

**FACTORS AFFECTING TRADE FACILITATION IN EAST AFRICA AND THEIR
IMPACT ON KENYA/UGANDA/TANZANIA/RWANDA/BURUNDI BORDER
POINTS**

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DECLARATION

I declare that this is my original work and has not been presented in any other university or college for examination purpose.

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ABSTRACT

The paper investigated the factors affecting Trade Facilitation at the border points of East Africa and their impact on Trade Facilitation.. The goal of this study was ultimately to answers the question as to whether Facilitation can reduce costs of doing business and if Trade Facilitation leads to economic growth of East African countries. The paper utilized the Gravity Model to establish the relationship between variables. The model was run using a fixed effect and a random effect .Horseman test was later on conducted to determine between the fixed effect and random model which was suitable. Secondary data was sourced from World Bank data base and CEPII, International Monetary Fund (IMF) year book.. Empirical results indicated that the border points in East Africa play an important part in Trade Facilitation if impediments to trade are addressed. The 8 border points in the study exhibit cross cutting non tariff barriers which impact negatively on Trade Facilitation and increase costs of doing business . Trade facilitation leads enhanced trade flows and economic growth. Recommendations made is that governments should invest in Trade Facilitation initiatives for economic growth of East African Countries among others.

DEDICATION

This proposal is dedicated to my family, relatives, sponsor(s) and all well-wishers who have worked tirelessly to ensure that all requirements are met.

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Planning and preparing this research proposal has been a 1 year effort. A great number of people helped me in the development of this project on relevant information and emotional support. I discussed among my supervisors, friends, workmates and college mates.

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To my children, I thank you always for your support in every aspect, your patience and encouragement. Finally I say thanks to Almighty God for He alone knows the plans He has for us all .

God bless you all.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

What is Trade Facilitation? There is no clear cut definition of Trade facilitation but any effort made to make legitimate trade to flow with minimum delay while exercising necessary controls is considered important in facilitating trade.

Zaki (2007) defines it as “making trade easier” This calls for Harmonization and simplification of trade rules. Trade facilitation aims at making International trade easier by eliminating administrative delays, simplifying trade procedures, increasing transparency, security and incorporating Technology in trade processes. According to WCO ‘Trade Facilitation is the avoidance of unnecessary trade restrictiveness by applying modern techniques and technologies while improving the quality of controls in an internationally harmonized manner’

1.1.1 Trade Facilitation and Multilateral Trade Negotiations

Trade Facilitation has become increasingly a subject of interest globally due to the need for freedom of movement of goods and services resulting from growth in trade volumes that is directly attributed to worldwide liberalization of trade. The origin of Trade Facilitation and the prominence the topic received as subject of negotiations at WTO discussions was at the Singapore Ministerial Conference of 1996 and in Doha, where the Doha Development agenda was adopted by the ministers as a framework of the Agreement (Hoek Aet al (2002)

From the outset, it must be pointed out that promotion of trade, removal of restrictions and provision of transport does not primarily lead to trade facilitation as we know it today. Trade facilitation is the tendency to minimise costs of doing business that come into play in the process of enforcing of regulations and policies (Staples, 2002).

In East Africa, the quest for efficiency in port operations, professionalism in customs procedures which allow for faster clearance of goods is now a matter of concern. In the pursuit of a fully fledged customs union, a common market, single currency and finally a political federation, East African Customs Union has been able to eliminate all tariffs on intra- East African trade and agreed on a Common External Tariff (CET) for goods that do not originate from East Africa. This considerably contributed towards cutting a proportion of costs of upto € 300 million to the taxes foregone by partner states in their Preferential Trade Arrangements. Nevertheless, the costs to trade attributed to non tariff barriers (NTBs) have more far reaching repercussions than those attributable to tariffs, Hoekman et al, (2013).

East Africa's trade would have recorded higher level of growth than it has now had several factors that heavily impact on Trade Facilitation been looked into and addressed. These are, insufficient and bad roads, technology and bad governance. According to Lima and VeEnables', (2001). The degree of infrastructural challenges rise to approximately 40% of transport costs and to a high of 60% for landlocked countries. Costs attributable to border inefficiencies are , low resource compatibilities where document processing systems are not perfectly compatible. For instance, Kenya has the Simba System 2004, while Uganda has the ASYCUDA World. Such challenges limit the extend one can explore the market that has widened as a result of the East African Community trade the region, Yang & Gupta, (2007), Njinkeu & Powo Fosso,(2006) and Forouton & Princhet,(1993). An attempt has been made to have Revenue Authorities' Digital Data Exchange (RADDEX) as a platform for exchange of data from the two systems but this has not fully been exploited.

High costs of doing business constitute a major barrier to East Africa's competitiveness and attainment of millennium goals. Transport costs have been attributed to prevalence of uncoordinated multiplicity of institutions at borders, repetitive processes and documentation in the cargo clearance, right from the port of Mombasa in Kenya to the landlocked countries of Uganda, Rwanda, Burundi, Democratic Republic of Congo (DRC) and South Sudan. The presence of numerous uncoordinated government agencies

forms a fertile breeding ground for integrity issues due to redundancy of processes .(USAID /COMPETE,2012)

Bureaucracy and red tape has been said to cost traders in the East Africa Region a whopping US\$7 million annually, PADECO Company Study, (2009). The study blames delay on axle load and gross vehicle load limits and their lack of harmonization in the five East African countries. Rwanda and Burundi moving towards a limit of 48 tons down from Rwanda's initial 53 tons, whilst Tanzania and Uganda have 56 tons as their maximum load .The challenge emanates from the fact that weigh bridges are primarily managed by government authorities with occasional intervention by police forces. The uncoordinated system of management results in creation of loopholes. Additionally, numerous presences of weigh bridges along the northern corridor and at short intervals excruciate the problem. It is noted that between Rwanda and Dar-es-Salaam there are 9 weigh bridges and 7 between Mombasa and Malaba border. Stoppages at these weigh bridges result in delay. The lack of verification sheds at borders also results in delays especially when the weather is unfavourable. The reluctance of transporters to embrace technological enforcement tools such as the use of complementary tracking devices such as the Electronic Cargo tracking system (ECTS) increases the time to physically monitor the movement of goods. Container Freight Stations' demurrages add to costs being transferred to the consumer encouraging inflationary trends. In order to attain desired positive impacts of Trade Facilitation. There is need for a more integrated and holistic approach when addressing these challenges. Kenya Customs for instance has undertaken considerable reforms in clearance processes. However, more needs to be done in addressing trade restrictive non tariff barriers (NTBs) that impinge on the benefits that can accrue from trade facilitation.

While several of the above challenges cut across the border posts of East Africa there has been little effort and enthusiasm made to substantively make Trade facilitation a priority subject of debate in the Multilateral Trade Negotiations and especially the issue of commitment for technical Assistance and support for capacity building in this area as agreed by Ministers in the Doha Development Agenda to significantly allow for the positive impact of Trade Facilitation to be felt in promotion East African Trade.

East Africa has been characterised by poor institutional, communication, and transport related infrastructure. These attributes impact negatively on the movement and growth of trade in East Africa, and thus limiting the full benefits of interregional trade. The World Country study (2005), Action plan indicates that entrepreneurs face more business obstacles in East Africa than any other Regions, United Nations Conference on Trade and Development, (2004). The study indicates further that a combination of ‘high regulatory costs, policy uncertainty, corruption, unfair competition and ineffective judiciary system account for 20-40% above other developing regions’.

This study examined challenges which impact negatively on Trade Facilitation and recommended reforms that enhance trade Facilitation such as increased port efficiency, improved Customs regulatory environment, upgrading service infrastructure and administrative measures which will result in benefits to East African countries. The project also considered how regional trade agreements influence trade flows in East Africa. Using secondary data available the project has shown that regional trade agreements influence and impact positively on trade flows.

In Kenya ,Mombasa port has been characterized by congestion due to inefficiency in the management of cargo, multiple inspections by different stakeholders, poor rail transport, power outages that interferes with seamless electronic process of customs documents, police road blocks and long convoys of trucks along the northern corridor, multiplicity of institutions and processes at the borders, all impose avoidable costs on business McKinnon(2005) .

1.2 Problem Statement

Traders in East Africa face numerous challenges in doing business. These challenges hinder positive impacts of Trade Facilitation to be fully realised, School of economics, University of Nairobi, Policy Brief (2012). These include unnecessary and excessive data and documentation requirements, lack of transparency, inadequate legal redress, delayed release and clearance, absence of co-ordination between Customs and other Government agencies (OGAs), little use of modern customs technology techniques and all are compounded by unchecked corruption. Although the Customs environment has

changed due to reforms and the entire East African Customs Union is working to address these problems through multilateral, regional and bilateral initiatives, the process is slow and ineffective. It is also notable that non tariff regulatory barriers deter trade development. While there is across-the-board agreement on the necessity of trade facilitation, not all East African countries have shown enthusiasm in ongoing negotiations of a multilateral nature under the pretext of inability to afford the modern technology required. There is a tendency of reluctance to take on additional legal obligations that may expose countries within East Africa to Dispute Settlement Mechanisms (DSM). However, this fear has been dispelled by the best endeavour clause in the text and the benefits that trade facilitation brings to the economies of East Africa

Taking into consideration the pace of integration of East African countries and their resolve to deal with outstanding issues towards fully fledged customs union and free market economy, there is no doubt that there exists an underlying problem that requires urgent attention. It is in this spirit that this study has attempted to assess factors affecting Trade Facilitation and make specific recommendations based on the conclusions drawn from the study.

1.3 The Scope of the Study

The scope of the study was limited to factors that affect Trade Facilitation at 8 border points in East Africa and the impact of these factors..

