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Effect of Human Capital Development on Kenya's Manufacturing Exports to EAC Region

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Abstract

Manufacturing industries have played a significant role in boosting economic wellbeing in the world through accelerating and maintaining greater productivity growth, boosting employment options for semi-skilled workers, and increasing country competitiveness through exports. Kenya, like many other developing nations, is working to build a strong manufacturing industry. Agriculture and services have been the primary drivers of growth in the country. Historically, the manufacturing sector's contribution to Kenya's economy has remained constant at 10% of GDP, and in 2021, it was around 8.4 percent. As a result, the country has seen an early deindustrialization, as evidenced by the manufacturing sector's contribution to GDP, which was just 8.4% in 2021 and 9.2% in 2016. Boosting manufacturing sector results remains a key priority for Kenya, as evidenced by the slew of planned interventions for the industry that have been created over the years. The government has established Vision 2030, the Kenya Industrial Transformation Programme (KITP), and, most recently, the Big 4 Agenda to modernize the industrial sector. The major goal of this research was to see how human capital development (HCD) affected Kenya's manufactured exports to the East African Community (EAC). The specific goals was to examine the impact of human capital development on Kenya's manufacturing exports to the EAC region. The Gravity model was used as the theoretical framework for the study, which is based on the theory of international trade and employs a correlation research design that is ideal for dynamic panel data models. Each country's data for

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the study variables was obtained from the United Nations Conference on Trade and Development (UNCTAD), Kenya Nation Bureau of Statistics, World Bank Devel opment and African Development Bank for six EAC members for the period 2007–2021. Unit root test, Im-Pesaran and Shin, Levin-Li-Chu and Hadri LM tests were used in the study. The Im-Pesaran unit root test results at Levels indicated that all the variables except inflation had unit root at levels as indicated by the p-values>0.05. Hausman Test Results of fixed effect model indicated that Human development index (HDI) had a positive and significant effect on export with a (p-value 0.0300<0.05) and (β1=0.299147). The government of Kenya and other stakeholders should invest more in infrastructure and improve capital through education, training, health, and housing, according to this report, in order to increase labor productivity and boost manufacturing exports. Government supply-side policies, such as government subsidies and tax rebates, are recommended to lower production costs and attract and channel foreign direct investment (FDI) to more productive and comparative advantaged manufactured exports, thereby improving domestic producers' productive and export supply capacity, lowering inflation rates, and increasing efficiency.

Keywords: Manufacturing exports, human capital development, Gravity model, EAC fixed effect model, Hausmann Taylor,

1.1. Background of the study

Manufacturing is the process of enhancing the value of goods for use or sale through the use of labor, machines, equipment, chemicals, and biological processing (World Bank, 2018). Manufacturing is under a lot of strain right now, all across the world. Shorter product life cycles, the formation of new business models, the creation of new materials, and enhanced production methods have all contributed to increased competitive pressures at the firm level (IMF, 2021). Over much of the last few decades, the world economy's continuous globalization has been accompanied with typically strong expansion in international trade. Since 1990, the entire value of international goods and services trade has expanded six fold, to over $24 trillion in 2014. (UNCTAD, 2020). Manufacturing products account for more than half of global commerce ($13 trillion), and growth in these products has outpaced growth in natural resources and agricultural exports over the last decade (Loto,2018). Between 2005 and 2014, Asia had the highest annual average growth rate in manufacturing exports (8.3%), followed by Africa (7.4%), Europe (4.3%), the Americas (3.9%), and Oceania (2.7%). This shows that manufacturing exports remain a significant source of revenue in developing countries (IMF 2021).

Low growth in exports, particularly industrial exports, has been linked to the poor performance of many African economies in recent decades (AFDB,2019). However, according to (UNECA, 2019), between 2005 - 2014, manufacturing exports from Africa to other continents increased by 2%. For example, manufacturing exports from Africa as a whole increased by 10% on an annual basis in 14 out of 34 groups of the products, with the fastest growth in non-primary plastics (17.9 percent), telecommunication and sound recording apparatus (15.9 percent), chemical materials and products (14.5%), and specialized machinery (13.3 percent), Fertilizers and inorganic chemicals both have a content of more than 5%. (Songwe, Vera & Deborah, 2012). Similarly,

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Africa contributes for more than 4 percent of global exports of leather, leather manufacturing, and dressed Fur skins, as well as roughly 2% of global exports of garments and clothing accessories (Kireyev,2017). In contrast, the share of intra-African manufacturing exports in total African manufacturing export value increased by about 15 percent between 2005 and 2019, reaching 34% (UNECA, 2015). Intra-African manufacturing exports amounted to more than 70% of overall exports in Ghana, Rwanda, Tanzania, Uganda, and Zambia in 2014, and as high as 82 percent in Zambia. Ghana's intra-African share was also high in 2013, at 67.5 percent (Dinh, Palmade& Chandra, 2018).

Though manufacturing exports to other parts of the world have fluctuated significantly in recent years, Kenyan manufacturing exports have tended to rise from 1994 to 2018, peaking at 28.4 percent in 2019. Kenya's trade with East African countries fell from $1.26 billion in 2015 to $1.21 billion in 2016, owing to ongoing trade disputes with Tanzania and lower food production, beverages, tobacco, leather and related products, rubber and plastics, and non-metallic minerals, according to the Kenya National Bureau of Statistics (KNBS) Economic Survey 2018. Nonetheless, Kenya's manufacturing exports to the East African Community have declined. The value-added outputs of the manufacturing sector have been steadily increasing (Githuku,2010). This value increased by Ksh 210 billion between 2011 - 2017, and the Integrated National Exports Development and Promotion Strategy predicts that it would reach Sh2,235 trillion by 2022. (KNBS,2018). A competitive manufacturing sector will be critical if Kenya is to attain the 15% share of GDP target by 2022 as set out in the 'Big Four' agenda and accomplish its Vision 2030 economic pillar. This study sought to investigate how chosen macroeconomic aggregates (inflation, infrastructure, and human capital development) affect manufacturing exports to EAC over the study period.

1.1.2 Human capital development and manufacturing exports

Key locator of tomorrow's labor force was stated as Human Capital Development (ILO,2019). Currently, many countries are working to ensure that their funds are directed toward increasing the number of people available to work (ILO,2017). Human development is critical for a nations manufacturing export base to grow. Krugman's hypothesis that a more skilled labor force leads to an increased manufacturing exports has empirical support. Between 1963 and 1968, the New Trade Theory discovered a positive relationship between industrial exports and literacy rates in 36 developing countries. According to (Schultz, 2017), a skilled labor force that is inefficient could be a major impediment for countries attempting to develop a competitive manufacturing industry. According to (George,2019), the shortage of technicians, nurses, factory workers, and other non-professional personnel is more serious than the shortage of fully qualified professionals. This is due to the fact that a rapidly expanding industrial sector requires a large pool of semi-skilled and efficient workers to staff its plants and provide basic services such as transportation (Tyler, 2018). Some East Asian countries, notably, Hong Kong, Korea and Taiwan attribute a large portion of their manufacturing export success to their relatively high labor force quality (Donald 2018).

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The growth of a robust manufacturing base in Africa, as well as the transition away from primary manufactured exports, is largely due to the increasing number of educated people and innovation (Thomas,2017). The notion that HCD (Human Capital Development) are important factors in establishing a manufacturing export base has significant policy implications for developing countries, which have frequently overlooked physical capital development, particularly HCD. (Schultz,2017). The development of South Africa's human capital has been linked to an increase in industrial exports. South Africa boosts of the bests Universities and other tertiary institutions hence most investors in manufacturing sector. In Africa one would rather choose to invest in South Africa due to the availability of labor as opposed to other African nations (Berger, Buch, Ijsselmuiden, 2010). Similarly, in recent years Nigeria and Egypt rapid export growth has closely been associated with development in the composition of their human development index International Monetary Fund (IMF, 2019). Human capital development appears to be a particularly powerful driver of manufacturing export growth, thus it's reasonable to conclude that industrialization is inextricably linked to human capital development (Hausmann, Ricardo, Jason & Rodrik. 2018).

