shock increased within industry wage inequality. Brambilla, Lederman and Porto (2009), posit that export destination and quality (and thus wages) are related. They argue that exporting to high income destinations requires quality upgrades that are skill-intensive and that lead to firms offering higher wages to skilled workers. They test this hypothesis using a panel of Argentinean manufacturing firms and the Brazilian devaluation of 1999 as an identification strategy. They find that only firms exporting to high-income countries pay higher wages than firms exporting to neighboring countries or those focused on the domestic market.

Fafchamps (2009) did a study on human capital, exports, and earnings. In his paper he tests whether manufacturing exporters pay more to educated workers in an effort to ascertain whether the productivity of human capital is raised by exports (Fafchamps, 2009). Using a panel of matched employer-employee data from Morocco, he found no evidence that the education wage premium is higher in exporting sectors and firms. Although exporters pay more on average, much of the wage differential could be explained by the fact that exporters had a larger workforce and more capital. Educated workers who start working for an exporter did not experience a larger wage increase relative to their previous job. He found a mild positive association between exports, technology, and product quality, part of which is due differences in firm size.

Baumgarten (2013), used a linked employer-employee data set of the German manufacturing sector, He analyses the role of exporting establishments in explaining rising wage dispersion (Baumgarten, 2013). Over the period of analysis (1996-2007), the raw wage differential between exporters and domestic establishments increased substantially, which can only partly be attributed to corresponding changes in human capital endowments and the returns to them. The findings were consistent with heterogeneous firm trade models that featured an exporter wage premium as well as variability of the premium with respect to increasing trade liberalization. Decomposition analysis showed that the increase in the conditional wage gap indeed contributed to rising wage inequality both within and between skill groups. In contrast, the growing employment share of exporters contributed to a reduction in wage dispersion.

Blanchard & William(2017) in his study on "Globalization and Human Capital Investment: Export Composition Drives Educational Attainment" concludes that Human capital is among the most important drivers of long-run economic growth, but its macroeconomic determinants are still not well understood (Blanchard, Smith, & Nguyen, 2013). His paper demonstrated

the importance of a key demand-side driver of education using exports as a lens to study how shifting patterns of production affect subsequent educational attainment. Using a panel of 102 countries and 45 years, He found that growth in less skill-intensive exports depresses average educational attainment while growth in skill-intensive exports increases schooling. His results provided insight into which types of sectoral growth are most beneficial for long-run human capital formation and suggest that trade liberalization could exacerbate initial differences in factor endowments across countries. Employing Mexican micro-level data (Aitken 2015) finds that the arrival of less-skilled export manufacturing jobs increases school dropouts at age 16.

Levin (1997) Using a panel of 30 semi-industrialized developing nations over the period 1965–84, the analysis found the same sensitivity to changes in sample period, selection of countries, and explanatory variables that had been apparent in earlier studies. However, the analysis yielded strong and robust evidence that this sensitivity is due to an interaction between average education and export orientation, which had been neglected by previous studies. The results indicated a high degree of complementarity between trade policies and education expenditures and provide new empirical support for the hypothesis that export orientation contributes to economic growth through increasing returns to scale and other sectoral productivity differentials and not merely by relaxing import capacity constraints. In addition, it was found that growth in the manufactured exports/GDP ratio has a strong influence on economic growth, whereas growth in the ratio of primary commodity exports to GDP had a negligible influence, indicating that increasing returns and other efficiencies are mainly concentrated within the manufactured export sector. These findings provide further support for development policies that stimulate long-run economic growth by simultaneously promoting investment in human capital as well as investment in the manufacturing export sector.

Fonchamnyo (2014) carried out the study on determinants of export propensity and intensity of manufacturing firms in Cameroon and his empirical findings on the one hand showed that human capital; years of experience, turnover, and modernization have positive effect on both the likelihood to export and on the export intensity (Fonchamnyo, 2014). On the other hand, insecurity and power outage had a detrimental effect on export performance. The results also pointed to the fact that many of the firms were labour intensive firms, taking advantage of the abundant cheap labour in the country. Liu (2004) in their study on the intensity of export revealed that productivity did not play a statistical significant role in influencing the quantity of goods exported. This result was also established by (Castellani, 2002) when studying the factors influencing the level of export by manufacturing firms in Italy. In the study of firms from (Martin & Rice, 2012) found out that the effect of productivity was heterogeneous for export oriented and domestic firms. A set of studies meanwhile have shown empirically that Human capital has a positive and statistical significant effect on the level and likelihood to export. For instance, in a study by Iyer (2010) on the level of export of New Zealand Agriculture and Forestry industry, it was shown that the productivity of firms influence the quantity exported by firms. This result is also supported by (Alvarez & López, 2008) in the study of Chilean firms and by (Arnold & Hussinger, 2005) in their study of the role of productivity on the level of exports in the manufacturing sector in Germany. Most of the above studies have been done at firm context on human capital, a study in RTA on manufactured exports, would add to the body of knowledge

Gashi, (2014), following the propositions of firm internationalization theories including the Melit'z dynamic model of export participation, investigated the effects of human capital on the export decisions of Kosovo's firms. Using a unique dataset of around 500 Small and Medium Enterprises, econometric estimates show mixed indications regarding the relationship between the propensity to export and longevity in export markets and human

capital variables, measured by the education of the workforce, and investment in training. While education generally has a negative effect on exporting decisions, the latter shows a consistent positive effect.

A number of studies have been done on Human capital development with respect to exports and trade. Several studies on wage premiums as a variable of human capital developments have been done but limited number of studies exists on the other determinants of HCD i.e. education and health. Furthermore, the results obtained from the studies vary from one region to the other. None however were found to have taken a study on HCD with respect to manufacturing exports in COMESA trade bloc.

2.2.3 Infrastructure Development

A study done by (Tong *et al.*, 2014) analyzed the dynamic relationships among transport infrastructure, economic output, and exports in the United States using the VAR approach developed by (Toda & Yamamoto, 1995). The results can be summarized as follows. First, in contrast to some previous studies supporting a direct economic impact of transport infrastructure, results from both Granger causality tests and generalized impulse response functions in the study did not suggest a direct effect of transport infrastructure on aggregated economic output, while causality from economic output to transport infrastructure formation was observed.

Second, aggregate non-transport infrastructure capital (e.g., educational structures, power, sewer and water systems, and residential, office and commercial structures), excluding national defense, had sustainable positive effects on economic output and exports over several years. Third, evidence showed that both transport and non-transport public infrastructure Granger cause aggregated exports. Fourth, impulse response functions suggested that economic output and exports react to each other immediately. Finally, results

suggest that the development of non-transport infrastructure capital creates multiple-year positive impacts on private capital formation and employment.

Similar to (Cullison, 1993), the findings suggested that expanding transport infrastructure capital, represented by highways and streets, provides relatively short and indirect impacts on aggregated economic output compared to expanding non-transport public infrastructure. The relatively vague economic impact of transport infrastructure capital found in the study was of little surprise, since a developed economy, where substantial highway and street infrastructure already exists, may experience a weaker influence of transport infrastructure investment than observed in developing economies (Talley, 1996). Also, public transport infrastructure, such as interstate highways, may only affect the spatial allocation of economic activity, leaving the total net economic impact unaffected (Chandra & Thompson, 2000). This finding does not suggest overlooking the contribution of transport infrastructure capital, since both causality tests and impulse response functions implied that improving road systems and enhancing accessibility affected the formation of both non-transport public infrastructure capital and private capital, which have positive impacts on economic output. The above studies were done using VAR approach of analysis in relation to exports and infrastructure, a gravity model approach would give an insight in this study.

Daviron & Ponte(2005) used a new panel dataset for 124 developed and developing countries, available for the period 2003-04, to assess the impact of trade facilitation and other trade-related institutional constraints on manufacturing export performance with particular reference to Africa. He estimated a standard gravity model augmented with trade facilitation, regulatory quality and infrastructure indicators, and control for endogeneity and remoteness. On a comparative basis, Sub-Saharan Africa (SSA) has been shown to lag behind other regions in providing investment and business environment that is conducive to private sector development. In the context of trade performance, it is argued that Africa can be

characterized as a high cost and high risk environment that constrains private sector investment and tradable production.

This constraint is particularly severe on manufacturing, and has held responsible for reducing Africa's international competitiveness and acting as a brake on diversification into manufactured exports. Trade facilitation, defined as reducing the transaction costs associated with the enforcement, regulation and administration of trade policies, has been at the forefront of discussions on policy measures for reducing the costs of producing for export in developing countries. The results of the study showed that trade facilitation reforms can indeed contribute to improved export performance in Africa. But other reforms, including the quality of the regulatory environment and the quality of the basic transport and communications infrastructure are also needed and are often more important than on the border trade facilitation reforms in facilitating export growth.

Bougheas, Demetriades, & Morgenroth (1999) have analyzed the effects of infrastructure on exports through its influence on transport costs. By endogenizing transport costs and infrastructure formation their findings predict that for pairs of countries for which it is optimal to invest in infrastructure, a positive relationship between the level of infrastructure and the volume of trade takes place. Using a gravity model they provide evidence from European countries. Portugal-Perez and (Wilson *et al.*, 2003) assessed the impact of four indicators related to trade facilitation—physical infrastructure, ICT, border and transport efficiency, and the business and regulatory environment—on the export performance of 101 developing economies. Unlike previous studies that used principal component analysis, this study used factor analysis to derive the aggregate indicator. Accordingly, physical infrastructure was found to have the greatest impact on exports. In addition, utilizing a gravity model approach, (Hernandez & Taningco, 2010) addressed behind-the-border measures that influenced bilateral trade flows in East Asia, such as telecommunications

services, quality of port infrastructure, time delays in trade, and depth of credit information. They noted that their impacts varied across sectors or product groups.

Studies that have applied the gravity model also emphasized the crucial role of infrastructure on trade. (Shepherd & Wilson, 2008) discovered that export flows in Southeast Asia were affected by transport infrastructure, mainly ports and ICT. (Hoekman & Nicita, 2008) found that poor roads and ports, poorly performing customs agencies and procedures, weakness in regulatory capacity, and limited access to finance and business services affected exports. (Wilson, Mann, & Otsuki, 2005), when extending the gravity model to trade facilitation measures and to a larger sample of 75 economies, posited that port efficiency and the proxies for infrastructure quality for the services sector, such as the use, speed, and cost of the internet, significantly affected export flows. (Wilson *et al.*, 2003) also found that that improving port and airport efficiency could positively impact intra-APEC trade on exports. (Bougheas *et al.*, 1999), in developing a gravity model to analyze the effect of infrastructure on the volume of trade via its influence on transport costs, found that infrastructure had a significant and positive relationship to the level of infrastructure and the volume of trade. As a result, differences in transport costs among economies may highlight differences in their ability to compete in international markets. Furthermore, differences in the volume and quality of infrastructure may account for differences in transport costs and, hence, variations in competitiveness. Better transport services and infrastructure improve international market access and increase trade.

Limao & Venables(2001) employed a gravity model similar to that developed by (Bougheas, Demetriades & Morgenroth,(1999) which included dummy variables representing possibilities of transit. Infrastructure was measured by variables including paved and unpaved roads, railways, and telephone lines. Infrastructure was found to be an important factor in determining transport costs, especially for landlocked countries. They estimated that

differences in infrastructure accounted for 40% of transport costs for coastal countries and 60% for landlocked countries.

A study by(Limao et.al 2001), (Nordås & Piermartini, 2004) investigated the role of infrastructure on trade in the clothing, automotive, and textile sectors. Indicators included the quality of airports, roads, ports, and telecommunications, and the time required for customs clearance. In addition, it incorporated bilateral tariffs. Their study proved that trade performance was significantly affected by infrastructure quality, especially port efficiency. Timeliness was more significant for export competitiveness in the clothing sector, while access to telecommunications in the automotive sector was more significant. It also concluded that, even after the quality of infrastructure was included, distance remained a significant factor.

Djankov, Freund, & Pham(2010) claimed that infrastructure directly affected transport costs by influencing the type of transport used and delivery time of the goods. By using data on time to export and import, they estimated the impact of delays on trade, showing that trade decreased by at least 1% for every extra day taken to move goods from the warehouse to the ship, comparable to an increase in the distance of an economy from its trading partner by 70 kilometers. (Anderson & Van Wincoop, 2011) demonstrated that trade costs were equivalent to a 170% ad-valorem tax for industrial economies. They estimated that transport costs were equivalent to 21% of 170% total trade in industrialized economies, while border-related barriers represented 44%, and distribution costs represented 55%. Time cost was particularly significant for perishable or other time-sensitive goods. (Hummels & Schaur, 2012) discovered that the time cost of 1 day in transit for United States imports was equivalent to an ad-valorem tariff rate of 0.8%, suggesting a corresponding 16.0% tariff rate on an average trans-Pacific shipment of 20 days. Thus, improvements in infrastructure services that reduce

delays in transit times, border-crossing procedures, or ports affect an economy's propensity to export.

