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EDITORIAL

On behalf of the scientific editorial board, I extend my deepest gratitude to the contribution made by lecturers and researchers that has made the compilation of this publication a success. The completion of this volume stemmed from their will, initiative and performance as lecturers and researchers. KIGALI INDEPENDENT UNIVERSITY ULK has always paid regards to promoting education and impacting the complete development of Rwanda through coupling teaching and research. In the same context, the 38th volume of ULK Scientific Journal is now out with five papers which tackle issues of national and regional concern. The authors of articles in this issue suggest scores of recommendations worthy of consideration to both policy makers and practitioners.

The first article by **NGABO YISONGA MATABARO Roch** is entitled “Empirical Study of the Relationship between External Debt and Public Investment in Rwanda: An Econometric Approach. The main purpose of this article was to analyze the case of Rwanda in order to know whether debt is a useful instrument to boost public investment in the long run.

The findings of the study revealed that in the case of Rwanda, external debt does not create an eviction effect because results show that there is a positive relationship between external debt and public investment.

The paper by **Dr. MBERA R. Zenon and NIRERE Ornella** dubbed “Effects of Electronic Banking on Service Quality of Commercial Banks in Rwanda: A Case of Access Bank

- Rwanda Ltd” aimed at to examining the relationship between e-banking and service quality in commercial banks in Rwanda particularly Access Bank Rwanda Main Branch. The study confirmed that electronic banking services are contributing to positively on good quality services offered by Access Bank Rwanda Main branch to their customers.

The article by **Dr. TWAGIRIMANA Emmanuel**, “Effect of Price Fluctuation on Agriculture Production in Rwanda (2008-2013) findings showed that there is a statistical significant relationship between prices change and production as an increase of one unit of price of Maize, Sweet Potatoes, Irish Potatoes and Beans, caused the increase of production from Maize, Sweet Potatoes, Irish Potatoes and Beans by 1798, 2905, 2174, and 442 Metric Tons respectively.

The last paper by **Dr. MURANGIRA Thierry** “Euthanasia and Human Rights Perspectives: Does the Right to Life Encompass the Right to Die?” revealed that euthanasia devalues human dignity and will offend the principle of sanctity of life. Euthanasia will leave sick, disabled or vulnerable people with less protection than the rest of population and could even be seen as providing a cover for murder.

Dr. Sekibibi Ezechiel

Vice Chancellor of ULK

**EMPIRICAL STUDY OF THE RELATIONSHIP
BETWEEN EXTERNAL DEBT AND PUBLIC
INVESTMENT IN RWANDA: AN ECONOMETRIC
APPROACH**

BY: NGABO YISONGA MATABARO Roch

ABSTRACT

The objective of this study was to investigate the empirical relationship between external debt and public investment in the case of Rwanda. The empirical literature review reveals that external debt may have a positive or negative impact. Most of previous studies did not focus on factors which explain the negative or positive effect of external debt.

Findings of this study revealed that in Rwanda, external debt has a positive impact on public investment thanks to good management of external debt. Government of Rwanda has set and implemented development strategies which determine priorities in terms of funding which explains its positive effect as compared to findings from some other least developed countries.

Indeed, results of the research obtained using the Ordinary Least Square method show that there exist a positive correlation between external debt and public investment in Rwanda. When external debt increases by 1%, public investment increases by 0.067441. Also, analyses done end at results that estimated coefficients are statistically significant at 5% level of confidence. The relative probabilities for LT_x , $LExtD$ and $LPubInv_{t-1}$ are less than 0.5. As the coefficient of external debt is significant one can conclude that there exist an empirical relationship between external debt and public investment. It has been demonstrated that is long term, all coefficients are positive. R-squared is 0.977062. This means that lagged public investment, external debt and tax explain public investment at 97.7%.

Key words: Rwanda, External debt, Economic growth, Public investment and Budget deficit

I. INTRODUCTION

Developing countries are characterized by economic imbalances which includes budget deficit (Ngabo Yisonga R, 2009). In front of budget deficit, Government can either resort to banknote plate or public debt. Banknote plate is in some cases source of inflation. Thus, despite consequences of debt on economy, a State is obliged resorting to it as a means addressing public deficit. A State may resort to external loan as well.

External debt is contracted in order to fill needs in terms of finance public investment funding with external effects on private sector, i.e. the economic growth. Indeed, external loan may have an indirect effect on economic growth if it impacts directly on public investment, that is, if there is an empirical relationship between external debt and public investment. The literature shows that it is not always the same since some author advocate a positive relationship while others advocate the opposite.

On the view of Bofoya K. B. (2011), the public management rationality requires the use of external loan for funding public infrastructure useful to boost private sector, what means a positive correlation between debt and public investment with indirect effect on private investment. This idea had been highlighted at the beginning of the 20th century by J.M. Keynes who states that public deficit honestly financed by debt stimulates production, makes wide the fiscal basis and allows the repayment of public debt in the future. Sanchez J.I. and Almada R.G. (2016)

established that sub-national governments hire debt for the purpose of financing public investment projects that complement private investment to translate into greater economic growth, from which contracted debt becomes sustainable and there is no risk for their finances. Therefore there should be established a positive relationship between debt and public investment.

Claessens and Diwan (1990) quoted by Ejigayehu (2013) also categorized the effect of external debt on investment and economic growth in two. First, debt servicing might put away (take) the limited resource of poor countries that could be used in public spending. More specifically, resources used to service the accumulated debt may crowd out public and private investment due to complementarities between private and public investment.