Kenya has taken progressive steps to achieve economic objectives, with a focus on the symbiotic relationship between (TVET) development and industrialization. For example, in 2017, the Kenya Association of Manufacturers (KAM) collaborated with the State Department of Vocational and Technical Training to launch a TVET Program with the goal of increasing economic and employment opportunities for Kenyan youths while also ensuring that local industry is ready to capitalize on the fourth industrial revolution with skilled labor (GoK, 2019). According to the KNBS (2018), 450 technical skills graduates have been placed in apprenticeship programs in industries across the country as a result of this initiative, while another 500 have received work readiness training. These are simply the first steps toward a larger goal agreed upon by industry and government to invest in TVET to aid Kenya's industrialization (Musamba,2010). Human capital development increases Kenya's export earnings because a healthy and skilled workforce is more productive in producing high-value manufactured items, thereby increasing the value of manufactured exports (Githuku, 2017). HCD for importing countries aids in the absorption of manufactured goods from Kenya because the populations in those countries have a high income and standard of living, resulting in the purchase of high-value manufactured goods. Most research work have focused on the impact of education on exports, with little attention paid to HCD, which includes education, health and living standards. As a result, determining the relationship between manufactured exports and human capital development needs to be looked into, which this current study endeavored to find out. The study looked into the impact of Kenya's human capital growth on manufactured exports to East African countries.

1.2 Statement of the problem

In developing economies, agriculture to manufacturing transition is widely regarded as the way to greater productivity as well as higher living standards. Almost two decades into the twenty-first century, industrial exports remain critical to global economic development and developing economies strive for stronger manufacturing growth, particularly through exports. Manufacturing

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value addition in Kenya has steadily declined as a percentage of GDP (gross domestic product), falling from 12 percent in 2008 to 9.2 percent in 2016 to 8.4 percent in 2021(KNBS, 2022). According to the Kenya Association of manufactures report (KAM,2022) inflation has been a major drawback in the growth of manufacturing sector coupled with inadequate connectivity to the rural areas. The decline of the manufacturing of export from 12% to 8.4% of GDP has been as a result of major macroeconomic factors including inflation, human capital development and infrastructural development (KAM,2021). Kenya's goal for the economic pillar of the Vision 2030 blueprint is to develop a strong, diverse and competitive manufacturing sector by 2030 in order to transform the country into a middle-income economy (GoK,2016). The Kenya's government big four programs from 2013-2022 emphasized the manufacturing sector and thus manufacturing exports, as a critical engine of economic growth and development. Its overall goal is to increase its GDP contribution by at least 15% by 2022 (AFDB,2022).

Many of the studies examined in this study addressed the expansion of manufacturing exports, though they primarily focused on wealthy and newly industrialized countries such as Brazil and Singapore. However, research on African countries has been limited, Dinh, Palmade, and Chandra (2012). Another research ought to be conducted on how inflation, human capital development and infrastructure development affect manufacturing exports of Kenya to member countries in the EAC region as a whole which this current study intended to fill this gap.

In Kenya, Kaimenyi and Ndung'u (2015) examined the macroeconomic effects on manufacturing exports to the COMESA region and the study revealed a strong relationship between FDI, Inflation and human capital development on the volume of Kenya's export to COMESA region. Njuru, (2020) and (Kamukunji,2017)examined the influence of macroeconomic factors on tea exports to Europe and discovered a strong connection between macroeconomic factors and tea exports. The studies done with respect macroeconomic effects to manufacturing exports are characterized by various research gaps. The studies largely concentrated on other regions. Similarly, studies done in Kenya were centered on exports from other sectors mainly Agricultural sector thus differing from manufacturing exports. The study by (Njuru,2020) and (Kamukunji,2017) focused on effects of macroeconomic variables on tea exports. As a result, little is known about the impact of inflation, human capital development, and infrastructure development on industrial exports in the EAC region. This was the rationale behind the study, which looked into the effects of inflation, human capital development, and infrastructure development on Kenya's industrial exports to the EAC region. This current study therefore fills the existing gap by establish the effects of macroeconomic variables on Kenya's manufacturing exports to the EAC community.

1.3 Objective of the study

The overall objective of the study was to find out the effects of macroeconomic variables on Kenya's manufacturing exports to EAC region from 2007-2021 Specifically the study sought to analyze the effect of human capital development on Kenya's manufacturing exports to EAC region.The study was based on the following hypothesis.

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Ho1 There is no statistically significant relationship between human Capital Development and Kenya's manufacturing exports to EAC region.

1.4 Significance of the Study

The study will be resourceful to various groups. Policy makers will find this study resourceful as it provides recommendations regarding the effects of macroeconomic variables on manufacturing exports. Findings of this study will be relevant to the following stakeholders involved in the manufacturing sector

The Kenya Association of Manufactures (KAM), Donors and government entities may find the findings of this study useful in the process of decision making because the findings of the study will form a basis of understanding on how inflation, infrastructural development and human capital development in Kenya affects the manufacturing exports. The study will be relevant to potential investors and existing investors who would want to be invest in manufacturing exports. The findings of the study may help them to identify the level of human capital and labor available in Kenya for their investments

1.5 Scope of the Study

The study focused on effect of human capital development on Kenya's manufacturing exports to EAC region over a 15-year period, from 2007 to 2021. Kenya witnessed post-election violence in 2007, which had a notable influence on manufacturing exports to EAC members, which is why 2007 was chosen as the starting year. Similarly, between 2007 and 2021.The six countries of EAC are the target for study because of their proximity to each other, such that their cross-border trade can be quantified, for example the Uganda market so big that most goods from Kenya go to Uganda. Lastly, updated data for the period under study was available hence giving accurate result for the study. The EAC is located between latitudes 12^0N and 10^0S, and Longitude 24^0W and 43^0E.

1.6 Theoretical framework

The gravity model has been used to explain origin-destination (Ij) flows such as international or regional trade, transportation flows, population movement, commodity flows, and information flows. The gravity model is based on Newton's gravitational theory and uses the concept of gravitational pull to explain the volume of global trade, financial movements and migration. According to Newton's theory, the force of attraction between two independent entities I and j is proportional to their respective masses and inversely proportional to the square of their distance, as indicated in equation 1.61.

$$F_{ij} = \frac{GM_iM_j}{D_{ij}^2} \quad \text{..... (1.61)}$$

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

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The gravitational force in Newton's law is replaced by trade flows or exports from country I to country j in the gravity model of international trade, while GDP is used as a proxy for a country's mass, and distance is often measured using 'great circle' calculations in accordance with equation 1.1. The gravity model of international trade between countries is represented by equation 1.62

$$X_{ij} = \frac{KY_i^{\alpha} Y_j^{\beta}}{T_{ij}^{\theta}} \quad \text{..... (1.62)}$$

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 $\alpha=\beta=1$ and $\theta=2$, we get the Newton's law.