Only a few studies have investigated ICT's effect on trade flows, such as (Findlay & Kierzkowski, 2005), which revealed that that the high cost of making a telephone call had a significant negative effect on bilateral trade flows. Further, the impact of ICT was greater for trade of differentiated products than on trade of homogenous products. (Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004) found that ICT was particularly important for trade-in services due to its high dependence on well-developed infrastructure in both exporting and importing economies. (Francois & Manchin, 2007), by using principal components to construct two indicators on infrastructure and institutional quality, found that institutional quality, along with transport and communications infrastructure, was a significant determinant for an economy's export levels as well as for prospective exports. The results support the belief that export performance depends on institutional quality and access to communications and transport infrastructure. In addition, (Sekkat, 2012) observed a positive relationship between poor institutional quality and low-quality manufacturing exports.

A study done by Tingting et al., (2014) analyzed the dynamic relationships among transport infrastructure, economic output, and exports in the United States using the VAR approach developed by Toda and Yamamoto (1995). The results can be summarized as follows; First, in contrast to some previous studies supporting a direct economic impact of transport infrastructure, results from both Granger causality tests and generalized impulse response functions in the study did not suggest a direct effect of transport infrastructure on aggregated economic output, while causality from economic output to transport infrastructure formation was observed. Similar to Cullison (1993), the findings suggested that expanding transport infrastructure capital, represented by highways and streets, provides relatively short and

indirect impacts on aggregated economic output compared to expanding non-transport public infrastructure. The relatively vague economic impact of transport infrastructure capital found in the study was of little surprise, since a developed economy, where substantial highway and street infrastructure already exists, may experience a weaker influence of transport infrastructure investment than observed in developing economies (Talley 1996). Also, public transport infrastructure, such as interstate highways, may only affect the spatial allocation of economic activity, leaving the total net economic impact unaffected (Chandra and Thompson 2000). This finding does not suggest overlooking the contribution of transport infrastructure capital, since both causality tests and impulse response functions implied that improving road systems and enhancing accessibility affected the formation of both non-transport public infrastructure capital and private capital, which have positive impacts on economic output.

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On a comparative basis, Sub-Saharan Africa (SSA) has been shown to lag behind other regions in providing investment and business environment that is conducive to private sector development. In the context of trade performance, it is argued that Africa can be characterized as a high cost and high risk environment that constrains private sector investment and tradable production. This constraint is particularly severe on manufacturing, and has held responsible for reducing Africa's international competitiveness and acting as a brake on diversification into manufactured exports. Trade facilitation, defined as reducing the transaction costs associated with the enforcement, regulation and administration of trade policies, has been at the forefront of discussions on policy measures for reducing the costs of producing for export in developing countries. The results of the study showed that trade facilitation reforms can indeed contribute to improved export performance in Africa. From the analysis the results for infrastructure development on exports were not conclusive furthermore few studies have been done in Africa on manufacturing exports and regional markets relating to infrastructure.

Several studies have been conducted on the effects of infrastructure on economic growth and bilateral trade. Most of the results from various studies indicate some consistency; unfortunately, the studies are based majorly on the developed economies of United States, Germany and some, lately on China. There are few studies on ID known to the study that have been done in Africa, especially sub Saharan Africa, but not COMESA. The results on the effect of ID on manufacturing exports could be varying as one move from the developed world to less developed and developing world. It is therefore important to have a study too on the effect of ID on manufactured exports in COMESA.

2.3 Summary of Literature Review

The reviewed literature covering FDI indicates that most of the studies used regional specific data (Soliman, 2003), (Sekkat, 2012), (Sharma, 2000) country specific (Wongpit, 2014), (T. Wang & Watson, 2008), (Zhang & Song, 2002), (Zhang, 2005), (Athukorala & Menon, 1995), manufacturing firms (Atkinson, Donev, & Tobias, 2007), (Kokko *et al.*, 2001); (Greenland & Lopresti, 2016), (Kneller and Pisu, 2007) research and development (Barrios *et al.*, 2003). It is clear that literature on the effect of FDI has been given scanty attention by researchers except some few like Vuksic (2005).

Similarly, from the reviewed literature it is clear that very few studies have attempted to examine the relationship between manufactured exports and human capital development. Some panel and cross-section studies have been done, but mostly COMESA countries has not been included. This study examines the effect of human development on Kenya's manufactured exports to COMESA region to fill the gap.

Different methodologies have been used to estimate the effect of infrastructural development on manufactured exports (see for instance Tinting 2014; Toda and Yamamoto; that employed VAR model, Tomasz 2007; Portugal-Perez, 2012; (Wilson *et al.*, 2005) and (Wilmsmeier &

Martinez-Zarzoso, 2010) employed panel data and (Francois & Manchin, 2007) employed principal component analysis. The current study extents such studies by employing gravity equation and panel data analysis to determine the effect of foreign direct investments, human capital development and infrastructure development on Kenya's manufactured exports to COMESA region thus shedding more light as opposed to the literature that has been reviewed which gave inconclusive results.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section discusses research design, Study area, target population, data collection, model specification, measurement of variables, data analysis, unit roots tests, and selection of the estimation method and panel diagnostic tests.

3.2 Research Design

Research design is a set of methods and procedures used in setting and analyzing measures of variables as specified in the problem of research. A design of a study defines the study type, research problem, methods of data collection and statistical analysis. It is a framework that has been created to find answers to research questions. Correlational research design was used to show relationship between study variables. It provides empirical evidence suggesting two or more variables are related and also the direction of relationship.

3.3 Study Area

The study covered COMESA member countries which are 18 in number. They include Burundi, Comoros, Democratic Republic of Congo, Djibouti, Egypt, Eswatini (formerly Swaziland), Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Sudan, Uganda, Zambia, Zimbabwe. The map of the study area is shown in APPENDIX 5.

3.4 Target Population

Purposively, all COMESA countries were selected for this study. Eritrea was not included due to lack of data and this brought the total number of countries to 18 including Kenya. The target period was from 2005 to 2016 (12 Years) 216 observations.

3.5 Model Specification

Empirical model used closely followed the one used by (Gilbert, Scollay, & Bora, 2001). The model among other things was to find out whether RTA membership was likely to produce

trade creation (this was carried out using dummy variables to capture participation in RTAs). A sample of 18 countries who are Kenya's trading partners (Kenya included) was included in the study. By modifying model (1.5) to introduce the variables of FDI, HCD and ID and following Gilbert *et al.* (2001), the empirical model used in this study is specified as follows:

$$LnMXP_{ijt} = \alpha_{ijt} + \beta_1 \ LnFDI_{ijt} + \beta_2 LnHCD_{ijt} + \beta_3 LnID_{ijt} + \beta_4 LnD_{ijt} + \beta_5 DVNC_{ijt} + \beta_6 DVCC_{ijt} + \nu_{ijt} + \varepsilon_{it} \quad \ldots\ldots (3.1)$$

Where: Ln denotes in natural logs. α_{ij} is a constant. FDI_{ij}, HCD_{ij} and ID_{ij} are the variables of the study as per the objectives, D_{ij} is the distance from country i (exporting country-kenya) to j (importing COMESA member country) at time *t*. Two dummy variables were introduced; DVCC and DVNC, $\beta_s$are the estimate coefficients. The error term was decomposed into ε_{ij} which denoted the unobservable individual specific effect and ν_{ijt} being the stochastic error term which changes across time and cross-section.

The expected signs of coefficient of D_{ijt} is negative while FDI_{ijt}, HCD_{ijt}, ID_{ijt} are all positive. The coefficients of variables in logarithmic form are interpreted as elasticities, that is, proportionate change inMXP_{ijt} due to a unit change in these variables.

Distance (in kilometers between Kenya's capital city and that of trading partner) between two countries was an important factor in determining geographic pattern of trade and was used as a proxy for transaction costs. Trade is meaningful to a country if gains from trade are higher than the costs incurred in realizing those gains. The larger the distance, the higher the transaction costs. A negative relationship was expected between trade flows and distance. Beyond some distance, transaction costs may be such that trade does not increase.

The first dummy variable which is neighboring countries (DVNC) takes the value of one when the country is a neighbor to Kenya and zero otherwise, the second dummy variable (DVCC) which is common colony takes the value of one if both countries were colonized by the same colonizer and zero otherwise. A positive coefficient is expected.

3.6 Measurement of Variables and Data Sources

Kenya's Manufacturing Exports (MXP) -Manufacturing is the value-added production of merchandise for use or sale using labor and machines, tools, chemicals and biological processing. This data was obtained from Kenya national bureau of statistics (KNBS) statistical abstracts. It is measured in US dollars.

Foreign Direct Investment (FDI) inflows: This is the total annual inward flow of FDI. FDI flows is defined as investments that acquire a lasting management interest (10 percent or more of voting stock) in a local enterprise by an investor operating in another country. Such investment is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments and both short-term and long-term international loans. Data on FDI inflows to Kenya was sourced from the World Bank, World Development Indicators online database valued in US dollars.

Human Capital Development (HCD): This measures the standards of living in a country in terms of Health, Education and Life Expectancy. This was obtained from the United Nations Development program website. It is measured as an index. For purposes of getting logarithms it was standardized by multiplying by factor of one hundred.

Infrastructure Development (ID): This refers to the stock and quality of roads, streets, and highways, rail lines, airports and airways, ports and harbors, waterways and other transit systems to facilitate the movement of goods and enable people to access internal and global markets. A higher rating indicates a better infrastructure. Better infrastructure should lead to

higher trade and therefore more exports from Kenya. This data was sourced as a percentage index, from the African Development Bank online database.

Distance (DIS): This is the geographical distance between the economic centers (i.e. capital cities) in Kenya and its trading partners, measured in kilometers (km) as the bird flies. Data on distance was sourced from an online distance calculator website, World Bank Statistics. Data used for all the variables is shown in Appendix 7.

3.7 Data Analysis

The study estimated a gravity model using panel data econometrics techniques. The types of data that are generally available for empirical analysis, namely, time series, cross section, and panel. In time series data we observe the values of one or more variables over a period of time for instance, GDP for several quarters or years. In cross-section data, values of one or more variables are collected for several sample units, or entities, at the same point in time (crime rates for 50 states in the United States for a given year). In panel data the same cross-sectional unit (say family or a firm or a state) is surveyed over time. In short, panel data have space as well as time dimensions (Greene, 2007).

There are other names for panel data, such as pooled data (pooling of time series and cross-sectional observations), combination of time series and cross-section data, macro-panel data, longitudinal data (a study over time of a variable or group of subjects). Although there are subtle variations, all these names essentially connote movement over time of cross-sectional units (Gujarati, 2007). The study therefore used the term panel data in a generic sense to include one or more of these terms.

The PMG estimator which was developed by (Pesaran, Shin, & Smith, 1999) offers a new technique for estimating nonstationary dynamic heterogeneous panels, and it relies on a combination of pooling and averaging of coefficients across groups (Francois & Manchin,

2007). Before running the data stationarity by the process of unit root test using various tests for robustness.

3.8 Panel Unit Root Tests

Regressing panel data variables that has unit root gives spurious regression results. Therefore, before starting regression analysis, panel data unit root test was tested on each individual series. Judge, (Hill, 2008) and Greene (2012) recommends use of different panel unit root test to check for consistency and robustness. Therefore, the following panel unit root test was estimated.

3.8.1 Levin-Lin-Chu Panel Unit Root Test

The Levin-Lin-Chu panel data unit root test was performed on the following model;

$$\hat{\rho}_{Yi}^2 = \frac{1}{T-1}\sum_{t=1}^{T}\Delta Y_{it}^2 + 2\sum_{L=1}^{\bar{K}}\omega\bar{K}L\left[\frac{1}{T-1}\sum_{t=2+L}^{T}\Delta Y_{it}\Delta Y_{it-L}\right] \quad \text{..... (3.2)}$$

Where ε_t is a white noise process $\rho = 1$ indicates a unit root $0 < \rho < 1$ implies stationarity (Levin, Lin and Chu, 2002; Phillips and Moon 1999 and Phillips and Moon 2000).

3.8.2 Im-Pesaran-Shin Unit Root Test

Im-Pesaran-Shin, (IPS) is an extension of the Dickey-Fuller (DF) test. The classic DF test for pure time series is usually presented as;

$$\Delta Y_{it} = \phi_i Y_{i,t-1} + Z_{it}'\gamma_i + \varepsilon_{it} \quad \text{..... (3.3)}$$

Where ε_t is a white noise, $\rho = 1$ indicates a unit root $0 < \rho < 1$ implies stationarity (IM, Pesaran and Shin, 2003; Pesaran, Shin and Smith, 1997 and Pesaran, Shin and Smith, 1999 Pesaran and Smith, 1995).