1.4 Location

Selected borders were used as the sample frame for the study. These include Namanga on the Kenya /Tanzania border. In Kenya it is situated in Kajiado county of Rift Valley with a population of 687,313 and over to the Tanzania side, it is 130 kilometres from Arusha. Namanga is famed for Amboseli national park in Kenya and Kilimanjaro mountain in Tanzania. Loitokitok township surrounded by the famous Masai Mara, and Taita Taveta with a population of 284,657 is wedged into the Kenyan territory but surrounded by Tanzania and thrives from business between the two countries fuelled by the Mombasa Taveta Kampala railway line. Isebania concludes the selected border posts

between Kenya and Tanzania famous for the Masai Mara game reserve .On the Kenyan side Isebania borders the agricultural divisions of Asumbi, Rangwe and Oyugis and Morogoro National park on the Tanzania side.

On the Kenya /Uganda border, we encounter Busia County that spills over to the Uganda side with a population of 743,946. It is a frontier town on the Western border side of Kenya and Eastern on the Uganda side of the divide with a similar name. Busia forms a gateway for goods on transit to at least 5 countries that are landlocked with no link to a major waterfront, namely Rwanda, Burundi, Democratic Republic of Congo (DRC), Uganda and South Sudan. These countries depend on Kenya for the most part and Dar-es-Salaam port in Tanzania to facilitate the movement of goods. Malaba, a border town between Kenya and Uganda has a population of 346,238 on the Kenya side and is located a few kilometres from Tororo in Uganda. This is a major border point on the Northern corridor that has greatly informed this study. Kagitumba, is a one stop border point (OSBP) established with technical assistance from Trade Mark East Africa (TMEA) Uganda and Rwanda to improve clearance of goods between the two countries. Lake Tanganyika on the other and divides Burundi and Tanzania at Bujumbura, the capital city of Burundi which has a population of 331,700. The port is a beehive of activity and is common to see the lake populated with small ships ferrying commercial goods from Tanzania and Malawi to Bujumbura. This border city is a major Transit point for humanitarian resources destined to DRC .

Information was sourced from Ministry of Planning and National Development (MOPND, 2009) Census in Kenya and internet based research.

1.5 Research Objectives

1.5.1 Broad Objective

The study investigated the factors affecting Trade Facilitation at the in East Africa and the impact of these factors.

1.5.2 Specific Objectives

- i. To identify border points in East Africa that are characterised by Non Tariff Barriers
- ii. Examine factors that impact negatively on Trade Facilitation in East African
- iii. To Analyse the Secondary data collected and
- iv. Make specific conclusions and recommendations on the findings of the study

1.6 Justification for the study

A majority of economists agree that trade facilitation leads to growth in trade and benefits accrue that improve the welfare of all involved. However, other schools of thought feel that costs attributable to implementation of trade facilitation are huge and beyond the capability of developing and least developed countries.

The findings of this study are expected to enhance the knowledge of Trade Facilitation, factors affecting Trade facilitation and the impact of Trade Facilitation in East Africa. Understanding the relationships among various variables relating to trade facilitation will be a step forward in global research and has built understanding of capacity of multilateral trade negotiators in the region. It is expected that the outcome of the study will assist policy and decision makers in various government institutions and agencies involved in the global supply chain in understanding the positive impact that trade facilitation can contribute towards reduction of costs to trade and growth of the economy. The findings are expected to also increase the stock of the theoretical and empirical knowledge on Trade Facilitation and related aspects of trade. The study is expected to form appoint of reference and a basis for further research.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Theoretical Literature Review

This section covered theories on Factors affecting Trade Facilitation by exploring thoughts on the impact of various factors on Trade Facilitation in general, definitions, concepts and the relevant indicators/variables facilitating trade, analysis of existing literature on the subject.

2.2 Theories of Trade Facilitation

Otsuki et al, (2003) analyzes the relationship between Trade Facilitation, Trade Flows and GDP in the Asia Pacific Region for the goods sector in the area of port efficiency, Customs environment and the use of technology. Results of their study relate very much to the expectations of the study in East Africa. The study reveals that there is a tendency for trade to grow with port efficiency. The authors use the gravity model. The study in Asia Pacific region showed growth in the area by 21% (\$ 254 Billion).

By using Kraay's estimate of effect of trade on average per capita GDP showed improvement of up to 4.3%. The economists argue that the 'relationship between trade flows, income growth and human development is simple in theory but complex and challenging in empirical design and estimation of the economic theory generates relatively simple chain of causality. Human development is influenced by growth in incomes which is brought about by growth in cross border trade which is increased by trade facilitation. Though some schools of thought have brought this analogy to scrutiny, this analogy has been proved in Otsuki et al, (2003).

The Authors focused on the empirical relationship between trade flows and trade facilitation. This study aims to prove that improved trading environment through port efficiency, improved Customs environment and administrative procedures enhances Trade facilitation and leads to economic development of the trading partners

Sohn (2001) defined trade facilitation as “All activities or policies which reduce transaction costs arising from eliminating or simplifying excessive and complex procedures, practices and processes increases efficiency and results in increased trade.”

Staples (2002) poses a question, 'but what is Trade Facilitation'? And states that although transport infrastructure, trade liberalization and trade promotion do in a sense facilitate trade, they do not constitute what is known today as Trade facilitation 'He argues that trade facilitation involves reducing all the transactions cost associated with the enforcement, regulation, and administration of trade policies which can be referred to as 'plumbing' of international trade.”

The simplification and harmonization of International procedures where procedures have been defined as 'activities, practices, and formalities involved in collecting, presenting, communicating, and processing data required for movement of goods in international trade'(World Trade Organization :Singapore Ministerial Conference Declaration, 1996)

OECD simply puts it as 'The Simplification and Standardization of procedures while UNECE defines it as 'Comprehensive and integrated approach to reduce costs and increase efficiency, transparency, and predictability'

APEC introduces the aspect of Technology by defining of Trade facilitation as 'simplification and harmonization, use of technologies to address procedural and administrative impediments to trade'

Trade facilitation in essence encompasses generally, 'any measure or set of measures' designed to cut costs associated with 'international trade'

By facilitation of compliant trader there still remains the responsibility by Customs to have the moral obligation to control and enforce the laws on noncompliant traders.

Evidently Trade facilitation has no standard definition. In a narrow sense, it refers to efforts made to address transportation and regulation applying to cross-border trade in

an effort to contain the costs to trade and the avoidance of delays which as we have seen above translate to uncalled for costs

According to Meyer (2003) trade facilitation is about ‘providing an environment for trade and transport that reduces the cost of international trade transactions’.

2.2.1 Ricardos theory

Ricardo reasoned in his theory of comparative advantage that the growth of trade among countries depended on specialization in areas where countries had comparative advantage so specialization was key. Ricardo argued that ‘there is mutual benefit from trade (or exchange) even if one party (e.g. resource-rich country, highly skilled artisan) is more productive in every possible area than its trading counterpart (e.g. resource-poor country, unskilled labour), as long as each concentrates on the activities where it has a *relative* productivity advantage’.

Ricardo, (1817) assumed a two country bilateral trade scenario between England and Portugal, where factors are perfectly mobile, two goods to be traded exist and a scenario of no trade barriers. He was a proponent of Accumulation of capital to form a stock of wealth. As a country continues to utilise capital, the stocks reduce. In the growth of the global economy therefore, the first-world countries, he states, will begin to lose value per trade, even to the purely theoretical extent of drawing from the capital base.

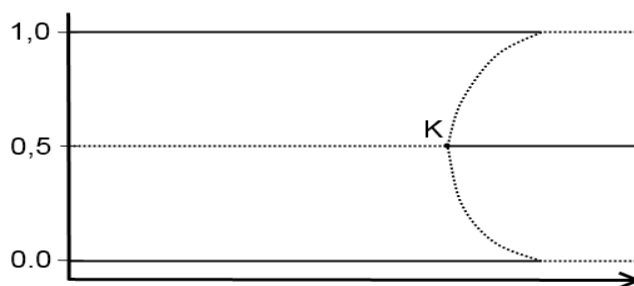
Romer’s Growth model

Romer, (1993) demonstrates in this model the benefits of an open trade orientation. This could be potentially higher than the static gains. In his growth model, Romer shows that a greater variety of inputs does more for production than higher quantities from a limited range. Results confirm that gains are realised in trade liberalization when trade facilitation improvements are incorporated.

In the study in Middle East and North Africa (MENA) region, trade with the European union(2007) increased welfare gains from \$913 million to \$3 billion (0.1% increase to base GDP) The study highlights improvement in welfare and Gross Domestic Product.

Krugman (1979) argues that tremendous growth in trade among countries in the 20th century is difficult to explain by the theory of comparative advantage. Krugman's explanation of trade between similar countries was proposed in the Journal of International Economics,(1979) and involves two key assumptions: that consumers prefer a diverse choice of brands, and that production goes with economies of scale, therefore he models a 'preference for diversity' for production and assumes a utility function for the consumers commonly referred to as the "new trade theory".

Figure 1 Distribution of Manufacturing between Two Regions.



Source: Krugman's (1979): Transport costs and Economic Geography

The above figure illustrates Krugman's 'core-periphery' model. The horizontal axis represents costs to trade, while the vertical axis represents the share of either region in manufacturing. Solid lines denote stable equilibrium, dashed lines denote unstable equilibria. The theory takes into account transportation costs, a key feature in production, and demonstrates that these costs have an impact on movement of goods and on trade in general. The country with the larger demand for a good shall, at equilibrium, produce a more than proportionate share of that good and becomes a net exporter. He argued that trade between similar countries remains beneficial in general,, because it permits firms to save on costs by producing at a larger, more efficient scale, and because it increases the range of brands available. Paul Krugman asserted that the theory behind comparative

advantage does not predict the relationships in the gravity model. According to Krugman, variety and consumer preference contributes to growth in trade.

Descriptive Model

The descriptive models typically offer numerical comparisons of policy scenarios to a baseline. Descriptive models are used to help explain various existing economic phenomena and processes. Classic examples are models of economic growth and models of competitive economic equilibrium. Descriptive models include economic growth models designed to forecast the basic aggregate indicators of development of the national economy and forecasting models for various parts of the economy in history. A descriptive model therefore describes how something works. If a simple problem is being modeled, a descriptive model is usually good enough to solve it. A large drawback *is the descriptive model approach will not work for complex system problems*, because the system is too complex to descriptively model completely or accurately. Examples of systems falling into this class are cultures, organizations, the universe, political dogmas, and a snowstorm at the molecular level. Due to the complexity of this model, it was therefore necessary to explore other models.