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

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

The amount of exports between pairs of countries, Xij, is a function of their incomes (GDPs), population, geographical distance, and a set of dummies, according to the generalized gravity model of commerce. The following is the generic gravity model:

$$X_{ij} = \beta_0 Y_i^{\beta_1} Y_j^{\beta_2} N_i^{\beta_3} N_i^{\beta_4} D_{ij}^{\beta_5} A_{ij}^{\beta_6} DU_{ij}^{\beta_7} \quad \text{..... (1.64)}$$

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

$$LnX_{ij} = \beta_0 + \beta_1 lnY_i + \beta_2 lnY_j + \beta_3 lnN_i + \beta_4 lnN_j - \beta_5 lnD_{ij} + \beta_6 lnA_{ij} + \beta_7 lnDU_{ij} \ldots$$
…….. (1.65)

2.0 Literature review

A number of studies have attempted to account for the individual characteristics of employees employed by exporting firms using matched firm and worker data. For example, (Baumgarten, 2013) looked into the role of exporting establishments in explaining rising wage disparities, (Blanchard, 2015) looked into globalization and Human Capital Investment: Export Composition Drives Educational Attainment, and (Fonchamnyo, 2014) looked into the determinants of manufacturing firms' export propensity and intensity. According to the findings, most studies

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focused on educational attainment and exports, with little emphasis placed on HCD, which combines education, health, and living conditions. As a result, determining the relationship between manufactured exports and human capital development is impossible. This justifies research into the impact of human capital development on Kenyan manufactured exports to the EAC region.

Emily Blanchard and William Olney (2017) investigated how educational attainment (Human capital development) responds to changes in a country's export pattern that are exogenously driven, with the goal of learning more about how human capital investment responds to production patterns in various industries. Using a Gravity model technique on a panel data set spanning 104 countries and 45 years, they discovered export volatility that is unrelated to domestic factors. Educational attainment decreased with agricultural exports, increased with unskilled intensive manufacturing exports, and decreased with skill-intensive manufacturing exports, according to the data. They discovered that the results were strongest where they were most predicted and were unaffected by a variety of extensions and sensitivity checks. The findings had far-reaching policy implications.

While the benefits of international trade have been widely emphasized, attention has been drawn to the more complex question of which types of exports are most beneficial for human capital development. Given that the majority of countries were already integrated into global markets, the pertinent policy question was how to engage in international trade as effectively as possible; the findings suggested that exporting skill-intensive goods had significant long-term benefits through an empirically demonstrated increase in human capital. Because none of the countries studied in the study are from the EAC region, the findings cannot be extrapolated to the region, necessitating a regional study like the one provided by this study. As a result, they discovered empirical support for (Bajona & Kehoe, 2010) and others' concern that trade could exacerbate economic inequities by influencing educational attainment. The findings suggest that developing countries that export low-skilled goods may see a drop in average educational attainment. This process, according to Jones (2014), may jeopardize development because human capital is a primary driver of economic success. Similarly, industrialized countries exporting high-skilled goods may see an increase in educational attainment, bolstering their initial economic advantages. These are serious implications that must be investigated further.

Razak (2019) looked into Morocco's export wage premium. Despite the fact that Moroccan exporters pay more, the study discovered that this is due in large part to their larger workforce and greater capital investment. He also discovers that when working for exporters, there is little evidence that educated workers earn more than illiterate workers. He believes that this demonstrates Morocco's export success is dependent on a plentiful supply of low-wage, unskilled female labor. Given the importance of Spain and the European Union as Moroccan export customers, traditional comparative advantage appears to account for Moroccan experience more effectively than trade models that emphasize human capital and technology transfer. In six Sub-Saharan African countries, Milner and Tandrayen (2017) discovered a link between workers' export status and individual earnings. When they broke it down by export destination, they

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discovered that exporting outside of Africa results in a negative wage premium, whereas exporting within Africa results in a positive wage premium.

One reason, they believe, is that regional trade rules and natural barriers frequently protect African markets, making them less competitive. Competitive pressure keeps salaries modest in global marketplaces, but there is no such discipline in the less competitive regional market.

(Verhoogen, 2008) and Brambilla, Lederman, and Porto (2009) investigate Verhoogen's quality upgrading hypothesis. Verhoogen uses panel data at the plant level to demonstrate how the Mexican peso depreciation in December 1994 increased wage disparity within the industry by driving quality upgrading. Export destination and quality (and thus earnings) are linked, according to Brambilla, Lederman, and Porto (2009). They argue that exporting to high-income countries necessitates skill-intensive quality improvements, resulting in higher pay for skilled workers. They put this theory to the test by identifying a panel of Argentine industrial enterprises as well as the depreciation of the Brazilian currency in 1999. Only businesses that export to high-income countries pay higher wages than those that sell to neighboring countries or focus on their domestic market, according to the study.

2.1 Theoretical literature review

The study was majorly guided by the Neo-classical theory of and the Economic theory of Production and Distribution. These theories explain how manufacturing exports is affected by human capital development as discussed below;

2.1.1 Neoclassical Theory of investment

According to Cockcroft and Riddell's (2020) neoclassical theory of investment, the inflow of investment into a country is influenced by factors such as macroeconomic policies and taxation. According to the hypothesis, FDI inflows boost capital growth in an economy both directly and indirectly through technology transfers, R&D, the introduction of new types of human capital, industry growth, and infrastructure development. Multinational Enterprises will be drawn to countries that have appropriate policies in place, such as tax breaks, quick in getting licenses and launching businesses, and improved infrastructure, resulting in increased investment and employment in the host country (George, 2019). When a country's employment rate rises, the host country's income per capita rises, implying that more people will seek better living conditions through better housing and other important social amenities such as improved education, recreation, and health centers (Francois, 2017) These requirements lead to enhanced infrastructure development and industrialization in the long run (Baumgarten, 2018).

2.1.2 Economic theory of Production and Distribution

Human Capital is so important in economic theory of production and distribution that it is only natural that it should also be important in economic theory of growth and industrialization Chiswick (2018). Human capital investment delivers a three-fold contribution. First, having more capital allows for the adoption of what Chiswick refers to as a "more circular" mode of manufacturing. This necessitates the employment of more durable tools in the manufacturing

process. Second, human capital investment is an essential component of industrialization. This is the process by which capital deepens rather than spreads, resulting in the industrialization of more and more areas of the production process. Third, this results in a shift in trade and consumption patterns toward manufactured commodities and services. Historically, these processes of changing trade and consumption patterns have been linked to greater living standards and trade terms for a specific economy. In his paper, Chiswick uses a variety of empirical studies to back up his claim that there is a positive relationship between human capital investment, capital goods, and industrialization. The level of per capita income in an economy is a key determinant of a country's ability to foster a thriving manufacturing exports industry. A country with a higher per capita income has a better chance of developing and maintaining an effective manufacturing industry. William Olney (2014).

3.0 Research Methodology

3.1 Data collection methods

The study used secondary data. Annual time series data of Kenya's manufacturing exports to east Africa was obtained from Kenya Association of Manufactures (KAM).Data on human capital development was obtained from the website database of the United Nations Development Program and Kenya National Bureau of Statistics (KNBS) using triangulation method for the period 2007-2021. It was calculated as an index and standardized for logarithms by multiplying by a factor of one hundred.

3.2 Model specification

The study employed a stochastic model as an empirical model for the study (Gilbert, Scollay, & Bora, 2001). The goal of the model, among other things, was to see if joining the Regional Trade Agreement (RTA) would result in more trade creation (this was carried out using dummy variables to capture participation in RTAs). The study comprised a sample of six nations that are Kenya's commercial partners (including Kenya). The empirical model utilized in this study was stated as follows by amending model (1.5) to include the variables of inflation (INF), human capital development (HCD), and infrastructure development (ID) and following Gilbert et al. (2015):

$$LnMXP_{ijt} = \alpha_{ijt} + \beta_3 LnHDI_{ijt} + \beta_4 LnD_{ijt} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.1)$$

Where: Ln denotes in natural logs. α_{ij}Is a constant. HDI_{ij} is the variables of the study as per the objectives, D_{ij} is the distance from country i (exporting country-kenya) to j (importing EAC member country) at time *t*.

The expected signs of coefficient of D_{ijt} is negative while $HDI_{ijt}$is 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.