3.8.3 Hadri Lm Unit Root Test

(Hadri, 2000) derives a residual-based Lagrange multiplier (LM) test where the null hypothesis is that there is no unit root in any of the series in the panel against the alternative of a unit root in the panel. It is based on OLS residuals of Y_{it} on a constant or on a constant and trend. Following (Hadri, 2000) the following two models were used:

$$Y_{it} = R_{it} + \varepsilon_{it}\ i = 1,2,\ldots,N;\ t = 1,2\ldots,T \quad \text{..... (3.4)}$$

and

$$Y_{it}\ R_{it} + \beta_i t + \varepsilon_{it}\ i = 1,2,\ldots,N;\ t = 1,2\ldots,T \quad \text{..... (3.5)}$$

Where $R_{it} = R_{i,t-1} + \mu_{it}$ is a random walk $\varepsilon_{it} \sim IIND(0,\sigma_{\varepsilon}^2)$ and $\mu_{it} \sim IIND(0,\sigma_{\mu}^2)$ are mutually independent normal that are identically independent distributed across *i* and over *t*. Back substitution was used to get the following model that will be estimated;

$$Y_{it} = R_{i0} + \beta_i t + \sum_{s=1}^{t} \mu_{is} + \varepsilon_{it} = R_{io} + \beta_i t + \upsilon_{it} \quad \text{..... (3.6)}$$

Where $\upsilon_{it} = \sum_{s=1}^{t} \mu_{is} + \varepsilon_{it}$. The stationary hypothesis will be $H_0 : \sigma_{\mu}^2 = 0$ in which $\upsilon_{it} = \varepsilon_{it}$. The LM statistic is given by

$$LM_1 = \frac{1}{N}\left(\sum_{i=1}^{N}\frac{1}{T^2}\sum_{t=1}^{T}S_{it}^2\right)/\widehat{\sigma}_{\varepsilon}^2 \quad \text{..... (3.7)}$$

Where $S_{it} = \sum_{s=1}^{t}\hat{\varepsilon}_{is}$ were the partial sum of OLS residuals $\hat{\varepsilon}_{is}$ from equation 3.4 and $\hat{\varepsilon}_{\varepsilon}^2$ is a consistent estimate of σ_{ε}^2 under the null hypothesis H_0 (Greene, 2012). A possible candidate is;

$$\hat{\sigma}_{\varepsilon}^{2} = \frac{1}{NT}\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{\varepsilon}_{it}^{2} \quad \text{..... (3.8)}$$

.

To allow for heteroscedasticity the procedure that was suggested by Hadri (2000) will be used. The alternative LM test that allowed for heteroscedasticity across *i*, for instance $\sigma_{\varepsilon i}^{2}$ will be as follows;

$$LM_{2} = \frac{1}{N}\left(\sum_{i=1}^{N}\left(\frac{1}{T^{2}}\sum_{t=1}^{T}S_{it}^{2}/\hat{\sigma}_{\varepsilon i}^{2}\right)\right) \quad \text{..... (3.9)}$$

3.9 The Fixed Effects Model

In the fixed effects model, the individual-specific effects are a random variable that is allowed to be correlated with the explanatory variables.

FE1: Related effects

FE1 explicitly states the absence of the unrelatedness assumption in *RE1*.

FE2: Effect Variance

FE2 explicitly states the absence of the assumption in *RE2.*

FE3: Identifiability

rank $(\ddot{X}) = K < NT$ and $E(\ddot{x}_i'\ddot{x}_i)$ is finite

where the typical element $\ddot{X}_{it} = X_{it} - \bar{X}_i$ and $\bar{x}_i = 1/T\sum_t x_{it}$

FE3 assumes that the time-varying explanatory variables are not perfectly collinear, that they have non-zero within–variance (i.e. variation over time for a given individual) and not too many extreme values. Hence, x_{it} cannot include a constant or any time-invariant variables. Note that only the parameters β but neither α nor γ are identifiable in the fixed effects model.

Random effects model: The pooled OLS estimator of *α, β* and *γ* is unbiased under *PL1, PL2, PL3, RE1,* and *RE3* in small samples. Additionally, assuming *PL4* and normally distributed idiosyncratic and individual-specific errors, it is normally distributed in small samples. It is consistent and approximately normally distributed under *PL1, PL2, PL3, PL4,RE1* and *RE3a* in samples with a large number of individuals ($N \to \infty$). However, the pooled OLS estimator is not efficient. More importantly, the usual standard errors of the pooled OLS estimator are incorrect and tests ($t-, F-, z-, Wald$) based on them are not valid. Correct standard errors can be estimated with the so-called cluster.

Fixed effects model: The pooled OLS estimators of α, β and γ are biased and inconsistent, because the variable c_i is omitted and potentially correlated with the other regress

Random Effects Estimation

The *random effects estimator* is the feasible generalized least squares (GLS) estimator

$$\begin{pmatrix} \hat{\alpha}RE \\ \hat{\beta}RE \\ \hat{\gamma}RE \end{pmatrix} = \left(W' \hat{\Omega}_v^{-1} W\right)^{-1} W' \hat{\Omega}_v^{-1} y \quad \text{..... (3.17)}$$

Where $W = [\iota_{NT} XZ]$ and ι_{NT} is a $NT \times 1$ vector of ones.

The error covariance matrix Ω_v is assumed block-diagonal with equi-correlated diagonal elements $\Omega_{v,i}$ which depend on the two unknown parameters σ_v^2 and σ_c^2 only. There are many different ways to estimate these two parameters. For example,

$$\widehat{\sigma}_v^2 = \frac{1}{NT} \sum_{t=1}^{T} \sum_{i=1}^{N} \widehat{v}_{it}^2 \ , \quad \widehat{\sigma}_c^2 = \widehat{\sigma}_v^2 - \widehat{\sigma}_u^2$$

Where

$$\hat{\sigma}_u^2 = \frac{1}{NT-N}\sum_{t=1}^{T}\sum_{i=1}^{N}\left(\hat{v}_{it} - \bar{\hat{v}}_i\right)^2$$

and $\hat{v}_{it} = y_{it} - \alpha POLS - x_{it}^{'}\hat{\beta}POLS - z_i^{'}\hat{\gamma}POLS$ and $\bar{\hat{v}}_i = 1/T\sum_{t=1}^{T}\hat{v}_{it}$. The degree of freedom correction in $\hat{\sigma}_u^2$is also asymptotically important when $N \to \infty$.

Random effects model: we cannot establish small sample properties for the RE estimator. The RE estimator is consistent and asymptotically normally distributed under *PL4, RE1, RE2* and *RE3b* when the number of individuals $N \to \infty$even if T is fixed. It can therefore be approximated in samples with many individual observations *N* as

$$\begin{pmatrix}\hat{\alpha}RE\\ \hat{\beta}RE\\ \hat{\gamma}RE\end{pmatrix} \underset{|\backslash}{AN}\left(\begin{pmatrix}\alpha\\ \beta\\ \gamma\end{pmatrix}, A\,var\begin{pmatrix}\hat{\alpha}RE\\ \hat{\beta}RE\\ \hat{\gamma}RE\end{pmatrix}\right)$$

Assuming the equi-correlated model (*PL4a* and *RE2a*), $\hat{\sigma}_v^2$and $\hat{\sigma}_c^2$ are consistent estimators of $\sigma_v^2$and σ_c^2respectively. The $\hat{\alpha}RE$, $\hat{\beta}RE$and $\hat{\gamma}RE$are asymptotically efficient and the asymptotic variance can be consistently estimated as

$$\hat{A}\,var\begin{pmatrix}\hat{\alpha}RE\\ \hat{\beta}RE\\ \hat{\gamma}RE\end{pmatrix} = \left(W^{'}\hat{\Omega}_v^{-1}W\right)^{-1} \quad \text{(3.18)}$$

Allowing for arbitrary conditional variances and for serial correlation in $\Omega_{v,i}$ (*PL4c* and *RE2b*), the asymptotic variance can be consistently estimated with the so-called cluster-robust covariance estimator treating each individual as a cluster.

In practice, we can rarely be sure about equi-correlated errors and better always use cluster-robust standard errors for the RE estimator.

Fixed effects model: under the assumptions of the fixed effects model (*FE1*, i.e. *RE1* violated), the random effects estimators of α ,β, and γ are biased and inconsistent, because the variable $c_i$is omitted and potentially correlated with the other regressors.

Fixed Effects Estimation

Subtracting time averages $\bar{y}_i = 1/T \sum_t y_{it}$ from the initial model

Yields the *within model*

$$\ddot{y}_{it} = \ddot{x}_{it}^{'}\beta + \ddot{u}_{it} \quad \text{(3.19)}$$

where $\ddot{y}_{it} = y_{it} - \bar{y}_i, \ddot{x}_{itk} = x_{itk} - \bar{x}_{ik} and \ddot{u}_{it} = u_{it} - \bar{u}_i$. Note that the individual – specific effect c_i, the intercept α and the time-invariant regressors $z_i$cancel.

The *fixed effects estimator* or *within estimator* of the slope coefficient β estimates the within model by OLS

$$\hat{\beta}_{FE} = \left(\ddot{X}'\ddot{X}\right)^{-1}\ddot{X}'\ddot{y} \quad \text{(3.20)}$$

Note that the parameters α and γ are not estimated by the within estimator.

Random effects model and fixed effects model: The fixed effects estimator of β is unbiased under *PL1, PL2, PL3* and *FE3I* in small samples. Additionally, assuming *PL4* and normally distributed idiosyncratic errors, it is normally distributed in small samples. Assuming homoscedastic errors with no serial correlation (*PL4a*), the variance $V\left(\hat{\beta}_{FE}|X\right)$ can be unbiasedly estimated as

$$V\left(\hat{\beta}_{FE}|X\right) = \hat{\sigma}_u^2(\ddot{X}'\ddot{X})^{-1} \quad \text{(3.21)}$$

Where $\hat{\sigma}_u^2 = \ddot{u}'\ddot{u}/(NT - N - K)$ and $\hat{\ddot{u}}_{it} = \ddot{y}_{it} - \ddot{x}_{it}^{'}\hat{\beta}_{FE}$.Note the non-usual degrees of freedom correction. The usual z- and *F*-tests can be performed.

The FE estimator is consistent and asymptotically normally distributed under *PL1-PL4* and *FE3* when the number of individuals $N \to \infty$ even if T is fixed. It can therefore be approximated in samples with many individual observations N as

$$\hat{\beta}_{FE} \underset{\approx}{A} N\left(\beta, A\,var\left(\hat{\beta}_{FE}\right)\right)$$

Assuming homoscedastic errors with no serial correlation (*PL4a*), the asymptotic variance can be consistently estimated as follows;

$$\hat{A}\,var\left[\hat{\beta}_{FE}\right] = \hat{\tilde{\sigma}}_u^2 \left(\ddot{X}'\ddot{X}\right)^{-1} \quad \text{..... (3.22)}$$

Where $\hat{\sigma}_u^2 = \hat{u}'\hat{u}/(NT - N)$.

Allowing for heteroscedasticity and serial correlation of unknown form (*PL4c*), the asymptotic variance $A\text{var}\left[\widehat{\beta}_k\right]$ can be consistently estimated with the so-called cluster-robust covariance estimator treating each individual as a cluster for large samples can be performed.

In practice, the idiosyncratic errors are often serially correlated (violating *PL4a*) when *T > 2.* Bertrand, Duflo and Mullainathan (2004) show that the usual standard errors of the fixed effects estimator are drastically understated in the presence of serial correlation. It is therefore advisable to always use cluster-robust standard errors for the fixed effects estimator.

Random Effects vs Fixed Effects Estimation

The random effects model can be consistently estimated by both the RE estimator or the FE estimator. We would prefer the RE estimator if we can be sure that the individual –specific effect really is an unrelated effect (*RE1*). This is usually tested by a (Durbin-Wu-) Hausmann test. However, the Hausmann test is only valid under homoscedasticity and cannot include time fixed effects.

The unrelatedness assumption (*RE1*) is better tested by running an auxiliary regression (Wooldridge 2010, p. 332, eq. 10.88, Mundlak, 1978):

$$y_{it} = \alpha + x_{it}^{'}\beta + z_{i}^{'}\gamma + \bar{x}_{i}^{'}\lambda + \delta_t + u_{it} \quad \text{(3.23)}$$

Where $\bar{x}_i = 1/T \sum_t x_{it}$ are the time averages of all time-varying regressors. Include time fixed δ_t if they are included in the RE and FE estimation. A joint Wald-test on $H_0: \lambda = 0$ tests *RE1*. Use cluster –robust standard errors to allow for heteroscedasticity and serial correlation.

