The Impact of Mobile Connectivity and Governance on Regional Trade: An Empirical Analysis of Uganda

Master's Degree Thesis

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THE IMPACT OF MOBILE CONNECTIVITY AND GOVERNANCE ON REGIONAL TRADE:

AN EMPIRICAL ANALYSIS OF UGANDA

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Master's Thesis

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This thesis titled **‘’The Impact of Mobile Connectivity and Governance on Regional Trade: An Empirical Analysis of Uganda”** has been prepared and submitted by **Umar SSENKUBUGE** in partial fulfilment of the requirements in ‘’ Anadolu University Directive on Graduate Education and Examination’’ for the Master of Arts Department of Business administration program of International Business has been examined and approved on the 24th day of July 2024.

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ÖZET

MOBİL BAĞLANTI VE YÖNETİŞİMİN BÖLGESEL TİCARET ÜZERİNDEKİ ETKİSİ: UGANDA'NIN AMPİRİK ANALİZİ

Umar SSENKUBUGE

Uluslararası İşletme Bölümü

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Bu çalışma, Uganda'nın diğer Doğu Afrika Topluluğu (EAC) devletleriyle dış ticareti bağlamında, mobil bağlantı ve yönetişimin bölgesel ticaret üzerindeki etkisini araştırmaktadır. Yönetişim; RQ (Düzenleyici Kalite), GE (Hükümet Etkinliği), VA (İfade Özgürlüğü ve Hesap Verilebilirlik), PSAVT (Siyasi İstikrar ve Şiddet/Terörizmin Yokluğu), RL (Hukukun Üstünlüğü) ve CC (Yolsuzluğun Kontrolü) boyutlarıyla ölçülmüştür. Mobil bağlantı; FTS (Sabit telefon aboneliği-nüfusun yüzdesi), IUI (İnternet kullanan birey-nüfusun yüzdesi), MCS (Mobil cep telefonu aboneliği-nüfusun yüzdesi) boyutlarıyla ele alınmıştır. Çalışmada 1995 – 2022 dönemine ait verileri mevcut olan EAC'nin mevcut 8 üyesinden 5'i olan Uganda, Kenya, Tanzanya,Ruanda ve Burundi'nin panel verilerinden yararlanmaktayız. Uganda'nın diğer devletlerle olan ticaret hacmini Uluslararası ticaretin yerçekimi modelini kullanarak modellemekteyiz. Sabit Etkiler modelinin bulguları, FTS'nin ticaret hacmiyle pozitif, MCS'nin ise ticaret hacmiyle negatif ilişkili göründüğünü göstermektedir. RQ ticaret hacmiyle pozitif ilişkili görünürken, GE ticaret hacmiyle negatif ilişkili görünmektedir. Nüfus Etkisinin de pozitif anlamlı bir etkiye sahip olduğu bulunmuştur.

Anahtar Sözcükler: Uganda, Doğu Afrika Topluluğu, Ticaret Hacmi, Yönetişim, İletişim Teknolojileri, Çekim Modeli.

ABSTRACT

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This study investigates the impact of mobile connectivity and governance on regional trade within the context Uganda's foreign trade with other East African Community (EAC) states. Governance is measured by the dimensions of RQ (Regulatory Quality), GE (Government Effectiveness), VA (Voice and Accountability), PSAVT (Political Stability and Absence of Violence/Terrorism), RL (Rule of Law) and CC (Control of Corruption). Mobile connectivity has been considered with the dimensions of FTS (Fixed telephone subscriptions -% of population), IUI (Individuals using the Internet-% of population), MCS (Mobile cellular subscriptions-% of population). We utilise panel data of Uganda, Kenya, Tanzania, Rwanda, and Burundi which are 5 of the current 8 members of the EAC whose data is available in the period of 1995 – 2022. We model the trade volume of Uganda with the other states by using the gravity model of international trade. The findings of the Fixed-Effects model indicate that FTS seems to be positively related with trade volume, while MCS seems to be negatively related with trade volume. RQ seems to be positively related with trade volume while GE seems to be negatively related with trade volume. Population Effect is also found to have a positive significant effect.

Keywords: Uganda, East African Community, Trade Volume, Governance, Mobile Connectivity, Gravity Model.

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DECLARATION OF COMPLIANCE WITH ETHICAL PRINCIPLES AND RULES

This thesis is my own, original work; I have acted in accordance with scientific ethics and rules in all stages of my study, including preparation, data collection, analysis and presentation of information; I have cited and included in this bibliography all data and information not obtained within the scope of this study; I declare that this study was scanned with the scientific plagiarism detection program used by Anadolu University Graduate Institute and does not contain plagiarism in any way. I hereby declare that I consent to all moral and legal consequences that may arise if, at any time, a situation contrary to this declaration I have made regarding my work is detected.

Umar SSENKUBUGE

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LIST OF ACRONYMS

EAC: East African Community

GATT: General Agreement on Tariffs and Trade

DRC: Democratic Republic of Congo

RTA: Regional Trade Agreement

PTA: Preferential Trade Area

FTA: Free Trade Area

CU: Customs Union

CET: Common External Tariffs

CM: Common Market

EU: Economic Union

GSMA: Global System for Mobile Communication Association

SSA: Sub-Saharan Africa

UN: United Nations

IT: Information Technology

APEC: Asian Pacific Economic Cooperation

MDGs: Millenium Development Goals

SGR: Standard Gauge Railway

NTBs: Non-Tariff Barriers

GDP: Gross Domestic Product

FDI: Foreign Direct Investment

ICT: Information Communication and Technology

ITU: International Telecommunication Union

GNP: Gross National Product

MTR: Multilateral Trade Resistance

BTR: Bilateral Trade Resistance

CES: Constant Elasticity of Substitution

MNCs: Multinational Cooperations

OLS: Ordinary Least Squares

FE: Fixed Effects

RE: Random Effects

RHS: Right Hand Side

Ln: Natural Logarithm

LM: Lagrange Multiplier

FTS: Fixed Telephone Subscriptions

IUI: Individuals Using Internet

MSC: Mobile cellular Subscriptions

GE: Government Effectiveness

VA: Voice and Accountability

PSAVT: Presence of Stability and Absence of Violence and Terrorism

RQ: Regulation Quality

RL: Rule of Law

CC: Control of Corruption

ISDN: Integrated Service Digital Network

MDG's: Millenium Development Goals

SMEs: Small and Medium Enterprises

W.T.O: World Trade Organization.

ONA: One Network Area

1. INTRODUCTION

This research investigates an impact of mobile connectivity and governance on regional trade within the context Uganda with other East African Community (EAC) states. The proliferation of mobile technology has transformed communication, commerce, and connectivity dynamics across the globe, particularly in developing regions like the Sub-Saharan Africa and East Africa in particular**.** Concurrently, governance structures act as the back born of international trade and integration within regional blocs. However, limited empirical research exists on the interplay between mobile connectivity, governance quality, and regional trade dynamics, especially within the EAC.

The global circulation of information at a substantially lower cost, due to the rise of many trade cooperations and the Uruguay round followed by the creation of WTO which set the stage for the growth of post-Fordist industrial systems globally(Kincheloe 1995). This shift in both knowledge content and circulation methods was brought about by this alteration, which Harvey referred to as "time-space convergence"(Harvey 1990).

A sequence of occasional and interrelated crises served as an additional catalyst for the birth of this informational mode of production. Events that occurred in the mid- to late-1970s, such as the oil crisis, the introduction of floating exchange rates, and the fall of the Bretton Woods system, had an extreme impact that included severe recession, stagnation, and acute petrodollar inflows. During this time, third-world debt rose to previously unheard-of heights, and a widespread shift from equity to debt also occurred (Corbridge 1988).

Conversely, the European market expanded quickly, and Japan emerged as the new global financial hub. The collapse of old western industrial powers paved a way for these changes, besides Japan and Germany developed at the same time to fill the void. These changes were made possible in part by Thatcherite and Reaganite policy(Warf 1995).

The development of the 'just-in-time inventory system' with the help of computerized technology, as well as the expanding capabilities of multinational corporations to function globally and seamlessly, resulted in a shift from state monopoly to globalization. The end of the cold war politics which led to the collapse of the eastern bloc underscored this

transition from static to dynamic conditions. This new era emphasizes the significance of mobile connectivity in international trade by enabling real-time communication and coordination among global partners. In this context, mobile connectivity has become an essential tool for economic development and growth in Africa (Pradhan et al. 2018)

The shift from analogue to digital data has led to a closer relationship between computer services and telecommunications. This change coincided with the privatization of telecommunication systems on a global scale. The United Nations recognized the importance of telecommunications and founded the ISDN to regulate technological progress in this field within its partner states. The extensive development of optical fibre networks in the United States played a decisive role in supporting these international initiatives hence resulting into a global coordination and more balanced information distribution (Li and Agbinya 2005)

For a significant period, landline telephones were widely used for both personal and business communication. Despite its limited spatial coverage, this method remained effective. The emergence of mobile phones revolutionized communication and overcame geographical limitations, leading to the creation of "digital divides." While mobile phones have been in existence since 1973 and became commercially available in 1983, it can be argued that the year 2000 marked the start of widespread exclusive use of mobile phones by people (Kamssu 2005)

The prevalent impact of data-driven average life has induced every aspect of human activity, whether in the business sphere or on a personal level. The combination of mobile and internet technologies has changed the interaction between consumers and producers from three-dimensional to two-dimensional. This transformation has brought noteworthy gains to the international trade, such as reduced accounting and opportunity costs. (Overå 2006)

The convergence of these three elements has given rise to a new group of entrepreneurs called digital entrepreneurs, creating much-needed jobs in an increasingly crowded world. Global trade heavily depends on financial transactions, making it one of the most beneficial results brought about by digitization. Before this shift to digital processes, dealing with financial transactions with remote countries was difficult and time-

consuming. This led to trust issues, delayed profit realization, and impeded reinvestment for expanding trade. However, with the integration of mobile technology and its association with internet access as part of digitalization, transaction times have significantly reduced (Yadav 2014).

The challenge of being physically distant from trading partners is no longer a major issue. Communication has become more affordable and convenient, helping even smaller nations to engage more in global trade. The dominant reality now is the online marketplace, where people who are connected to internet normally make purchases through numerous online shops like Amazon and Jumia in Sub-Saharan Africa. The user-friendly mobile applications provided by these online stores appear to encourage increased purchasing due to the ease of browsing products, comparing options across different platforms, and making quick transactions with just a few clicks. The sizable growth in digital connectivity helps consumers to assess items available at home companies and those abroad with the help of connectivity transformation. As a result, there seems to be an increased tendency towards purchasing merchandise from foreign companies while enjoying the comfort of home than before (Overå 2006)

Theoretically, the cost of doing business internationally is higher than that of doing business locally which hinders SMEs and individuals access to markets beyond shores. This implies that, the economic growth of any country remains constant if international trade stalls.

Among the costs of trade is the cost associated with exchange of information, this means that for any business entity to do business, there must be an exchange of information which comes at a certain cost. This cost will determine the form of communication as trading partners will always prefer trading with lower communication as a way of minimizing costs. This may create monopolistic environments in the international market as multinational cooperations will go beyond others since they've got the capital which in the end wipes the SMEs from the international trade.

Many developing countries like those in the East African community have tried to improve telecommunication infrastructures which as a result has resulted into lower costs of communication and improved standards of living. This is because consumers adopt

lower tech-products and automatically mobile connectivity improves. This also pushes both SMEs and individuals into exploring their potential as they go beyond their local markets to international markets hence accessing cheap raw materials and management of the global supply chain.

In previous times, prominent themes in assessing good governance have included elements that measure the freedom of speech, peace and security, justice government regulation, property rights and (Suntharalingam and Hassan 2016). The international financial institution that oversees world economic development's framework for democracy and (Kaufmann et al 1999) developed a scale which is widely recognized and frequently referenced in scholarly literature(World Bank 1994)

Good governance has become a worldwide concern in the present era. Good governance plays a tremendous and the reverse is true. For the case of global south, corruption has always been a stumbling block in the face of progress. Sub-Saharan African countries account for six on the cale of ten of the highest levels of corruption (all Africa, 2016). However, the impact of governance on regional trade goes beyond just addressing corruption. It includes protecting property rights, regulations, vibrant policies which as a result contribute favourable business atmosphere, hence foreign direct investment and regional integrations among countries as a result of good governance.(Sarker and Khalid 2018).