The standard solution to the complexity constraint has been to model the portion of the system that, if understood, will lead to solution of the problem, which given enough time, luck (trial and error) leads to a workable solution.

A simulation model

What the simulation model does is to model the relationship between variables, the probability of different scenarios, and to analyze the business as a complex whole. Each uncertain variable is assessed by key decision makers giving their estimates for the expected value of the variable, the low value at a given probability, the high value at a corresponding probability level and the shape of the probability curve. The relationship between variables is either modeled by its correlation coefficient or a regression. A Simulation model represents how a system works by capturing its fundamental structure and allowing that structure to be simulated over time, usually via computer software.

There are two big advantages to performing a simulation rather than actually building the design and testing it. The biggest of these advantages is money. The simulation testing is cheaper and faster than performing the multiple tests of the design each time. The second biggest advantage of a simulation is the level of detail that result from a simulation. A simulation can give one results that are not experimentally measurable with the current level of technology

The disadvantages of a simulation model find expression in inherent errors. Any incorrect key stroke has the potential to alter the results of the simulation and gives one the wrong results. Also when one is programming using the theories of the way things work, not laws, and theories are not often 100% correct. Provided that one gets simulation to give one accurate results one must first run a base line to prove that it works. On the basis of these challenges, the study uses the Gravity Model as opposed to a Simulation Model.

The Computable General Equilibrium model

This model is popularly used by governmental organizations and academic institutions to analyze the economy-wide effects of events such as climate change, tax policies, and immigration.

Zaki et al, (2010) used the model theoretically and empirically to explicitly investigate in a dynamic manner Tariff equivalents, of red tape and related procedures through modification to take into account the cost and tariff equivalents in the process of Trade facilitation. The model is dynamic enough to study the theoretical and empirical aspects of trade facilitation .Using the model, Zaki grouped the Trade facilitation issues in four sections namely, administrative barriers, rent seeking, lengthy clearance times ,Bureaucracy and poor infrastructure .

Zaki's motivation to use the GCE model in an Egyptian case he studied in 2008 was economic interest and empirical reasons. He was able to establish that reduction in administrative barriers was likely to impact more on trade than the classical impediments we know of such as transaction length, bureaucracy ,Customs fraud etc. With increased supply chain dependency, Zaki argues that imported products delivery delays have turned

into a severe constraint on production and that the cost of non facilitation has risen to a high of 2-15% of the value of goods traded in. Egypt, which was his study location was ranked 26th in Trading across borders (Wold bank “Doing Business 2008’) a head of economies like Turkey, Lebanon, Jordan and Syria. Applied general equilibrium models had achieved a degree of acceptance and prestige which is in many respects unique due to the inherent potential of the approach to respond to many needs in a superior way compared to previous methods. However, as new applications and extensions are proposed, it becomes clear that the results obtained are not always in line with the expectations, and that the approach has some limitations which must not be overlooked (Borges, 2010) weakness is the lack of empirical validation of the models, in the sense that usually there is no measure of the degree to which the model fits the data or tracks the historical fact. General equilibrium models are usually very large, including a substantial number of parameters and often embody rather complex structures. Because of the assumption of general economic equilibrium, which is seldom observed results of the model indicate long-term tendencies around which the economy will fluctuate. The models cannot be used to replicate the evolution of the economy in the past as a means of checking their validity. CGE models not only assume that all markets find their equilibrium but also that nothing happens until equilibrium is reached. In other words, no transactions take place in disequilibrium. The general equilibrium approach is directed towards long-term questions. Its results should be interpreted in that context. Therefore, it has not been applied to issues other than long term consequences of policy decisions or exogenous shocks. Equilibrium, as if all economic agents were to wait until equilibrium is found before they made any decisions. The CGE models do not take into account the role of technological progress. Finally, most existing general equilibrium models have a very inadequate treatment of the foreign sector, and in particular of net trade flows. In view of the facts prevailing in relation to the appropriate model for use, the model used in this study is the Gravity Model.

The Gravity Model

The gravity model was developed simultaneously by Tinbergen (1962), Poyhonen (1963) and Pulliainen (1963) in explaining bilateral trade flows between countries. It is called

“gravity model” because of its analogy with Newton’s law of universal gravitation. According to the universal law discovered by Newton in 1687, the standard gravity model describes that the trade between countries is determined positively by each country’s GDP, and negatively by the distance between them Hatab et., al (2010). The gravity model has been used in a number of fields. The model has been used in the analysis of the impact of GATT/WTO memberships, RTAs, currency unions, migration flows, FDI between countries and many other studies. Initially the gravity model was not based on any theoretical foundations. The standard proxies for trade costs in the gravity model are; distance, adjacency, common language, colonial links, common currency, island, landlocked, institutions, infrastructures, migration flows etc.

There are many studies which have contributed to the improvement of the gravity equation. Matyas (1997) and (1998), Cheng and Wall (1999), Breuss and Egger (1999) and Egger (2000) improved the econometric specification of the gravity equation. Also Berstrand (1985), Helpman (1987), Wei, (1996), Soloaga and Winters (1999), Limao and Venables (1999), and Bougheas et al, (1999) and many others, contributed to the refinement of the explanatory variables considered in the analysis and to the addition of new variables (Martinez-Zarzoso and Nowak-Lehmann 2001). After the work by Tinbergen and Poyhonen, many authors have applied the model in their studies. For example population was incorporated as an additional variable in the model by Linnemann (1966). Other authors used per capita income which is usually a proxy for economic development. Models which have incorporated population as an additional variable are sometimes referred to as augmented gravity models (Cheng and Wall, 2004).

The basic form of the gravity model according to Tinbergen (1962) and Poyhonen (1963) can be represented as follows:

$$X_{ij} = K \frac{Y_i Y_j}{D_{ij}} \dots\dots\dots 1$$

Where X_{ij} is the value of exports (imports) from country i to country j , K is constant while Y stands for the economic size in each country (i and j), D_{ij} is the distance between the trading countries. When empirically estimating the gravity equation other

variables can be incorporated in the basic form of this model. These variables were outlined earlier and can include: exchange rates, dummy variables such as the colonial links, existence of the common language, common borders, trading blocs and also trade agreements. The above basic model implies that the value of exports flowing from a given country is affected by the exporter's income, importer's income and the distance between the trading partners. In addition to the above model which incorporates only three variables, an augmented model will be estimated which will include all the variables which affect the flow of goods in Kenya to its trading partners.

The Gravity Model Analysis

Motivations for the use of the gravity model include empirical evidence of the success of the model in ranking the size of cities, rail road freight movement, telephone messages and rural land values. The gravity model is visually striking when graphed and has been successful investigating and survey feedback. The model is cost effective in conducting the study both in terms of time and money spent and works best in identifying patterns of relationships for a large population. The model has credibility in removing ambiguity in specification by imposing a particular functional form.

Iwanow and Kirkpatrick 2007, attest to the fact that trade liberalization and reduction of tariffs and no tariff barriers combine with the growth in the global supply chain management practices to contribute to heightened costs of border trade transactions accounting for 2-15% of the goods trade. Non tariff barriers represent a negative externality that increase the costs of doing business

Concepts and Definitions

Sohn (2001) defined trade facilitation as "All activities or policies which reduce transaction costs arising from eliminating or simplifying excessive and complex procedures, practices and processes related to thus increasing efficiency, which results in increased trade."

Staples (2002) poses a question, 'but what is Trade Facilitation'? And states that although transport infrastructure, trade liberalization and trade promotion do in a sense facilitate trade, they do not constitute what is known today as Trade facilitation. 'He argues that trade facilitation involves reducing all the transactions cost associated with the enforcement, regulation, and administration of trade policies which can be referred to as 'plumbing' of international trade."

World Trade Organization: The simplification and harmonization of International procedures where procedures have been defined as 'activities, practices, and formalities involved in collecting, presenting, communicating, and processing data required for movement of goods in international trade'

OECD simply puts it as 'The Simplification and Standardization of procedures while UNECE defines it as 'Comprehensive and integrated approach to reduce costs and increase efficiency, transparency, and predictability'

APEC introduces the aspect of Technology by defining of Trade facilitation as 'simplification and harmonization, use of technologies to address procedural and administrative impediments to trade'

Trade facilitation in essence encompasses generally, 'any measure or set of measures' designed to cut costs associated with 'international trade'

By facilitation of compliant trader there still remains the responsibility by Customs to have the moral obligation to control and enforce the laws on noncompliant traders.

Evidently Trade facilitation has no standard definition. In a narrow sense, it refers to efforts made to address transportation and regulation applying to cross-border trade in an effort to contain the costs to trade and the avoidance of delays which as we have seen above translate to uncalled for costs.

According to Meyer (2003) trade facilitation is about 'providing an environment for trade and transport that reduces the cost of international trade transactions'.

2.2 Empirical Literature Review

This covered what other studies have found in relation to the current study through investigation of the body of knowledge that has relevance to the topic of research and highlights motivations, initiatives/strategies that have been employed by economists factors affecting trade facilitation, its advantages and an appreciation of challenges .

Macro Benefits of Trade Facilitation:

Port efficiency, proper customs environment, regulations that are prominently published after consultation with parties concerned and consolidated costs that are commensurate with services rendered by government agencies form the basic frame work of Trade facilitation that result in immense benefits as reiterated by UNCTAD,(2004).The benefits range from ‘overall increase in trade flows’(Hertel, Wansley and Itaura,2001) Electronic commerce has been found to reduce in the time spent doing business which results in savings

Global Economic Prospects (2004), clearly outlines the links between trade reform measures that address factors affecting trade facilitation to poverty reduction. Because most poor people live in rural areas and engage in agricultural production. Cutting trade barriers in agriculture is among the effective strategy to combat poverty. A relatively simple program to cut tariff peaks in rich countries to 10 percent in agriculture and 5 percent in manufacturing, reciprocated with cuts upto 15 percent and 10 percent respectively in transition and developing countries.