For Fitzgerald et Al. (1992), funding of public investment through its effect on inflation and debt accumulation can create uncertainty of business environment. Raffinot (1998) states that in developing countries public investment creates a real eviction for private companies because there is a shortage of market weight.

In one word, examples presented below show that an antagonism exists at the theoretical level when it comes to establish a linkage between external debt and public investment. It is the same regarding the theoretical relationship between external debt and economic growth. In fact, the contribution of external debt to economic growth is controversial since it may have a positive or

negative effect. Debt is presented by some authors as a burden. Among them we quote: Tayebwa M. (1998), Human D.N. (1996), Sharp A.M. et Al. (1992), Abel A.B. et Al. (1995) who present external debt as a burden for future generations since it requires more taxes in the future.

Perkins D.H. et Al. (2011), states that debt creates crisis while Todaro (1992) argues that external debt has a cost. At the other side, the literature presents external debt as an opportunity. According to Varoudakis A. (1994) borrowing is a factor which helps boost economy in a case of recession. For Raffinot (2002) external financing has allowed some developing countries to increase exports and incomes, thus the debt payback was easy. Case of Asiatic countries, especially “New Industrialized countries”.

The same idea is supported by empirical evidences. An econometric study led by Sanchez I.J. and Almada R.G. (2016) confirmed that public debt is positively correlated with public investment and that this in turn generates economic growth

Likewise, different experts are of the view that external debt has favorable effect on economic growth. Among them we quote: Jayaraman and LAU, Kalonji et al., Ayadi, Elouar etc. However, according to Mulugeta F. (2014:65), external debt burden requires due attention of policy makers. An increase in external debt servicing decreases GDP growth and there is evidence for existence of crowding out effect□ in Ethiopia.

Likewise, a study led in 2003 by Diallo B. (2003) on the case of GUINEA reached the conclusion according to which external debt acts negatively on economic growth. Ezeabasili N. Vincent et AL., (2011) ended with the same result as regards the case of Nigeria.

Debt in general and external debt in particular is a world issue whose Rwanda is not exempted. Despite consequences of external debt on Rwandan economy, Government has not stopped resorting to debt from bilateral and multilateral sponsors. Arguably, the indebtedness of Rwanda is structural given its connection with its economic situation.

No trustworthy investigation had been done to demonstrate the effect of external debt on public investment in Rwanda. Besides, no research among the previous ones had shown clearly through which economic mechanism external debt can impact on public investment in Rwanda. That is why the case of Rwanda requires an empirical analysis.

Indeed, this article aims at showing that, external debt will become profitable to countries if it is allocated to public investments which have a positive external effect on private investments otherwise it will become a threat for economic growth and a stumbling block in the development process.

Therefore, the main purpose of this article is to analyze the case of Rwanda in order to know whether debt is a useful instrument to boost public investment in the long run. Thus, the problem statement is of this research is oriented

towards one concerns i.e. to study the relationship between external debt and public investments.

The problem under study as presented in the problem statement pushes us to formulate the following question: Is there any relationship between external debt and public investment in Rwanda?

The objective of this study is to study the effect of external debt on public investment i.e. the long run relationship between these two variables.

In the current study secondary data have been used. They were drawn from annual report of national bank of Rwanda and Ministry of finance and economic planning of Rwanda. Data collected were related to: the evolution of the external debt of Rwanda from 1991 to 2016, the evolution of GDP, public investment, etc.

As regards data analysis I have used the econometric method through the E-views software.

This study has been structured as following: The first part is devoted to the general introduction in which the basic part is the problem statement. As it is important to know some theories related to external debt, the second part carries on literature review. The third part is devoted to the research methodology. In the fourth part results were presented and discussed. In the fourth part it has been about to present conclusions related to findings.

II. LITERATURE REVIEW

II.1. Theoretical literature review

Several authors have discussed the issue of external debt and its relationship with public investment at the theoretical and empirical levels. External debt has been presented in the economic theory as way to cover the gap existing between local resources and needs of Government in terms of public investments. If domestic saving is not sufficient, there must be the possibility of obtaining from abroad the amount that can be invested to fill the gap (Balogo, G.S., 2014).

According to TODARO and SMITH (2009:674), external debt is a common phenomenon of developing countries at the stage of development where the supply of domestic saving is low, current account payment deficits are high, and imports of capital are needed to augment domestic resources. However, most of theories on debt developed demonstrate that the indebtedness may or may not be favorable.

The positive effect of external debt on public investment and economic growth has been highlighted long time ago by the founder and father of macroeconomics. J.M. Keynes argues that a public deficit honestly financed by debt stimulates production, makes wide the fiscal basis and allows the repayment of public debt in the future (Bofoya, 2011). For Keynes, the weight of public debt is from somewhere else, it can be found in public management inefficiency, bad decision making in the allowance of

public resources, eviction effect, transformation of saving in current expenditure reducing capital accumulation and stopping economic growth (Bofoya, 2011).

Foreign debt had been considered as strategy of economic development and growth in the past. USA had borrowed during 19th century to finance its expansion towards the western. European countries have sometimes relied on foreign borrowings. Indeed, borrowing allows a country to invest more than its savings and make superior its exports. To reach that objective, borrowings should finance productive investments so that the return of investments allows repaying capital and interest of debt. In this contest, borrowing can contribute to favor economic growth and development (Perkins *et Al.*, 2011).