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The distance between two nations (in kilometers between Kenya's capital city and that of a trading partner) was an essential element in shaping trade patterns and was used as a proxy for transaction costs. A country's trade is substantial if the benefits from trade outweigh the expenses of achieving those benefits. The more the transaction costs, the greater the distance. Trade flows and distance were expected to have a negative relationship. Transaction costs may be such that trade does not increase beyond a certain distance.

In regression analysis, a dummy variable is one that has the values 0 or 1 to indicate the presence or absence of a categorical effect that could influence the outcome. When the dummy is set to 1, its coefficient serves to change the variables that are included in the regression model in the same way that quantitative variables are. The first dummy variable is Neighboring Countries (DVNC), which is one if the country is a neighbor of Kenya and zero otherwise, and the second dummy variable is Common Colony (DVCC), which is one if both countries were colonized by the same colonizer and zero otherwise. The coefficient is assumed to be positive.

3.3 Measurement of variables

Manufacturing Exports in Kenya (MXP) -Manufacturing is the added-value production of goods for use or sale using labor, machines, tools, chemicals, and biological processing. This data came from statistical abstracts published by Kenya's National Bureau of Statistics (KNBS). It is denominated in US dollars.

Human Capital Development (HCD) is a measure of a country's living standards in terms of health, education, and life expectancy. This information was obtained from the website of the United Nations Development Program. It is calculated as an index. It was standardized for logarithms by multiplying by a factor of one hundred.

Distance (DIS): The geographical distance in kilometers (km) between Kenya's economic centers (capital cities) and its trading partners as the bird flies. World Bank Statistics, a distance calculator website, was used to obtain distance information.

3.4 Research design

A research design is a collection of methodologies and procedures for determining and evaluating variables as specified in a research challenge (Burns and Groove, 2016). The design of a study specifies the type of study, research problem, data collection techniques, and statistical analysis. It's a method for determining the answers to research questions (Mugenda, 2013). A correlation panel research design was used in this study. Researchers utilize this research design when they sample a group, or panel, of individuals and then test some variables of interest from this sample at multiple points in time. It gives empirical evidence that two or more variables are connected, as well as the direction of the relationship, allowing for a more in-depth analysis of the data (Gujarati, 2017).

3.5 Random Effects vs. Fixed Effects Estimation

Both the RE and FE estimators can consistently estimate the random effects model. We prefer the RE estimator if we are confident that the individual-specific effect is truly unrelated (RE1). A

(Durbin-Wu-) Hausmann test is commonly used to test this. The Hausmann test, on the other hand, is only valid in the presence of homoscedasticity and cannot account for time-dependent effects. The unrelatedness assumption (*RE1*) is better tested by running an auxiliary regression (Wooldridge 2010, p. 332, eq. 10.88, Mundlak, 1978):

$$y_{it} = \alpha + x_{it}'\beta + z_i'\gamma + \bar{x}_i'\lambda + \delta_t + u_{it} \quad \text{(3.51)}$$

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: RE1 is a very strong assumption, and the FE estimator is almost always much more convincing than the RE estimator. Accepting RE1 despite not rejecting it is not the same as accepting it. The desire to understand the effect of time-invariant variables is not a sufficient reason to employ the RE estimator (Baltagi, 2008).

$$Y_{it} = \beta X_{it} + \varepsilon_{it} \quad \text{(3.52)}$$

Where $i = 1,2,\cdots,N$ the number of observations selected firms is 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;

$$\begin{bmatrix} Y_1 \\ Y_2 \\ \vdots \\ Y_7 \end{bmatrix} = \begin{bmatrix} X_1 \\ X_2 \\ \vdots \\ X_7 \end{bmatrix} \beta + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_7 \end{bmatrix} \quad \text{(3.53)}$$

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

3.6 Hausman Test

Hausman and Taylor (1981) proposed the Hausman Taylor Method, which is superior to both the FEM and the REM in terms of estimating time invariant variables and addressing the problem of endogeneity (HTM). The unobserved individual heterogeneity is the source of potential endogeneity bias in gravity model estimations (Rault et al., 2009). HTM uses variables specified in a regression equation as instruments to solve the endogeneity problem. This removes the correlation between the explanatory variables and the unobserved individual effects, reducing the REM's utility in the gravity model context (Keith, 2006). Another advantage of HTM is that it is frequently difficult to find variables not specified in an equation that can serve as valid instruments for endogenous regressors. The Haussmann Taylor method was used to choose between fixed and random effect models.

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In a regression model, the Hausman test (also known as the Hausman specification test) detects endogenous regressors (predictor variables). The values of endogenous variables are determined by other variables in the system. The Hausman test can assist in deciding whether to use a fixed effects model or a random effects model. The null hypothesis states that the preferred model has random effects, while the alternate hypothesis states that the model has fixed effects. The tests essentially look to see if there is a relationship between the unique errors and the regressors in the model. The Hausman test estimates the following equation under the null hypothesis.;

$$H = (\beta^I - \beta^0)_{\backslash}\left(\Lambda^{SE}(\beta^0) - \Lambda^{SE}(\beta^I)\right)_{\dagger}(\beta^I - \beta^0) \quad \ldots\ldots\ldots\ldots\ldots(3.54)$$

3.7 Diagnostic Tests

This section presents diagnostic tests applied in this study. This included Multicollinearity, Heteroscedasticity Tests and Serial Correlation.

4.0 Results and discussion

Descriptive Statistics and Normality

The descriptive nature of the data was determined in order to detect outliers. Various statistical measures, such as mean, standard deviation, minima and maxima values, were used to describe the data.

According to the descriptive statistics results in Table 1, Kenya's manufactured exports had a logged mean of Ksh. 15.608 billion, a logged minimum of Ksh.12.151 billion, and a logged maximum of Ksh.19.717 billion, with a logged standard deviation of Ksh.2.099 billion.

Table 1: Descriptive Statistics Results

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
Log MXP	55	15.60808	2.098543	12.15074	19.71667
Log HDI	55	3.940571	.2591112	3.583519	4.543295
Log DIS	44	6.474741	0.2227396	0.222739	6.755769

Source: Stata computation 2021

The logged mean index for the human capital development was (3.940571). It has a logged minimum index of (3.583519) and a maximum index of (4.543295). It had a standard deviation index of (0.259112). The larger variance of mean from the standard deviation indicates that human capital development varies widely across east African countries. The reported distance was 0.222739 kilometers with a maximum of 6.755769 kilometers, indicating the city farthest away from Nairobi. This is the distance between Nairobi and Kigali, while the shortest distance between Nairobi and Nairobi was 0.222739. The standard deviation was less than the mean for

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the majority of the variables, indicating that there were no outliers and that the data had a normal distribution, according to the summary statistics.

4.2 Correlation Matrix

Pairwise correlation analysis was performed to determine the nature and direction of association between variables in this study, and the results are shown in table 2.

Table 2 Correlation matrix Results

	MXP	ID	DIS
Log MXP	1.0000		
Log HDI	0.3852*	1.0000	
	(0.0002)		
Log DIS	-0.0962*	0.5872*	1.0000
	(0.0344)	(0.0000)	

Source Stata 2021

***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, 2021)**

According to the correlation results in Table 2, the human capital development index and manufacturing exports had a positive correlation value of 0.3852*. The Kenya's manufactured exports to East Africa had a negative correlation with distance as indicated by a correlation value of -0.0962* The variables' p values are all p <0.05. Furthermore, the correlation between independent variables was significant, but none were greater than 0.8, indicating that the independent variables are not highly correlated, thereby ruling out multicollinearity.