Micro Benefits of Trade Facilitation

At a micro-economic level, trade facilitation has a direct impact on total logistical costs, the sum of time and money involved in moving traded goods. (UNCTAD, 2004). Trade Facilitation benefit small and Medium scale Enterprises (SME) have been found to be ‘the engines of economic development in many transitional countries’ (World Bank, 2002)

A 3 percent reduction in landed costs from electronic documentation reduces trade costs by \$60 billion; (Yatsui and Walkenhorst, 2003,)

Each day saved in shipping time in part due to faster customs clearance has the same impact as 0.5 percentage point tariff reduction for importers and exporters

A 10 percent increase in the relative number of web hosts in an economy increases trade flows by 1 percent and 10 percent decrease in telecommunications costs increases trade by 8 percent. .(Wilson, Man and Otsuki, 2003)

The Contribution of trade facilitation to trade and economic growth

Reduction in the costs associated with the movement of goods across borders and regulatory environment, Reforms have been cited as drivers to economic growth (University of Manchester, 2009). ‘The reductions of tariff barriers in successive rounds of international trade negotiations, the continued expansion of world trade, and the growth in global supply chain management practices have resulted in a heightened interest in the impact of on-the-border and inside-the-border trade transaction costs on international trade.’

Clarke (2005) illustrates that export performance of manufacturing enterprises in African countries that manufacturing enterprises are less likely to export in countries with ‘poor customs administrations and restrictive trade and customs regulation’. Landlocked countries such as Uganda, Burundi and Rwanda face particular problems with Kenya and Tanzania transit arrangements, and have proposed changes to EAC rules which would help address their difficulties.

Costs of Trade

The ‘negative impact of inefficient border procedures on governments, businesses and ultimately on the customer and the economy as a whole’ results in smuggling, fraud and national security problems, which ‘drains the public coffers, while businesses pay the price of slow and unpredicted goods delivery, costly customs procedures, and even lost

business opportunities. All these costs ultimately make goods more expensive for the consumer. These “hidden” costs of trade can be as high as 15% of the value of the goods traded in. For many countries, the welfare benefits from more efficient customs procedures could be as high if not higher than those from reducing tariffs’.(OECD,2005).

Indicators of trade facilitation measures

Gains from trade facilitation can be best realised while analysing the impact of the linkages between ‘removal of a trade barriers ’and reforms in enterprise and household behaviour, and the results in favour of’ the economic, social and environmental dimensions of sustainable development’. Below are some indicators from positive impacts of trade facilitation: Indicators

Figure 2 : Economic, and Social impacts on sustainable development

Sustainability Dimension	Core Indicator
Economic	Real income Fixed capital formation employment
Social	Poverty

Source: Trade sustainability impact assessment (SIA) University of Manchester, (2005).

The main indicators of development are seen where social benefits result in poverty reduction and increase in real income derived from employment

The SIA ‘methodology also allows for the development of second tier indicator to describe results at a lower level of aggregation than the core indicators. For trade facilitation they are identified through the chain analysis ‘impacts on the key procedures, processes and practices that are needed for longer-term advancement of sustainable development.’(University of Manchester 2005)

2.3 Trade Facilitation and increase in imports and exports

Several research studies have confirmed that a better trade facilitation environment increases import and export volumes. Wilson et. Al. (2003) estimated the impact of trade facilitation on trade flows using a gravity model methodology. Their results indicate large potential increases in trade and growth rates from trade facilitation reform in countries that have above average trade transaction costs. Djankov et al, (2006), found that on average, each additional day that a product is delayed prior to being shipped reduces trade by at least 1 percent as well as the effect on trade volumes. It has been shown that a reduction in customs clearance times can have a significant influence on attracting foreign investment. Nordas et al, (2000) analyzed the relation between time for exports and imports, logistics services and international trade and found that time delays result in lower trade volumes and reduce the probability that firms will enter export markets for time sensitive products.

Impact of trade Facilitation on SME

The effect of trade facilitation measures on Small and Medium Sized Enterprises (SMEs) is of particular interest. They have limited capital, so border delays can affect their liquidity.

Economic Benefits versus Costs

There is broad consensus that trade facilitation does have the potential to contribute significantly to smoother and intensified trade between countries, particularly in terms of eliminating burdensome non tariff barriers

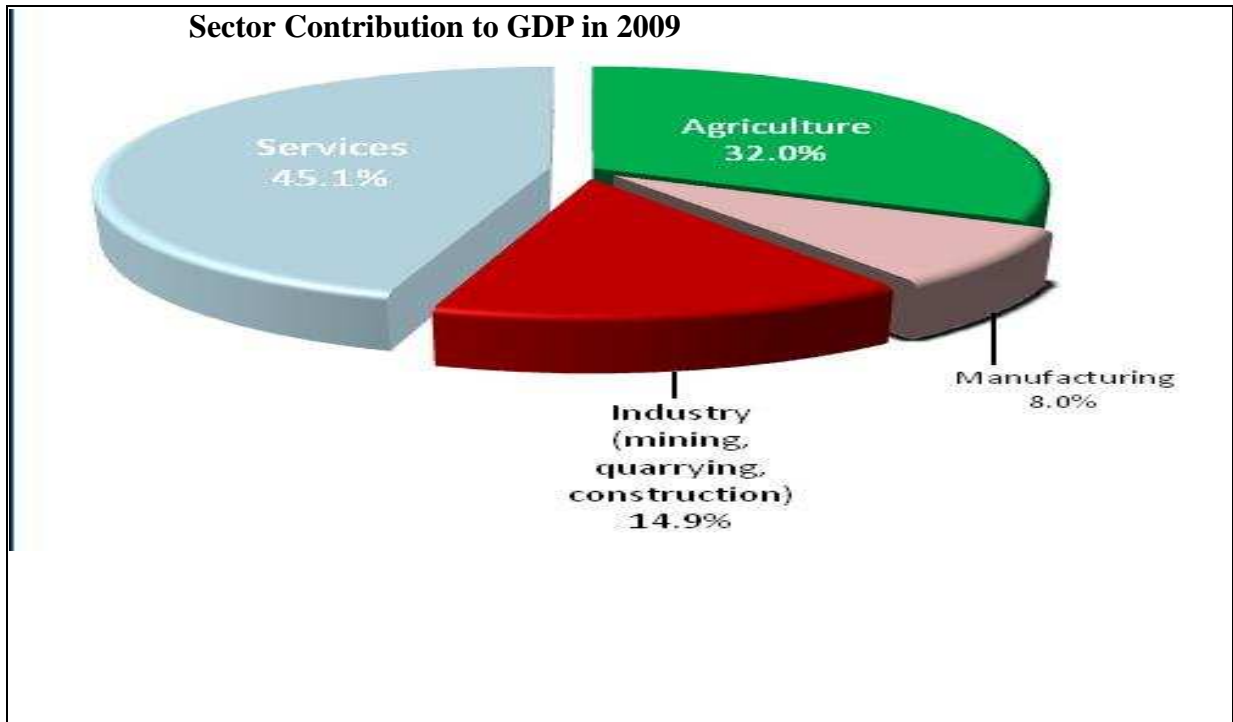
The study focused specifically on implementation costs for governments, and considered the following four cost components specifically and directly related to a given TF measure: Regulatory costs; Institutional costs; Training Costs and Equipment/Infrastructure costs.

The study notes that overall implementation costs of specific measures will be affected by current level of infrastructure development in each country, which may need to be

improved before a particular measure may be effectively implemented. automation is often a major component in some cases, amounting to over two-thirds of the total cost of a customs-related lending project.

The OECD study on potential impact of Trade Facilitation on developing Countries' Trade and Trade Facilitation Indicators ,(2013) conclude that the costs for implementing. Maintaining and operating automated customs systems are substantial. OECD However, stipulates proposals that can alleviate the situation in developing countries and result in benefits. OECD has done this by developing a set of TF Indicators to help government policy makers improve border procedures, reduce trade costs, boost trade flows and reap greater benefits from International trade . This set of indicators identify key areas for action when implementing potential reforms. OECD in the studies mentioned stress the importance of initial analysis and diagnosis of trade facilitation issues. One of the most common causes of failed reform is inadequate or insufficient understanding of problem areas that need to be addressed thus the development of indicators appended to this study.

Figure 3: Impact of Trade Facilitation on Economic Growth



Source: ADB Data Platform August 2010 Poverty and income distribution

Impacts on core economic indicators.

According to the African Development Bank Data Platform report (2010), the key economic sectors such as services, with an indication of (45.1%), agriculture (32%) and mining and quarrying (14.9%) are key indicators drive the regional growth process. while the contribution of manufacturing (8%) is still small, this could be improved. Growth in these sectors could improve with investment in Trade Facilitation initiatives.