It is not wrong for developing economies to rely on external credits to finance their domestic investments. If borrowed funds could be utilized effectively to put in place production facilities, commodities produced, therefore, would contribute to reduction in imports, and further, to expansion in exports. If external debt could be paid back by foreign exchange thus saved or earned, no serious accumulation of external debt would arise. In fact, fast growing economies in East Asia, especially Korea, borrowed heavily in their development process (Yujiro, 1997).

Nevertheless, when external debt is not efficiently utilized in productive investment it creates negative effects on the economy in general and economic growth in particular. Therefore, the debt overhang theory has been developed by economists.

Edouard Borenstein (1990) quoted by Ejigayehu (2013) defines debt overhang as a situation in which the debtor country benefits very little from the return to any additional investment because of the debt service obligations. For him debt overhang is a condition when the debtor country fails to service its foreign debt obligation fully with the existing resources, and undertakes a negotiation with creditors to determine actual debt payment. As a result, part of the increase in output will be used to pay the forthcoming debt. This in turn creates a disincentive on private investment and poses a hindrance on the government to pursue the right policies.

Debt becomes a real burden when the creditor has to pay. Debt creates financial crisis especially when it is about short run debt. Exit of capitals provokes reduction of exchange rate and increase of interest rate. A borrowing policy to finance consumption or bad conceived investments can create difficulties. It looks easier to borrow than to raise taxes (Perkins D.H. et Al., 2011).

Another assumption is that foreign borrowings have a cost. While foreign borrowing can be highly beneficial providing resources necessary to promote economic-growth and development - it has its cost. The main cost associated with the accumulation of a large external

debt is 'debt servicing'. Debt servicing is the payment of amortization (i.e. the liquidation of the principal) and accumulated interest; it is a contractually fixed charge on domestic real income and savings (Todaro M.P., 1992). The debt servicing may end at the problem of default especially in low developed countries.

The weight of debt becomes heavier when the borrower country is confronted to the problem of default i.e. it is not able to repay according to the loan contract. Cohen D. (2000) advocates that debt is a trap and a drug which postpones problems. Then, since debt is a problem, its cancellation is a solution. Therefore, action is also needed on so-called 'odious debt' racked up by corrupt or repressive regimes. Until 2006, Ethiopia, for example was still repaying debt incurred by the repressive Mengistu regime that was on power from 1974-91, much of which went to finance the suppression of the freedom fighters who are now in government. Similarly, the ANC government in South Africa is repaying debts incurred by apartheid regime, and the Chilean government is paying off debts taken on by the dictator Augusto Pinochet.

A solution would be to forgive odious debt through some forms of international adjudication, and by giving the UN the authority to declare 'credit sanctions' against current regimes, make it clear that debts to these regimes would be considered odious. This would prevent the 'immoral hazard' of banks and governments lending to repressive regimes and saddling their peoples with the obligation to repay the loans (Duncan G., 2012). Therefore, if negative

effects shown above are taken into consideration, actions should be undertaken in order to reduce indebtedness, especially in low developed countries.

In one word, in the literature there is no unanimity among authors when it is about to discuss the effect of debt on public investment. Some authors advocate the hypothesis of debt overhang while others think that indebtedness is source of funding for public investment and economic growth. Sanchez J.I. and Almada R.G. (2016) established that sub-national governments hire debt for the purpose of financing public investment projects that complement private investment to translate into greater economic growth, from which contracted debt becomes sustainable and there is no risk for their finances. Claessens and Diwan (1990) quoted by Ejigayehu (2013) also categorized the effect of external debt on investment and economic growth in two. First, debt servicing might put away (take) the limited resource of poor countries that could be used in public spending. More specifically, resources used to service the accumulated debt may crowd out public and private investment due to complementarities between private and public investment.

II.2. Empirical literature review

In the empirical literature review, the effect of debt on public investment has been examined notably for the case of Mexican economy. Sanchez and Almada (2016) have demonstrated evidence of the relationship between public debt and public investment, as well as between public

investment and economic growth. They built a database with information from 1993 to 2012 for the 32 states that make up the Mexican Republic. They used eight variables: population, total output or production, output per person, public investment, current government spending, average years of schooling, foreign direct investment and public debt.

The first estimated equation in the study of Sanchez and Almada showed that the output per capital is determined by lagged value of output, foreign direct investment, years of schooling, foreign direct investment and public debt. The second estimated equation explains the public investment itself is determined by lagged public investment, current expenditure of government, population, foreign direct investment and public debt.

Results of the research show that:

- Public debt is positively correlated with output per person with a significance level of 0, 01. Therefore public debt is a determinant of economic growth. It is the same for public investment because it has a positive effect on output per person with a significance level of 0, 01.
- The variable interaction between public investment and public debt is statistically significant at 0, 01. This confirms the hypothesis according to which the debt which is channeled for public investment collaborates to observe a greater economic growth.

The same authors showed that public investment is a positive determinant of economic growth.

For the case of Low Income Countries, Benedict C. et Al. (2003) demonstrated that external debt has an indirect effect on growth through its effect on public investment. However debt service has a negative effect on public investment. On average every 1 percentage point increase in debt service as a share of GDP reduces public investment by about 0, 2 percentage point.