Note: Assumption *RE1* is an extremely strong assumption and the FE estimator is almost always much more convincing than the RE estimator. Not rejecting *RE1* does not mean accepting it. Interest in the effect of a time-invariant variables is no sufficient reason to use the RE estimator (Baltagi, 2008).

$$Y_{it} = \beta X_{it} + \varepsilon_{it} \quad \text{(3.24)}$$

Where $i = 1,2,\cdots,N$ is the number of observations selected firms Y_{it} was either return on asset or assets turnover. $t = 2005, 2006, \cdots, 2013$ years, X_{it} were the independent variables. This is stated as;

$$\begin{bmatrix} Y_1 \\ Y_2 \\ \vdots \\ Y_7 \end{bmatrix} = \begin{bmatrix} X_1 \\ X_2 \\ \vdots \\ X_7 \end{bmatrix} \beta + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_7 \end{bmatrix} \quad \text{(3.25)}$$

The data generation process is described by linearity, independence, strict exogeneity (mean independence) and error variance.

3.10 Hausman Test

A superior method to both the FEM and REM that can estimate time invariant variables and address the problem of endogeneity was proposed by Hausman and Taylor (1981) and is

called Hausman Taylor Method (HTM). The source of potential endogeneity bias in gravity model estimations is the unobserved individual heterogeneity (Rault *et al.*, 2009). HTM uses variables that are specified in a regression equation as instruments to solve the problem of endogeneity. This makes it possible to eliminate the correlation between the explanatory variables and the unobserved individual effects that undermines the appropriateness of the REM in the gravity model context (Keith, 2006). Another advantage of HTM is that it is usually difficult to find variables not specified in an equation that can serve as valid instruments for endogenous regressors. Haussmann Taylor method was used to choose between fixed and random effect models.

The Hausman test (also called the Hausman specification test) detects endogenous regressors (predictor variables) in a regression model. Endogenous variables have values that are determined by other variables in the system. The Hausman test can help to choose between fixed effects model or a random effects model. The null hypothesis is that the preferred model is random effects; The alternate hypothesis is that the model is fixed effects. Essentially, the tests looks to see if there is a correlation between the unique errors and the regressors in the model. Under the null hypothesis Hausman test estimates the following equation;

$$H = (b_1 - b_0)'\big(\operatorname{Var}(b_0) - \operatorname{Var}(b_1)\big)^{\dagger}(b_1 - b_0) \quad \text{.....(3.26)}$$

3.11 Diagnostic Tests

3.11.1 Multicollinearity

Multicollinearity generally occurs when there are high correlations between two or more predictor variables. In other words, one predictor variable can be used to predict the other. Multicollinearity is measured using Variance Inflation Factor. If the VIF average value is less than 10 indicates the absence of Multicollinearity.

3.11.2 Heteroscedasticity Test

In many cross-sectional datasets, the variance for each of the panels differs. It is common to have data on countries, states, or other units that have variation of scale. The heteroscedastic model is specified by including the panels (heteroscedastic) option, which assumes that Ω is an identity matrix expressed as follows;

$\Omega = \delta_{it}^2 I$ …… (3.27)

3.11.3 Serial Correlation

Residuals or errors in a prediction are supposed to be independent. To check this, the researcher will use Durbin-Watson d test ranges from 0 to 4 with the acceptable range being 1.50 to 2.50. Value close to zero has positive correlation and those variables with values closer to 4 have negative serial correlation.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This section presents descriptive statistics, correlation matrix, diagnostic Tests (Multicollinearity, Serial correlation and heteroscedasticity Tests), panel unit root tests, Haussman Test. Regression analysis and test of hypotheses are presented in this chapter.

4.2 Descriptive Statistics and Normality

The first step of the analysis was to compute the descriptive statistics which are presented in Table 4.1.

Table 4.1: Presents the Descriptive Statistics of the variables under study

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
MXP	204	3277864	5677852	2839	3.20e + 07
HCD	216	0.5398	0.1322	0.32	0.94
FDI	216	7.25e+09	1.61e+09	4619.426	1.16e+10
ID	216	25.7138	22.5927	1.12	93.39
DIS	216	1999.22	1092.3	0	4535
DVNC	216	0.1111	0.31499	0	1
DVCC	216	0.6111	0.4996	0	1

Source: Author's Survey Data, 2019

From Table 4.1, Kenya's manufactured exports reported a mean of US$ 3277864, a minimum of US$ 2839 and a maximum of US$ 32 million its standard deviation is US$ 5.7million. Human Capital Development a proxy for HCD registered a mean of 0.5398 (index), a minimum of 0.3200 (index) and a maximum of 0.9400 (index). The standard deviation was of 0.1322 (index). Foreign direct investment had a mean of US$ 7.25 billion, a minimum of US$ 4619.426 and a maximum of US$ 11.6 billion. It has standard deviation of 1.61 billion.

Infrastructure Development a proxy for ID showed a mean of 25.71375. It has a minimum of 1.1200 and a maximum 93.3900. Its standard deviation is 22.59272 a small variation from it

mean. This indicates that all COMESA countries have almost the same Infrastructure Development. Distance reported a minimum of zero and maximum of 4535 Kilometers which indicates the furthest city from Nairobi city. This is actually the distance between Nairobi and Tripoli while the least was 0 representing distance from Nairobi to Nairobi. DVNC (Dummy variable neighboring countries) and DVCC (dummy variable common colony) are all dummy variables. From the summary statistics the standard deviation was less than the mean for most of the variables for the non-dummy variables meaning there were no outliers and these points to a normal distribution of the data.

The data had a normal distribution as evidenced by figure 4.6 appendix 2 The study tested whether the data followed a normal distribution. In statistics, a normal distribution has a skewness of zero (i.e. it's perfectly symmetrical around the mean) and a kurtosis of three; Skewness is a measure of symmetry in a distribution whereas kurtosis tells you how much data is in the tails and gives an idea about how "peaked" the distribution is. If the data comes from a normal distribution, so the statistic can be used to test the hypothesis that the data are from a normal distribution. The Figure 4.6 in Appendix 2 shows that the data used in this study followed a normal distribution since its mean is around zero and the kurtosis is approximately 3.

4.3 Correlation Matrix

In order to determine the nature and direction of association between variables under this study, Pearson correlation analysis was done as shown in the Table 4.2.

Table 4.2: Correlation analysis results

	MXP	HCD	FDI	ID	DIS	DVNC	DVCC
MXP	1.0000						
HCD	0.1370* (0.0418)	1.0000					
FDI	0.0643* (0.0338)	0.2142* (0.0016)	1.0000				
ID	0.1419* (0.0375)	0.4900* (0.0000)	0.2153* (0.0015)	1.0000			
DIS	-0.4858* (0.0000)	0.3747* (0.0000)	0.1818* (0.0076)	0.4049* (0.0000)	1.0000		
DVNC	0.1714* (0.0124)	0.1900* (0.0051)	0.1030* (0.0075)	0.2032* (0.0027)	0.2178* (0.0013)	1.0000	
DVCC	0.1945* (0.0042)	0.2144* (0.0015)	0.2253* (0.0008)	0.1915* (0.0047)	0.2221* (0.0010)	0.2820* (0.0000)	1.0000

Note. Values in parentheses ( ) indicate p-values and * shows significance at 5% level of significance i.e. p-value < 0.05 (*Author's Survey Data, 2019*)

Results of correlation analysis in Table 4.2 indicated significant and positive associations between human capital development and manufacturing exports had value of 0.1370* and p-value of (0.0418) < 0.05, foreign direct investment and manufacturing exports had a value of 0.0643* and p-value of (0.0375) < 0.05, infrastructure development and manufacturing exports had value of 0.1419* and p-value of (0.0338) < 0.05, dummy variable neighboring country and dummy variable common colonizer with Kenya's manufactured exports to COMESA. Distance is negatively correlated with Kenya's manufactured exports to COMESA. The p values of the variables are in brackets and are all $p < 0.05$. Further the correlation between independent variables was significant but none was above 0.8 which indicates that the independent variables are not highly correlated thus ruling out multicollinearity.

4.4 Panel Unit Root Tests

Having established the nature of the data generation processes, it is necessary to test for unit root among the time variant variables. These are manufactured exports, foreign direct investment, Human Capital Development and Infrastructure Development. The results are presented in Table 4.3.

Table 4.3: Result of unit root test of unit Root at Levels

Variable	Levin-Lin-Chu				Im Pesaran and Shin				Hadri LM Test			
	Time Trend				Time Trend				Time trend			
	Included		Not included		Included		Not included		Included		Not included	
	t-statistic	p-value	t-statistic	p-value	t-statistic	p-value	t-statistic	p-value	z–statistic	p-value	z –sat	p-value
MXP	-5.5368	0.0000	-3.1160	0.0009	-4.2566	0.0000	-3.2219	0.0006	2.4089	0.0080	21.4426	0.0000
FDI	-4.6155	0.0000	-2.0884	0.0184	-3.4321	0.0030	-0.8497	0.1977	*13.5678*	*0.0000*	7.1356	0.0000
HCI	-6.0860	0.0000	-3.4225	0.0003	-3.4859	0.0020	1.4919	0.9321	10.8681	0.0000	18.4926	0.0000
ID	-8.1781	0.0000	-0.4002	0.3445	-3.1954	0.0007	9.1406	1.0000	9.4997	0.0000	26.5170	0.0000

Source: Author's Survey Data, 2019

Table 4.4: Unit Root Test at First Difference

	Levin-Lin-Chu				Im Pesaran and Shin				Hadri LM Test			
	Time Trend				Time Trend				Time trend			
	Included		Not included		Included		Not included		Included		Not included	
	t-statistic	p-value	t-statistic	p-value	z-statistic	p-value	z-statistic	p-value	z – statistic	p-value	z – statistic	p-value
MXP	-0.4102	0.0000	-0.4744	0.0000	-6.4374	0.0000	-6.3905	0.0000	-2.3029	0.9894	-2.5211	0.9942
FDI	-6.1049	0.0000	-5.6894	0.0000	-5.8556	0.0000	-5.6229	0.0000	1.5948	0.0554	0.6195	0.2678
HCD	-7.5475	0.0000	-8.0213	0.0000	-6.3293	0.0000	-5.9975	0.0000	-2.3571	0.9908	-0.7413	0.7707
ID	-3.9182	0.0000	--.4420	0.0000	-2.0794	0.0188	-3.7657	0.0000	4.1771	0.0000	0.7563	0.2247

Source: Author's Survey Data, 2019

Results of Hadri LM showed that the variables were stationary at first difference This is when trend is not included. This was done because the plot of each of the variables had shown that they were random walk with drift but without trend. In such case econometric theory requires testing of unit root without trend option (Hardin & Hilbe, 2012)(Greene, 2012; Hamilton, 1994, Lutkepohl, 2005; and Lutkepohl and Kratzig, 2004).

Levin–Lin–Chu (2002), Harris–Tzavalis (1999), Im – Pesaran – Shin (2003), all have null hypothesis that all the panels contain a unit root. Levin Lin and Chu test fits Augmented Dickey–Fuller for each panel; we requested that the number of lags to include be selected based on the AIC. The Hadri (2000) Lagrange multiplier (LM) test has as the null hypothesis that all the panels are (trend) stationary. Levin Lin and Chu tests (time trend included) in Table 4.4 indicates that all the variables (Kenya manufactured exports (MXP), Foreign direct investment (FDI), human capital development (HCD) and infrastructural development (ID) were stationary at levels (p- value 0.0000 < 0.05) therefore rejecting the null hypothesis that all the panels contain unit root in favor of alternative hypothesis that the all the panels are stationary. When time trend is excluded infrastructural capital development was found to contain unit root at levels (p- value 0.3445 < 0.05) at 5% level of confidence. Im Pesaran and Shin tests attested that Kenya manufactured exports, foreign direct invest, human capital development and infrastructural development were stationary at levels. by the in both time trend included and excluded. Hadri LM test hypothesis is that panels are stationary while its alternative hypothesis is that some panels contain unit roots. The results from the Table 4.4 indicate that Kenya's manufactured exports, foreign direct investment, Human Capital Development were all stationary at levels (time trend included). Infrastructural development had unit root at levels (p-value 0.0000 < 0.0500). When time trend is excluded the entire variables in the study were stationary (p-value 0.0000 < 0.0500).