Trade Facilitation initiatives can affect the distribution of income hence aid poverty reduction in a society in three key ways:

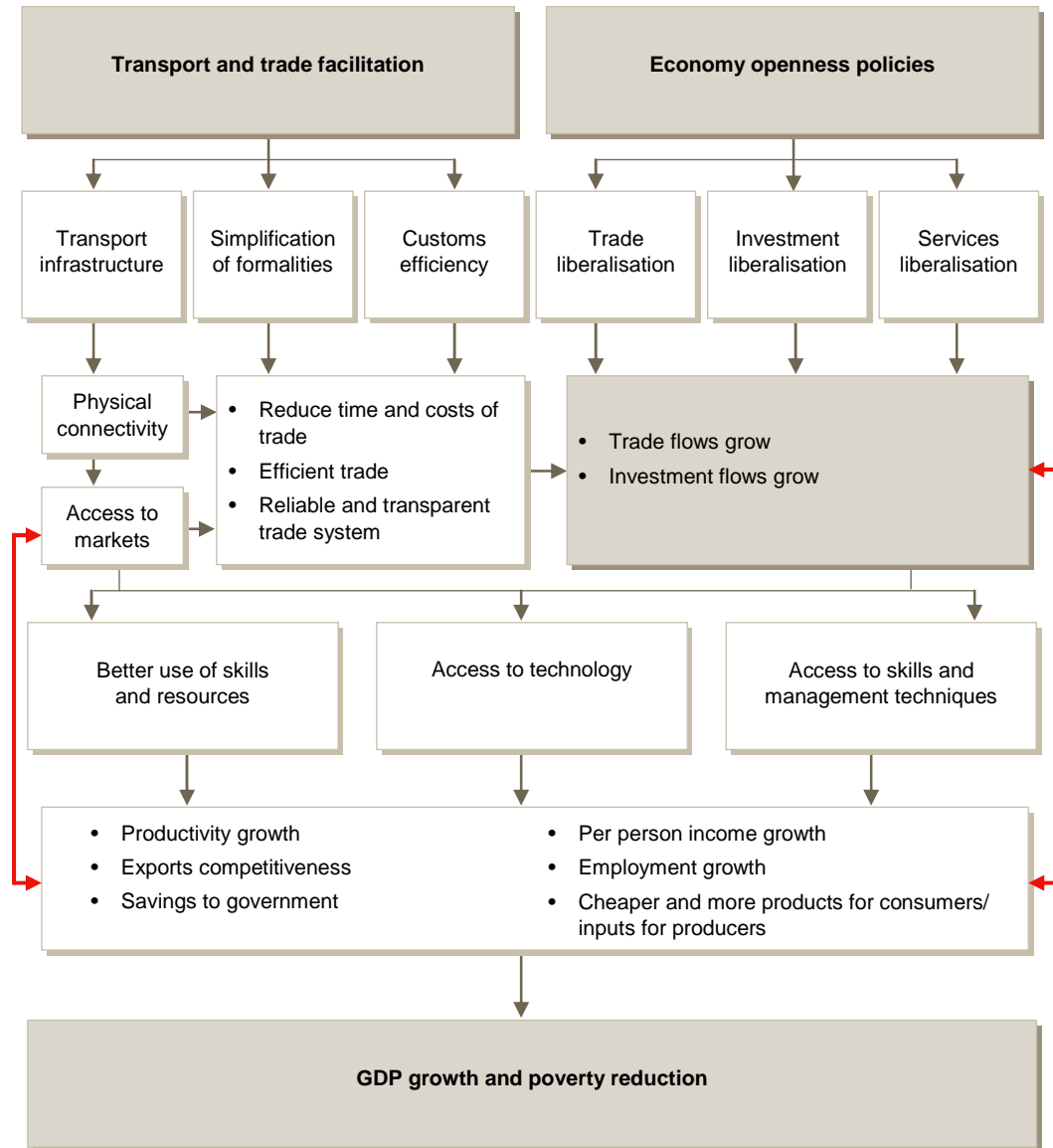
1) Trade facilitation increases the volume and range of a country's international trade, by reducing the transaction costs of trade, making exports more competitive, leading to

increases in wages and the numbers employed in the exporting sectors, and imports less expensive, thereby also increasing real wages. World Bank,(2003).

2) Trade facilitation contributes to economic growth, which in turn leads to higher incomes

3) The final way that Trade Facilitation impacts on income distribution and poverty reduction relates to the increase in government revenues, which is the concomitant of increased trade flows.

Figure 4: Trade Facilitation, Regulatory Quality & Export Performance.



Source: University of Manchester Trade Facilitation Forum , (2007) on Trade Facilitation, Regulatory Quality & Export Performance.

Real income

The direct financial and revenue benefits of a well designed trade facilitation programme can often outweigh the costs, with potentially large indirect economic benefits in the

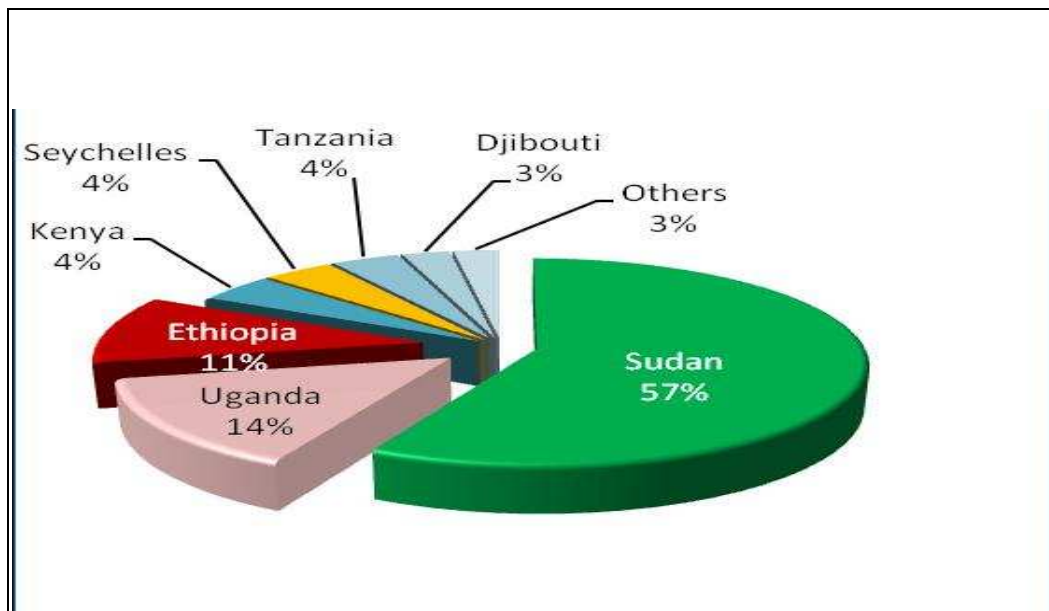
longer term. The static efficiency effects on economic welfare are fairly small but the longer term dynamic effects are potentially much larger. These gains are not available in EAC countries, which have made less progress than the EU in implementing efficient TF and workable TF border procedures and reforms.

Fixed Capital Formation

Trade facilitation can contribute to fixed capital formation through increased foreign direct investment, since investing companies require cheap, quick, transparent and predictable customs services

Impact of trade facilitation initiatives on competitiveness

Figure 5: Annual Average Foreign Direct Investment in East Africa (2008-2008)



Source ADB platform Data August 2010.

Improved business climate, can have a positive impact on Foreign Direct Investment (FDI), which itself creates further knowledge spillages and linkage externalities.

Employment

It is reasonable to anticipate beneficial employment effects from Trade Facilitation measures. Efficient Trade Facilitation will increase employment at border points of many countries.

Impact on core social indicators

Although it is not easy to assess the absolute economic impact of the Trade Facilitation component of the trade agreement until the negotiations are complete, it is reasonable to anticipate the outcome to be economically beneficial to the social well being of East African countries.

Impact on Small and Medium Enterprises

The limited amount of evidence emerging from the Trade Facilitation Audits, so far, suggests that where impediments exist, the associated costs fall disproportionately on small and medium sized enterprises, (*World Bank, 2002*).

2.4 Overview of the Literature Review

The overview of related literature on trade facilitation indicates that though the topic of trade facilitation has attracted a lot of attention, there is limited academic research on the topic. This study addressed this gap by adding to the existing scarce literature by bringing out the factors affecting Trade facilitation in East Africa and their impact. The literature review has brought an understanding of the relationship between Trade facilitation and trade flows which may appear complex. Trade facilitation has centred the checklist of issues affecting trade facilitation in four categories (Otsuki et al, 2002) namely, port efficiency, Customs environment, Regulatory environment and the use of technology in the process of trade. The economists allude to the fact that measures to address trade facilitation for each country will enhance trade for these countries even with their unique trade facilitation measures and patterns of trade. The review has shown that using augmented gravity model resulted in confirming that Trade facilitation

enhances trade. Survey of information was used with care and the transparent secondary data with respect to data sample questions was investigated and yielded desired results.

This study benchmarked with the World Forum, Global competitiveness Report 2001-2002 for authenticity. The General Agreement on Tariffs and Trade (GATT, 1994) which has given the legal framework for Trade Facilitation summarized in Articles v ,viii and x namely, Freedom of Transit, fees and charges and publication and administration of trade rules is the basis of trade facilitation and reforms directed toward trade facilitation will accrue benefits to countries involved. The World Bank's 'Doing Business' report (2009) on regulatory reforms gave guidance on the treatment of non tariff barriers to trade. The literature reviewed converged on the fact that elimination of non tariff barriers enhances trade which leads to economic well being due to increased trade flows.

CHAPTER THREE

3.0 : METHODOLOGY

3.1 Methodology and approach

Secondary data was used and variables/indicators developed, described and appropriately analysed using scientific analytical tools.

3.2 Data collection strategy

Secondary data was collected from review of files, reports, articles, documents, maps, books and data available on the internet.

3.3 Data Analysis and Reporting

Data was analyzed, presented and interpreted using regression models where the study r assessed the relationship among variables. Tables and graphs have been used to give a clear reporting and view of the distribution. Conclusions have been drawn and recommendations made on the results. Development of a model was enriched by the gravity model which examined how regional preferential trade agreements play a role in enhancing trade within the partner states.

Estimation was by use of the STATA software through OLS, using a robust estimator and importer/exporter fixed effects to control for resistance. Correlation between explanatory

3.4 The Gravity Model

The basic form of the gravity model according to Tinbergen (1962) and Poyhonen (1963) can be represented as follows:

$$X_{ij} = K \frac{Y_i Y_j}{D_{ij}} \dots\dots\dots(1)$$

Where X_{ij} is the value of exports (imports) from country i to country j , K is constant while Y stands for the economic size in each country (i and j), D_{ij} is the distance

between the trading countries. When empirically estimating the gravity equation other variables can be incorporated in the basic form of this model. These variables include: exchange rates, dummy variables such as the colonial links, existence of the common language, common borders, trading blocs and also trade agreements. The above basic model implies that the value of exports flowing from a given country is affected by the exporter's income, importer's income and the distance between the trading partners. In addition to the above model that shows three variables, an augmented model was estimated which included all the variables impact on trade facilitation in East Africa.