Competitive government structures can result into trade stability, builds investor confidence, and fostering trade beyond country's border. This can be done through introducing non-tariff barriers and customs unions with its neighbouring countries. Therefore, governance impact on international trade can be observed in its ability to provide an enabling climate for investment and trade hence fostering trust and confidence within trading countries and simplifies the smooth movement of people, services, and trade across borders.

Regional integration has seen an increase in all parts of the world since the end of the second world war as countries were looking for not only security partners but also trade partners. After the Bretton woods, the Uruguay Round which created the World Trade Organisation then the Doha Round spearheaded the UN commitment to regional

integration. Countries started to integrate and formed trade agreements which saw the flourishment of international trade around the world.

Cooperation of the East African countries of Uganda, Kenya and Tanzania dates to the beginning of the twentieth century. These countries have been cooperating in economic and political sectors whin phases and the latest phase was creating of the East African Community in the year 2000. Later the community expanded by adding Rwanda and Burundi, South Sudan, Democratic Republic of Congo and Somalia in 2007,2016,2022 and 2024 respectively.

The dream goal of the founders of the EAC was to attain full economic and political integration that's why recently many baby steps have been taken by members towards full regional integration. The community formed Customs Union, removed trade barriers, created one border post, Common Passport, Common Market, Common Voice in the international arena and many other steps have been taken to achieve regional cooperation.

1.1.1 Problem Statement

Many researchers have found out that Regional Integration promotes regional trade although few or no attention has been drawn to the effect of Mobile Connectivity and Governance on the Regional Trade (Ejones, Agbola, and Mahmood 2021).Furthermore, it is interesting to observe the effects of Mobile Connectivity and Governance on the regional trade Uganda with EAC countries.

1.1.2 Study Objectives

This study's main objective is to evaluate how mobile connectivity and governance affect regional trade of Uganda with EAC countries.

The study categorically aims to the objectives as follows:

1. To investigate the effect of selected governance indicators on regional trade with Uganda with EAC countries.

2. To examine the impact of the selected mobile connectivity indicators on regional with Uganda with EAC countries.

Research Questions

1. What is the impact of Mobile Connectivity on regional trade with Uganda with EAC countries?
2. What is the Impact of governance on regional trade with Uganda with EAC countries?

1.1.3 Research Significance

3. The research used a full dataset and advanced econometric gravity modelling procedures to empirically examine the influence of Mobile Connectivity and Governance Regional Trade of Uganda with EAC countries. Research findings may provide valuable intuitions into Mobile Connectivity and Governance's effect on regional trade within the East African Community.

1.1.4 Limitation of the Study

This study takes into consideration of limited available data on the subject from the year 1995 to 2022 for the oldest members of Uganda, Kenya, Tanzania, Rwanda and Burundi. Countries like South Sudan, D.R.C and the recently added member The Federal Republic of Somalia are not considered in this research as these countries are troubled by political instabilities which explains the absence of data, hence narrowing the scope.

1.1.5 Hypothesis

From the recent literature like that of (Jungmittag and Welfens 2009) showed a connection between regional trade and telecommunications as it impacted the cost of exports in the European Union. This research seeks to examine the impact of mobile connectivity and governance on regional trade with an empirical analysis of Uganda and the EAC countries. Also (Mehta 2012) found that the cheaper mobile connectivity increased the number of mobile phone users which would have an effect on trade as well.

On the other hand, governance has been seen by scholars as a determining factor in both regional and international trade. Therefore, governance institutions' success can easily be reflected in the country's trade volumes (de Groot et al 2005).

For this, hypothesis for both Mobile Connectivity and Governance indicators have been created to find out how these indicator's affect Uganda's trade volume with EAC countries.

Developments in mobile networking technology should strengthen enterprises' and individuals' ability to engage and thrive in regional trade, which would eventually result into economic development.

H1: Fixed telephone subscriptions affect Uganda's trade volume with EAC countries.

The effect of individuals using the Internet over time, it would strengthen arguments for policy reforms or adjustments in the field of mobile connectivity enhancement. Potential policies and areas for development include but not limited to developing infrastructure and high-tech production.

H2: Individuals using the Internet affects Uganda's trade volume with EAC countries.

Increased communication amongst people doing business in Uganda and those in the EAC countries is likely to enhance trade volume. Policies like cutting the cost of mobile phone gadgets and the cost of making calls like the One Network Area introduced by the EAC which scraps off the roaming charges for all calls originating from member countries. This would ease the cost of exchanging information and communication while doing business among the EAC countries.

H3: Mobile cellular subscriptions affect Uganda's trade volume with EAC countries

Government effectiveness pertains to the perceived qualities essential for competent governance, including conditions of services provided by the state, the government employees expertise, administrative efficiency, trustworthiness of the authority, keeping the government in check and independence of non-state actors like whistle blowers. When analysing the impact public threat on the business environment of MNCs from the perspective of some Southern African nations like Zambia and Zimbabwe, (Mawanza et

al 2008) highlighted the significant influence of political risk on multinational corporations' location choices and a country's overall business climate. also assert the importance of a country's leadership over any other factors like transparency and accountability(Lin et al 2020).

H4: Government effectiveness affects Uganda's trade volume with EAC countries.

Voice and Accountability is a pertain to the government's capacity to ensure its responsiveness to the public, encompassing various dimensions of democracy, political liberty, and civil freedom. This indicates that people can engage in selecting their government (Sharma 2009).

H5: Voice & Accountability affects Uganda's trade volume with EAC countries.

Political stability pertains to the likelihood of abrupt government structure changes and encompasses various indicators that indicate the potential risk of unconstitutional or violent overthrow of a current governing body (Shepherd 2012). Furthermore, political stability has a detrimental effect on trade in the SSA (Asongu et al 2021).

H6: Political stability affects Uganda's trade volume with EAC countries.

Regulatory Quality measures how well the government is perceived to create and enforce effective policies and regulations that support private sector growth. Hence better institutional quality directly impacts exports which directly improves international trade (Abreo et al 2021).

H7: Regulatory quality affects Uganda's trade volume with EAC countries.

The rule of law involves several to evaluate the public and citizens' trust in and adherence to societal rules. This includes the safe guarding of property rights and unbiased enforcement of laws by an effective justice system. (Jatmikowati et al 2020).

H8: Rule of law affects Uganda's trade volume with EAC countries.

Control of corruption represents the perception of how much the people in the government uses their positions for their personal interests, this sums up all levels of corruption be it

high or low level also includes taking over the public offices in forms of nepotism and practicing of exclusive policies where a certain group of people is entitled to government privileges over the mass. In the long run, doing business becomes highly expensive due to monopoly in the market and hence trade output goes down. (Gil-Pareja et al 2019).

H9: Corruption control affects Uganda's trade volume with EAC countries.

As per existing literature, Population growth has an impact on bilateral trade. This impact can be positive or negative according to the comparative advantage of the trading countries. Scholars like (Nuroglu 2014) argue that population has a positive impact on exporting country while it also has a negative impact on importing country (Fohoue et al 2024).

H9: Population of the trading partners affects Uganda's trade volume with EAC countries.

2. REGIONAL TRADE AGREEMENTS

Literature section introduces both the theoretical background and the empirical part of research. This section begins with a theoretical background of regional integration and regional trade. Mobile Connectivity, Governance, and the East African Community and concludes with summary research. The conceptual background deals with the theoretical basis of the research and finds a mutual connection of both theoretical and empirical aspects of the research in the question.

These are defined differently by economists and researchers, but they generally refer to a collection of rules and commitments agreed upon by participating countries to manage their commercial interactions within a region. An RTA is an agreement signed among countries to promote free movement of services and goods beyond borders. (World Bank 2018). Regional economic integration is defined by (Berg 2004) as a situation in which a collection of countries agrees to remove trade barriers among themselves while keeping trade obstacles with non-members. While international cooperation includes any activity aimed at reducing discrimination between trade and non-trading countries; economic integration includes laws requiring the elimination of some or all forms of discrimination (Bela Balassa 1962). In short, reducing barriers between countries is an act of economic integration, and international trade agreements are the description of international cooperation.

A regional trade agreement aims to foster economic collaboration and trade within countries in a specified geographical region. Trade integrations are typically created to reduce trade barriers, enhance market access, and encourage economic growth within the region of integration(Viner 1950).

2.1.1 The Forms of Trade Integrations

Economic integrations vary in the degrees of integration as follows:

2.1.2 Preferential Trade Area (PTA)

This is the lowest level of economic integration as it only grants partial preferences and diminishes trade barriers to a certain group of countries (Cooper and Frankel 1998). These concessions are normally granted by developed or industrialised countries to low-developed countries and the WTO forbids developed countries from forming these PTAs (Berg 2004).

2.1.3 Free Trade Area (FTA)

An FTA intends to eliminate all tariffs and import restrictions on the flow of goods among participating countries within the bloc, while each country maintains varying levels of duties and trade restrictions with non -member states (Frankel, 1998).

2.1.4 Customs Union (CU)

A customs Union enhances the FTA by establishing a uniform tariff known as the CET on products originating from countries outside the union. while eliminating internal trade barriers and equalizing tariff rates across members of the block.

2.1.5 Common Market (CM)

This is the highest level of integration where member countries agree to uniform macro and micro-economic policies, thus allowing unrestricted movement of production factors like goods, labour, capital and not limited to people in among members (Berg 2004).

2.1.6 Economic Union

The economic union is a combination of the common market and a customs union. Participants have the same policies on the regulation of products and it comprises a complete unification of fiscal, monetary, social and countercyclical policies and it's the on the pick of all integrations. (Bela Balassa 1962).

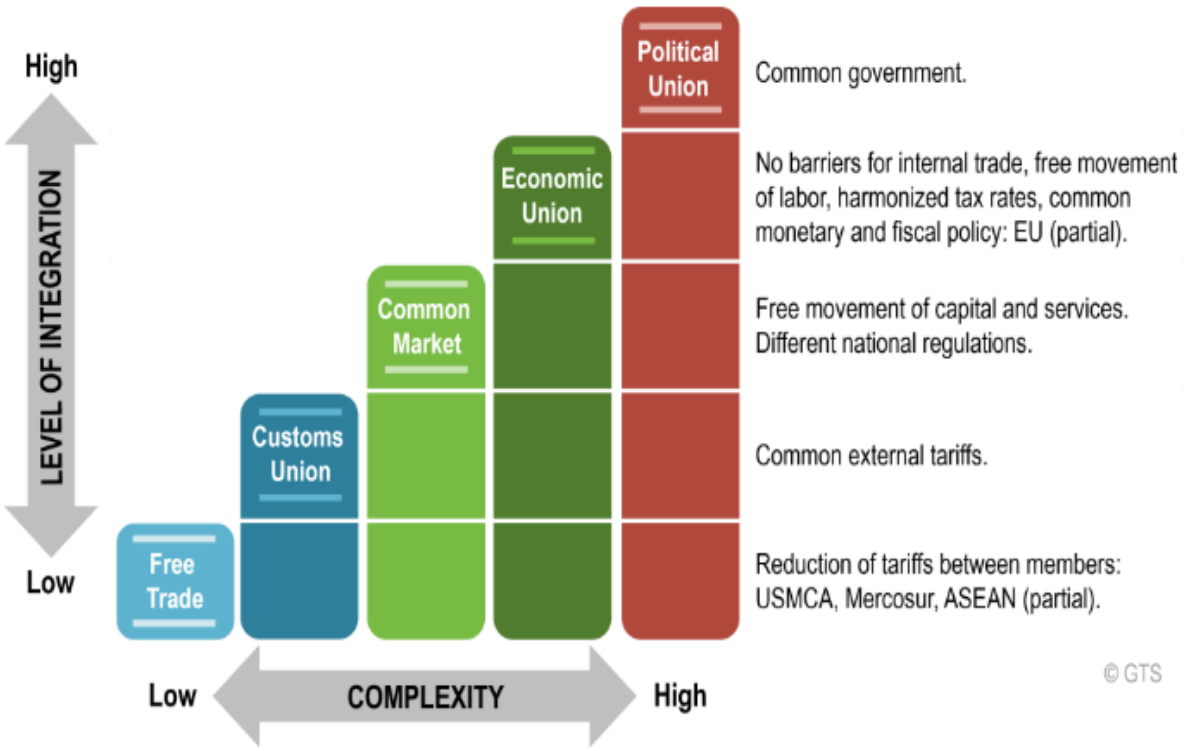

Figure 1 . An illustration for the levels of economic integration.