4.3 Panel Unit Root Tests

After determining the nature of the data generation processes, the unit root among the time variant variables had to be tested. Manufactured Exports and human capital development unit root at levels are as summarized in Table 3 below

Table 3.: Im- Pesaran unit root test of unit Root at Levels

Variable	Z(t)	Prob> |t|	Critical Values 1%	5%	10%	Conclusion
lMXP	- 2.3353	0.0835	-2.540	-2.210	-2.060	Unit root
LHDI	-0.9640	0.8690	-2.540	-2.210	-2.060	Unit Root

Source: (Author, 2021)

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Table 4 Im- Pesaran unit root test of unit Root at first difference

Variable	Z(t)	Prob> |t|	Critical Values 1%	5%	10%	Conclusion
lMXP	-3.7989	0.0016	-2.660	-2.280	-2.100	Stationary
LHDI	-3.0893	0.0044	-2.790	-2.280	-2.006	Stationary

According to the Im – Pesaran panel unit test results in table 3 above, all variables' data contained unit. Manufacturing Export had a unit root at levels (p-value 0.0835> 0.0500) and human capital Development Index had a unit root at levels (p-value 0.8690 > 0.0500). This meant that the null hypothesis of unit root data was accepted and the alternative hypothesis of stationarity was rejected. This demonstrated that the variables contained unit roots at various levels. However, after the first difference all of the variables had (p-values<0.0500).According to the unit root test results in table 4 above, indicating that the series were stationary at first difference. As a result of rejecting the null hypothesis of a series with a unit root in favor of the alternative hypothesis of a series without a unit root, it was determined that the series were stationary at first difference.

4.4 Hausman Test

The Hausman test is a statistical hypothesis test that compares an estimator's consistency to that of another, less efficient estimator that is known to be consistent (Hausman et al,2018). The Hausman test statistic was used to choose the best fixed effect and random effect panel regression models. The Hausman test's null hypothesis states that H0: the difference in coefficients is not systematic (random effect is appropriate). According to the Huasman test results in table 4.5 below, the Probability chi-square value was less than 0.05 (Prob>chi2 = 0.0261). This means that the random effect model is useless. As a result, the null hypothesis was rejected, which states that the difference in coefficients is not systematic (random effect is appropriate). Table 5 displays the Hausman Test results.

Table .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	0.299147	0.27818	0.020967	0.0877
Log of Distance	-7.5662	-7.31092	-0.25528	.

Source (STATA, 2021)

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2 (5) = (b-B)'[(V_b-V_B)^(-1)](b-B)

prob chi2 = 0.0261<0.05 ==> model fitted on these data meet the asymptotic assumptions of the fixed model test;therefore null test fails to meet the assumption

4.5 Regression Analysis and Test of Hypotheses Based on Fixed Effects Model

After determining the model that could be estimated, GLS regression was estimated. According to equation, both random and fixed effect models were estimated, and the Hausman test was used to determine the best model, which was best on the gravity model (3.1). The fixed effect regression model was chosen based on the Hausman test results.

Table .6: Fixed Effect Regression

Fixed Effect (Within) Regression		Number of Observations =44		
Group Variable	Year	Number of Groups		=11
		Observation per group		=4
		Minimum		4
R^2Within	0.8681	Average		4.0
R^2Between	0.3802	Maximum		4.0
R^2Overall	0.7631	F(4,29)		47.67
Corr(u,i, Xb)	0.0686	Prob. > F		0.0000
Log of Manufactured Exports	Coefficient	Std. Error	T	P>|t|
Log of human capital Development	0.299147	0.147894	2.02	0.0300
Log of Distance	-0.75662	0.852258	-8.880	0.0000
Constant	36.3811	6.060841	6.00	0.0000
Sigma_u	0.647551			
Sigma_e	0.809496			
Rho	0.3902096			
F-Test that all u_i = 0: F(10, 29)	1.41	Prob. > F		0.0032

Source: Authors Survey Data, 2021

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Table 6 displays the results of fixed effects. The F – statistic was found to be significant (p – value 0.0032 0.05), indicating that the variables fit the model very well (the model was well-identified). The overall R Square was 0.7631, indicating that the independent variables accounted for 76.31 percent of the variation in Kenya's manufacturing exports to the East African Community (dependent variable). This is high because fixed and random effects models do not compute R square value from the dependent variable's mean. In this case, the primary emphasis is on model specification and the overall significance of the coefficients. This has been accomplished in the current study because the overall fit is F stat 0.0032 0.05.

The variance due to observed covariate (sigma u) is 0.6476, which is less than the variance due to time invariant covariates (sigma e, 0.6476). (0.8095). the fraction of variance due to u i is 0.3902, which is between sigma u and sigma e, indicating that the model is not distorted. Following this, the Hausman test was used to select between the coefficients of fixed and random effects. Table 6 displays the results, which show that their fixed effect was the most interpretable model (p – value 0.000 0.05). The distinction between random and fixed effect models is based on the assumptions of the residual distribution of the regression estimates. In such cases, the fixed effect model is usually preferred for interpretation because it reduces the number of assumptions and adheres to well-established normal probability distributions (Baltagi,2018; Hsiao, 2020). Appendix I contains the results of the random effect.

The next step was to test the hypotheses, provide economic implications, and compare them to prior results from existing theoretical, empirical, and scientific studies after establishing the model specification test, diagnostics tests, and the coefficients to be estimated within random and fixed effects. This is done in the order listed below, in accordance with the objectives and hypotheses of the study.

4.6 Discussion of the results

4.6.1 Infrastructure Development (ID) and Manufactured Exports

The study's goal was to investigate the impact of human capital development on Kenya's manufacturing exports to East African countries. Using fixed effects regression, the hypothesis that human capital development has no effect on Kenya's manufacturing exports to East African countries was tested. The development of human capital was discovered to be a factor influencing Kenyan manufactured exports to the East African community (p - 0.0300< 0.05). Human capital development has a positive beta coefficient (0.2991), implying that a one-percentage-point increase in human capital development increases Kenya's manufacturing exports by 29.91 percent when all other factors are held constant. These findings are consistent with those of (Baumgarten, 2018) and (George, 2019), who investigated the impact of export diversification on African economic growth. Infrastructure, human capital, and institutional framework, among other factors, were found to play a significant role in manufactured goods export. According to William Olney (2014), building human capital and other complementarities may be important in the link between manufacturing exports and economic growth. Among other things, the complementary nature of new technologies and human capital is critical in promoting manufactured exports. Levin and Raut discover that investing in human capital and exporting

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manufactured goods both promote growth. According to Schultz (2006), Agra (2017), and Sheena (2017), this necessitates complementarities between exports and skills (2017).

Kenya has made progress toward economic goals, with a focus on the synergy of TVET development and industrialization. For example, in 2017, KAM collaborated with the State Department of Vocational and Technical Training to launch a TVET Program with the goal of increasing economic and employment opportunities for Kenyan youths while also ensuring that local industry is prepared to capitalize on the fourth industrial revolution with skilled labor. As a result of this initiative, 450 technical skills graduates have been placed in apprenticeship programs in industries across the country, and another 500 graduates have received work readiness training. These are just the first steps toward a larger goal reached by industry and government to invest in TVET to help Kenya's industrialization. Kenya's exports benefit from human capital development; a healthy, high-income population is more productive in the creation of high-value manufactured items, which boosts manufactured exports. HCD assists in the absorption of manufactured goods from Kenya because the populations in those countries have a high income and way of life, which leads to the purchase of high-value manufactured goods.

Kenya should start emphasizing its economic development goals in comparison to Singapore, which serves as a global potential benchmark for other countries in terms of connecting genuine monetary gain through TVET funding. In the 1960s and 1970s, Singapore began to sponsor its TVET programs. This made them realize the importance of updating the industrial sector's education curriculum, particularly TVET, to help her deal with the changing job market dynamics (KAM, 2018b). As a result, Singapore has become a leading example of the benefits of achieving industrial growth through the establishment of multiple production opportunities, and it has become one of the world's fastest growing economies and most attractive investment destinations. Manufacturing, on the other hand, continues to play an important role in the country's economy and is credited with the country's economic stability. The manufacturing sector grew by 15.5 percent in the third quarter of 2017, compared to 8.3 percent in the same quarter of 2016.