Upon first difference both Levin Lin and Chu and Im Pesaran and Shin tests showed that all the variables were stationary (p-value 0.0000 < 0.0500 with both time trend and no time trend. Hadri LM tests also suggested that the variables were all not stationary at levels and stationarity was attained at first difference.

4.5 Hausman Test

In order to determine which model between the fixed effect and random effects model Hausman test statistic was used. According to Hausman test null hypothesis H_0: difference in coefficients not systematic (random effect is appropriate) as shown below, the p-value = 0.0361, therefore this null hypothesis was rejected and concluded that fixed effect was appropriate model.

Table 4.5: Hausman Test Results

	Coefficients			
	(b) Fe	Re (B)	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Log of human capital development	2.4183	2.8132	-0.3949	0.0877
Log of foreign direct investment	0.0774	0.1176	-0.0402	0.0090
Log of distance	-0.9889	-1.1256	0.1367	0.0148
Log of infrastructural development	0.4989	0.4578	0.0411	.
Dum variable neighboring countries	1.5341	1.4456	0.0925	.
Dum variable common colonizer	0.7803	0.8102	0.0299	.

*b = consistent under Ho and Ha; obtained from regression; B = inconsistent under Ha, efficient under Ho; obtained from regression; Test: Ho: difference in coefficients not systematic; chi2 (6) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 13.47; Prob>chi2 = 0.0361; (V_b-V_B is not positive definite)

Source: Authors Survey Data, 2019

4.6 Regression Analysis and Test of Hypotheses Based on Fixed effects Model

Having established the model that could be estimated, GLS regression was estimated. Both random and fixed effect models were estimated then Hausman test was done to determine the appropriate model and all these were best on the gravity model as per equation (3.1 . Fixed effect regression model was chosen as haussman test. Results for random effect model are shown in appendix 1. The findings were discussed in line with the study objectives in

sections 4.7.1, 4.7.2 and 4.7.3. based on the fixed effect model regression results, as shown in Table 4.6

Table 4.6: Fixed Effect Regression

Fixed Effect (Within) Regression		Number of Observations		=204
Group Variable	Year	Number of Groups		=12
		Observation per group		
		Minimum		16
R^2Within	0.4277	Average		16.7
R^2Between	0.6732	Maximum		17.0
R^2Overall	0.4169	F(6,198)		22.67
Corr($\mu\_i, X\beta$)	0.0686	Prob. > F		0.0000
Log of Manufactured Exports	Coefficient	Std. Error	T	P>|t|
Log of Human Capital development	2.4183	0.6648	3.6400	0.0000
Log of Foreign Direct Investment	0.0774	0.0371	2.0900	0.0380
Log of Infrastructural Development	0.4989	0.1486	3.3600	0.0010
Log of Distance	-0.9889	0.2474	-4.0000	0.0000
Neighboring Countries	1.5341	0.3335	4.6000	0.0000
Common Colony	0.7803	0.2200	3.5500	0.0000
Constant	-23.2901	2.4413	-9.5400	0.0000
Sigma_u	0.3857			
Sigma_e	1.1623			
Rho	0.09918			
F-Test that all u_i = 0: F(11, 198)	1.58	Prob. > F		0.0067

Source: Authors Survey Data, 2019

Results from fixed effects are presented in Table 4.7. The F – statistic is significant (p – value 0.0000 < 0.05) showing that the variables fitted the model very well (the model was well-identified). The overall R Square is 0.4169 showing that the independent variables explained 42 % of the manufacturing Exports dependent variable. This is high given the fact that fixed

and random effects model do not compute R from the mean of the dependent variable. In such case the main focus is model specification and overall significance of the coefficients. This has been achieved in the current research since the overall fit is F stat 0.0000 < 0.05.

The variance due to observed covariate (sigma_u) is 0.3857 and is smaller than the variance due to time invariant covariates (sigma_e, (1.1623). The fraction of the variance due to u_i is 0.0992 and lies between sigma_u and sigma_e showing that the model is not distorted. Having established this, Hausman test was conducted to choose between the coefficients of fixed and random effects. Results are presented in table 4.80 and shows that there fixed effect was the feasible model for interpretation (p – value 0.0361 < 0.05). The difference between random and fixed effect models is based on the assumptions of the distribution of the residuals of the regression estimates. In such case fixed effect model is normally preferred for interpretation because it limits the number of assumptions and follows well established normal probability distribution (Arellano & Bond, 1991; Baltagi, 2008; Hsiao, 2014). Results of random effect are shown in Appendix I.

Having established the model specification test, diagnostics tests and selection of the coefficients to be estimated within random and fixed effect, the next step was to test the hypotheses, give their economic implications and compare them with prior results from the existing theoretical, empirical and scientific studies. This is done below sequentially as per the objectives and the hypotheses of `the study.

4.6.1 Objective one-FDI and Manufactured Exports

The first objective was that the study sought to determine the effects of foreign direct investments on Kenya's manufacturing export to COMESA. Therefore, the first hypothesis stated that foreign direct investments, does not have effect on Kenya's manufacturing exports to COMESA trading. Results of fixed effect regression model indicated that foreign direct

investment had positive and significant effect on Kenya's manufactured exports to COMESA countries (p – value 0.0380 < 0.05). The coefficient of foreign direct investment is 0.077 showing that if foreign direct investment changes by one percent, Kenya's Manufacture exports to COMESA countries are expected to increase by 0.077 percent. The results are presented in Table 4.8 showing p – value 0.0000 < 0.05.

The results of FDI support prior study by Jongwanich (2010) who found that FDI has a positive impact on the export of manufacturing in Thailand. Unlike the results of Pupphavesa and Pussaransri (1994) which found a positive impact of FDI on the export from Thailand to source country like Japan, USA and other countries (Dilios & Keeley, 2001) conducted a survey of 400 Japanese manufacturing firms in Thailand in 1999. They found the primary attraction of Japanese firms to invest in Thailand was the low-cost of labor especially local blue-collar employees.

The distance reflects the transportation costs; as a result, Kenya has more trade with closer countries than farther countries. This is the reason why the government of COMESA countries negotiates more free trade agreements with trading partners at the bilateral and multilateral levels.

Despite the fact that FDI has been demonstrated to have positive effect on manufactured exports, (Bende-Nabende *et al.*, 2003) is skeptical about the positive contribution of FDI on manufacturing export performance. (Bende-Nabende *et al.*, 2003; He, 2002) is of the opinion that because capital and consumption goods not available locally are imported, and profits remitted, thus cutting into the export earnings generated. (Ernest, Ganiatsos, & Mytelka, 1998) on the other hand, observe that the role of FDI was low in countries where local firms had good capabilities and could undertake subcontracting at low cost to the buyer. The FDI role tended to be larger when local capabilities were weak. Similarly, in Latin America FDI's

role was high in low – quality segments where wage costs are the main competitive factor; there is little design capability or independent marketing (Mortimore, 1998).

From the results FDI had the least impact basing on the $\beta_{1=}$ 0.77 this as compared to the other variables . HCD had positive and significant (β_2 = 2.4183) effect and IDI (β_3 = 0.4989).

4.6.2 Objective two- Human Capital Development (HCD) and Manufactured Exports

The second objective of the study examined the effect of human capital development on Kenya's manufacturing exports to COMESA countries. To achieve this fixed effects regression was done to test the hypothesis that human capital development does not affect Kenya's manufacturing exports to COMESA trading. Results showed that human capital development was indeed determinant of Kenya's manufactured exports to COMESA (p – 0.0000 < 0.05). The beta coefficient for human capital development is positive (2.4183) showing that if human capital development increases by one percent Kenya's manufacturing exports increases by 2.4 percent ceteris paribus.

These results are in line with (Elhiraika & Mbate, 2014) who focused on the export diversification and its impact on the economic growth for African countries. . It was concluded that infrastructure , human capital and institutional framework among others, significantly contributed in the export of manufactured products.

(Calderón & Chong, 2001) state that building up human capital and other complementarities may be important in the link between exports of manufactures and economic growth. Complementarities between new technologies and human capital, and other factors are important in promoting manufactured exports. Levin and Raut find that growth is promoted when investing in human capital and exports in manufactured simultaneously. To do this there must be complementarities between exports and skills in line with (A. Sen, 1990), (Anand & Sen, 1995) and (Nagar & Basu, 2002).

Similarly, (Osakwe, Santos-Paulino, & Dogan, 2018) showed that higher human capital leads to greater manufactured exports diversification. This is in line with the findings in the literature e.g. (Hausmann, Hwang, & Rodrik, 2007) and (Agosin, Alvarez, & Bravo-Ortega, 2012), that countries with abundant human capital specialize in differentiated manufactured products. GDP per capita is positively associated with exports concentration, contrary to the finding by (Elhiraika & Mbate, 2014) for African countries.

The review of literature showed that several studies have concentrated on effect of international trade either in goods or services on human capital development (Findlay & Kierzkowski, 2005). For instance, more recent theoretical work on endogenous human capital responses to international trade includes (Vogel & Schiele, 2007), (Jung & Mercenier, 2010), (Davidson & Sly, 2014), (Blanchard & William, 2017), (Elhiraika & Mbate, 2014), (Findlay & Kierzkowski, 2005), (Greenland & Lopresti, 2016). .

Results of fixed effect model indicated that HCD had positive and significant ($\beta_2 = 2.4183$). the highest among the three variables which could indicate Kenya has done well.

4.6.3 Objective three-Infrastructure Development (ID) and Manufactured Exports

The third objective of the study was to determine the effect of infrastructure development on Kenya's manufacturing exports to COMESA. To achieve this, the third hypothesis of the study stated that infrastructure development does not have an effect on Kenya's manufacturing exports to COMESA trading. Regression results shows that infrastructure development had positive and significant effect on Kenya's manufactured exports to COMESA countries (p – value 0.0010 < 0.05). Further, the beta coefficient for infrastructure development is 0.4989 meaning that when infrastructure development changes by one percent, Kenya's manufacturing exports increases by about 0.5 percent units.

The export-led growth hypothesis suggests that exports can be an engine for economic growth to increase employment and income in the exporting country, increase the efficiency of resource allocation, and achieve economies of scale (Giles and Williams 2010). Similarly, trade expansion through manufacturing exports potentially stimulates the need for and development of transport infrastructure (Tong *et al.*, 2014), (Lee & Rodrigue, 2006), (Beningo, 2008). Conversely, infrastructure development in a country can affect trade on manufactured exports. Domestic economic conditions, including strong product demand and/or agglomeration economies, can promote the growth of exports (Levchenko, 2007) and (Zestos & Tao, 2002). Previous researchers have confirmed a positive relationship between transport infrastructure and trade through lower transportation costs or better infrastructure quality (Limao & Venables, 2001), (Nordås & Piermartini, 2004), (Tong *et al.*, 2014).

However, (Estache & Fay, 2007) and (Yamin & Sinkovics, 2009) note that correlation between infrastructure development more generally and economic growth and poverty reduction is neither definite nor automatic. But infrastructure provides links to the world market that are important for export competitiveness and manufacturing, which in turn are regarded as vital drivers of economic performance. More generally, empirical evidence indicates that quality of infrastructure is an important determinant of trade performance (Francois & Manchin, 2007), (Limao & Venables, 2001), (Nordås & Piermartini, 2004), (Portugal-Perez & Wilson, 2010), Brandi, 2013). (Jaen & Rodrigue, 2010) argues that efficient transport and logistic services have emerged as strategic elements of trade facilitation in explaining market access: "Trade facilitation means providing a more predictable, secure and efficient international trading environment, through the simplification, standardization and harmonization of administrative formalities" (Sourdin & Pomfret, 2012). (Nugroho, 2014) notes that the effects on trades are complex due to lack of harmonization in standards. (Helble, Shepherd, & Wilson, 2009) add that the gains of greater predictability

obtained from trade facilitation can be perceived in terms of falling trade costs and increasing domestic gains.

The results further support the findings which provide evidence that improvement in economic infrastructure generates huge gains in terms of export of manufactured exports; and there are more gains from hard infrastructure compared to soft infrastructure. Therefore, the electricity, rail, road, airports infrastructure is paramount in boosting exports of manufactured products in the EAC region. It emerges that, transparency and accountability, internet connectivity and telephone subscription improve the efficiency and business environment, which support the exportation of manufactured products. It is concluded that the mobilization of resources for investment in economic infrastructure to promote exports of manufactured products is inevitable for the EAC region.