The concept mobile connectivity is featured by the growing number of various groups of people taking the chance in applying digital media communication through the use of devices such as mobile phones, social media and all other internet connections as a result of emerging global economy or digitalization. (Hunold et al. 2000)

Early in the Philippines was a dialogue about what capability mobile applications would have regarding social, economic, and pollical development since this country was regarded as the top user of online banking, online education, and governance. This documentation was also a recommendation to the east African community as well since they are known to be the users of mobile interconnection. (Hellström 2010)

Majority of the population worldwide have a mobile phone or socially connected in anyway, this has become part of their lives to the extent that someone would not seat longer without checking something on their mobile phone. Research says that mobile connectivity has rapidly increased due to availability of internet connections, which

encourages more users to interact with either through communicating with family and friends, workmates, school colleagues and many others.

Correspondingly, a report that investigated about'' mobile connectivity in emerging economies'', explains various mobile phone gadgets while emphasizing smart phones as widely used. These include the following.

Basic phones, which are described as the cheapest, and their functionality rotates only on phone calls and messaging to enable interaction, these do not use internet though. Secondly, the Feature mobile phones are reported to have some characteristics of both basic and smart phones, in which they use internet, they are relatively affordable, and allow social media use. However, they do not use apps. Thirdly, smartphones are regarded to be the widely used mobile phones that have extra great features which support internet, apps download, and social media dialogue. But they are relatively expensive and are not affordable to every person.

Their report also added seven among the social media platforms and the years when they were founded, these include the following,

Facebook/Meta (2004), WhatsApp (2009), Twitter (2006), Viber (2010), Instagram (2010), Snapchat (2011), and Tinder (2012). people who use these are regarded as social media users or bloggers. (Silver et al. 2019)

The state of mobile internet connectivity report (GSMA 2023) reports that, the benefit of the mobile connectivity to consumers is looked at in terms of, nature of information used , services offered, and generally any organizational set-up for the global population. The report found out that worldwide, many people are connected to the internet, which was not the case in the past years, some regions have access to the broadband though some groups of people do not use it. Further describes that people may not be connected may be because they're living in a region without broadband network or they have it, but they just do not utilize these internet services. These are explained in the diagrams below.

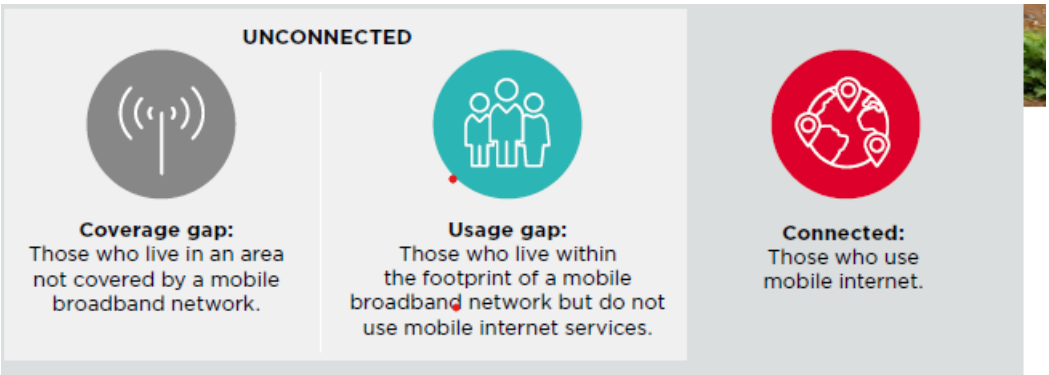

Figure 2. Illustrating regions with and without broadband internet connections. (GSMA, 2023).

The report provides some of the challenges of mobile connectivity such as the use of mobile phones has some challenges that are explained below.

- Insufficient knowledge about the use and advantage of mobile connectivity. Here, some people may have just basic knowledge and lack advanced skills to meet their needs.
- It is costly to some groups of people, since it may be hard to purchase internet packages regularly. For instance, in Africa, the telecommunication companies provide internet services alongside other serves such as mobile money etc.
- There are security issues such as theft challenges, sexual harassment, impersonation that may be a big threat to the mobile internet users.
- Sharing of content that does not add up or irrelevant is another problem of mobile connectivity, where most users always share a lot of data that in most cases lacks authenticity, this is a challenge because it causes confusion among people that receive such information. (GSMA, 2023).

Researchers have credited mobile connectivity with boosting education systems due to the possibility of e-learning, as communication has been made easier for mobile users because they can communicate with their friends and families instantly regardless of distance. However, some of their respondents disagreed, believing that this connectedness has done more harm than good, particularly to their children, who are frequently exposed to content that may influence the way they behave as a result of mimicking habits (Taylor and Silver 2019).

Ordinary trade means the transfer of goods, services for monitory exchange in different locations either locally, nationally, or internationally in exchange of monetary rewards. While digital trade means the digital transactions of both goods and services either in-person or online. This is done locally and internationally as well, though with the application more advanced means of operation right from the production stage to the final consumer. (Degryse, 2016), and Due to the presence of digitalization, most of the trade transactions are now performed online, a good example is ordering online products, internet banking, online job applications, and any other kind. Correspondingly, the dynamics of how companies interact with their clients on matters concerning their goods and services have changed, how they communicate with the lawmakers, government, and other stakeholders that have direct impact on the organizations even though they are located at a far area from each other geographically, mobile connectivity has solved all these barriers. (Gonzalez and Jouanjean 2017). Currently most of the businesses are thinking and trying to improve by applying innovative ways of packaging the goods and services they offer to their clients, this has improved competitive advantage brand name for their services. (Profile 2017).

(Staff, Paper, and Ersd-- 2023) , provide ways through which digital connectivity cuts expenses of trade internationally as described below, First, online business services provided such as online marketing or e-commerce, have reduced the barrier to distance between buyers and sellers, whereby once interested in a product, a buyer will check the specifications of it online without having to meet the company selling that product in-person. Secondly, during the business transactions, digitalization contributes to easy means of interaction in the transaction process between the companies and their clients, for instance, using voiceover to talk, and then the language problem is limited due to the presence of translation system. Furthermore, there is no wastage of time when goods are in the transit process at the airports, since the updated digitalized systems are installed to track the details of those goods at the boarders, and so this reduces the costs for management in charge. And lastly, the speed at which global financial services are growing such as internet banking and online business platforms, has facilitated a positive impact on fair credit nature. Also, (Freund and Weinhold 2004) in their study, applying a cross-section regressions, found how important the internet has been to the international trade.

The mobile phones usage is now deeply connected with the internet. With the advent of a numerous of user-friendly applications designed for commercial activities such as marketplaces like Jumia in the Sub-Saharan countries and Trendyol in Türkiye. Mobile phones have evolved into a portable marketplace accessibly anytime and everywhere.

The remarkable growth of the mobile market can be largely attributed to liberalization within telecommunications markets and the establishment of independent regulatory bodies that fostered competition. Another significant factor specific to East Africa is the introduction of mobile money services which allow individuals using a cell phone to conduct financial transactions, store funds, or establish and expand businesses. These services have garnered exceptional popularity due to a substantial portion of households across Sub-Saharan Africa being unbanked or choosing not to participate in traditional banking systems. Additionally, these money services do not necessitate broadband connection requirements further enhancing their attractiveness and bolstering adoption rates for mobile phones. The rate of mobile subscription growth has been remarkably high in Kenya and Nigeria. In 2005, approximately 10% of the population held a mobile phone subscription, compared to over 80% in 2016. Conversely, Uganda experienced a slower increase in mobile phone subscriptions, with less than 5% of the population having one in 2005 and just over half by 2016.

A significant increase in the number of mobile phone subscribers which and a decrease in the fixed phones subscribers emphasizes the quick expansion Nigeria's telecommunications market. While second-hand and recycled mobile devices are important for bridging the digital divide, caution is necessary to carefully consider the trade-offs involved (Osibanjo and Nnorom 2008).

(Meltzer 2016)discussed the synergy between mobile phones and the internet, particularly in enhancing internet accessibility in developing nations. Currently, mobile phones serve as the primary means for people in these countries to connect to the online world. However, obstacles to expanding this access include the expenses associated with internet-capable smartphones and mobile broadband plans.

Mobile phones are often the most affordable and efficient means of communication, especially in areas where landline telephones and broadband internet infrastructure are

limited and costly. The African continent is home to 650 million mobile phone users, with their numbers increasing at a faster rate than anywhere else globally. Mobile phones are widely used for various purposes, from transferring money to monitoring elections and disseminating public health information across shantytowns and remote villages(GSMA 2023).

This widespread use has led to the emergence of an informal economy supporting the mobile sector through activities such as airtime sales, charging and repair services, as well as device rentals. Africa serves as a hotspot for innovate on and entrepreneurship in the mobile phone industry. The unexpected rapid adoption of this technology by Africans along with its significant benefits has been described as astonishing, remarkable phenomenon', and revolutionary'. This transformation took place largely without anticipation from business or research communities.(Bruijn, Nyamnjoh, and Brinkman 2009)

In today's globalized economy, mobile connectivity has emerged as a crucial factor shaping international trade dynamics. The widespread accessibility to mobile phones and the internet has revolutionized the way businesses engage in cross-border transactions. These advancements in technology have facilitated efficient and effective communication, allowing businesses to connect with partners and customers around the world at any time. (Wang & Choi, 2018)

The rise in connectivity has eased movement of information, good and services and has compelled countries to ease many trade barriers. Consequently, this has seen wide market integrations, information sharing through the global supply chain and beyond border advertisements. This explains the connection of the global supply chain (Yadav, 2014).

An influx in the use of e-commerce platforms, social media accounts is all because of improved IT infrastructures. As a result, traders can easily make business by selling their products to customers beyond their own borders, instantly exchange information, make instant payments and due to the connected global supply chain instant deliveries are no accident. This has created room for SMEs to take part in the world trade (Freund and Weinhold 2005).

All in all, the mobile connectivity has enormously influenced intercontinental trade through connecting distant traders to distant customers, wide access of information, instant payment methods and introducing variety in the customer taste. It should be noted that the effect of mobile connectivity on international trade can be different from goods to goods and its greater impact is mainly on the services sector (Meltzer 2016).

Mobile connectivity has acted as a catalyst in breaking down trade barriers, closing financial gap in some countries as it gives wider access to online transactions hence enabling SMEs access to bigger international markets (Freund & Weinhold, 2004).

Mobile connectivity has also transformed international trade by connecting small markets to bigger ones which contributes to the global exchange of goods and services hence leading to the global economic growth as people do trade with each other, it directly elevates poverty and increase their living standards (Freund and Weinhold 2005).

The advancement of telecommunications in Africa has created an essential foundation for global financial system integration. It is clear that countries needed to adopt significant advancements in data processing and communication technologies on a worldwide level to benefit from comparative advantage as outlined by Ricardo and take part in the global economy(Hanna 2009)

Mobile connectivity in Africa has not only transformed the way individuals access financial services but also facilitated economic development and integration into the global economy (Addisu Lashitew 2022).It has opened doors for low-income households, enabled digital payment and banking services, reduced communication costs, connected individuals to information and markets, and provided access to basic financial services to those who lack easy access to formal banking systems(Nan et.al 2021)

According to the report from the world bank on the development of the MDGs published in mid-April-2015, poverty rates have decreased in most areas apart from the Sub-Saharan Africa where the percentage of 45 falls short of the MDG’s poverty objective. Despite economic progress since the mid-1990s, SSA has seen no significant reduction in poverty. Recent research, particularly Fosu's study in 2015b, highlights the significance of political governance in generating economic growth in the global south. (Lee et al. 2012)

The preceding section emphasises the important link between government quality and broader-based economic growth. This ultimately enhances the framework for social change and improves living conditions by better managing economic resources.(S. A. Asongu and Nwachukwu 2016),(Anyanwu and Erhijakpor 2014). Additionally, this work adds to the expanding research interest in the developmental effects of mobile phone penetration. There is an emerging concern in academic circles that governments may consider mobile phone adoption as the only solution for economic advancement. (S. Asongu et al. 2019), (S. Asongu and Nwachukwu 2017).