A number of studies have attempted to account for the individual characteristics of employees employed by exporting firms using matched firm and worker data. For example, (Baumgarten, 2013) looked into the role of exporting establishments in explaining rising wage disparities, (Blanchard, 2015) looked into globalization and Human Capital Investment: Export Composition Drives Educational Attainment, and (Fonchamnyo, 2014) looked into the determinants of manufacturing firms' export propensity and intensity. According to the findings, most studies focused on educational attainment and exports, with little emphasis placed on HCD, which combines education, health, and living conditions. As a result, determining the relationship between manufactured exports and human capital development is impossible. This justifies research into the impact of human capital development on Kenyan manufactured exports to the EAC region.

Fafchamps (2019) investigated the effects of Moroccan human capital development on manufacturing exports to Asia and found no significant relationship. According to the study,

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while Moroccan exporters do pay more, much of this difference can be explained by the fact that they have a larger workforce and use more capital. He also finds no evidence that educated workers receive a higher wage than uneducated workers when working for exporters. He claims that this demonstrates that Morocco's export success is linked to an abundance of cheap, uneducated female labor. Given the importance of Morocco's export markets in Spain and the European Union, standard comparative advantage appears to account for Moroccan experience better than trade models that emphasize human capital and technology transfer.

4.7 Diagnostic Tests

Multicollinearity, Heteroscedasticity, and Serial Correlation were the diagnostic tests used. These tests are typically performed following a regression analysis.

4.7.1 Multicollinearity

When there are strong correlations between two or more predictor variables, multicollinearity occurs. Another option is to use one predictor variable to predict another. The Variance Inflation Factor is used to assess multicollinearity. If the average VIF value is less than 10, there is no multicollinearity.

Table .7: Variance Inflation Factor (VIF).

Variable	VIF	1/VIF
Log of Dis	2.32	
Log of HDI	1.55	0.643808
Mean VIF	2.95	

Source: Authors Survey Data, 2021

The results in table 7 above indicated mean VIF of 2.95 < 10 showing that there was no Multicollinearity.

4.7.2 Heteroscedasticity Test

The Breusch-Pagan-Godfrey test is used to test for heteroscedasticity in a linear regression model with normally distributed error terms. It determines whether the independent variable values affect the variance of the errors in a regression. The null hypothesis states that there is no heteroscedasticity. The results shows that the probability of F-statistic = 0.0006 was less than the 0.05 level of significance. The null hypothesis was thus rejected, and homoscedasticity was discovered.

5. Summary, conclusion and recommendation

5.1 Summary of findings

The study's overarching goal was to investigate the effects of human capital development on Kenya's manufacturing exports to the East African Community (EAC). According to the study, human capital development was a significant and positive determinant of Kenya's manufactured exports to the EAC community. Distance had a negative and significant influence on the volume

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of Kenya's manufactured exports to the EAC community. These findings lend support to the gravity equation model.

According to the Impeseran unit root results, all variable data contained unit root at levels, but they all achieved stationarity after first differencing with (P<0.005). The Hausman test statistic was used to compare the fixed effect and random effect panel regression models, with the results indicating that the fixed effect model was superior (Prob>chi2 = 0.0261). The overall R Square was 0.7631, indicating that the independent variables explained 76.31% of the variation in Kenya's manufacturing exports to the East African Community (dependent variable). The findings in relation to the objectives are summarized briefly below

At a 5% level of significance, the impact of human capital development on Kenya's manufacturing exports to the EAC community by testing the null hypothesis that human capital development has no effect on Kenya's manufacturing exports to the EAC community. The findings revealed a significant positive relationship, resulting in the null hypothesis being rejected. Fixed Generalized Least Squares panel data estimates with coefficient values (0.299147) and (P =0.0300) support Human Capital Development's significance as a significant driver of Kenya's manufactured exports.These results support the outcomes of Okonkwo (2020) and Ezeabasili (2019), who discovered a positive and significant effect of HDI on Nigerian manufactured exports, but contrast with the findings of Schclarek (2017) and Adegbite (2018), who discovered a positive but insignificant relationship between HDI and manufactured exports in developing countries.

Lastly Distance, on the other hand, had a negative effect, leading to the conclusion that increasing distance by one unit resulted in a decrease in manufactured exports. Distance hinders international trade by raising transportation costs, causing delays, and causing other logistical issues.

5.2 Conclusion

Based on the findings presented above, the following conclusions were reached

Based on the findings presented above, the following conclusions were reached. Kenya's manufactured exports have benefited from human capital development, indicating that manpower development is critical for manufacturing export production. Inflation has been shown to reduce the volume of manufacturing exports to the EAC community Lastly Distance, on the other hand, had a negative effect, leading to the conclusion that increasing distance by one unit resulted in a decrease in manufactured exports. Distance hinders international trade by raising transportation costs, causing delays, and causing other logistical issues.

Finally, as evidenced by the slew of proposed interventions for the manufacturing sector that have been developed over the years, the Kenyan government's renewed interest in the sector through the Big 4 Agenda, which aims to increase the sector's GDP contribution to 15% by 2022, remains a priority. The government to revitalize the manufacturing sector established the Kenya Industrial Transformation Programme (KITP) and the most recent Big 4 Agenda. "The low and

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declining shares of GDP in manufacturing, industrial, and exporting sectors pose a significant challenge to economic growth," according to the Medium-Term Plan 3 Concept Note. As a result, growing Kenya's manufacturing sector with a focus on exports will significantly boost the country's economy and propel it into the middle-income bracket.

5.3 Recommendations

The study's key findings, as summarized above, have significant implications for Kenya's manufactured export policy. Based on these key findings, the policy configuration and formulation recommendations presented below seek to increase Kenya's manufactured exports to the EAC community and regional trade blocs, maximizing trade gains and accelerating the country's economic growth.

Human capital development, as previously stated, has a significant impact on manufacturing exports; therefore, it is critical that the government and relevant authorities continue to improve the quality of its human capital resources through education, training, health, nutrition, and housing in order to increase labor productivity and boost manufacturing export production, as it is a major source of labor in the manufacturing sector.

According to the findings, inflation reduced the volume of manufacturing exports to the EAC. As a result of the findings, the government proposes supply-side policies such as government subsidies and tax breaks to attract and channel FDI to more productive and comparative advantaged manufactured exports sectors, thereby augmenting domestic producers' productive and export supply capacity, lowering inflation rates, and increasing their level of efficiency. Additionally, market-friendly regulatory policies (aimed at removing barriers to domestic and foreign private investment, streamlining and simplifying regulations and procedures for new entrants), strengthening property rights and contract enforcement, and improving the trade policy regime to facilitate exports and promote outward-oriented growth are strongly recommended.

According to the study's findings, distance has a negative impact on trade volume. Increased economic integration among economic blocs, according to the findings, is required to reduce transportation costs. A common language is expected to improve communication and documentation, leading to increased international trade; lower the electricity tariff for heavy steel industries by at least 50% to make local products competitive in regional markets; promote regional trade agreements to improve market access and induce increased demand for products; and strengthen regional integration by improving border logistics and regional transportation network.

6. Suggestions for Further Research

The identification and deep knowledge of factors that have a major impact on Kenya's export sector's productive capacity is required for implementation of supply-side strategies advocated in this study. Future research could look at studying Kenya's manufacturing exports using disaggregated data from individual industries inside the gravity model.

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The current analysis is not able to determine which nations Kenya has untapped manufacturing export potential and which countries it has reached its limit with. Future studies should take this into account in order to help Kenya select nations with high potential for developing its manufacturing exports so that it may optimize its profits.