III. RESEARCH METHODOLOGY

3.1. Introduction

Research methodology is a systematic way to address a problem. It displays how research is to be or has been carried out. Essentially, these are procedures used by researchers to go about their work describing, explaining and predicting phenomena. It is also defined as the study of methods with which knowledge is gained. It aims at providing the work plan to research (Rajasekar S. et Al., 2013)

Research requires use of tools or instruments to collect data and this chapter intends to make an overview of such tools. In this chapter, topics like study area, research design, sample size, data collection, model specification, data analysis and processing will be developed.

3.2. Study area

The area for this research is the territory of Rwanda. So, the analyses conducted are of macroeconomic nature. Rwanda is a landlocked country located in central Africa.

It is bordered by Uganda to the North, Tanzania to the East, Burundi to the South and the Democratic Republic of Congo to the West. According to Rwanda Development Board (2012), the country surface area is 26 338 kilometers square. The total population of Rwanda is 11 920 000 inhabitants. The GDP per capita is 729 USD at current price while the currency is Rwandan francs (MINECOFIN, 2017).

3.4. Sample size

For the purpose of this study, the sample has been taken from from yearly data ranging from 1991 to 2016.

3.5. Data collection

For the sake of this research, secondary data were mainly used. The secondary data are those which have already been collected by someone else and which have already gone through statistical process. In case of secondary data the nature of data collection work is merely that of compilation. Secondary data may either be published data or unpublished data (Kothari C.R., 2004). They can provide a useful source from which to answer, or partially to answer the research question (Saunders M. et Al., 2012).

Data related to evolution of the external debts of Rwanda from 1991 to 2016 were collected. Other data collected were related to the evolution of GDP, debt, public investment, etc. Reports which have been consulted include those of the Ministry of finance and National banks of Rwanda, the International Monetary Fund, the African Development

Bank, etc. The observation technique was used because during the research process it was mandatory to visit the service in charge of debt in the ministry of finance as well as the service in charge macroeconomic analyses in Rwanda.

3.6. Model building

The objective of this research is to analyze the effect of external debt on public investment

The econometric model related to this objective is inspired from the model developed for the case of Mexico by Ramirez and Erquizio (2012) cited by Sanchez I.J. and Almada R.G. (2016) while explaining the effect of public debt on public investment. The model was formulated as follows:

$$Inver_{it} = \alpha_1 Inver_{it-1} + \beta_i X_{it} + \mu_i deuda_{it} + \varepsilon_{it} \quad (1)$$

X_{it} stands for foreign direct investment.

$Inver_{it}$ = Public investment

$Inver_{it-1}$ = Lagged public investment

$deuda_{it}$ = Public debt

Tax has been added in the model specification since a part of public investment in Rwanda is financed by tax. Therefore the following model has been formulated to demonstrate the effect of external debt on public investment in Rwanda.

$$PubInv = \alpha_0 + \alpha_1 PubInv_{t-1} + \alpha_2 ExtDt + \alpha_3 T_x + \varepsilon t \quad (2)$$

Where:

$PubInv$ = Public Investment

$PubInv_{t-1}$ = Lagged Public Investment

$ExtDt$ = External Debt

T_x = Taxes

εt = Error term

α_0 = Constant

α_1, α_2 and α_3 are coefficients of lagged public investment, external debt and tax respectively.

The variable lagged public investment measures the effect of previous year public investment. Its expected sign is positive.

A tax is a payment deducted by Government from taxpayers according to their ability to pay, using constraints, without direct compensation in order to cover public loads (Mankiw N.G., 1997). Taxes are supposed to have a positive effect on public investment because they are used notably for infrastructures. Data related to infrastructures in Rwanda have been collected from the Ministry of Finance and Economic Planning (MINECOFIN).

Expected signs are presented in the following table:

Table 1: Expected signs and parameters for the econometric model objective1

Parameters	α_1	α_2	α_3
Expected signs	+	+	+

Source: The author

The expected signs of $\alpha_1, \alpha_2, \alpha_3$ are positive because a positive effect of lagged public investment, tax and external debt on public investments is expected.

IV. PRESENTATION AND DISCUSSION OF RESULTS

Analyzing the effect of external debt on public investment was the objective of this research. To reach that objective, an empirical analysis has been conducted. The main purpose of the econometric analysis is to test the long run relationship between external debt and public investment considering that external debt acts on economic growth through public investment. However, before establishing the long run relationship a stationarity test has been done on variables of the model as the Ordinary Least Square method has been used.

IV.1. Stationarity test

Stationarity test is very important in modeling since the macroeconomic data without the same moment cannot be included in the same model. In fact, whether a series is stationary or not, it influences the choice of the model to be adopted. When all series are not stationary, we have to transform them until they become stationary by differentiating them before modeling and estimating parameters associated to the stationarity component.

The rationale behind stationarity lies much on the conventional asymptotic theory for least squares method used in regression. This test is used to know the methodology to be adopted. When the series are stationary, we use the Ordinary Least Squares (OLS), but when the series are non-stationary, OLS cannot be used

because there may be a non-sense regression or a spurious regression in the terminology of Granger and Newbold.

The series in stationary process will tend to turn around its mean and fluctuations around its mean (variance) will have generally constant amplitude. The stochastic process is stationary if:

A non-stationary process becomes stationary by differencing it n^{th} times. A time series is said to be integrated of order d , written $I(d)$, when after being differencing it d times it becomes stationary. A series is integrated of order zero when it is stationary at level.