These results are in line with (Francois & Manchin, 2007), who used principal components to construct two indicators on infrastructure and institutional quality, and found that institutional quality, along with transport and communications infrastructure, was a significant determinant for an economy's export levels as well as for prospective exports. The results support the belief that export performance depends on institutional quality and access to communications and transport infrastructure. In addition, (Meon & Sekkat, 2006) observed a positive relationship between poor institutional quality and low-quality manufacturing exports. Compared to government effectiveness or the rule of law, control of corruption was the most significant factor related to manufacturing exports. Another study by (Anderson & Van Wincoop, 2011) and (Francois & Manchin, 2007), who used data on contractual enforcement and corruption, discovered that lower institutional quality was associated with a negative effect on trade. Other similar empirical evidence is found in (Depken II & Sonora, 2005) and (Levchenko, 2007).

Adopting the study by (Limao & Venables, 2001), (Nordås & Piermartini, 2004) investigated the role of infrastructure on trade in the clothing, automotive, and textile sectors of manufacturing exports. Indicators included the quality of airports, roads, ports, and telecommunications, and the time required for customs clearance. In addition, it incorporated bilateral tariffs (Nordås & Piermartini, 2004). Their study proved that trade performance was significantly affected by infrastructure quality, especially port efficiency. Timeliness was more significant for export competitiveness in the clothing sector, while access to telecommunications in the automotive sector was more significant. It also concluded that, even after the quality of infrastructure was included, distance remained a significant factor.

From the foregoing analysis it is concluded that the pattern of manufacturing export performance is linked to the political economy of policy reform, to institutional development, infrastructural development, colonial history, development assistance, and the general North-South dialogue facing COMESA countries.

The study revealed that distance had negative and significant effect on Kenya's manufactured exports to COMESA region (p – value $0.0000 < 0.05$). This implies that for a one percent increase in distance Kenya's manufactured exports to COMESA region was expected to reduce by 0.98 percent.

Radelet and Sachs (1998) examine some empirical evidence on differences in shipping costs across developing countries, and its impact on manufactured exports and economic growth. They find that geographical considerations specifically access to the sea and distance to major markets, have a strong impact on shipping costs, which in turn influence success in manufactured exports and depresses real investment and long-run economic growth. (Weerahewa, 2009) found the coefficients for the distance variable to be negative and highly significant indicating that if countries are further far apart by 10% the value of exports would decrease by around 9.22-19.87% in all specifications. However, the coefficient for

manufacture is smaller than those for agricultural good suggesting that distance makes a bigger difference when exports of agricultural items are concerned than that of manufacturing items. Among agricultural product categories preparatory food items affected lesser by distance.

The dummy variable DVNC (Dummy Neighboring Country, DVNC) was positive and significant (p – value 0.000 < 0.05). In addition, the second dummy variable DVCL (Dummy Variable Common Language) had positive and significant effect on Kenya's manufactured exports (p – value 0.000 < 0.05). Thus, it implies that language encourages trade because it eases communication.

The DVCC (Dummy Variable Common Colonizer (DVCC) had positive and significant effect on Kenya's manufactured exports (p – value 0.000 < 0.05). The implication of this is that countries that were colonized by common colonizer developed similar political, social, economic and cultural ties that still link them together to date. In the ASEAN for instance social and cultural factors (such as a common language) appear to have been important in their choice of countries for relocation.

Weerahewa (2009) notes that common language has a significant and positive effect on value of exports of agricultural commodities, vegetable products, prepared food stuff and manufacture products. According to the results of the study the export values of countries which speak the same official language tend to export 6.12-12.6% more than those of other countries. This is particularly recorded for exports of vegetables, prepared food and manufacture products. A positive and significant impact of common colony on the value of exports of agricultural commodities, live animals, and vegetable products was also observed by Weerahewa (2009) and further notes that countries which were under the same colony tie tend to export 9.4%, 11.12% and 12.38% more of agricultural items, live animals and vegetables supporting the results of the current study.

The research results proved that manufactured exports were positively determined significantly ($\beta_3 = 0.4989$) by infrastructure development with (p – value 0.0010 < 0.05). This shows moderate effect and which could be an indication that Kenya is trying to fix infrastructure.

4.7 Diagnostic Tests

The following diagnostic tests were carried out; Multicollinearity, Heteroscedasticity and Serial Correlation. These tests are normally done after regression analysis.

4.7.1 Multicollinearity

Multicollinearity generally occurs when there are high correlations between two or more predictor variables. In other words, one predictor variable can be used to predict the other. Multicollinearity is measured using Variance Inflation Factor. If the VIF average value is less than 10 indicates the absence of Multicollinearity.

Table 4.7: Variance Inflation Factor (VIF).

Variable	VIF	1/VIF
Dvcc	**5.94**	**0.1682**
Log of hdi	**3.43**	**0.2913**
Log of idi	**3.27**	**0.3058**
Log of dis	**2.81**	**0.3554**
Dvnc	**1.21**	**0.8241**
Log of fdi	**1.04**	**0.9585**
Mean VIF	**2.95**	

Source: Authors Survey Data, 2019

4.7.2 Serial Correlation

The results in Table 4.7 in Appendix shows that the value for Durbin-Watson statistic was 1.996, this implies that there was no serial correlation between the explanatory variables.

According to Durbin and Watson, the value of Durbin-Watson Statistic is between 0 and 4 a value of 2 indicates there is no serial correlation. The approximate value on Table 4.7 is 2 meaning the absence of serial correlation.

4.7.3 Heteroscedasticity Test

Breusch-Pagan-Godfrey test is used to test for heteroscedasticity in a linear regression model and assumes that the error terms are normally distributed. It tests whether the variance of the errors from a regression is dependent on the values of the independent variables. The null hypothesis is that there is heteroscedasticity. From the results presented in Table 4.7 in Appendix 4 shows that the probability of F-statistic = 0.0006 was less than 0.05 level of significance. This implies that the null hypothesis was rejected and concluded that there was homoscedasticity.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter of the study gives a summary of the findings, conclusions and recommendations in line with the objectives of the study and finally the Limitations of the study and suggestions for further research.

5.2 Summary of Findings

The general objective of the study was to estimate the effects of human capital development, foreign direct investment, Infrastructure Development on Kenya's manufacturing exports to COMESA region. The study established that human capital development is significantly determined Kenya's manufactured exports to COMESA region. Results further documents that foreign direct investment is significant determinant of Kenya's manufactured exports to COMESA region. Investment in infrastructure significantly determined Kenya's manufactured exports to COMESA region. Distance negatively and significantly affected Kenya's manufactured exports to COMESA region. These Findings confirms the gravity equation model.

5.2.1 FDI and Manufactured Exports

The first objective of the study was to determine the effect of foreign direct investments on Kenya's manufacturing exports to COMESA region based on the null hypothesis, foreign direct investments, does not determine Kenya's manufacturing exports to COMESA region tested at 5% level of significant. Results indicated a positive significant relationship therefore leading to the rejection of the null hypothesis. Fixed effect model of panel data estimates provide evidence supporting the importance of foreign direct investments on Kenyan manufactured exports. The FDI inflows enhanced the productive capacity of manufactured

exports and for the importing countries their absorptive capacity culminated towards taking in manufactured exports.

5.2.2 Human Capital Development and Manufactured Exports

The second objective was to analyze the effect of human capital development on Kenya's manufacturing exports to COMESA region based on the null hypothesis that human Capital Development does not affect Kenya's manufacturing exports to COMESA region tested at 5% level of significance. Results indicated a positive significant relationship therefore leading to the rejection of the null hypothesis. Fixed Generalized Least Squares panel data estimates provide evidence supporting the importance of Human Capital Development as significant drivers of Kenya's manufactured exports. Human capital development affected Kenya's manufacturing exports implying that development of human resources is a critical aspect in determining the growth of Kenya's manufactured exports. The productive capacity was felt for the period of study contributed by human capital development. The importing countries may be because of contribution of HDC to the higher living standards absorbed more of Kenya's manufactured exports.

5.2.3 Infrastructure Development and Manufactured Exports

The third objective was to determine the effect of infrastructure development on Kenya's manufacturing exports to COMESA region based on the null hypothesis that Infrastructure Development does not have an effect on Kenya's manufacturing exports to COMESA region tested at 5% level of significance. Results indicated a positive significant relationship therefore leading to the rejection of the null hypothesis. Generalized Least Squares panel data estimates provide evidence supporting the importance of Infrastructure Development as significant drivers of Kenya's manufactured exports. Better infrastructure leads to more production of manufactured goods as evidenced by the results.

5.3 Conclusions

The aim of conclusion to present the empirical findings of the study and for policy purposes put forward some recommendations that would help improve Kenya's manufacturing exports to the trading blocs. Based on the findings above the following conclusions can be drawn.

The inflow of foreign direct investments was found to positively impact on Kenya's manufactured exports. It was found to play a significant role in enhancing Kenya's productive capacity and boosting its export of manufactured goods. It further means investment by foreign firms forms an integral part of the manufactured exports and therefore provision of conducive environment for the same is a boost for Kenya's Economy. Human capital development positively impacted on Kenya's manufactured exports, meaning development of manpower is critical for the production of manufactured exports. Infrastructure Development had a positive coefficient which means that Kenya's manufactured export relies heavily on infrastructure development.

The effect of distance however was negative leading to the conclusion that a unit increase in distance resulted in reduction in manufactured exports. Distance reduces international trade because of increasing the costs of transportation, cause delays and other logistical problems. This same conclusion was reached for common neighbors and common colony.

The study highlights the export-diversifying impact of foreign direct investment (FDI) in a developing country. FDI may lead to export diversification in the host country if it positively affects the export intensity of industries that have a low share in world exports. Indirectly, FDI may encourage export diversification through spillover effects: that is, the presence of FDI in an industry may increase the export intensity of domestic firms.

5.4 Recommendations

The key findings of this study, as summarized above, have important implications for the manufactured export policy in Kenya. Based on these key findings, the following recommendations are advanced for policy configuration and formulation aimed at expanding the volume of Kenya's manufactured exports to the regional trade blocs so as to maximize its gains from trade and boost the pace of the nation's economic growth.

As reported human capital development has a very high impact on manufacturing exports and it was of great importance if the government and the concern authorities would keep improving the quality of its human resource for it forms the great source of the required labor in the manufacturing sector.

The lower impact of current level of infrastructural development on Kenya's manufacturing exports, as found in this study, accentuates the urgent need to radically expand, improve and modernize manufacturing-related infrastructure in Kenya. The current government's focus on infrastructural development is a stride in the right direction as this would not only facilitate Kenya's external trade, but also enhance manufacturing export supply capacity, reduce transportation and other transactions costs and increase the relative competitiveness of made-in-Kenya goods on the regional trade bloc and the entire global market in the long run.

Government supply-side policies such as government subsidies, tax rebates, are recommended to attract and channel the foreign direct investment (FDI) to more productive and comparative advantaged manufactured exports sectors, so as to augment the productive and exports supply capacity of domestic producers, and increase their level of efficiency. In addition, market-friendly regulatory policies (aimed at removing impediments to domestic and foreign private investment, streamlining and simplification of regulations and procedures for doing business by new entrants), strengthening of property rights and contract

enforcement, and improvement of trade policy regime to facilitate exports and promote outward oriented growth are highly recommended.

Once again, this has the long run benefit of improving consumer and investor confidence in the economy by creating incentives for individuals to engage in trade, and invest in human and physical capital. Even though Kenyan Institutions are becoming more effective, efficient and trade enhancing, trade-inhibiting obstacles however still remain, and particular institutions need development and reform. For instance, high levels of corruption persist due to overall weakness in the rule of law and the overall investment regime lacks efficiency and transparency. It is, therefore, highly recommended that policies and legislative reforms aimed at promoting transparency, accountability and integrity in our institutions be austerely pursued so as to boosts investors' confidence in the country hence leading to increased foreign direct investments.

Based on the outcome of the dummy variable common language that became statistically significant there is need for a higher level of integration within the economic blocs to the effect of developing a common language to boosts the communication and faster understanding between the trading partners. Common language is expected to ease communication and documentation therefore enhancing international trade.

5.5 Research Contributions

The research findings form useful materials of knowledge to academia by contributing to existing literature with regards to manufacturing exports.

5.6 Suggestions for Further Research

An effective implementation of the supply side policies recommended in this study requires identification and a detailed understanding of factors that significantly affect the productive capacity of this particular exports sector in Kenya. Thus, analyzing Kenya's manufacturing

exports within the gravity model using disaggregated data of specific sectors can also be considered in future studies.

The present study is unable to indicate with which countries Kenya has unexploited manufacturing export potentials and those with which it has exhausted its potential. A consideration of this in future studies would help the nation to identify the countries in which there exist high prospects for expanding Kenya's manufacturing exports in order to maximize its gains from the same.

The current study analyzed the effect of hard infrastructure on Kenya's manufactured exports to COMESA, based on this, future study can be done to analyze the effect of soft infrastructure on Kenya's manufactured exports and other trade flows to COMESA and other Kenya's trading partners therefore a study should be done to fill this gap.