Based on the results of the current study, another study could be conducted to assess the impact of infrastructure on Kenya's manufactured exports and other trade flows to the EAC and other Kenyan trading partners; as a result, a study to fill this gap should be conducted.

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References

Adaora. N. A. (2018). The Impact of Inflation on the Manufacturing Sector of the Nigerian Economy (1981- 2011). Caritas University, Amorji-Nike, Enugu, Enugu State.

AfDB (African Development Bank). 2019*Eastern Africa's Manufacturing Sector: Promoting Technology, Innovation, Productivity, and Linkages.* Nairobi, Kenya: African Development BankGroup–East Africa Regional Resource Center.

AFDB.(2014). *State of infrastructure in East Africa*. AFDB – Statistics Department Africa Infrastructure Knowledge Program, Côte d'Ivoire

Agbodji, A. E. (2008). The Impact of Subregional Integration on Bilateral Trade: The Case of UEMOA. *African Economic Research Cornsotium*, Nairobi.AERC Research Paper No 16.

Agosin, M. R., Alvarez, R., & Bravo-Ortega, C. (2012). Determinants of export diversification around the world: 1962–2000. *The World Economy, 35*(3), 295-315.

Agra. 2017. "Doubling Productivity and Incomes of Smallholder Farmers in Africa." AGRA: Growing Africa's Agriculture. August 23, 2017. https://agra.org/doubling-productivity-and-incomes-of-smallholder-farmers-in-africa/.

Alemayehu, G., & Haile, K. (2002). Regional Economic Integration in Africa. *A Review of Problems and Prospects of some Non-Causality Results Part 1. Journal of International Trade & Economics*

Vol. 7, No.06; 2023

ISSN: 2456-7760

Anderson, J. E., & Van Wincoop, E. (2011). Gravity with gravitas: a solution to the border puzzle. *American economic review, 93*(1), 170-192.

Arnold, J. M., & Hussinger, K. (2005). Export behavior and firm productivity in German manufacturing: A firm-level analysis. *Review of World Economics, 141*(2), 219-243.

Atkinson, A., Donev, A., & Tobias, R. (2007). *Optimum experimental designs, with SAS* (Vol. 34): Oxford University Press.

Bacchetta, P., & Van Wincoop, E. (2003). Why do consumer prices react less than import prices to exchange rates? *Journal of the european economic association, 1*(2-3), 662-670.

Bajona, C., & Kehoe, T. J. (2010). Trade, growth, and convergence in a dynamic Heckscher–Ohlin model. *Review of Economic Dynamics, 13*(3), 487-513.

Bajona, M., & Kehoe, S. (2010). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies, exacerbate economic differences across countries through its impact on educational attainment. 58*(2), 277-297

Baltagi, B. (2018). *Econometric analysis of panel data*: John Wiley & Sons.England Chichester.

Baumgarten, D. (2018). Exporters and the rise in wage inequality: Evidence from German linked employer–employee data. *Journal of International Economics, 90*(1), 201-217.

Berger, M., J. Buch, C. Ijsselmuiden, M. (2010). *Strengthening Pharmaceutical Innovation in Africa*. Geneva, Switzerland and Midrand, South Africa: COHRED (Council on Health Research for Development) and NEPAD (New Partnership for Africa's Development).

Berger, M., J. Murugi, E. Buch, C. Ijsselmuiden, M. Moran, J. Guzman, M. Devlin, and B. Kubata. 2020. *Strengthening Pharmaceutical Innovation in Africa*. Geneva, Switzerland and Midrand, South Africa: COHRED (Council on Health Research for Development) and NEPAD (New Partnership for Africa's Development).

Bergstrand, J. H. (1985). The gravity equation in international trade: some microeconomic foundations and empirical evidence. *The review of economics and statistics*, 474-481.

Bergstrand, J. H., Egger, P., & Larch, M. (2007). Gravity Redux: structural estimation of gravity equations with asymmetric bilateral trade costs. *Unpublished manuscript*.

Blanchard, & William. (2017). Globalization and human capital investment: Export composition drives educational attainment. *Journal of International Economics, 106*, 165-183.

Blanchard, Smith, M. J., & Nguyen, C. H. (2013). *Parameter identification study of frequency response data for a trilayer conjugated polymer actuator displacement model.* Paper presented at the Advanced Intelligent Mechatronics (AIM), 2013 IEEE/ASME International Conference on.

Bonuedi, I. (2013). *Determinants of Ghana's Bilateral trade Flows: A Gravity Model Approach.* Knust Ghana.

Brambilla, J., Lederman, R., &Porto, B. (2019).*Assessing regional trading arrangements in the Asia-Pacific*: UN.

Chaudhry, I. S., Ayyoub, M., & Imran, F. (2018). Does Inflation Matter for Sectorial Growth In Pakistan? An Empirical Analysis. *Pakistan Economic and Social Review*, 51(1), 71-92.

Chiswick, C. (2018). Modelling Economic Development: The Lewis Model Updated (No. 2018-

Vol. 7, No.06; 2023

ISSN: 2456-7760

Cockcroft, L., & Riddell, R. (2020). Foreign direct investment in sub-Saharan Africa (Vol. 619). World Bank Publications.

Damiyano, D., Muchabaiwa, L., Mushanyuri, B., Chikomba, C. (2012). 'An Investigation of Zimbabwe‟s Manufacturing Sector Competitiveness'. *International Journal*, 1(2), 581-598.

Doran, C. J. (2019). The role of personal values in fair trade consumption. Journal of business ethics, 84(4), 549-563.

Dinh, H.T., V. Palmade, V. & Chandra. F 2012. *Light Manufacturing in Africa: Targeted Policies to EnhancePrivate Investment and Create Jobs.* Washington, DC: World Bank. ECA (Economic Commission for Africa). 2017. *Economic Report on Africa: Urbanization and Industrialization for Africa's Transformation.* Addis Ababa, Ethiopia.

Dinh, H.T., V. Palmade, V. & Chandra. F 2018. *Light Manufacturing in Africa: Targeted Policies to EnhancePrivate Investment and Create Jobs.* Washington, DC: World Bank. ECA (Economic Commission for Africa). 2019. *Economic Report on Africa: Urbanization and Industrialization for Africa's Transformation.* Addis Ababa, Ethiopia.

Donald B. K., (2018) "World Trade and Output of Manufactures: Structural trends and Developing countries' exports" World Bank Staff Working Paper No. 316. Washington DC: World Bank,

Emily, B., &William, O. (2017). Gender Inequality in Human Development and growth of indusries in sub-saharan african countries: Theories and Measurement. Ora.ox.ac.uk

Findlay, R., & Kierzkowski, H. (2005). International trade and human capital: A simple general equilibrium model. *Journal of Political Economy, 91*(6), 957-978.

Fonchamnyo, D. C. (2014). Determinants of export propensity and intensity of manufacturing firms in Cameroon: an empirical assessment. *Applied Economics and Finance, 1*(2), 30-36.

Francois, J., & Manchin, M. (2017). *Institutions, infrastructure, and trade*: The World Bank.

Fuenzalida-O'Shee, D., Valenzuela-Klagges, B., & Corvalán-Quiroz, A. (2018). Trade facilitation and its effects on Chile's bilateral trade between 2006 and 2014. *CEPAL Review.*

George, J. E. (2013). A theoretical foundation for the gravity equation. *The American Economic Review, 69*(1), 106-116.

George. A.A., (2019) "The place of Capital in Economic progress" in Factors of Economic Development, London, pp-III-14.

Githuku, S. (2010). *Effects of Regional Trade Arrangements on Kenya's Export Flows*: KIPPRA, the Kenya Institute for Public Policy Research and Analysis.

GoK (2016). *State of infrastructure in Kenya East Africa*. – National Statistics Department Africa Infrastructure Knowledge Program,. Nairobi, Kenya

Greene, W. H. (2007). Limdep version 9, Econometric modeling guide, Volume 1. *Econometric Software, Inc.,: Plainview, New York*.