The evolving body of research on the development consequences of mobile phones has not adequately studied the links between mobile technology and governance in the subcontinent despite (Fosu 2015) confirming the importance of institutions in pushing for collective social development. Our review shows that only four studies have explored this idea in Africa (Freund and Weinhold 2005).

Other scholars discovered that there is a link between a country's mobile phone use and openness in a country's leadership mainly some African countries. This is based on the research made on some sub-Saharan African countries which showed that the larger than number of African youths using mobile phone, the higher the chances of increased successful implementation of policies and the rule of law. It was also found that there are considerable improvements in the preventive and corrective procedures in the government of Kenya linked to mobile penetration links (S. Asongu et al. 2019).

Recent literature examined using gravity model the impact of European Union's liberalization of telecommunication on international trade and found out that the magnitude of telecommunication costs on the international trade flow is the same as that of tariff and other trade barriers. They used the minutes exporters used to call importers. As a result, they found out that when international telecommunication increases by one percentage point, international trade increased by two percentage points (Jungmittag and Welfens 2009).

Governance has emerged as a focal topic in modern discourses within the social sciences, particularly in public administration, as the twentieth century comes to an end and the twenty-first begins. The term is increasingly utilized with varying interpretations and consequences compared to 'government', largely due to its ability to encompass all institutions and connections related to the governing process (Katsamunska 2016).

Governance is a central organising principle in many social science disciplines. It is not a separate field, particularly in schools of economics and administrative sciences. In other areas in humanities have all played a pivotal role in better perception of governance and governing systems. This presents an exclusive chance for the different social sciences to merge or even reunite after their split-up more than a century ago.(Dixit 2009) explained that, Economic governance refers to the organization and operation of legal and societal establishments that uphold economic operations and transactions through safeguarding property rights, ensuring contract enforcement, and collaborating to offer physical and organizational infrastructure. While (Fukuyama 2013) suggests that, Governance is associated with the methods and protocols implemented to improve the "quality of government" in terms of outcomes, politics, and capacity for production.

Governance can be defined as a complex concept encompassing the enforcement of laws, efforts to combat corruption, the standard of regulations, and the efficiency of bureaucratic systems(Tusalem 2015),.

Some scholars divided governance metrics into three categories, that’s nominating leaders, their successors, and absence of political unrest. Promotion of better-quality goods and living standards through implementing favourable economic policies and regulating the leadership. The last metric is the populations’ adherence to the available institutes and constitutional instruments of power in regulating the people’s day-to-day activities through gauging the amount at which power is miss used by the country’s leadership (Andrés et al 2015).

Success of societies and organizations, such as cooperatives, governments relies on key aspects of good governance including openness of the leaders and holding them responsible, participating, and obedience to the supremacy and equality of the law. These

elements guarantee fair decision-making processes, responsible resource management, and representation of all members' interests (Dayanandan 2014).

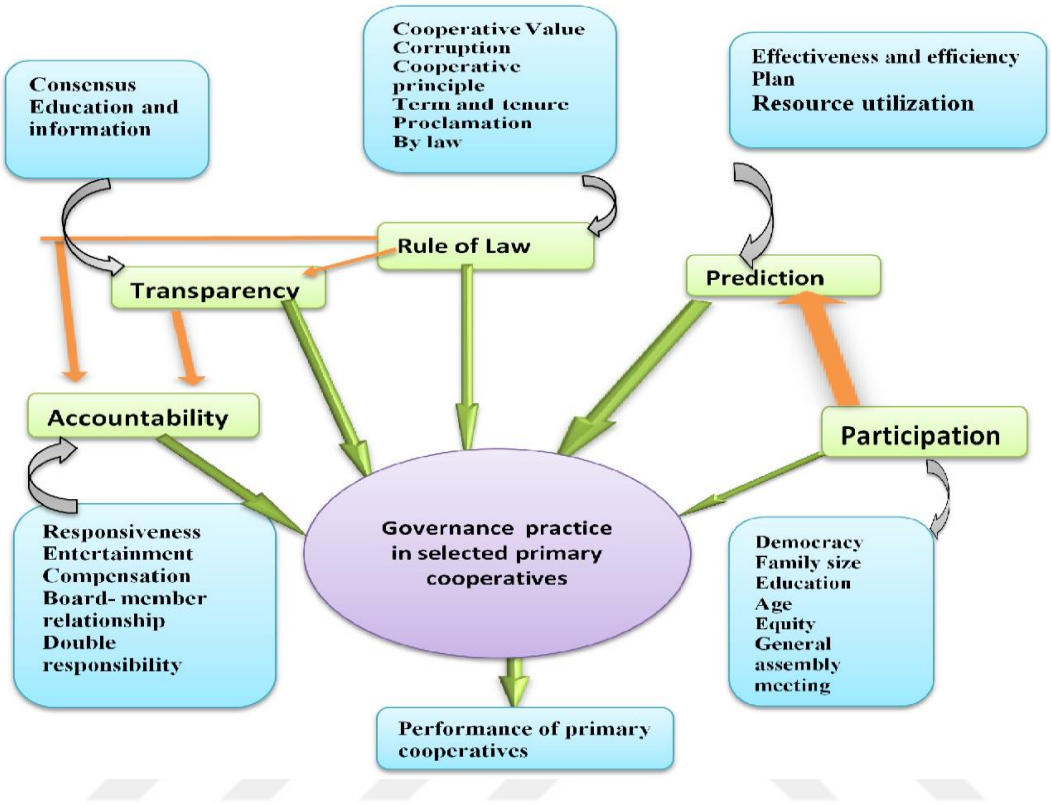

Figure 3. *An illustration by* (Dayanandan 2014) *good governance model*

The governance indicators by (Kaufmann et al 2011) have faced scrutiny from various authors, particularly (Kurtz and Schrank 2007) who evaluated the models, measures, and mechanisms used hence questioned the assumption of the linkage of good governance and the economic wellbeing of a given society. In their indicators, they emphasise concerns including perception prejudices and conceptual confusion with policy choices.

(Kurtz and Schrank 2007) were disproved as their claims were deemed biased as disruptive to the short-term link between governance and growth proposed by other academics. The debate continues to revolve around concerns regarding measurement accuracy and its impact on discussions about the relationship between economic growth and governance effectiveness (Kaufmann et al 2011).

From the Islamic perspective of governance, the leader of a society is put on the top of the hierarchy responsible for implementing necessary disciplines such as Islamic laws

and values, usury free financial systems, security, justice, openness, economic welfare and answerability of leaders to the arms of law. According to the study, presidential democratic systems and monarchies in Muslim communities/countries are the most similar in form and nature to the Islamic model(Naqvi et al 2011).

Figure 4 An illustration of the Islamic Governance structure.

This study utilizes the indicators of governance as used by (Andrés et al 2015) due to their widespread use and data accessibility as most of the previous empirical studies like that of (de Groot et al 2005) on effective governance and international trade have frequently employed the same models in their research to showcase how governance influences international trade. This decision allows for a comprehensive analysis of the subject matter and provides a foundation for potential policy implications. Furthermore, the study aggregates specific indicators of governance into four indicators as put out by Kaufmann et al, 2011 to support robust findings.

It's important to note that the improved governance benefits trade between European Union regions. As its also concluded that institutional factors more significantly impact

the ability of regions to engage in international trade rather than domestic trade, and this positive effect varies depending on the sector and level of development (Gil-Pareja et al 2019).

2.1.7 The Foundation of the E.A.C

For centuries, the region has witnessed many integrational attempts. for example, several initiatives were taken during colonial times to bring put all their colonies under a unified administrative frameworks, such as customs administration (Ngari 2016). They started with integrating Tanzania, Uganda, and Kenya. They construction of the Uganda-Kenya railway took shape from 1897 to 1901, Customs collection centre came to life in 1900, regional court of appeal, Postal Union and many other infrastructures joined the region during the colonial era (E.A.C 1999).

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2.1.8 Origin of the EAC in the 1960s

The community has gone through a lot of numerous name changes, from 1948 to 1961 was called the East African High Commission, then from 1961 to 1967 it was called the East African Common Service Organization and then the EAC between 1967 and 1977.

After all countries had gained independence, the heads of states of Uganda, Tanzania and Kenya decided to re-establish the EAC and to put aside their political differences. In 1967, the EAC was established with the aim of overseeing movement of goods in the region and its headquarters were located in Arusha Tanzania (E.A.C 1999).

It is important to note that the initial motivation for integration originated from the necessity for collaboration in developing infrastructure and trade partnerships. At the core of early regional agreements was the crucial task of creating rail connections and ensuring access to ports. Additionally, there was a requirement to establish cooperation in telecommunications and currency exchange. As a result, the earliest initiatives were sector-specific, with institutions featuring the East African Mail and Telegraphs, Currency Board, the Customs Union, and Common Services Organisation established in 1961. Many of these early collaborative endeavours faced obstacles due to political

differences, ideological conflicts, and concerns about some countries' economic supremacy.(Oluoch 2009)

By this time, were several political conflicts between member, Kenyan government started demanding for more seats in decision-making bodies, tensions among member nations, and differences in economic systems, particularly between Tanzania and Kenya, Uganda and Tanzania faced off in the war which led to the overthrow of president Idd Amin of Uganda hence the community was disgracefully dissolved. (Senkejji 2018).

2.1.9 The Revival of the EAC in 2000

After regime change and political unrest in Uganda, the heads of states of the three initial members signed a treaty for the revival of the EAC as a new regional organization 1999 in Arusha-Tanzania in 1999. The agreement came into effect on the 7th of July 2000 with the aim of promoting regional cooperation in all sectors and like trade, tourism, security, infrastructure and later unifying the region into a political federation. (Hazlewood 1979). Since then, the community has undergone through various developments in advancing economic development and regional integration (E.A.C, 2023)..

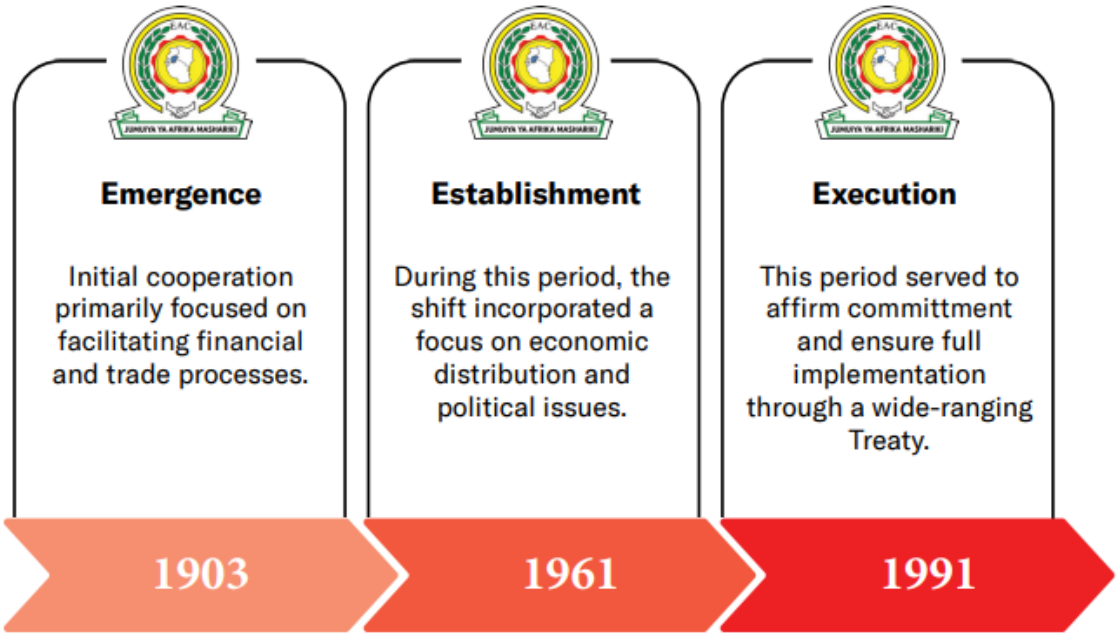

Figure 5. An Illustration of the integration process of the EAC.