3.5. Empirical analysis of the gravity model

In all the studies applying the gravity model, a similar equation has been used this study with the following general specification of the gravity model;

$$X_{ij} = \beta_0 Y_i^{\beta_1} Y_j^{\beta_2} N_i^{\beta_3} N_j^{\beta_4} D_{ij}^{\beta_5} A_{ij}^{\beta_6} \varepsilon_{ij} \dots\dots\dots(2)$$

Where *i* denotes the exporter and *j* the importer, *X* stands for the exporting country while *Y_i* and *Y_j* indicate the GDP of the exporting and the importing country respectively. *N_i* and *N_j* represents the population of the exporter and importer respectively. *D* stands for the distance in kilometres between the economic centres while *A* denotes any other factor which affects the flow of exports to the importing country. These factors can include: regional and trade arrangements, economic partnerships, bilateral relationships, common language, common currency, common border, exchange rate etc). Lastly *ε_{ij}* denotes the stochastic disturbance term/ error term which is assumed to be normally distributed and has a mean of zero and variance of *σ²*(sigma squared). Variables were checked to avoid co linearity.

3.4 : Model specification

Equation (2) above was adopted as the basic gravity model and is similar in all cases to the augmented gravity models with the only difference being that is structured in such a way to take into account different area of studies e.g. the agricultural sector and the manufacturing sector.

$$X_{ij} = \beta_0 Y_i^{\beta_1} Y_j^{\beta_2} K_i^{\beta_3} K_j^{\beta_4} D_{ij}^{\beta_5} A_{ij}^{\beta_6} \varepsilon_{ij} \dots\dots\dots(3)$$

Where i denotes the exporter and j the importer, X stands for the exporting country while Y_i and Y_j are the GDP of the exporting and the importing country respectively. K_i and K_j stands for the population of the exporter and the importer respectively. D stands for the distance in kilometres between the economic centres while A denotes any other factor which affects the flow of exports from the exporting country to the importing country. These factors can include: regional and trade arrangements, economic partnerships, bilateral relationships, common language, common currency, common border, exchange rate etc). Lastly ε_{ij} denotes the stochastic disturbance term/ error term which is assumed to be normally distributed and has a mean of zero and variance of σ^2 (sigma squared).

The above model can be expressed in logarithm linear form as follows:

$$\log X_{ij} = \beta_0 + \beta_1 \log(Y_i) + \beta_2 \log(Y_j) + \beta_3 \log(K_i) + \beta_4 \log(K_j) + \beta_5 \log D_{ij} + \beta_6 \log(A_{ij}) + \varepsilon_{ij} \dots \dots \dots (4)$$

However, the model to be estimated in this study was written in the following log-linear equation:

$$\ln export_{ij} = b_0 + b_1 \ln gdp_i + b_2 \ln gdp_j + b_3 \ln pop_i + b_4 \ln pop_j + b_5 \ln dist_{ij} + b_6 border_{ij} + b_7 lang_{ij} + b_8 eacrta + e_{ij} \dots (5)$$

β_0 = A constant

Y = GDP

K = Population

D = Distance in kilometres between the two countries economic centres

Exc = Real exchange rate

lang = language

$eacrta$ =Dummy variable for membership in East Africa Community Regional Trade Agreement

ij = Export and Import Country

order=captures the border effects that have a negative impact on Trade Facilitation

The main purpose of incorporating the dummy variables for the EAC was to analyse the impact of the regional agreements on the bilateral exports flow. As was expected that the co-efficient of these variables was positive because the purpose of regional agreements is to stimulate trade between the member countries. The exporter's Gross Domestic Product (GDP) measures the country's productive capacity. GDP measures the productive ability of the country, Galan et al (2002). The border effects are exemplified in the uncoordinated border inefficiencies, Customs environment and non tariff barriers that impact negatively on Trade Facilitation. The distance in the above model has been included as the proxy for the transportation costs. The greater the distance the higher will be the transportation costs and thus trade will be reduced. The distance in this model is assumed to be the distance between the economic centres of the trading countries preferably capital cities. The co-efficient for the distance was expected to have a negative sign

Where:

For estimation purpose, this model can be rewritten in the following log-linear equation:

$$\ln(X_{ij}) = \beta_0 + \beta_1 \ln(Y_i) + \beta_2 \ln(Y_j) + \beta_3 \ln(K_i) + \beta_4 \ln(K_j) + \beta_5 \ln(D_{ij}) + \beta_6 \ln(Exc_{ij}) + \beta_8(eac) + \dots \dots \dots (6)$$

In addition to the usual variables of the basic gravity, additional variables which affect the flow of trade to be incorporated in the augmented gravity model above

3.5: Estimation Methodology

In panel data estimation, three models can be estimated. These models are the fixed effects model, pooled and the random effects model. A random effects model is more appropriate when estimating a sample of trading partners which has been randomly drawn from a large population. The fixed effects model is appropriate when estimating the flows of trade between an ex ante predetermined selection of countries (Egger, 2000; Eita and Jordan, 2007). Since this study will be focused on trade between Kenya and its main trading partners in Europe the fixed effects model will be more appropriate than the random effects specification. In addition Hausman test will be applied to check whether the fixed effects model is more appropriate than the random effects model. If the null hypothesis between the individual effects and the repressors' is rejected, then fixed effects model will be efficient.

3.5 Estimation Methodology

In panel data estimation, three models can be estimated. These models are the fixed effects model, pooled and the random effects model. A random effects model was found more appropriate when estimating a sample of trading partners which has been randomly drawn from a large population. The fixed effects model was found appropriate when estimating the flows of trade between an ex ante predetermined selection of countries (Egger, 2000; Eita and Jordaan, 2007). Since this study was also focused on trade between Kenya and its main trading partners in Europe the fixed effects model was found more appropriate than the random effects specification. In addition Hausman test was applied to check whether the fixed effects model is more appropriate than the random effects model. If the null hypothesis between the individual effects and the regressors is rejected, then fixed effects model would be efficient.

The fixed effects model had a problem in that the variables that did not change over overtime couldnot be estimated directly because the inherent transformation wiped out such variables. To avoid this problem, these variables were estimated in a second step by running another regression with the individual effects as the dependent variable and the distance and the dummy variable as the explanatory variables.

3.5 Estimation using Augmented Gravity Model

The ordinary Least squares was the most logical method to use. OLS was the econometric equivalent of lines of best fit used to show the connection between trade and GDP or trade and distance. Ordinary Least Squares (OLS) minimized the sum of squared errors. Under certain assumptions as to the error term e_{ij} OLS gave parameter estimates that were not only intuitively appealing but had useful statistics that enabled conducting hypothesis testing and drawing of inferences.

Conditions under which OLS estimates of the gravity model that were statistically Useful

- i. the error term e_{ij} must have mean zero and was uncorrelated with each of the explanatory variables (the orthogonality assumption)

- ii. the error e_{ij} was independently drawn from normal distribution with a given (fixed) variance (the homoskedasticity assumption)
- iii. non of the explanatory variables was a linear combination of other explanatory variables(the full rank assumption)

The three properties held, therefore OLS estimates were consistent, unbiased and efficient within the class of linear models. By consistent we mean that the OLS coefficient estimates converged to the population values as the sample increased. By unbiased we mean that the OLS coefficient estimates were not systematically different from population values even though they were based on sample rather than full population .By efficient we mean that there were no other linear ,unbiased estimator that produces smaller standard errors for the estimated coefficients.

As we got OLS coefficient estimates that satisfied the assumptions above we used them to test hypothesis using the data and the model. To test the hypothesis that involved one parameter only for example the distance elasticity is -1- we used the *t*-statistic. To test a compound hypothesis that involved *more* than one variable, for example that both GDP coefficients are equal to unity, we used F-statistic.

Table 1: Priori Expectations of the Study

Non Tariff Barriers	<ul style="list-style-type: none"> • Port inefficiencies • Poor Customs Environment • Administrative Barriers • Delays 	Have a Negatively Impact on Trade
Technology	Automation and E-Business	Positively Impact Trade Facilitation
Transport Costs	High costs of transport	Have a negative impact
Uncoordinated Borders	Lead to delays	IMPACTS Negatively on trade facilitation

Source: Developed during this study (2013)

3.6: Choice of Estimation Method

A number of specification tests were conducted to establish the most appropriate model formulation that fits the data well. This was necessary in order to obtain consistent empirical results and draw correct policy recommendations and conclusion.

3.6.1 Breusch-Pagan Random Effects Test

This test is a Lagrange Multiplier (LM) test for the random effects model based on the OLS residuals (Greene, 2003). The LM statistic is chi-square (X^2) distributed with one degree of freedom under the null hypothesis.

We assumed that the estimation of the Random Effect Model (REM) was a weighted average of the fixed and between estimates, and that the goal was to estimate variables that were constant with units. The Random Effects Model (REM) estimation method thus required residuals to be treated as random variables that followed the normal distribution. The Breusch-Pagan Random Effects was conducted to assess the validity of the distributional assumption by testing whether the variance of the residuals is constant or not. If the null hypothesis was true, then there were to be no significant random effects in the data. Rejection of the null hypothesis implied within-unit correlation and that there were significant random (individual) effects in the data. This test was conducted to complement the Hausman specification.

3.6.2 Hausman Specification Test

The Hausman test was performed to determine the choice between the Fixed Effect Model - FEM (LSDV) and the Random Effect Model - REM (GLS). Fixed effects model gave statistically consistent results, however, sometimes the results were found to be efficient. The random effects gave better p-values as they were more efficient estimators, and ought have been the best choice of model if found to be statistically justifiable. The Hausman test was based on the hypothesis of no correlation, where both OLS in LSDV model and GLS were consistent, but OLS was inefficient. The null hypothesis tests were to determine whether the coefficients estimated by the efficient random effects were the same as the ones estimated by the consistent fixed effects model or not .

Rejection of the null hypothesis lead to the conclusion that the REM was not expected , while the FEM was the appropriate estimation technique. Acceptance of the null hypothesis lead to the conclusion that the random effects estimator was efficient (Greene, 2003).

3.7 : Diagnostic Tests

This section strove to ensure that model framework satisfied the various econometric assumptions in order to derive reliable coefficient estimates. These included Woodridge's correlation test for serial correlation and Likelihood ration test for panel level heteroscedasticity.