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APPENDICES

APPENDIX 1: RANDOM EFFECTS GLS REGRESSION

Random Effects GLS Regression		Number of Observations		200
Group Variable	Year	Number of Groups		12
		Observation per group		
		Minimum		16
R^2 Within	0.4212	Average		16.7
R^2 Between	0.7593	Maximum		17.0
R^2 Overall	0.4246	Wald chi2(6)		142.40
Corr($\mu\_i, X\beta$) = 0 (assumed)		Prob > chi2		0.0000
Log of Manufactured exports	Coefficient	Std. Error	z	P > |t|
Log of Human Capital Development	0.1176	0.0359	3.2700	0.0001
Log of foreign direct investment	2.8132	0.6590	4.2700	0.0000
Log of Infrastructure Development	0.4578	0.1505	3.0400	0.0002
Log of Distance	-1.1256	0.2469	-4.5600	0.0000
Neighboring countries	1.4416	0.3379	4.2700	0.0000
Common colony	-0.8102	0.2233	-3.6300	0.0000
Constant	- 23.7220	2.4626	-9.6300	0.0000
Sigma_u	0.0			
Sigma_e	1.1623			
Rho	0			

Table A1 Random Effects Regression Model

Source: Author's survey data, 2019

APPENDIX 2: NORMALITY TEST

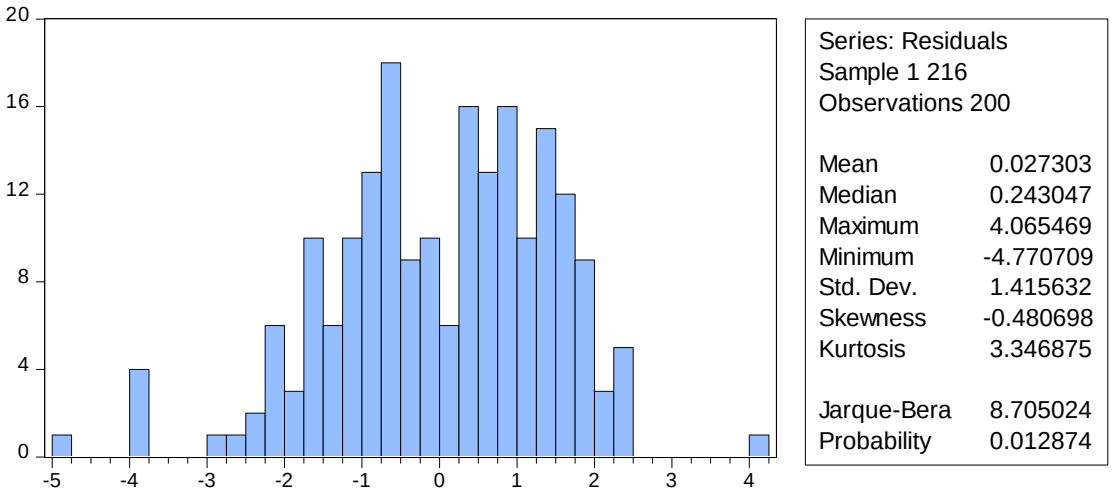

Figure 4.6: Normal Distribution Diagram.

Source: Author's Computation, 2019

APPENDIX 3: SERIAL CORRELATION

Table 4.9: Serial Correlation Results

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	6.331001	Prob. F(2,191)	0.0022
Obs*R-squared	12.43433	Prob. Chi-Square(2)	0.0020

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LHCD	0.139886	0.643481	0.217390	0.8281
LFDI	0.023165	0.035815	0.646787	0.5185
LID	0.115630	0.151535	0.763057	0.4464
LDIS	-0.015800	0.245284	-0.064415	0.9487
DVNC	0.004094	0.341214	0.011997	0.9904
DVCC	0.052327	0.225203	0.232356	0.8165
C	-0.766433	2.438957	-0.314246	0.7537
RESID(-1)	-0.222155	0.081965	-2.710368	0.0073
RESID(-2)	0.047967	0.083799	0.572411	0.5677

R-squared	0.062172	Mean dependent var	1.66E-15
Adjusted R-squared	0.022891	S.D. dependent var	1.163543
S.E. of regression	1.150149	Akaike info criterion	3.161616
Sum squared residual	252.6629	Schwarz criterion	3.310040
Log likelihood	-307.1616	Hannan-Quinn criterion.	3.221681
F-statistic	1.582750	Durbin-Watson stat	1.996044
Prob(F-statistic)	0.132200		

Source: Author's Computation, 2019

APPENDIX 4: HETEROSCEDASTICITY RESULTS

Table 4.10: Heteroscedasticity Results

Heteroscedasticity Test: Breusch-Pagan-Godfrey				
F-statistic	4.158749	Prob. F (6,193)		0.0006
Obs*R-squared	22.89719	Prob. Chi-Square (6)		0.0008
Scaled explained SS	31.65482	Prob. Chi-Square (6)		0.0000
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.380823	4.634431	-0.945278	0.3457
LHCD	1.634767	1.240225	0.318122	0.1890
LFDI	0.145707	0.067630	2.154483	0.0324
LID	0.207601	0.283243	0.732944	0.4645
LDIS	0.834050	0.464673	1.794918	0.0742
DVNC	0.325883	0.635825	0.512535	0.6089
DVCC	1.026226	0.420276	2.441793	0.0155
R-squared	0.114486	Mean dependent var		1.347064
Adjusted R-squared	0.086957	S.D. dependent var		2.326983
S.E. of regression	2.223509	Akaike info criterion		4.470423
Sum squared residua	954.1903	Schwarz criterion		4.585864
Log likelihood	-440.0423	Hannan-Quinn criterion		4.517140
F-statistic	4.158749	Durbin-Watson stat		1.868102
Prob(F-statistic)	0.000591			

Source: Author's Computation, 2019

APPENDIX 5: MAP OF COMESA

Source: COMESA website

APPENDIX 6: COMESA COUNTRIES

<table>
<tr><th>Hone of Africa</th><th>African Great Lakes</th><th>Former members</th></tr>
<tr><td>  Djibouti
  Eritrea
  Ethiopia</td><td>  Burundi
  Kenya
  Malawi
  Rwanda
  Uganda</td><td rowspan="5">  Lesotho
  Mozambique
  Tanzania
  Namibia
  Angola</td></tr>
<tr><td>North Africa</td><td>Southern Africa</td></tr>
<tr><td rowspan="3">  Libya
  Sudan
  Comoros

Egypt
  Madagascar
  Mauritius
  Seychelles</td><td>  Eswatini (Swaziland)
  Zambia
  Zimbabwe</td></tr>
<tr><td>Central Africa</td></tr>
<tr><td>  Democratic Republic of the Congo</td></tr>
</table>

Source: COMESA website

APPENDIX 7: DATA SET USED IN THE ANALYSIS

Year	ID	CTR	MXP	HDI	FDI	IDI	DIS	DVNC	DVCC
2005	1	BUR	1264320	0.32	1.20E+07	14.21	859	0	0
2006	1	BUR	1175788	0.34	5.60E+06	14.35	859	0	0
2007	1	BUR	1206098	0.35	430423	13.87	859	0	0
2008	1	BUR	1977511	0.36	1.40E+08	13.94	859	0	0
2009	1	BUR	2093231	0.37	3.40E+06	13.97	859	0	0
2010	1	BUR	2196541	0.38	6.50E+08	14.02	859	0	0
2011	1	BUR	2358291	0.38	2.30E+07	14.15	859	0	0
2012	1	BUR	2358291	0.39	2.60E+08	14.3	859	0	0
2013	1	BUR	1593175	0.39	2.80E+07	14.57	859	0	0
2014	1	BUR	1975733	0.42	15000000.00	14.53	859	0	0
2015	1	BUR	1784454	0.41	5900000.00	14.6	859	0	0
2016	1	BUR	1975733	0.41	350000000.00	14.63	859	0	0
2005	2	COM	61161	0.46	4.80E+07	18.49	1357	0	1
2006	2	COM	111552	0.47	7.10E+08	18.64	1357	0	1
2007	2	COM	77479	0.47	9.20E+07	19.05	1357	0	1
2008	2	COM	383511	0.47	1.80E+08	19.57	1357	0	1
2009	2	COM	35666	0.48	3.00E+08	19.82	1357	0	1
2010	2	COM	109960	0.48	2.60E+07	20.02	1357	0	1
2011	2	COM	133763	0.48	4618.43	20.26	1357	0	1
2012	2	COM	133763	0.49	1.10E+07	20.47	1357	0	1
2013	2	COM	74086	0.49	793760	20.95	1357	0	1
2014	2	COM	133763	0.50	390000000.00	21.64	1357	0	1
2015	2	COM	133763	0.50	14000000.00	22.03	1357	0	1
2016	2	COM	74086	0.50	240000000.00	22.12	1357	0	1
2005	3	DRC	2874877	0.53	2.50E+07	4.27	2413	0	0
2006	3	DRC	6281409	0.54	4.70E+08	4.48	2413	0	0
2007	3	DRC	2742281	0.54	8.20E+07	4.81	2413	0	0
2008	3	DRC	389525	0.55	1.30E+07	5.06	2413	0	0
2009	3	DRC	4154953	0.56	8.30E+07	5.44	2413	0	0
2010	3	DRC	4517120	0.57	3.40E+08	5.96	2413	0	0
2011	3	DRC	6473875	0.55	5.80E+07	6.46	2413	0	0
2012	3	DRC	6473875	0.56	1.30E+09	6.56	2413	0	0
2013	3	DRC	6578141	0.56	6.10E+07	6.81	2413	0	0
2014	3	DRC	6473875	0.60	200000000.00	7.57	2413	0	0
2015	3	DRC	6473875	0.61	350000000.00	8.09	2413	0	0
2016	3	DRC	6578141	0.61	3800000.00	8.16	2413	0	0
2005	4	DJB	954217	0.41	44509	19.40	1593	0	0
2006	4	DJB	889323	0.42	1.50E+07	19.28	1593	0	0
2007	4	DJB	944060	0.43	671354	19.45	1593	0	0
2008	4	DJB	808475	0.44	4.10E+08	19.74	1593	0	0
2009	4	DJB	922653	0.44	3.90E+07	19.84	1593	0	0
2010	4	DJB	1021125	0.45	1.30E+09	20.41	1593	0	0
2011	4	DJB	1058322	0.46	2.40E+07	21.1	1593	0	0
2012	4	DJB	1058322	0.46	5.50E+08	22.15	1593	0	0
2013	4	DJB	8428516	0.47	4.60E+07	23.45	1593	0	0
2014	4	DJB	1058322	0.47	53000000.00	23.44	1593	0	0

2015	4	DJB	1058322	0.47	130000000.00	23.95	1593	0	0
2016	4	DJB	8428516	0.47	240000000.00	23.93	1593	0	0
2005	5	EGY	2839	0.64	3.80E+07	45.08	3531	0	1
2006	5	EGY	461828	0.65	1.50E+09	45.90	3531	0	1
2007	5	EGY	60235	0.66	7.00E+07	46.82	3531	0	1
2008	5	EGY	114291	0.67	3.00E+08	51.19	3531	0	1
2009	5	EGY	16179	0.67	3.90E+08	53.14	3531	0	1
2010	5	EGY	114291	0.68	8.70E+06	56.57	3531	0	1
2011	5	EGY	617627	0.68	584702	61.79	3531	0	1
2012	5	EGY	617627	0.68	1.00E+07	70.18	3531	0	1
2013	5	EGY	201291	0.68	558643	77.76	3531	0	1
2014	5	EGY	617627	0.68	170000000.00	81.12	3531	0	1
2015	5	EGY	617627	0.69	22000000.00	85.62	3531	0	1
2016	5	EGY	201291	0.69	5400000000.00	85.66	3531	0	1
2005	6	ETH	902708	0.34	1.40E+06	1.12	1165	0	0
2006	6	ETH	1659965	0.36	2.70E+08	1.56	1165	0	0
2007	6	ETH	1369295	0.38	2.10E+07	1.96	1165	0	0
2008	6	ETH	1598586	0.39	8.50E+07	2.43	1165	0	0
2009	6	ETH	2315955	0.4	1.40E+08	2.99	1165	0	0
2010	6	ETH	2437333	0.41	1.20E+08	3.55	1165	0	0
2011	6	ETH	2356867	0.42	8.10E+07	3.99	1165	0	0
2012	6	ETH	2429143	0.43	1.60E+09	4.62	1165	0	0
2013	6	ETH	1529836	0.44	4.60E+07	5.37	1165	0	0
2014	6	ETH	2356867	0.44	380000000.00	6.44	1165	0	0
2015	6	ETH	2429143	0.45	360000000.00	7.38	1165	0	0
2016	6	ETH	1529836	0.46	100000000.00	7.56	1165	0	0
2005	7	KEN		0.48	31593.8	8.53	0	0	1
2006	7	KEN		0.49	3.50E+07	8.96	0	0	1
2007	7	KEN		0.50	777728.00	9.42	0	0	1
2008	7	KEN		0.51	2.40E+08	9.91	0	0	1
2009	7	KEN		0.52	1.10E+08	11.49	0	0	1
2010	7	KEN		0.52	1.00E+10	12.01	0	0	1
2011	7	KEN		0.53	1.50E+07	12.98	0	0	1
2012	7	KEN		0.53	5.50E+08	16.23	0	0	1
2013	7	KEN		0.54	5.10E+07	18.43	0	0	1
2014	7	KEN		0.57	290000000.00	21.85	0	0	1
2015	7	KEN		0.58	36000000.00	24.00	0	0	1
2016	7	KEN		0.58	190000000.00	24.37	0	0	1
2005	8	LBY	954217	0.77	1.40E+08	50.86	4535	0	1
2006	8	LBY	889323	0.78	1.80E+09	51.64	4535	0	1
2007	8	LBY	944060	0.78	1.20E+08	52.54	4535	0	1
2008	8	LBY	808475	0.79	6.40E+08	54.95	4535	0	1
2009	8	LBY	922653	0.79	6.20E+08	57.51	4535	0	1
2010	8	LBY	1021125	0.8	4.00E+07	58.63	4535	0	1
2011	8	LBY	1058322	0.75	500245	64.4	4535	0	1
2012	8	LBY	1058322	0.79	5.70E+07	68.96	4535	0	1
2013	8	LBY	8428516	0.78	7.70E+06	71.37	4535	0	1
2014	8	LBY	1058322	0.69	1800000000.00	73.45	4535	0	1
2015	8	LBY	1058322	0.69	200000000.00	77.67	4535	0	1