2.1.10 Expansion of Membership

Since its revival in 2000 with Uganda, Tanzania, and Kenya as initial members, the EAC grew to add new members in the region as the Republics of Rwanda and Burundi became full members in June of 2007. The Republic of South Sudan was also added to the treaty in 2016 and DRC in 2022. Somalia is the latest country to join the treaty as it joined in 2024 though it applied in 2012. The Republic of Sudan before the current war also had applied to join in 2011 though it was disqualified by the parliaments of Uganda and that of Tanzania on the grounds of mistreatment and discrimination of the South Sudanese Now the region is looking forward to bringing on board Ethiopia and Djibouti in order have a full integration of all East African countries. This expansion aims at fostering free movement of people and trade with in the region and promoting regional political stability (EAC, 2024).

Figure 6. The current map of the full members of the EAC.

2.1.11 Macrostructure of the East African Community.

The EAC is organized with several Organs and bodies that are meant to collaborate to achieve the organization's goals of regional integration and cooperation. The relationships of authority and lines of accountability within the overall structure of the EAC can be quite intricate. Some structures, like the Legislative Assembly and Court of Justice, have defined powers outlined in the founding Treaty, enabling them to directly make binding decisions. However, it is important to note that this separation of roles may not align closely with what is seen at the country level in Constitutions. The diagram below broadly outlines the macrostructure of the EastAfrican Community.

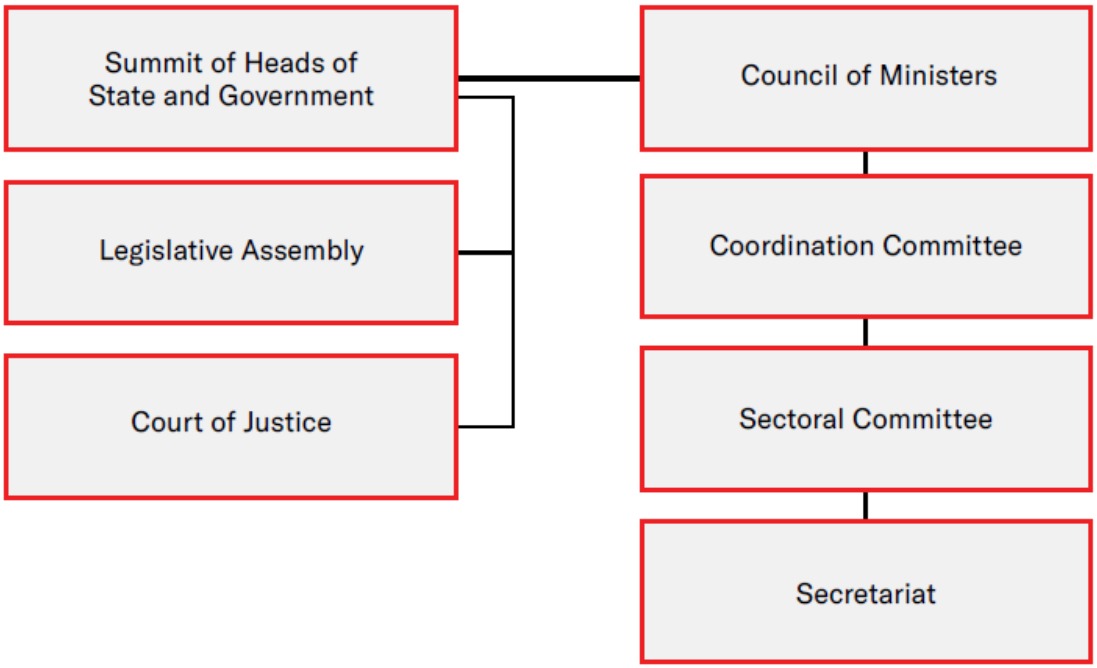

Figure 7. *Macrostructure of the EAC*

The East African Community's highest decision-making body is the Summit of Heads of or Governments. The Treaty defines its jurisdiction and tasks, establishing it as the ultimate governing body for all major policy and decision-making within the EAC. All member countries introduced in their cabinets a post known as the ministers in in charge of East African Community affairs who works closely with the Summit. The Council of Ministers concentrates on intricate decision-making aspects and provides its recommendations to the Summit (Chilangazi and Magasi 2023).

2.1.12 Key Milestones in the EAC

2.1.13 Common Market

The Common Market Protocol was in adopted in 2010 which was a defining moment towards the realisation of the EAC vision. This is the broadest scope of any integration. This emphasizes the single market as it goes beyond borders of member countries and grants movement of persons, capital, and goods and services within the region. Under this protocol, movement the community's citizens came to life with the introduction of the East African Passport. It also created a framework for policy, regulatory, and standardization alignment(EAC 2023).

2.1.14 Customs Union

In 2005, the EAC established its Customs Union with the aim of reducing internal trade barriers like the tariffs and establishment of the common external tariffs and facilitate trade among member countries. By lowering barriers and increasing economic cooperation, the Customs Union has encouraged intra-regional trade(EAC 2022).

2.1.15 Monetary Union Protocol

In November 2015, member states agreed and signed the decorum on the formation of a Monetary Union and authorized the Council of Ministers to implement the 10-year roadmap to a single currency to construct the institutions required for protocol implementation. The institutions like the East African Statistics Bureau, Monetary Institute, Financial Services Commission and the East African Surveillance, Compliance, and Enforcement Commission are among the institutions. The aim is to economic cooperation and boost regional trade and investment(EAC 2023).

2.1.16 Infrastructure Development

The East African community has given a strong priority to connecting the region through launching many infrastructure development projects like promotion of the maritime safety on lake victory, construction of the Standard Gauge Railway connecting Mombasa, Nairobi, Kampala, Kigali, Juba, Bujumbura, Dar Selam all being the economic cities of the region. In addition, many Airports, Roads and Inland ports have been constructed all with the same aim of easing the movement of people and goods within the region (EAC 2022).

In the infrastructure development, the EAC also took a big step towards connecting the region by introducing a system known as the One Network Area. This system removes all roaming calls in the region hence east Africans can make call with in the region without roaming charges which has directly eased the flow of information in the region (ITU 2016).

2.1.17 Sectoral Cooperation

East African governments have signed many sectorial protocols to foster cooperation in different sectors, for example the region introduced a common tourism visa commonly known as the East African Visa which gives tourist a wide access to all east African countries with just a single visa (EAC 2023).

2.1.18 Challenges and Future Outlook

Since its foundation, the EAC has been faced with different challenges which many it has been able to address, and others are still standing. With all countries have almost different political agendas, the region has not been spared from political and diplomatic divisions. Many times, Uganda and Kenya have almost flexed their muscles on the disputed Migingo island in Lake Victoria, Uganda and Rwanda have recently severed tires and borders were closed for more than a year, recently Rwanda vowing to fight the DRC. Other challenges like unbalanced infrastructural development also possess a big challenge to the community. However, the EAC has always been dedicated to solving all the standing challenges and fostering a win-win approach of integration. It has resolved disputes between Uganda and Rwanda and many others are still in the pipeline.

Since its resurrection in 2000, there has been a significant improvement in the building a stronger integration in the continent. The EAC is known as the most successful and oldest regional cooperation in the whole of Africa as Uganda, Kenya and Tanganyika's cooperation dates way back in 1967 (DAL 2023). The main goal of its founding fathers is to form a politically integrated region and many steps have been taken towards this goal. For example, the Customs Union, then a Common Market, signing of the duty free where all products manufactured in the region are sold locally regardless of their country of origin within the EAC. The community has also eased the movement of its citizens when it introduced the East African Passport came into implementation by all member

countries in 2018. The leaders have played a tremendous role as they've committed themselves to the full integration by establishing the regional production value chain (EAC 2023).

3. Data and Methods

To perform the empirical analysis, this study took data from different sources and compiled to fit the analysis. Data on economic indicators, international Trade, ICT, Governance Indicators, was extracted from the East African Community Database from the year 1995-2022. International trade is the dependant variable, which leveraged import volume and export volume from one country to another and these data were taken from the UN Com-trade database. It is denoted as Ln Trade, and it is computed by adding the total volume of exports and imports to the total value of international trade. Since the Gravity model is multiplicative, the natural log form it was to prevent heteroscedastic difficulties; nonetheless, it includes unobserved effects that may hinder us from addressing the issue of unincorporated variables.

Distance data was taken directly from the distance calculator website, its defined by the distance from Kampala to the capital cities of the EAC partners without considering the real routes by any means of transport.

Remoteness was created as a variable since geographical distances between countries does not vary with time, Fixed Effects model cannot be established. Therefore, the remoteness captures the relative importance of trade partners in the global economy and incorporates geographical distance hence it's not time invariant and Fixed Effects model can be incorporated. It's calculated as the log and the outcome of distance plus partner GDP divided by the GDP of the world in the period of the study.

To capture the difference in the level of economic development among countries, the GDP per Capita Distance variable was created. It's calculated by getting the GDP per capita of Uganda and that of the partner countries and subtract the Minimum Value from the Maximum Value and take the natural log.

The economic indicators like GDP, Population, Inflation, FDI were extracted Database of the world bank. Fixed-broadband subscriptions (per 100 inhabitants), fixed-broadband subscriptions (per 100 inhabitants) fixed telephone subscriptions (per 100 inhabitants), Percentage of Individuals using the Internet, Mobile telephone subscriptions (per 100 inhabitants) were used as main independent variables. This was extracted from the ITU World Telecommunication/ICT indicators database. Distance, common languages, colonial link, sharing a border and landlocked data were used as control variables of

transportation cost taken from CEPII (Centre d'Etudes Prospectives et d'Informations Internationales) gravity dataset. Governance Indicators data were extracted from the World Bank database. The analysis was done for the period 1994 to 2022.

Table 1 Data Summary

Dependent Variables	Independent Variables	Dummy Variables
Ln Trade	**Mobile Connectivity Indicators**: Fixed Broadband Subscriptions Fixed Telephone Subscriptions Percentage of individuals using internet Mobile phone/ Cellular telephone subscriptions	Common Language Distance Common Border Common Colonizer
	Economic Indicators: GDP Population Inflation Foreign Direct Investment	
	Governance Indicators: Government Effectiveness Voice and Accountability Political Stability and Absence of Violence/Terrorism Regulatory Quality Rule of Law Control of Corruption	

General specification of gravity model equation.

$$\ln(T)_{ijt} = \beta_0 + \beta_1 \ln \gamma_{j_t} + \beta_2 + \ln \gamma_{j_t} \beta_3 \ln D_{ij} + U_{ij} + i = 1 \dots \dots \dots . N_{ij} = 1 \dots \dots . . M, t = 1 \dots . . T$$

The dependent variables $\ln(T)_{ijt}$ are trade flows which are imports and exports of Uganda with subscript i indicating Uganda and j the EAC partner countries while t indicates time.

This study uses gravity model to examine the effect of governance and mobile connectivity on regional trade in the context Uganda with other East African Community (EAC) states.

The gravity model of international trade is based on the Newton's Law of Universal Gravitation, which states that the every particle in the universe attracts others with the force that's proportional to their mass and inversely proportional to the square of their distance (Chasimidis 2013).

In international trade, the gravity model suggests that the total volume of two countries is induced by the size of their economies represented by the GDP, distance between them, and transportation costs (Hollweg and Rocha 2018). These elements can be considered as the "mass" and "distance" parameters in the model, which estimates the size of economic relationships between nations (Cevik 2022)

The mathematical equation of gravity model of international trade was developed by a group of economists from the Netherlands who tested it empirically and was first applied by Tinbergen .In his key work, Tinbergen invented the the gravity equation which shaped the world economy. He econometrically identify the standard model for investigating the flow of trade and it is currently considered to the a benchmark in interntional trade(Shahriar et al. 2019).

In 1962, Jan Tinbergen first noticed the applicability of this concept to international economics. He concentrated on trade flows under conditions of no trade barriers and proposed that free trade would typically result in optimal global welfare. By comparing real trade volumes with theoretical volumes without trade barriers, we assess the explanatory power of multivariate linear regression in contrast to the gravity model(Haveman and Hummels 2004).

Several studies have been published in the previous years that provide greater theoretical basis like that of Tinbergen. The hypothetical basis of the gravity model of international trade can be traced back to models such as the Ricardian, Heckscher-Ohlin, and rising returns to scale. Each of these hypotheses differ in how the economies have specialised. For example, for the Ricardian model, technology vary between nations, so that each country specialises in producing the items in which it has a comparative advantage.