Examples: - $I(0)$: The series are stationary at level

- $I(1)$: The series become stationary after the first difference

The Augmented Dickey-Fuller (ADF) tests are performed to test the unit root in time series.

The ADF tests follow these rules:

➤ When $ADF_{\text{cal}} < ADF_{\text{crit}}$: There is no unit root

➤ When $ADF_{\text{cal}} > ADF_{\text{crit}}$: There is unit root

After analyses using the e-views software, results are such as series are not stationary at level, rather they are stationary at the first difference. Results related to the stationarity test are presented in the table above:

Table 4: Stationarity test at the first difference

Variables	ADF Critical at 1%	ADF Calculated	Conclusion
LPubInv	-3.73	-5.83	Stationary
LPubInvlag	-3.73	-3.95	Stationary
LTax	-3.75	-4.21	Stationary
LExtD	-3.73	-6.3	Stationary
Laid	-3.73	-5.76	Stationary

Source: Econometric analysis

From the results of the stationarity test at the first difference, series that were not stationary at level become stationary after the first difference, they are integrated of order one (I (1)) as all ADF calculated are inferior to ADF critical at 1% level of confidence.

IV.2. Long run equation of external debt impact on public investment in Rwanda

The long run equation allows analyzing the empirical relationship between external debt and public investment. The linear model takes into consideration logarithms of both sides of the equation. Thus, the equation can be presented as following:

$$LPubInv = \alpha_0 + a_1 LPubInv_{t-1} + a_2 LExtD + a_3 LT_x + \epsilon_{it}$$

The model was converted into logarithm form to allow a proper interpretation of the results in terms of percentages. Coefficients and probabilities are presented in the following table:

Table 5: Results for the Long Run equation

Variables	Coefficients	Probabilities
L PubInv _{t-1}	0.410778	0.0015
L ExtD	0.336465	0.0001
L T _x	0.067441	0.0560

Source: Econometric Analysis

According to these results, the LExtD and L PubInv_{t-1} are statistically significant as their respective probabilities (0.0015), (0.0001) are less than critical value of 5%. Ltx is statistically significant at 10% margin of error because 0.0560 is less than critical value of 10%.

From Table 5, the econometric model used under this study can be written as follows:

$$L PubInv = 0.410778L PubInv_{t-1} + 0.336465L ExtD + 0.067441L T_x + 0.731236 \quad (3)$$

R-squared is 0.977062. There is goodness of the model and the model is fitted. Independent variables i.e. lagged public investment, external debt and tax explain public investment at 97.7%. An R-square of 97.7% indicates that the model used captures 97.7% variability of L PubInv_t, and the rest percentage variability is unaccounted for.

Based on the results of the long run model from Eviews 7.1, all variables have effect on public investment as their

estimated coefficients are statistically significant at 5% level of confidence; their relative probabilities are less than 0.5. Furthermore, all coefficients related to exogenous variables (lagged public investment, external debt and tax) are positively correlated to the public investment. Results above mean that when:

- $L\text{PubInv}_{t-1}$ increases by 1%, the $L\text{PubInv}$ increases by 0.410778% while keeping all other variables constant;

- $L\text{ExtDt}$ increases by 1%, the $L\text{PubInv}$ increases by 0.067441 while keeping all other variables constant;

- LT_x increases by 1%, the $L\text{PubInv}$ increases by 0.336465 while keeping all other variables constant.

Thus, results of analyses show that there exist a positive correlation between external debt and public investment in Rwanda. Estimated coefficient of external debt is statistically significant at 5% level of confidence. Also, the coefficient of external debt is positive, what means that a positive correlation exists between external debt and public investment in Rwanda. The rationale is that in Rwanda loan from external debt is allocated to public infrastructures. Results above are significant in terms of policy implication. One can notice that, although external debt positively impacts on public investment, tax have more amplitude. Therefore Government of Rwanda should implement policies in order to collect more taxes i.e. to increase fiscal plate so that it may resort less to external debt.

IV.3. Cointegration

According to Engle and Granger, different variables in the model are cointegrated if the residuals from the long run estimated model are stationary. The cointegration mechanism suggests the following steps:

1. Test the order of co-integration of all variables
2. Estimate the long run model
3. Test the stationarity of residuals

The first and the second steps have been performed previously; the remaining step is to test the stationarity of the residuals. The stationarity of the residuals was tested by E-views 7.1 and the following are the results:

Table 6: Results for cointegration test

Test critical value	T-statistics
1% level	-3.737853
5% level	-2.991878
10% level	-2.635542

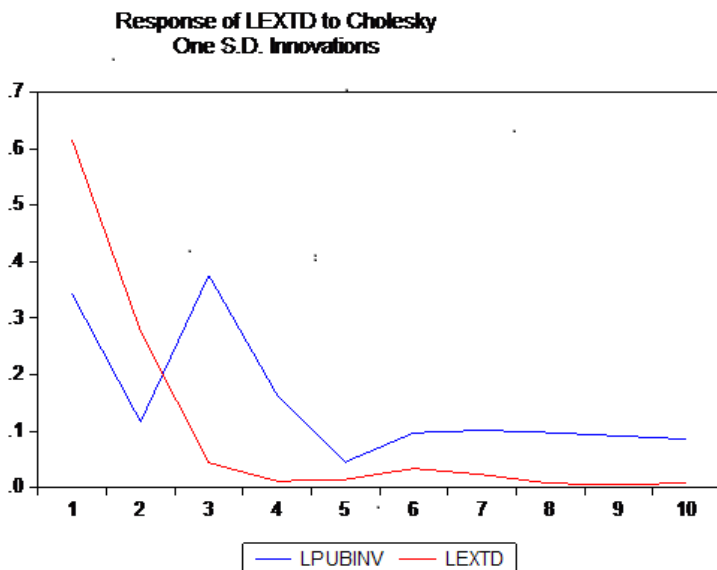
Source: Econometric analysis

The Augmented Dickey-Fuller test statistics is -4.027388. Its probability is 0.0052.