3.7.1 Heteroscedasticity Test

Equation (6) assumed that the standard error of the regression was homoscedastic with the same variance across individuals and time. This assumption was viewed to be restrictive considering that countries involved in the study differ in a lot of aspects as such the results exhibited variances. Failure to correct for homoscedastic disturbances would result in consistent but inefficient estimates of the regression coefficient.

Likelihood-Ratio Test for Heteroscedasticity

In this test the homoscedastic model was pooled together in the heteroscedastic model. This type of nest is superior to the general approach for testing for heteroscedasticity whereby the test is based on the behaviour of the residuals (Greene, 2003). Under the null hypothesis, the LR Statistic followed an asymptotic χ^2 distribution.

3.7.2 Autocorrelation in Panel Data

According to Baltagi (2000), the disturbance term presented in (6) above assumed that the only correlation over time is due to the presence of the same unit across a panel. This assumption was restricted in the practice as unobserved shock in any given time period affects the behavioural relationships over the next few time periods. Ignoring correlation would lead to consistent but inefficient estimates of the regression coefficients, as well as standard errors.

CHAPTER FOUR

4.0 DATA ANALYSIS, INTERPRETATION & PRESENTATION

4.1 Introduction

This chapter presents the descriptive and empirical analysis of variables estimated in the model. The descriptive analysis gives the mean and standard deviations of the observed variables while the empirical analysis gives the regression results of the estimated model.

4.2 Descriptive Statistics

In this section we give a summary of the main variables that have been used in the estimation of the model as shown in Table 4.1.

Table 4.1: Summary of Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
lnexportsij	936	17.38194	4.072331	0	24.81838
lngdpi	936	25.23638	3.146175	20.48075	30.38371
lngdpj	936	24.94142	3.123194	20.48075	30.38371
lnpopi	936	17.63746	1.588579	15.71377	21.02389
lnpopj	936	17.63746	1.588579	15.71377	21.02389
lndist	936	8.181399	1.309364	4.91359	9.43114
borderij	936	.1944444	.395984	0	1
langij	936	.2767094	.4476107	0	1
eacrta	936	.2916667	.4547727	0	1

The total number of observations in the data was 936 and all the variables are complete showing that there are no missing values in the primary observations. The data was therefore qualified as a balanced panel. The mean average export in terms of its natural log is 17.38 with a standard deviation of 4.07. The standard deviation is considered very high showing that there is high variability of intra-EAC trade. This was due to the members' dominance in terms of trade within the region e.g. Kenya. In terms of trade facilitation it is evident that with investment in trade enhancing technology enhances Trade Facilitation.

The mean GDP for the exporting country-i was 25.24 with a standard deviation of 3.15 while that of the importing country-j was 24.94 and a deviation from the mean of 3.12. This meant that the countries level of development and size are quite different. This was an indication that the member states of the EAC are likely to benefit from the RTA and to be shown in the growth of GDP. There was less variability in population as compared to the GDP. This was explained by the low standard deviation of 1.58 for both exporter-i and importer-j countries. This was due to the different geographic and population sizes of the trading partners and the level of investment in the trade facilitation.

The variable distance as a proxy for transportation cost had a mean of 8.18 and a standard deviation of 1.31. This shows the different levels of transaction cost to stimulate the bilateral trade.

4.3 Correlation Matrix

A correlation test was conducted on the variables and the results generated summarized in a correlation table as shown in Table 4.2. There is high correlation of 0.55 reported between exports and the GDP of the exporting country showing that increased exports will enhance GDP and likely to invest in Trade Facilitation initiatives . All the traditional gravity model variables have a positive correlation with the dependent variable while the augmented gravity model variables that include the dummy variables have showed negative correlation with the dependent variable.

Table 4.2 : Correlation Analysis

	lnexpo~j	lngdpi	lngdpj	lnpopi	lnpopj	lndist	borderij	langij	eacrta
lnexportsij	1.0000								
lngdpi	0.5532	1.0000							
lngdpj	0.2412	-0.1057	1.0000						
lnpopi	0.3542	0.7572	-0.1004	1.0000					
lnpopj	0.0941	-0.0887	0.8496	-0.1227	1.0000				
lndist	0.0700	0.4410	0.4267	0.3841	0.3841	1.0000			
borderij	-0.1634	-0.3903	-0.3468	-0.2286	-0.2286	-0.7280	1.0000		
langij	-0.0492	-0.0761	0.0831	-0.1647	-0.0248	0.0378	0.0099	1.0000	
eacrta	-0.2575	-0.5456	-0.3990	-0.3455	-0.2761	-0.8329	0.7656	-0.1237	1.0000

There was high correlation of 0.83 between EAC RTA dummy and distance while the lowest correlation of 0.01 is recorded between language dummy and the border dummy variable. The high correlations recorded were a signs of effects of the independent variables effects on the dependent variable when estimated using the fixed effect model. However this has been highlighted and corrected for in the empirical results and tests.

4.4 Empirical Results

Different regression analyses were run and post estimation tests conducted to allow for the choice of the better estimator for the coefficients generated. The results are presented in the tables and further discussions conducted to allow for the proper interpretation of the results.

Diagnostic Tests

A Hausman test was first run to make a choice between Fixed Effect and Random Effect Models. The resulting chi-square statistics is 39.53 and is statistically significant at 1% level of confidence. We therefore conclude that a Fixed Effect model is the most appropriate. Second, a Breusch-Pagan Test for Random Effect was run to confirm for the presence of random effects. The resulting chi-square value was 3010.81 with a significant p-value at 1% level. We therefore accept the alternative hypothesis that there is a random effect.

Due to the conflicting results of the tests conducted and based on the p-values of the coefficients that are generated in both the random and fixed effect model cases, we therefore conclude that a Pooled OLS regression provides a better and unbiased estimates for the coefficients generated. Further, robust standard errors are used to control for heteroskedasticity in the data.

Discussion of the Results

The results were got from running a simple pooled OLS are presented in Table 4.3. The standard variables of the gravity model were expressed in their natural logs hence their coefficients were interpreted as elasticities. Generally, it was evidenced that economic mass variables had their expected signs and they were all significant in the case of the pooled OLS regression at 1% level. The dummy variables were seen to have their expected signs and were significant at 5% level except the border dummy. The model however explained 61.21% of the fitted regression line.

However, in the case of Fixed Effect regression importing country's GDP and Population coefficients were insignificant with an overall R-squared of 18.15% as shown in Table 4.4. The distance variable however was omitted because of co linearity. In the case of the Random Effect regression, the population variable coefficients of the standard gravity model were both insignificant at all levels with an overall R-squared of 57.59% as shown in table 4.5. The augmented gravity model dummy variable and the Random effect regression was not significant at all levels. These therefore confirm the best estimated model with significant coefficients to be the estimated pooled OLS regression results. Both models had the general F-statistics being significant at 1% level.

Table 4.3: Pooled OLS Results

Source	SS	df	MS			
Model	9542.80095	8	1192.85012	Number of obs =	936	
Residual	5963.12701	927	6.43271522	F(8, 927) =	185.43	
				Prob > F	= 0.0000	
				R-squared	= 0.6154	
				Adj R-squared	= 0.6121	
Total	15505.928	935	16.5838802	Root MSE	= 2.5363	

lnexportsij	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lngdpi	1.23628	.0505966	24.43	0.000	1.136983	1.335577
lngdpj	1.201034	.0587136	20.46	0.000	1.085807	1.316261
lnpopi	-.3464586	.0890232	-3.89	0.000	-.521169	-.1717482
lnpopj	-1.083163	.1097034	-9.87	0.000	-1.298459	-.8678674
lndist	-1.450649	.1345125	-10.78	0.000	-1.714633	-1.186665
borderij	.1849661	.3501075	0.53	0.597	-.5021291	.8720613
langij	-.5564786	.1986745	-2.80	0.005	-.9463826	-.1665746
eaacrta	.5187802	.4321222	1.20	0.230	-.329271	1.366831
_cons	-6.72285	1.811369	-3.71	0.000	-10.27771	-3.167991

The estimated coefficient of the exporting country's GDP (lngdp-i) was 1.23 indicating that a 1% increase in exporters GDP will increase bilateral trade by 1.23%, while an increase in the importers GDP by 1% improved bilateral trade by 1.2%. This conforms to other studies findings that economic size influences positively trade between partner countries and therefore Trade Facilitation due to ability to invest in Trade Facilitation initiatives.. A higher GDP of the exporter country is an indication of high production and potential supply of exports due to specialization hence the likelihood to have Trade Facilitation techniques I place.. Therefore EAC members' GDP plays a key role in the region in facilitating export trade within the region. The exporter and importer country's population coefficients are significant at 1% level and have a negative expected sign indicating a large domestic market and gains from economies of scale. The negative sign indicated that large countries tend to be more self sufficient. The result showed that an increase of the exporter's population by 1% would decrease export trade by 0.35%. However, an increase in the importers population by 1% reduced trade between member countries by 1.08%. The negative relationship was explained by the fact that an increase in population leads to a low GDP per capita and reduces the capacity to import thus reducing the capacity to invest in trade facilitation initiatives..

There was a negative relationship between trade and transportation cost. The study used the lateral distance as a proxy to measure the effects of transport cost on the bilateral trade the effect of transport cost on trade indicated also the negative impact on Trade Facilitation. This was attributed to the fact that the larger the distance between country *i* and *j*, the higher the transportation cost and the more time involved while delivering the goods to the partner country and the delay impacts negatively on trade Facilitation. The estimated coefficient of distance (Indist-ij) was significant at 1% confidence level and had the expected negative sign and is 1.45, indicating that trade between pairs of countries falls by a little over 1% for every 1% increase in the distance between them thus delays attributable to distance had a negative impact on Trade Facilitation.

The formation of an economic integration and the common membership of RTA provided an explanation to growth in bilateral trade and Trade facilitation as compared to the basic gravity model variables like economic size, distance, GDP and population. This is made worse by the un coordinated border agencies, Customs environment, bureaucracy and red tape, inefficiencies at the borders all compound the negative effect on Trade Facilitation. The estimated coefficients of the EAC dummy variable had the expected positive signs. The dummy variable *eaerta* showed intra-regional trade and provided explanations on the regions trade creation effect. This showed that the EAC member countries will benefit more from the customs unions if they all participate well in promoting and facilitating trade within the region. It showed that the formation of a Regional Trade Agreement (RTA) enhances trade and improved intra-EAC trade of about 68% ($e^{0.52} = 1.68$). Further, it indicated that EAC members import volumes comprised a lot from the non-members than within the regional block.