Economies in Heckscher-Ohlin's model have varying factor proportions, consequently industrialised countries have a larger capital-labour ratio than non-industrialised countries, and vice versa. This is just alternative method to describe a country's comparative advantage. Product specialisation happens at the firm level in expanding returns to scale models. (Evenett and Keller 2002)

Some studies determined that a portion of production is correctly specialised because of changes in factor proportions, leading them to assume that the Heckscher-Ohlin model is insufficient to describe the empirical success outcome of the model. Second, increasing returns are the perfect explanation for an excellent product specialisation and the Model, particularly in industrialised countries. (Evenett and Keller 2002).

In 1980, one of the most well-known monopolistic models is that of Paul Krugman was published. Through his idea, production has the appropriate savings in costs, and businesses can easily minimise costs and maximise profits. Thus, labour is the available production factor with people getting the same utility function. Each additional good produced will incur a fixed cost and a constant marginal cost of production. As output grows, the average cost decreases. There is full employment and enterprises maximise profits, but because firms can freely enter and quit, the equilibrium profits are zero.(Theodoridis and Kraemer 2010).

Recently, academics have critiqued existing gravity models for a variety of causes. The use of the GDP as the sole measurement of the movement of goods and services beyond borders. Academics claim that the import demand of an intermediate good in another country is determined by the import demand of the final product in the third country. Which means that the GDP of the importing country in this scenario is not the best mass-variable in determining the country's bilateral trade flow. Unless the import demand of an intermediate goods remains constant with the import demand of the final goods. This the only way scholars accept the GDP is as the best indicator of bilateral trade flow(Baldwin and Taglioni 2011).

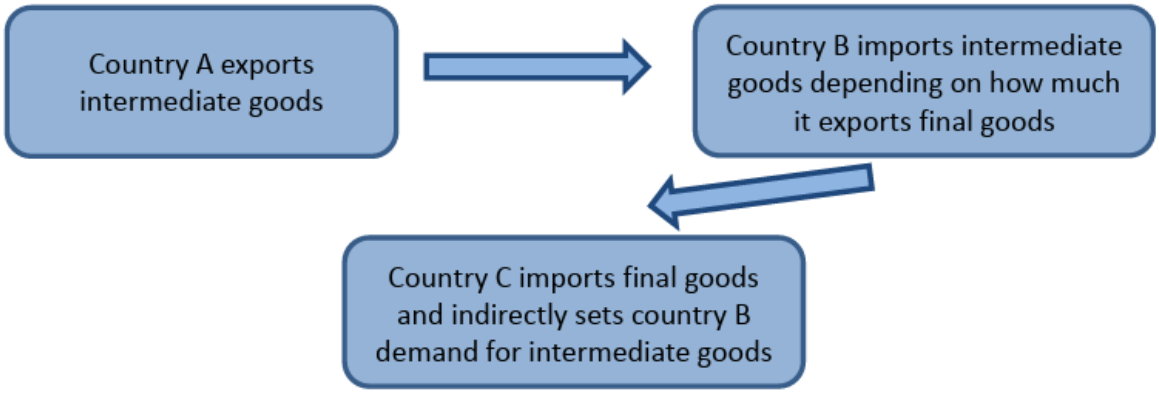

Figure 8. *The demand for intermediary items is established by a third country.*

Numerous researchers have tried to find out the methods by how the trade flow is affected by distance. Normally, the standard claim is that the distance is the sole method for calculating time and the costs of transportation as they both negatively affect trade flow. However, academicians these days claim that differences in economic developments, cultural and technological development have a lot to do with the fact that many developed countries manufacture free products for low developed countries and this removes commerce in between then and hence it's hard to determine the effect of distance since the transportation costs cannot be determined (van Bergeijk, Brakman, 2010).

Based on the above claims, this supports the claims by other scholars on the lessening of the impact of distance on bilateral trade in the present days. This is because some countries do trade in intangible products which also makes it hard to determine distance between importers and exporters(Yotov 2012).

The challenge of defining trade costs as they differ significantly among product lines and countries hence oversimplifying of them can result in erroneous estimations(B. J. E. Anderson and Wincoop 2003). Though academicians claim that trade costs are proportional in all directions of across paired countries. For the case of preferential trade agreements where countries mostly the developed ones offer preferential tariffs unilaterally to different countries like what the EU offers to products manufactured in East African Community, hence this claim is far away from the reality. It's also claimed

that imports and exports of a country are always equal which also conflicts the reality (De Benedictis and Taglioni 2011).

Nevertheless, scholars use the zero-trade observation while using the log-linear which at the end of the day gives biased findings. Though if they used the fixed effects can eliminate the biases that's if a positive value is assigned instead of zero-trade observation(Westerlund and Wilhelmsson 2011).

Scholars who support the use of zero-trade observations claim that removing it will affect lead to the loss of important information on international trade. This backed by the research they conducted on around 158 countries bilateral trade for the period of 27 years. They found a dramatic increase in in the volume of trade though there was just a slight increment on the number of countries they traded with (Helpman et al 2008).

Distance has played a tremendous role in championing the trend of globalisation as markets are becoming more steadily integrated, this is due to the breakthroughs in infrastructure around the world and the adoption on technology as a result of free trade among countries. (Morgan 2001).

Empirical gravity literature consistently shows that distance has a significant impact on trade, making it a well-documented result in international economics. A standard estimate suggests that increasing the distance between countries reduces trade volume by almost half. Distance has a significant impact on trade that outweighs actual transportation costs whose effect appears to increase over time(B. J. E. Anderson and Wincoop 2003).

The function of distance remains significant for trade not just because transport costs are insignificant, the role of data availability is a prevailing circumstance that makes distance a crucial substitution to information costs(Brei and Peter 2017) that's why scholars like (Disdier andHead 2008) emphasizes the fact that the significance of distance keeps on increasing day by day.

Some scholars have tried to remove the puzzle of distance when calculating the impact of cross-border distance and domestic distance. Though the impact of both is relative to each other hence ignoring distance in international trade might not be possible.(Yoto V. Yotov 2012)

Other studies have shown that the size of an exporting country's GDP is positively connected with the volume of overall exports from that country. This is extremely rational, because countries with high GDPs typically have a greater overall numerous companies doing exports (Lawless 2010).

In the literature of analysing bilateral trade, the use of gravity model of international trade has been rampant in all aspects, they argue that it's easy to justify even the simplest forms of gravity model equations from standard trade theories. This underscores the fact that the gravity models show a strong relation between international trade and its determinants. For example, (Disdier andHead 2008) used gravity model to find out what determine what makes countries do trade. Even though the data and methods employed in these investigations varied greatly, the primary conclusions were remarkably consistent.

The universal gravity model rationalizes imports and exports as a measurement a country's market volume and their trade barriers among themselves. The traditional form of the model claims that, economic development which is the size of GDP, Population, Geographical Distance, and control variables that can be used to determine bilateral trade between countries. This model specification follows the traditional paths universally used in the literatures like ((De Benedictis and Taglioni 2011),(J. E. Anderson 2011) and(Baldwin and Taglioni 2011))

The Gravity Model of International Trade has demonstrated considerable experimental accomplishment in rationalizing intercontinental trade. The gravity model assumes that larger economies will attract more trade, and greater distances between countries will reduce trade.

The gravity model equation for international trade is typically expressed as follows:

$$T\_ij = (M\_i \times M\_j)/D\_ij$$

Where:

T_ij is the trade value of i and j.

M_i and M_j are the economic sizes of i and j, measured by GDP.

D_ij the distance between two countries' centroids (geographical centres)

Therefore, researchers have expanded the gravity model to include additional variables such as cultural similarities, language, and common historical ties to better explain trade flows. This extended approach aims to capture the complexities of international trade patterns by considering a broader range of influencing factors beyond economic size and distance (De Benedictis and Taglioni 2011)

In the empirical literature, many variables are used to represent trade barriers which include transport costs calculated by finding the distance between trading countries, countries being landlocked, Islands, borders dummies that shows that transport costs. It should also be noted that distance does is not affected by change in time though its effect differs compared to the country's development as their infrastructure developments are dissimilar among countries.

In addition, several economic, political, and geographic factors such as free-trade agreements or shared language are consistently important variables predicting bilateral trade flows when using gravity models for analysis(Ismail 2020)

As of this study, the model is expanded as follows.

$$\ln(T)_{ijt} = \beta_0 + \beta_1 \ln \gamma_{j_t} + \beta_2 + \ln \gamma_{j_t} \beta_3 \ln D_{ij} + U_{ij} + i = 1 \dots \dots \dots . N_{ij} = 1 \dots \dots .. M, t = 1 \dots .. T$$

The dependent variables $\ln(T)_{ijt}$ are trade flows which are imports and exports of Uganda with subscript i indicating Uganda and j the EAC partner countries while t indicates time.

The common language dummy is the one used to represent the information costs among trading partners. Therefore, the dummy variables used in this study for EAC trading partners like Common language, common borders and common coloniser were given the value of one (1) (Nordås and Piermartini 2004).

To initiate the model, the log form of the gravity model was built using the linear combination of indicators. The model is purely augmented with mobile connectivity dynamics, governance and remoteness which incorporates the distance between the countries as well as the relative importance of the partner country's GDP in the global GDP. This is because most of the recent literature in the gravity models underlined that hypothetically, bilateral trade barriers between trading countries are not the only determinants of the models.

The panel data with several variables representing geographical, cultural and integration characteristics was used in the quest to probe the factor's effect on Uganda's bilateral trade Vis-à-Vis it's East African Community partners.

The OLS regression was run first with no Fixed or Random Effects, with LnTrade treated as a dependent variable which LHS of gravity model regression equation and the independent variables on the RHS.

Table 2 Gravity Model analysis

LnTrade	Coefficient	Std. err.	t	P>|t|	95% conf. interval lower	95% conf. interval upper
Dstance	-0.003577	0.080633	5.46	0	-0.2047131	-0.0022022
GDP of Uganda	9.77E-11	1.45E-11	6.76	0.008	6.91E-11	-16.732
GDP of Partner	-4.06E-11	9.398E-12	-4.32	0	-5.92E-11	-2.2E-11
ComLang	4.068618	0.601864	6.76	0.008	2.874823	5.262412
ComBorder	0.224491	0.3981456	0.57	0.573	-0.5534027	0.994301
_cons	10.71394	0.5439024	19.78	0.008	9.635187	1.79276

Number of obs=108, F (5,102) = 19.78, Prob > F = 0.0000, R-squared =0.4675, Root MSE = 1.3593.

After performing the F.E and R.E Models, to choose between random or fixed models the Hausman test was performed. The Hausman test is used to establish whether there is correlation between unique errors and the regressors. With the P-Value being 0.0008, its statistically significant which means the FE model is chosen in this analysis. With Hausman test indicating significant differences in the coefficients, the FE was found to be significant.