The results indicate that there is cointegration as ADF value= -4.027388 is less than test critical value (-3.737852) at 1%; there is a long run relationship in the model. Residuals of the long run equation have no unit root.

The error correction term is negative (RESIDL1= -0.597) and it makes a good indicator that the correction of errors is possible. Based on the value of the error correction term, the researcher concludes that around 59.7% of all errors will be corrected in one year (one period), while 100% of errors will be corrected in one year and 8 months.

Impulse responses of public investment to shock in external debt is presented in the following figure:



Results indicate that through external debt exerts a significant positive effect on public investment. In general, the trend of these two variables is the same.

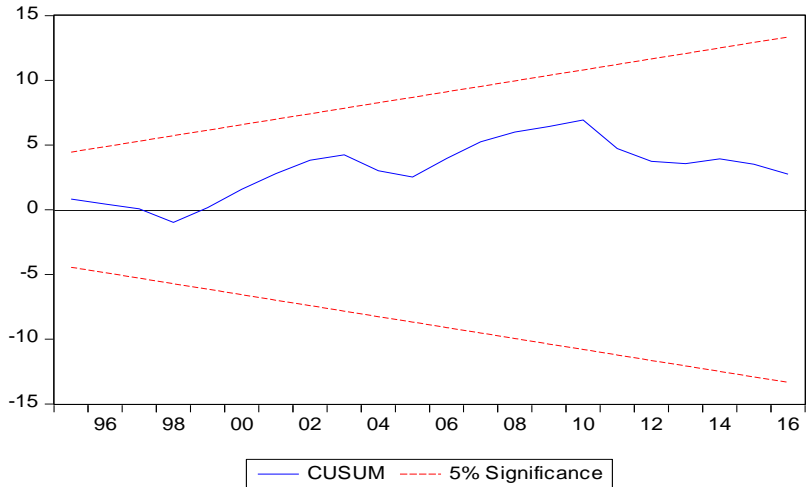
IV.4. Causality analysis

Granger causality test was computed to check the causal relationship between external debt and public investment. Based on findings, the researcher found that the external debt granger causes the public investment as the probability is equal to 0.095 (9.5%) less than critical value of 10% what allows rejecting the null hypothesis. Indeed in Rwanda external debt is mostly invested into productive public investments.

IV.5 Stability test

Stability test is conducted by the CUSUM TEST which test is based on the cumulative sum of recursive residuals. The cumulative sum is plotted with the 5% critical lines and parameter instability is found when the cumulative sum goes outside the area between the two critical lines. The graph below was generated by Eviews7.1:

Figure 6: CUSUM TEST



Parameters are stable because the cumulative sum does not get outside the area of two critical lines at 5% significance. This test is very important because as the parameters are stable, the predictions are possible with the model.

V. GENERAL CONCLUSION

This article had as objective to analyze the empirical relationship between external debt and public investment. This objective of this research was reached verifying the empirical relationship between external debt and public investment. In the equation formulated, endogenous variable was public investment while exogenous variables were lagged public investment, external debt and tax.

Analyses done end at results that estimated coefficients are statistically significant at 5% level of confidence. The relative probabilities for LT_x , $LExtD$ and $LPubInv_{t-1}$ are less than 0.5. Also, it has been demonstrated that in long term, all coefficients are positive.

In Rwanda, if an increase of lagged public investment of 1% ends at an increase of public investment of 0.410778%; an increase of external debt of 1% ends at an increase of public investment of 0.067441 while an increase of tax of 1% ends at an increase of 0.336465. R-squared is 0.977062. This means that lagged public investment, external debt and tax explain public investment at 97.7%.

In conclusion, in the case of Rwanda, external debt does not create an eviction effect because results show that there is a positive relationship between external debt and public investment. External debt is used to finance public investment which creates a positive external effect on private investment. Indeed, in Rwanda, external debt is mostly used to fund public investment necessary to boost economic growth and economic growth creating external effects on private investments.

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**EFFECTS OF ELECTRONIC BANKING ON SERVICE
QUALITY OF COMMERCIAL BANKS IN RWANDA**

A CASE OF ACCESS BANK - RWANDA Ltd

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ABSTRACT

The article covers the following objectives: To determine the major electronic banking services offered by Access Bank Rwanda Ltd, to measure the level of quality service offered by Access Bank in Rwanda, to investigate the challenges faced by customers in using electronic banking services offered by Access Bank and to find out the relationship between electronic banking services and service quality offered by Access Bank in Rwanda. Descriptive research design was used as research methodology. Questionnaire and interview were used to collect data and quantitative and qualitative analysis such descriptive and inferential statistics were used to analyse data.