Vol. 7, No.06; 2023

ISSN: 2456-7760

Gylfason, T. (2020). *Exports, inflation and growth.* Washington, D.C.: International Monetary Fund Working paper 119.

Hall, S. G., and Lagoa, S. (2020). Inflation and Business Cycle Convergence in the Euro Area: Empirical Analysis using an Unobserved Component Model. Open Economies Review, 25: 885-908.

Hausmann, Ricardo, Jason Hwang, and Dani Rodrik. (2018). "What You Export Matters." Journal of Economic Growth12 (1): 1–25. https://doi.org/10.1007/s10887-006-9009-4.

Hsiao, C. (2017). *Analysis of panel data*: Cambridge university press.

IMF, (2019) Is public expenditure productive? *Journal of Monetary Economics*, *23*(2), 177–200. https://doi.org/10.1016/0304-3932(89)90047-0

International Labour Organization (ILO,2017) *Human development reports*. Human Development Index (HDI). http://hdr.undp.org/en/content/human-development-index-hdi]

International Labour Organization (ILO,2019) *Human development reports*. Human Development Index (HDI). http://hdr.undp.org/en/content/human-development-index-hdi]

International Monetary Funds (IMF. 2021). World Economic Outlook. Transitions and Tensions, October 2021.

Jones, L. M. (2014). Restructuring or de-industrializing? Zimbabwe's texttile and metal industries under adjustment. Nordic Africa Institute.

Kaimenyi and Ndung'u (2015). The African Lions, Kenya Country Case Study. *Wider .unu.edu*

Kamukunji, J. K. (2017). *Strategic planning practices and performance in kirinyaga county government in kenya.* School of Business, University of Nairobi.

Kireyev, A.P. 2017. "Growth Inclusiveness in Djibouti." IMF Working Paper WP/17/93, International Monetary Fund, Washington, DC. McKay, A. 2004. "Economic Growth for Poverty Reduction in Africa: Recent History and Current Issues." Background paper for the IV Mediterranean Seminar on International Development, "Africa's Tragedy," Universitat de les Illes Balears, Palma de Mallorca, Spain.

Kishor, N.K., and Ssozi, J. (2021). Inflation Convergence and Currency Unions: the Case of the East African community. Indian Growth and Development Review, 3.

KNBS.(2018). *Economic Survey 2018*.Kenya National Bureau of Statistics.

Knight Frank Global Cities Report (2018). *Enabling Environment for Stimulating Investment for Competitive cities*

Krugman, P. R., Obstfeld, M., and Melitz, J. M. (2012).*International Economics: Theory and Policy, 9th Edition.* Boston, Addison-Wesley.

Leontief, W. (1953). Domestic production and foreign trade; the American capital position re-examined. JSTOR

Loto, M. A. (2018). Global Economic Downturn and the Manufacturing Sector Performance in the Nigerian Economy (A Quarterly Empirical Analysis). *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)*, 3(1), 38-45.

Vol. 7, No.06; 2023

ISSN: 2456-7760

Milner, S. H., &Tandrayen, E. (2017).Explaining firms' export behaviour: R&D, spillovers and the destination market "relationship between export status and individual earnings among workers in firms in six Sub-Saharan African countries". *Oxford Bulletin of Economics and Statistics, 65*(4), 475-496.

Munch, J. R., & Skaksen, J. R. (2018). Human capital and wages in exporting firms. Journal of International Economics, 75(2), 363-372.

Musamba, Charity. 2010. "The Developmental State Concept and its Relevance for Africa," in Peter Meyns and Charity Musamba (eds.) *The Developmental State in Africa: Problems and Prospects*, INEF-Report 101/2010.

Musamba, J. A., (2010). Export-led growth: a survey of the empirical literature and some non-causality results. Part 2. *Journal of International Trade & Economic Development, 9*(4), 445-470.

Njuru, S. G. (2020). *Effects of fiscal policy on private investment in Kenya (1964- 2010).* Kenyatta University. Nairobi: Kenyatta University.

Nyanga, T., Zirima, H., Mupani, H., Chifamba, E. and Mashavira, N. (2018). Survival of the vulnerable: Strategies employed by Small to Medium Enterprises in Zimbabwe to survive an economic crisis. Great Zimbabwe University. *Journal of Sustainable Development in Africa,* 15(6).

Osinowo O. H. (2015). Effect of Fiscal Policy on Sectorial Output Growth in Nigeria. *Advances in Economics and Business,* 3(6), 195-203.

Razak, M. (2019). Human capital, exports, and earnings. *Economic Development and Cultural Change, 58*(1), 111-141.

Schultz. T.W., (2017) "Reflections on Investment in Man" Journal Of Political Economy, Supplement: October 2006, pp-2-3.

Shah, M. A., Aleem, M., & Arshed, N. (2014). Statistical analysis of the factors affecting inflation in Pakistan. *Middle-East Journal of Scientific Research, 21* (1), 181-189.

Sheena, P. (2018). Beyond industrialization: New approaches to development strategy based on service sector. UNUWIDER Research Paper No. 60.

Siyakiya, P. (2017). An Analysis of the Effects of Hyperinflation on Manufacturing Sector Output. A Case of Zimbabwe's Manufacturing Firms 2000 – 2013. International Institute of Social Studies. The Hague, The Netherlands. Retrieved from file:///C:/Users/Microsoft/Downloads/done-PURUWETI-SIYAKIYA%20(6).pdf; 13/10/2016.

Songwe. P.K., Vera. W.J., and Deborah W., (2012). "Exports and Export Diversification in Sub-Saharan Africa: A Strategy for Post-Crisis Growth." Brookings Institution.

Swerts, E. and Denis, E. (2017). Megacities: The Asian Era. In Urban Development Challenges, Risks, and Resilience in Asian

Thomas K. Morrison,(2017) "Manufactured Exports from developing Countries" International Economics and Development Series, Praeger Publishers, New York. Pg. 69-70

Vol. 7, No.06; 2023

ISSN: 2456-7760

Tyler. D.W.(2018) "Manufactured Exports and Capital development: Some Empirical Evidence." Journal of Economic Development, June 2018

UNCTAD (UN Conference on Trade and Development) (2017). *Key Statistics and Trends.*

UNECA (2015), *State of infrastructure in East Africa*. AFDB – Statistics Department Africa Infrastructure Knowledge Program, Côte d'Ivoire.

http://scholar.google.com/scholar_lookup?hl=en&publication_year=2013&author=AFDB.&title=State+of+infrastructure+in+East+Africa

United Nations Economic Commission for Africa. (UNCTAD, 2020). *Fiscal policy for financing sustainable development in Africa – economic report on Africa*. Economic Commission for Africa.

Wilson, J. S Maskus, K. E. &., Otsuki, T., (2018). Do foreign product standards matter? Impacts on costs for developing country exporters. Asia-Pacific Journal of Accounting & Economics, 20(1), 37-57.

World Bank. (2014). *World bank development indicators.* Washington DC: World Bank.

WorldBank,(2018), East Africa Economic Outlook 2019. Côte d'Ivoire.

http://scholar.google.com/scholar?hl=en&q=African+Development+Bank.+%282019%29.+East+Africa+Economic+Outlook+2019.+C%C3%B4te+d%E2%80%99Ivoire.+https%3A%2F%2Fwww.afdb.org%2Ffileadmin%2Fuploads%2Fafdb%2FDocuments%2FPublications%2F2019AEO%2FREO_2019_-_East_Africa_.pdf

Yamin, M., & Sinkovics, R. R. (2009). Infrastructure or foreign direct investment?: An examination of the implications of MNE strategy for economic development. *Journal of World Business*, *44*(2), 144-157.