Table 3 Random Effects Model (RE)

LnTrade	Coefficient	Std. Error	z	P>|z|	[95% conf.	interval]
GDPpercapita	0.259444	0.175402	1.48	0.139	-0.08434	0.603226
Distance	-0.58975	0.67953	-0.87	0.385	-1.9216	0.742109
Remote	5.326437	1.202605	4.43	0	2.969375	7.6835
Population Effect	-4.49477	2.328486	-1.93	0.054	-9.05852	0.068978
Com Lang	0.951679	1.063662	0.89	0.371	-1.13306	3.036418
Com Border	0	(omitted)				
Com Colonizer	-0.00321	0.001252	-2.57	0.01	-0.00567	-0.00076
Distance	87.15116	36.39597	2.39	0.017	15.81636	158.486
FTS effect	-0.00139	0.023015	-0.06	0.952	-0.0465	0.043722
IUI Effect	-2.84505	1.089918	-2.61	0.009	-4.98124	-0.70885
MCS Effect	-0.0593	0.023343	-2.54	0.011	-0.10505	-0.01355
GE Effect	0.00179	0.0184	0.1	0.923	-0.03427	0.037853
VA Effect	0.029061	0.021769	1.33	0.182	-0.01361	0.071728
PSAVT Effect	0.041953	0.019261	2.18	0.029	0.004201	0.079704
RQ Effect	-0.00585	0.025527	-0.23	0.819	-0.05588	0.044187
RL Effect	0.000514	0.014765	0.03	0.972	-0.02843	0.029453
CC Effect	-2.8897	10.28104	-0.28	0.779	-23.0402	17.26077
FDI Effect	-155.425	43.08094	-3.61	0	-239.862	-70.9874
_cons	0					
Sigma_u	1.274405					
Sigma_e	0 (fraction of variance due to u_i)					
rho						

Table 4 Additional Information about R.E Model

R- Squared	Obs per group	Wald chi2(16) = 137.41
Within = 0.4599	min = 27	corr(u_i, X) = 0 (assumed)
Between = 1.0000	avg = 27.0	Prob > chi2 = 0
Overall = 0.6016	max = 27	Wald chi2(16) = 137.41
		corr(u_i, X) = 0 (assumed)
		Prob > chi2 = 0

Table 5 Fixed Effects Model (FE)

LnTrade	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
GDPpercapita Distance	0.2594444	0.175402	1.48	0.143	-0.08897	0.6078591
Remote	-0.589746	0.67953	-0.87	0.388	-1.939549	0.7600578
Population Effect	5.326437	1.202605	4.43	0***	2.93761	7.715264
Com Lang	0	(omitted)				
Com Border	0	(omitted)				
Com Colonizer	0	(omitted)				
Distance	0	(omitted)				
FTS effect	87.15116	36.39597	2.39	0.019 **	14.85502	159.4473
IUI Effect	-0.001388	0.023015	-0.06	0.952	-0.047105	0.0443294
MCS Effect	-2.845045	1.089918	-2.61	0.011 **	-5.010033	-0.680057
GE Effect	-0.059301	0.023343	-2.54	0.013 **	-0.10567	-0.012933
VA Effect	0.0017898	0.0184	0.1	0.923	-0.03476	0.0383392
PSAVT Effect	0.0290609	0.021769	1.33	0.185	-0.014181	0.0723026
RQ Effect	0.0419526	0.019261	2.18	0.032 **	0.0036926	0.0802126
RL Effect	-0.005846	0.025527	-0.23	0.819	-0.056552	0.0448613
CC Effect	0.0005135	0.014765	0.03	0.972	-0.028816	0.0298432
FDI Effect	-2.889701	10.28104	-0.28	0.779	-23.31173	17.53233
_cons	-159.5056	44.9092	-3.55	0.001	-248.7122	-70.299
sigma_u	3.1617785					
sigma_e	1.2744045					
rho	0.8602432					

F test that all u_i = 0; F (9,91) = 6.14 Prob> F=0.0008

Table 6 Additional Information about F.E Model

Fixed effects (within) regression	**R-squared**:	Obs **per group**:
Number of obs: 108		
Group variable: Partner.	Within: 0.4599	Min: 27
Number of groups: 4	Between: 0.4922	Avg: 27.0
	Overall: 0.2723	0.6016 Max: 27
F(13, 91): 5.96		
corr(u_i, Xb): -0.9215		
Prob > F: 0.0000		

Table 7: Results of the Hausman test

Coefficients

	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) Std. err.
GDPpercapi~e	.2594444	.2594444	-1.62e-11	**2.62e-07**
Remote	-.5897457	-.5897457	9.81e-11	**1.78e-06**
Population	5.326437	5.326437	7.53e-10	**.0000127**
FTS effect	87.15116	87.15116	2.74e-09	**.000044**
IUI Effect	-.0013876	-.0013876	-4.25e-13	**7.69e-09**
MCS Effect	-2.845045	-2.845045	-5.71e-10	**9.60e-06**
GE Effect	-.059301	-.059301	-5.83e-12	**9.95e-08**
VA Effect	.0017898	.0017898	-3.39e-12	**5.77e-08**
PSAVT Effect	.0290609	.0290609	-3.03e-12	**5.14e-08**
RQ Effect	.0419526	.0419526	4.49e-12	**7.82e-08**
RL Effect	-.0058455	-.0058455	3.97e-12	**6.44e-08**
CC Effect	.0005135	.0005135	2.31e-12	**3.85e-08**
FDI Effect	**-2.889701**	**-2.889701**	**-1.13e-09**	**.0000181**

b = Consistent under H0 and Ha; obtained from xtreg.

B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

chi2(8) = (b-B)'[(V_b-V_B) ^ (-1)] (b-B)
= 0.00
Prob > chi2 =
0.0000
(V_b-V_B is not positive definite)

In this analysis, (Prob>chi2 = 0.0000) is very low, suggesting the rejection of the null hypothesis. With Hausman test indicating significant differences in the coefficients, the FE model was found to be appropriate. Theoretically, choosing the Fixed Effects model centres on its ability to control for time-invariant heterogeneities across entities, provide consistent and efficient estimates, offer policy-relevant insights, and mitigate endogeneity concerns. Therefore, based on theoretical grounds and the nature of our data, opting for the Fixed Effects model is theoretically justified to obtain robust and interpretable estimates of the predictors' effects on bilateral trade of Uganda and its partners in the region.

4. Findings

This chapter presents and discusses the estimation findings. The purpose of this study is investigating the impact of governance and mobile connectivity, on regional trade within the context of Uganda Vis-à-Vis other East African Community states.

The findings of the fixed effects panel data model suggests that distance, GDP of the partner country, and a common language significantly impact trade. Variables such as common borders do not show a significant effect in this context. The overall model explains nearly half of the variance in trade, indicating a reasonably good fit.

Moreover, the current research involves characteristics that are unique to each entity and are likely to influence the dependent variable. This is common in studies involving individuals, firms, or countries where intrinsic differences are expected to affect outcomes. Thus, FE models are preferred.

Table 8 Fixed Effects Model (FE)

LnTrade	Coeff.	Std. err.	t	P>|t|	[95% conf.	interval]
GDPpercapita Distance	0.2594444	0.175402	1.48	0.143	-0.08897	0.6078591
Remote	-0.589746	0.67953	-0.87	0.388	-1.939549	0.7600578
Population Effect	5.326437	1.202605	4.43	0	2.93761	7.715264
Com Lang	0	(omitted)				
Com Border	0	(omitted)				
Com Colonizer	0	(omitted)				
Distance	0	(omitted)				
FTS effect	87.15116	36.39597	2.39	0.019	14.85502	159.4473
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VA Effect	0.0017898	0.0184	0.1	0.923	-0.03476	0.0383392
PSAVT Effect	0.0290609	0.021769	1.33	0.185	-0.014181	0.0723026

Table 9 (Continuation) Fixed Effects Model (FE)

RQ Effect	**0.0419526**	**0.019261**	**2.18**	**0.032**	**0.0036926**	**0.0802126**
RL Effect	-0.005846	0.025527	-0.23	0.819	-0.056552	0.0448613
CC Effect	0.0005135	0.014765	0.03	0.972	-0.028816	0.0298432
FDI Effect	-2.889701	10.28104	-0.28	0.779	-23.31173	17.53233
_cons	-159.5056	44.9092	-3.55	0.001	-248.7122	-70.299
sigma_u	3.1617785					
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F test that all u_i = 0; F (9,91) = 6.14 Prob> F=0.0008

Table 10 Additional Information about F.E Model

Fixed effects (within) regression	**R-squared**:	Obs **per group**:
Number of obs: 108		
Group variable: Partner.	Within: 0.4599	Min: 27
Number of groups: 4	Between: 0.4922	Avg: 27.0
	Overall: 0.2723	0.6016 Max: 27
F(13, 91): 5.96		
corr(u_i, Xb): -0.9215		
Prob > F: 0.0000		

The analysis indicated a significant connection between some mobile connectivity and governance indicators on the Uganda's regional trade.

The findings suggests that in the connectivity dimensions like FTS and MCS and GE and RQ from the governance indicators significantly affect trade volume. Fixed Telephone Subscription shows a positive correlation with volume of trade. This suggests that's the fixed telephone subscriptions in the region contributed to the exchange of information and communication in the region which positively impacted trade volumes. However, MCS shows a negative corelation with the volume of trade. This informs us that mobile cellular subscription as individuals using internet were not significant in the model.

Government effectiveness and Regulatory Quality showed a negative correlation to trade volume which reflects that these governance indicators reduced trade volumes as some EAC countries might have strained trade with trade barriers on some products to and from Uganda. It should be noted that, most of the EAC countries produces identical products with Uganda hence countries don't find it necessary to trade in those products.

Population Effect showed a positive correlation which reflects the increasing total population of the EAC countries. This can be supported by the EAC data which showed 300 million population in community(EAC 2022).This also reflects the significance of population effect in the model.

As the gravity model regression was conducted, collinearity was encountered in the dummy variables of common language, common border and common colonizer and were automatically omitted. This means that there is strong correlation among these variables making it difficult to estimate their individual coefficients.

Table 11. Hypothesis Testing

Hypotheses	**Accept**	**Effect**	**Reject**
H1: Fixed Telephone Subscription	✓	+	
H2: Individuals Using Internet			✓
H3: Mobile Cellular Subscription	✓	-	
H4: Government Effectiveness	✓	-	
H5: Voice and Accountability			✓
H6: Political Stability			✓
H7: Regulatory Quality	✓	+	
H8: Rule of Law			✓
H9: Corruption Control			✓
H10: Population Effect	✓	+	

5. Conclusion

This study investigates the impact of mobile connectivity and governance on regional trade within the context Uganda's foreign trade with other East African Community (EAC) states. Governance is measured by the dimensions of RQ (Regulatory Quality), GE (Government Effectiveness), VA (Voice and Accountability), PSAVT (Political Stability and Absence of Violence/Terrorism), RL (Rule of Law) and CC (Control of Corruption). Mobile connectivity has been considered with the dimensions of FTS (Fixed telephone subscriptions -% of population), IUI (Individuals using the Internet-% of population), MCS (Mobile cellular subscriptions-% of population). We utilise panel data of Uganda, Kenya, Tanzania, Rwanda, and Burundi which are 5 of the current 8 members of the EAC whose data is available in the period of 1995 – 2022. We model the trade volume of Uganda with the other states by using the gravity model of international trade. The findings of the Fixed-Effects model indicate that FTS seems to be positively related with trade volume, while MCS seems to be negatively related with trade volume. RQ seems to be positively related with trade volume while GE seems to be negatively related with trade volume. Population Effect is also found to have a positive significant effect.

FTS being positively related to the trade volume, means that an increase in the Fixed Telephone Subscription in Uganda and its EAC trading partners increases trade among themselves. This is line with the studies of (Luong and Nguyen 2021) and (Tay 2020) who found that FTS had significantly impacted trade. Though (Kang 2021)'s findings show a negative effect on Korea's Trade which can be understandable as Korea is a developed country .

The fact that Regulatory Quality was found to be positively related to trade volumes, means that Uganda and its EAC have the ability of formulating and implementing policies that promotes regional trade. This is also confirmed by other studies like (Sarma et al 2008),(Borrmann et al 2006),(Fiorini et al 2018) and (Basedow et al 2016) whose findings showed that a sound regulatory quality facilitates export growth and reduces trade cost which as a result increases trade volume.

Uganda and its EAC partners should consider more investments in mobile connectivity, improve available ICT infrastructure and implementing more inclusive policies to improve regulatory quality which in return will enhance regional and international trade.

Furthermore, Uganda and the EAC countries should consider investing in education, human capital development, and technology development strategies through improving the national curriculum to increase skills as the population increase had a positive effect on trade volumes. Uganda and the EAC partners should improve their infrastructures like railways, and roads to reduce transport costs.

The fact that the EAC added three politically struggling countries of DRC, South Sudan and Somalia, the community should be prepared to support these young members to implement peace and stability it is very crucial for trade to flourish.

For future studies, an emphasis should be put on the impact One Network Area which was adopted by the EAC and the recent Telecommunications infrastructure improvements on regional trade in the EAC.