The study covers 98 customers of Access Bank Rwanda main Branch as sample size and interview was given to manager and 6 employees working in IT departments. The findings revealed that the major electronic banking services used by clients of Access Bank Main branch was internet banking services with mean score of (4.5) mobile banking services with very high mean (4.4), electronic card with very high mean (4.26), branch network was very high mean score of (4.25), personal computer banking with high mean score of (3.78), point of sale banking was low mean score of (2.1).

The findings indicated that the level of quality services in relation of electronic banking services was very good in terms of communication & empathy was very high and with mean (4.54), reliability services was very high and with mean (4.5), assurance, security and accessibility in relation was very high and with mean of (4.45), responsiveness was very high and with

mean (4.37) and last one was tangible tools used by Access Bank was high and with mean score of (4.06). The study revealed that the most challenges faced by bank and customers of Access Bank in using and adoption of electronic banking services was problem of difficulties in transacting electronic banking with (54.1%), unreasonable prices with (52%), and 53.1% of respondents strongly agreed that there is insufficient awareness of the service.

Challenges highlighted by manager and IT manager were high start-up cost for implementation of e-banking services and problem of ignorance on the part of customers towards the use of e-banking product. The findings revealed that there is a moderate and positively significant correlation between electronic banking adopted by Access Bank and quality services ($r=0.689$, $p\text{-value}=0.000 < 0.01$).

1. GENERAL INTRODUCTION

1.1. Background of the Study

Consumers all over the world have become more quality conscious; hence there has been an increased customer demand for higher quality service. Service operations worldwide are affected by this new wave of quality awareness and emphasis. Therefore service-based companies like the banks are compelled to provide excellent services to their customers in order to have sustainable competitive advantage, especially in the

current trend of trade liberalisation and globalization (Dabholkar & Bagozzi, 2002).

In the recent years, the banking sector has witnessed rapid and successive developments in the context of globalization and markets openness, as well as the entering of the foreign banks to the local market and the intensification of the competition between banks. As a result of such changes, new banking products popped up and banks shifted towards providing advanced E-Banking services and using new technologies.

Thus, banks are required to maintain a high standard of Banking services quality and Electronic banking system in order to attract their customers (Simon & Senaji, 2016). Because of the highly undifferentiated products and services that financial organizations and specifically banks, they offer service quality becomes main tool for competing in this marketplace. In general, because of the higher profits and higher customer retention to which they lead, high-quality services are believed to provide banks with competitive edge in the marketplace.

In the line with the technological revolution, Rwandan has witnessed development in various economic fields, and this development of the banking sector is Rwandan considered as the most important aspect of economic advances, Rwandan commercial banks have reached an advanced stage of using modern technology to provide electronic banking services to customers using quick communication systems and sophisticated information

network in terms of inclusiveness and protection, so bank was able to keep up with developments happening in the developed nations in the field of banking work. These developments also reflected on the performance of many Rwandan commercial banks that offer online banking services to their customers, whether individuals or institutions (IPAR, 2010).

1.2. Problem Statement

Since all commercial banks in Rwanda offer different e-banking products, it is expected that their customers are satisfied with service delivery of e-banking as a channel as this provides a better avenue of accessing banking services without necessarily visiting the banks. Statistics obtained on number of over the counter transactions in these banks in the past one month indicated that indeed, over the counter transactions are still preferred by many clients.

One problem associated with this financial innovation is card fraud, particularly on counterfeit cards. Fraudulently authorized EFTs and RTGSs are the other avenues through which financial losses occur as customers utilize these avenues of service delivery. Frequent system failure especially on ATM machines has also been of concern and affects quality customer service delivery especially during end month and during festive seasons when the service is most needed by customers. In addition, complaints have also been raised on failures at Point of Sale terminals in

stores whenever access to the host bank fails, thus causing inconveniences to customers, sometimes leading to litigations (IPAR,2010).

Despite the advancement of e-banking in the commercial banking sector, there still remain questions on whether this advancement has helped improve service quality in terms of delivery time, reliability, security, conformance and efficiency. Long queues, congested-banking halls, and various complaints in newspapers about poor services from the banks reveal evidence that there is a gap somewhere (BNR, 2012). This gap is being addressed in this study to find out the influence of e-banking services and services quality of commercial banks in Rwanda specifically Access Bank Rwanda Ltd Main Branch.

1.3. Objectives of the study

The study is guided by general and specific objectives.

1.3.1. The general Objective

The study sought to examine the relationship between e-banking and service quality in commercial banks in Rwanda particularly Access Bank Rwanda Main Branch.

1.3.2. Specific objectives

The study was guided by the following specific objectives:

1. To determine the major electronic banking services offered by Access Bank Rwanda Ltd

2. To measure the level of quality service offered by Access Bank in Rwanda

3. To investigate the challenges faced by customers in using electronic banking services offered by Access Bank

4. To establish the relationship between electronic banking services and service quality offered by Access Bank in Rwanda

1.4. Research Questions

Based on the research objectives, the study attempts the following research questions:

1. What are the major electronic banking services offered by Access Bank Rwanda Ltd?

2. What is the level of quality service offered by Access Bank in Rwanda?

3. Are there challenges faced by customers in using electronic banking services offered by Access Bank?

4. Is there any relationship between electronic banking services and service quality offered by Access Bank in Rwanda?

1.5. Research hypotheses

H_0 . There is no relationship between electronic banking services and service quality offered by Access Bank in Rwanda.