The language dummy variable was introduced in the model to help explain the extra ordinary trade flows between countries sharing similar languages. The results gave an unconvincing and an unexpected negative effect but significant at 5% level. This means that countries sharing a common language does not mean that they automatically have some cultural and linguistic ties that boost the way they trade in the region. Overall language therefore is not an important determinant of the bilateral trade nor does it lead

to enhanced Trade Facilitation in the region but does help ease communication and some meaningful sensitization of the need for trade facilitation on country pairs.

The results on common border influence on EAC trade shows a positive sign of the coefficient but not significant at all levels. The magnitude of the border shows that countries which share common border tend to trade quite a lot. This means that common border increases and facilitates trade by 0.18% within the region. Therefore cross border plays a key role in Trade Facilitation if non tariff barriers are eliminated.

CHAPTER FIVE

5.0 : CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1: Summary of findings

The aim of this study was to identify factors affecting Trade Facilitation and their impact using the gravity model for trade flows as an indicator of Trade Facilitation among the EAC Countries and to estimate trade potentials of the economic bloc. The independent variables included in the model were: GDP, population, distance between the economic capitals, common language, common border issues which include regulatory, customs environment, administrative barriers and the EAC dummy variable.

The results indicated that the standard gravity model presented the expected signs and highlighted the role played by intra-bloc effects. The estimated coefficients had in most cases the expected signs and magnitudes. Their significance at one and five percent levels was also impressive.

The common language dummy, behaved quite unexpectedly with the coefficient sign being negative in all the regressions, this means that countries sharing a common language do not obviously have some cultural and linguistic ties that boosts the way they trade. However, this can be explained by the bilingual nature of these countries. For instance Burundi although a French speaking country also speaks Kiswahili a common language with Kenya, Tanzania and Uganda, Rwanda also speaks French, and Kiswahili. It is also argued that countries with comparative advantage cannot be prohibited to trade due to language barriers, for instance most small countries trade with the west and Asia and have bilateral agreements on trade and yet they cannot speak the same language.

The estimated coefficients for the trading countries GDPs was positive indicating a high strong economic growth has a positive effect on trade, with an elasticity exceeding unity. Therefore, GDP was a powerful determinant of trade with a positive effect on it such that when the GDP of the trading countries also increase so does the trade.

Population effects on trade in this bloc was negative meaning that larger countries in the bloc tend to be more self sufficient –absorption effects. In other words population diminishes the openness ratio and hence negative effect. This is likely to be the case considering that most of these economies in the region tend to be agricultural economy such that most of their products are consumed locally and very little is targeted for export.

Distance between the economic capitals behaved as expected, its coefficient presented a negative sign with an elasticity of around 0.15. This reflected the negative effects of transaction costs between the trading countries. The dummy for common border though not significant had a positive coefficient indicating that countries sharing a common border are likely to trade more.

Whereas countries sharing a common border indicated enhanced cross border trade, border effects like prevalence of non tariff barriers impact negatively on Trade Facilitation

Interpretation of the EAC dummy indicated that intra-EAC is significantly determined by their customs union in facilitating trade. The coefficient is positive in all cases. What this means is that the countries currently participating in the Customs Union tend to trade more than the others not currently participating.

Estimated trade potential for the EAC suggested high trade creating effects of the recently formed Customs Union. There should be high expectations for the near future derived from the application and consolidation of the EAC customs union if it is properly implemented.

5.2: Conclusions.

The objective to investigate selected border points in East Africa that are akin to Non Tariff Barriers was achieved through study of the data on the eight border points of East Africa. It was established that the border issues cut across borders and absence of coordination, existence of non tariff barriers impacted negatively on Trade Facilitation. Where reforms like Automation of processes evidenced in reforms tended to reduce the time taken to clear goods and had a positive impact on Trade facilitation while effects like administrative barriers showed that they had a negative impact on Trade Facilitation.

On examination of factors that impact negatively on Trade Facilitation in East African Border points under study, delays in the movement of goods and services, increased costs of doing business indicating that investment in techniques of Trade Facilitation can boost trade and economic growth from increased trade .

From Analysis of the Secondary data collected it is evident that whereas countries paired by borders increase cross border trade thus trade facilitation, inefficiencies can wipe out the benefits due to their inherent nature of increasing the cost of doing business. Reduction in costs of doing business enhances trade and therefore ability to invest in trade facilitation initiatives

Regional trade Agreements enhance trade as evidenced in the expanded market in the East African Community.

5.3 RECOMMENDATIONS AND POLICY OPTIONS.

Based on the findings, investment in techniques of Trade Facilitation can enhance trade flows and therefore lead to economic growth. It is recommended that government agencies should initiate reforms that facilitate trade and aim at being coordinated with a lead agency. Governments should engage with the private sector and through dialogue and partnership Trade will be facilitated. Joint verifications ,electronic data interchange will speed up communication on trade matters,Use of technology will boost documentation coupled with Business Process Review to get rid of unnecessary documentation

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APPENDICES

4.4 Fixed Effect Results

```

Fixed-effects (within) regression      Number of obs      =      936
Group variable: centry                 Number of groups   =      72

R-sq:  within = 0.2049                  Obs per group: min =      13
      between = 0.1943                    avg =      13.0
      overall  = 0.1815                    max =      13

corr(u_i, Xb) = -0.8765                  F(5,859)           =      44.26
                                           Prob > F           =      0.0000

```

lnexportsij	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lngdpi	.4887613	.2101955	2.33	0.020	.0762044	.9013182
lngdpj	-.034381	.2112089	-0.16	0.871	-.4489269	.3801649
lnpopi	4.303239	.895716	4.80	0.000	2.54519	6.061287
lnpopj	1.272368	.9159676	1.39	0.165	-.5254283	3.070165
lndist	0	(omitted)				
borderij	0	(omitted)				
langij	-.1840611	1.310577	-0.14	0.888	-2.756369	2.388247
eacrta	0	(omitted)				
_cons	-92.38374	16.38246	-5.64	0.000	-124.5381	-60.2294
sigma_u	7.2803513					
sigma_e	1.2551001					
rho	.97113757	(fraction of variance due to u_i)				

```

F test that all u_i=0:      F(71, 859) =      62.34      Prob > F = 0.0000

```

Table 4.5: Random Effect Results

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Random-effects GLS regression                Number of obs    =    936
Group variable: centry                      Number of groups =    72

R-sq:  within = 0.1802                      Obs per group:  min =    13
        between = 0.6251                    avg =    13.0
        overall = 0.5759                    max =    13

corr(u_i, X) = 0 (assumed)                  Wald chi2(8)     =    304.35
                                                Prob > chi2      =    0.0000
    
```

lnexportsij	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lngdpi	.897656	.1085959	8.27	0.000	.684812	1.1105
lngdpj	.6778287	.1209153	5.61	0.000	.4408392	.9148183
lnpopi	.2348614	.2636113	0.89	0.373	-.2818072	.7515301
lnpopj	-.2181145	.2970881	-0.73	0.463	-.8003964	.3641675
lndist	-1.889155	.4460964	-4.23	0.000	-2.763488	-1.014822
borderij	-.5211484	1.17197	-0.44	0.657	-2.818167	1.77587
langij	-.2108845	.5982682	-0.35	0.724	-1.383469	.9616996
eacrta	-1.195906	1.308013	-0.91	0.361	-3.759564	1.367753
_cons	-6.508607	5.406369	-1.20	0.229	-17.1049	4.08768
sigma_u	2.3129711					
sigma_e	1.2551001					
rho	.77252693	(fraction of variance due to u_i)				

Hausman Test Results

	Coefficients			
	(b) fixed	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
lngdpi	.4887613	.897656	-.4088947	.1799697
lngdpj	-.034381	.6778287	-.7122097	.1731724
lnpopi	4.303239	.2348614	4.068377	.8560468
lnpopj	1.272368	-.2181145	1.490483	.8664498
langij	-.1840611	-.2108845	.0268234	1.166056

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)
         =    39.53
Prob>chi2 =    0.0000
    
```

Breusch – Pagan Test for Random Effect

$$\ln \text{exports}_{ij}[\text{cntry}, t] = Xb + u[\text{cntry}] + e[\text{cntry}, t]$$

Estimated results:

	Var	sd = sqrt(Var)
lnexpor~j	16.58388	4.072331
e	1.575276	1.2551
u	5.349835	2.312971

Test: $\text{Var}(u) = 0$

$\text{chibar2}(01) = 3010.81$
 $\text{Prob} > \text{chibar2} = 0.0000$

OECD INDICATORS	
Advance Rulings	Prior statements by the administration to requesting traders concerning the classification, origin, valuation method, etc., applied to specific goods at the time of importation; the rules and process applied to such statements.
Appeal Procedures	The possibility and modalities to appeal administrative decisions by border agencies.
Co-operation – External	Co-operation with neighboring and third countries.
Co-operation – Internal	Co-operation between various border agencies of the country; control delegation to customs authorities.
Fees and Charges	Disciplines on the fees and charges imposed on imports and exports.
Formalities – Automation	Streamlining of border controls; single submission points for all required

	documentation (single windows); post-clearance audits; authorised economic operators.
	.
Governance and Impartiality	Customs structures and functions; accountability; ethics policy
Information Availability	Publication of trade information, including on internet; enquiry points. .
Formalities Automation	Electronic exchange of data; automated border procedures; use of risk management.
Formalities – Documents	Simplification of trade documents; harmonization in accordance with international standards; acceptance of copies.
Formalities – Procedures	Streamlining of border controls; single submission points for all required documentation (single windows); post-clearance audits; authorized economic operators.
Involvement of the Trade Community	Consultations with traders

Source: OECD Trade Facilitation Indicators (2013)