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APPENDIX

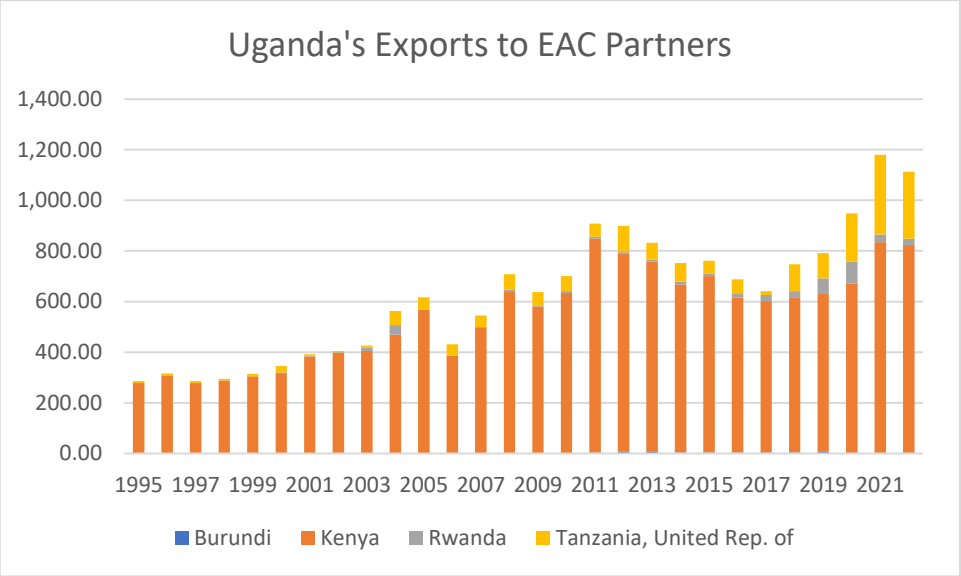

Figure 9. *Uganda's Exports to its East African Partners.*

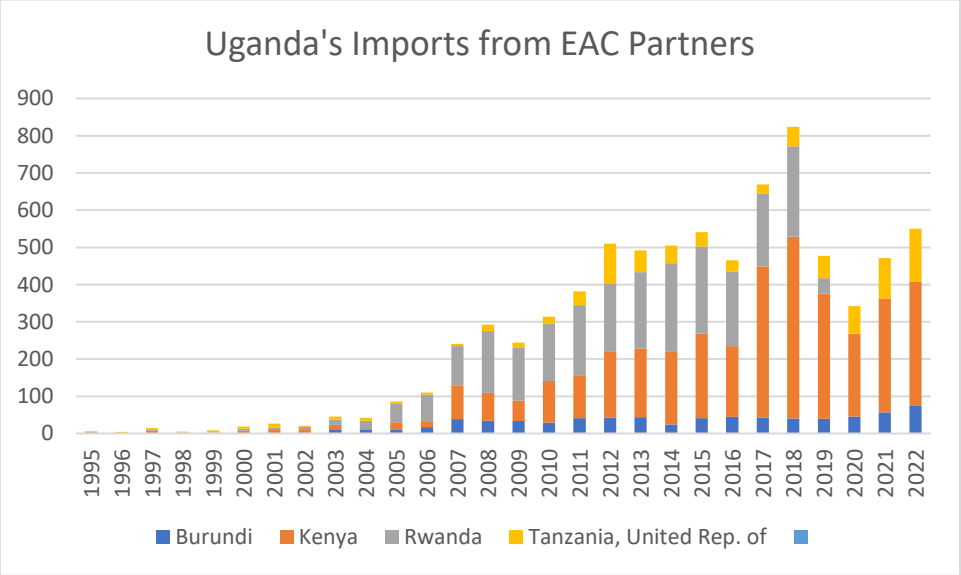

Figure 10. *Uganda's Imports from EAC partners.*

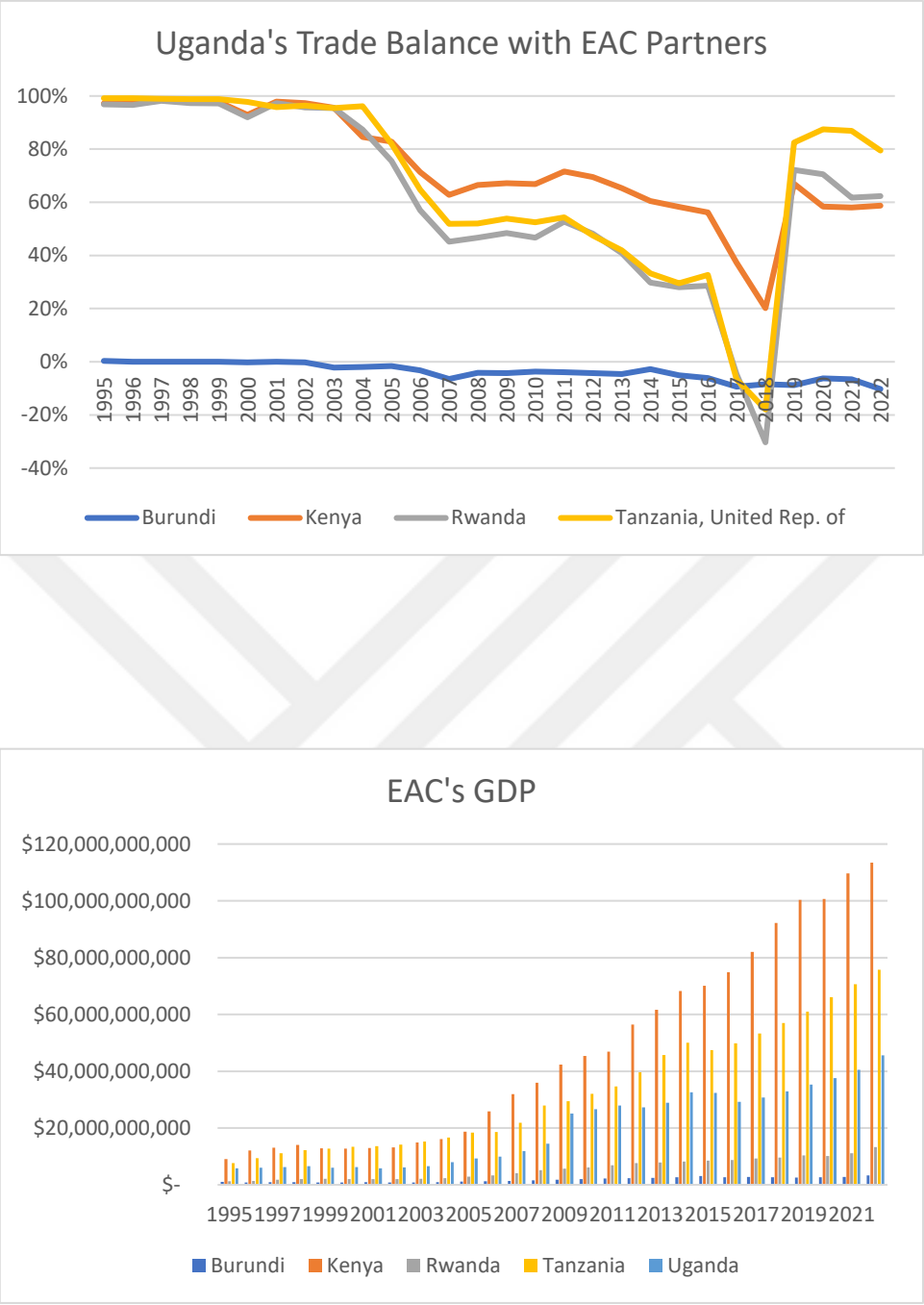

Figure 11 . *The GDP of EAC countries.*

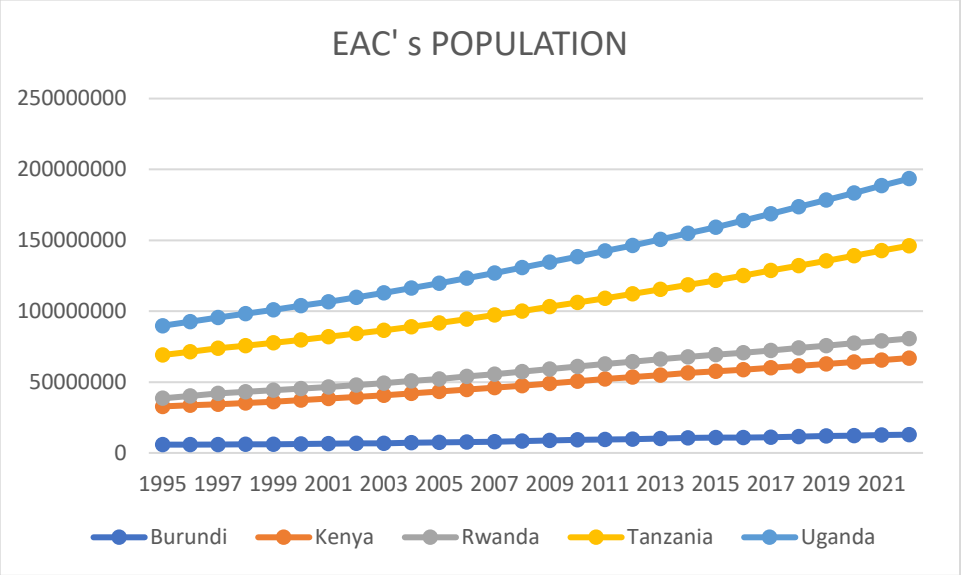

Figure 12. *The Population of EAC countries.*

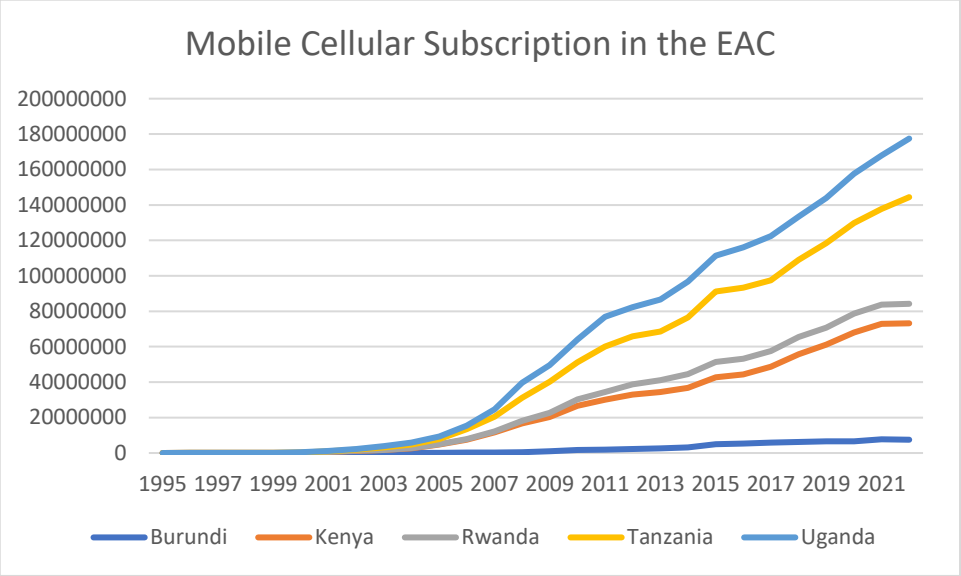

Figure 13. *Mobile Cellular in the EAC*

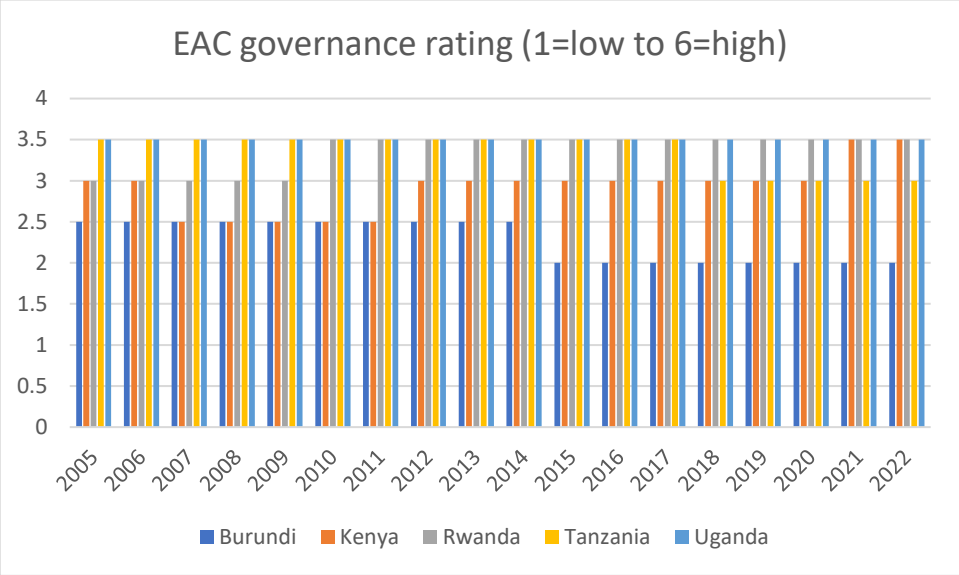

Figure 14. *Governance scores of the EAC countries.*