2016	8	LBY	8428516	0.69	12000000000.00	77.79	4535	0	1
2005	9	MDG	954217	0.47	7.20E+06	3.46	2280	0	0
2006	9	MDG	889323	0.48	2.20E+08	3.62	2280	0	0
2007	9	MDG	944060	0.48	7.30E+08	3.81	2280	0	0
2008	9	MDG	808475	0.49	7.70E+08	4.09	2280	0	0
2009	9	MDG	922653	0.50	120000000.00	4.39	2280	0	0
2010	9	MDG	1021125	0.49	4.20E+08	4.83	2280	0	0
2011	9	MDG	1058322	0.49	1.80E+08	5.79	2280	0	0
2012	9	MDG	1058322	0.50	1500000000.00	6.34	2280	0	0
2013	9	MDG	8428516	0.50	37000000.00	6.6	2280	0	0
2014	9	MDG	1058322	0.51	790000000.00	7.47	2280	0	0
2015	9	MDG	1058322	0.51	1300000000.00	8.17	2280	0	0
2016	9	MDG	8428516	0.52	69000000.00	8.45	2280	0	0
2005	10	MLW	906841	0.37	3.80E+06	12.24	1451	0	1
2006	10	MLW	1250854	0.38	1.20E+08	12.50	1451	0	1
2007	10	MLW	1263703	0.38	4.60E+06	12.86	1451	0	1
2008	10	MLW	1633735	0.4	1.70E+09	13.32	1451	0	1
2009	10	MLW	1738732	0.41	2.30E+08	13.78	1451	0	1
2010	10	MLW	2142977	0.41	9.50E+09	14.33	1451	0	1
2011	10	MLW	3695738	0.41	3.90E+07	14.81	1451	0	1
2012	10	MLW	3695738	0.41	1.10E+08	15.42	1451	0	1
2013	10	MLW	1591333	0.41	9.60E+07	16.45	1451	0	1
2014	10	MLW	3695738	0.47	1200000000.00	17.14	1451	0	1
2015	10	MLW	3695738	0.47	200000000.00	18.01	1451	0	1
2016	10	MLW	1591333	0.47	560000000.00	18.45	1451	0	1
2005	11	MUS	135244	0.72	1.80E+08	44.51	3074	0	1
2006	11	MUS	465838	0.73	1.70E+09	46.19	3074	0	1
2007	11	MUS	414955	0.74	1.10E+08	47.26	3074	0	1
2008	11	MUS	58951	0.74	7.30E+08	48.75	3074	0	1
2009	11	MUS	792654	0.75	9.40E+08	53.25	3074	0	1
2010	11	MUS	888430	0.75	5.20E+07	54.02	3074	0	1
2011	11	MUS	977711	0.76	348405	58.92	3074	0	1
2012	11	MUS	977711	0.77	4.20E+07	63.17	3074	0	1
2013	11	MUS	87954	0.77	1.40E+07	67.01	3074	0	1
2014	11	MUS	977711	0.78	280000000.00	71.21	3074	0	1
2015	11	MUS	977711	0.78	97000000.00	74.28	3074	0	1
2016	11	MUS	87954	0.79	6700000000.00	74.08	3074	0	1
2005	12	RWD	1298978	0.39	9.10E+07	13.96	753	0	0
2006	12	RWD	1600844	0.41	2.20E+08	13.95	753	0	0
2007	12	RWD	2135706	0.42	1.20E+08	14.98	753	0	0
2008	12	RWD	2520261	0.43	1.10E+09	15.15	753	0	0
2009	12	RWD	4200580	0.44	4.90E+07	15.42	753	0	0
2010	12	RWD	3815559	0.45	9.00E+08	15.9	753	0	0
2011	12	RWD	5623368	0.46	1.70E+08	16.78	753	0	0
2012	12	RWD	5623368	0.50	1700000000.00	18.07	753	0	0
2013	12	RWD	4614366	0.51	6.60E+07	18.65	753	0	0
2014	12	RWD	5623368	0.51	840000000.00	19.52	753	0	0

2015	12	RWD	5623368	0.51	690000000.00	20.45	753	0	0
2016	12	RWD	4614366	0.52	110000000.00	20.45	753	0	0
2005	13	SYC	954217	0.76	780582	50.86	2101	0	0
2006	13	SYC	889323	0.76	6.20E+07	56.29	2101	0	0
2007	13	SYC	944060	0.76	8.30E+06	59.78	2101	0	0
2008	13	SYC	808475	0.77	2.70E+09	63.54	2101	0	0
2009	13	SYC	922653	0.74	3.70E+07	70.52	2101	0	0
2010	13	SYC	1021125	0.76	6.40E+09	73.82	2101	0	0
2011	13	SYC	1058322	0.75	9.10E+07	73.82	2101	0	0
2012	13	SYC	1058322	0.75	2.90E+08	77.99	2101	0	0
2013	13	SYC	8428516	0.76	1.80E+08	84.41	2101	0	0
2014	13	SYC	1058322	0.79	810000000.00	89.57	2101	0	0
2015	13	SYC	1058322	0.79	97000000.00	90.79	2101	0	0
2016	13	SYC	8428516	0.79	1300000000.00	93.93	2101	0	0
2005	14	SUD	1185259	0.42	1.60E+08	7.24	1934	1	1
2006	14	SUD	1658823	0.43	2.10E+09	7.36	1934	1	1
2007	14	SUD	1591816	0.44	1.40E+08	7.35	1934	1	1
2008	14	SUD	1770048	0.45	5.40E+08	7.52	1934	1	1
2009	14	SUD	3292257	0.46	1.70E+09	9.16	1934	1	1
2010	14	SUD	4754636	0.46	1.70E+08	9.89	1934	1	1
2011	14	SUD	5507601	0.47	3.40E+06	10.9	1934	1	1
2012	14	SUD	5507601	0.47	3.70E+07	11.2	1934	1	1
2013	14	SUD	307760	0.47	2.30E+07	13.21	1934	1	1
2014	14	SUD	5507601	0.49	1600000000.00	13.71	1934	1	1
2015	14	SUD	5507601	0.50	79000000.00	14.60	1934	1	1
2016	14	SUD	307760	0.50	480000000.00	14.67	1934	1	1
2005	15	SWA	954217	0.50	39000000.00	14.78	2846	0	1
2006	15	SWA	889323	0.51	6.30E+08	14.90	2846	0	1
2007	15	SWA	944060	0.51	3.40E+08	15.41	2846	0	1
2008	15	SWA	808475	0.52	8.10E+08	16.32	2846	0	1
2009	15	SWA	922653	0.52	1.30E+08	16.94	2846	0	1
2010	15	SWA	1021125	0.53	3.60E+09	17.89	2846	0	1
2011	15	SWA	1058322	0.53	1.40E+08	19.34	2846	0	1
2012	15	SWA	1058322	0.53	2.30E+09	20.96	2846	0	1
2013	15	SWA	8428516	0.53	9.30E+07	22.30	2846	0	1
2014	15	SWA	1058322	0.94	890000000.00	23.40	2846	0	1
2015	15	SWA	1058322	0.94	1100000000.00	24.70	2846	0	1
2016	15	SWA	8428516	0.94	390000000.00	24.63	2846	0	1
2005	16	UGA	12262340	0.43	604920	11.03	520	1	1
2006	16	UGA	10133629	0.44	7.10E+07	11.33	520	1	1
2007	16	UGA	14869758	0.45	1.00E+07	11.58	520	1	1
2008	16	UGA	18174194	0.46	2.90E+09	12.07	520	1	1
2009	16	UGA	22369785	0.47	1.10E+08	12.50	520	1	1
2010	16	UGA	22965446	0.47	2.80E+09	13.42	520	1	1
2011	16	UGA	32030697	0.48	4.10E+07	15.19	520	1	1
2012	16	UGA	32030697	0.48	2.80E+08	16.04	520	1	1
2013	16	UGA	23221588	0.48	2.60E+08	17.88	520	1	1
2014	16	UGA	32030697	0.50	810000000.00	18.61	520	1	1
2015	16	UGA	32030697	0.50	130000000.00	19.81	520	1	1

2016	16	UGA	23221588	0.51	5600000000.00	20.00	520	1	1
2005	17	ZMB	1049395	0.47	1.70E+08	15.03	1828	0	1
2006	17	ZMB	1715930	0.48	2.30E+09	15.25	1828	0	1
2007	17	ZMB	1747153	0.49	9.00E+07	15.65	1828	0	1
2008	17	ZMB	1520229	0.50	1200000000.00	16.31	1828	0	1
2009	17	ZMB	2097253	0.53	1.70E+09	17.04	1828	0	1
2010	17	ZMB	2155970	0.53	4.00E+08	17.57	1828	0	1
2011	17	ZMB	2504826	0.54	6.90E+06	18.07	1828	0	1
2012	17	ZMB	2504826	0.55	800000	18.86	1828	0	1
2013	17	ZMB	2660188	0.56	1.40E+07	20.13	1828	0	1
2014	17	ZMB	2504826	0.58	1700000000.00	20.87	1828	0	1
2015	17	ZMB	2504826	0.58	290000000.00	21.55	1828	0	1
2016	17	ZMB	2660188	0.59	5600000000.00	21.55	1828	0	1
2005	18	ZWE	62012	0.41	4.40E+07	20.15	1928	0	1
2006	18	ZWE	8574	0.42	9.50E+08	20.73	1928	0	1
2007	18	ZWE	32448	0.42	5.10E+08	21.21	1928	0	1
2008	18	ZWE	46210	0.42	8.40E+08	21.85	1928	0	1
2009	18	ZWE	168271	0.44	1.20E+08	21.45	1928	0	1
2010	18	ZWE	432664	0.46	6.70E+09	22.07	1928	0	1
2011	18	ZWE	976751	0.47	1.80E+08	21.81	1928	0	1
2012	18	ZWE	976751	0.48	2.20E+09	22.94	1928	0	1
2013	18	ZWE	989663	0.49	2.40E+07	24.72	1928	0	1
2014	18	ZWE	976751	0.52	1200000000.00	23.86	1928	0	1
2015	18	ZWE	976751	0.53	1800000000.00	24.17	1928	0	1
2016	18	ZWE	989663	0.53	400000000.00	24.15	1928	0	1

APPENDIX 8

Sum of Kenya's total Manufacturing Exports to COMESA Countries.

			∑
2005	7	KEN	2.7E+07
2006	7	KEN	3.1E+07
2007	7	KEN	3.2E+07
2008	7	KEN	3.4E+07
2009	7	KEN	4.8E+07
2010	7	KEN	5.2E+07
2011	7	KEN	6.7E+07
2012	7	KEN	6.9E+07
2013	7	KEN	8.4E+07
2014	7	KEN	6.8E+07
2015	7	KEN	6.9E+07
2016	7	KEN	8.6E+07