H₁. There is significance relationship between electronic banking services and service quality offered by Access Bank in Rwanda.

1.6. Scope of the Study

Contextually, the research emphasizes on electronic banking focusing its potential effect on services quality in commercial banks. There are numerous and emerging types of electronic banking such as Automated teller machine (ATM), internet banking, mobile phone banking, debit and credit cards, SMS banking, home banking, and network banking just to mention a few. In doing this all the existing electronic banking services were identified and out of which those available in Rwandan commercial banks especially in Access Bank are selected to know which ones were available to the banks chosen for the research. There are a lot of banks that offer electronic banking to its customers in Rwanda; hence the study is limited to Access Bank Main Branch. The geographical scope of the study is situated within Nyarugenge sector, Nyarugenge District in Kigali City due to its high rate of banking activities. This study covered for the period of four years from 2015-2018 which was judged enough for measuring variances of the variables.

2. LITERATURE REVIEW

Electronic Banking

Electronic banking is the deployment of banking services and products over electronic and communication networks directly to customers. These electronic and communication networks include Automated Teller Machines (ATMs), direct dial-up connections, private and public networks, the Internet, televisions, mobile devices and telephones. Among these technologies, the increasing penetration of personal computers, relatively easier access to the Internet and particularly the wider diffusion of mobile phones has drawn the attention of most banks to e-banking (Diniz, 1998).

In addition, other factors related to customers awareness, customer readiness, the specific nature of ICT diffusion in the wider market, and experience with electronic based transactions can also influence this path (Awamleh, *et. al.*, 2003). In addition, issues related to customers, development choices and potential channel conflict need special attention. A critical assessment of these issues can enable a bank to formulate the objectives of entering e-banking services, make strategic decisions on the services to be provided and the appropriate delivery channels to deploy and manage these services efficiently.

Service Quality of Commercial Banks

Service quality as “a measure of how well a delivered service matches the customers’ expectations” whilst

according to Grönroos (2000) service quality refers to the customer's perception of the difference between the expected and the actual service and he specified various dimensions of service quality in banking whilst Timothy A. (2012) empirically found that customers considered reliability and security as the most important ones, followed by responsiveness, communication and competence. Conversely, cleanliness, comfort and aesthetics proved least important.

The service quality dimensions in the banking industry as argued by Soteriou & Stavrinides (2007), comprise of bank ambience, service equipment, human resources and the means of communication to ensure that their customers various prepositions by service-profit-chain analysis are that profitability and growth are stimulated by customer loyalty which results from customer satisfaction which in turn is influenced by the value of the service to the customer Literature also focused more specifically on banking services being offered in an electronic context.

Conceptual Framework

Conceptual framework explained in different ways as follows; a set of coherent ideas or concepts organized in a manner that makes them easy to communicate to others or an organized way of thinking about how and why a study takes place and about how we understand its activities. The model shown in the figure below examines the relationship between e-banking and service quality. E-banking plays a big role in connecting service quality is attained.

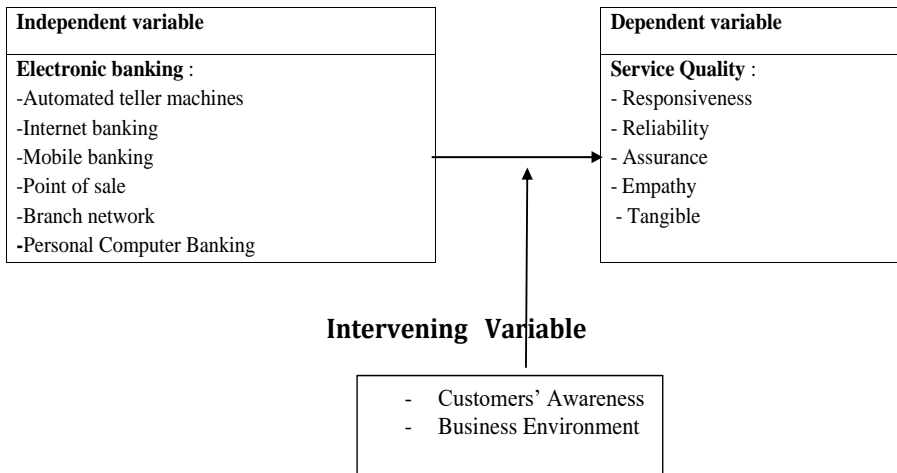


Figure 2.1: Conceptual Framework

Source: Researchers' design, 2018

Research Gap of the Study

Despite the growing interest and importance of electronic banking in many commercial banks in Rwanda and the implementation of such innovations in some banks like Access Bank Rwanda Ltd, there has remained low adoption rates among clients and its usage has not brought significant outputs in the way clients become happy with the services offered. The literature indicates that despite such growing interest, no significant studies that have focused on e-banking and more so, services quality in Rwanda. With technology implementation, a new phenomenon in Rwanda's banking sector and

many customers has not yet embraced it. This study was conducted to investigate the effects of E-banking services quality in Rwanda particularly Access Bank Rwanda Ltd as case study during the period of 2015 up to 2018.

3. RESEARCH METHODOLOGY

3.1. Research Design

Research design refers to a comprehensive plan for data collection in order to answer research questions (Kothari, 2004). This study used descriptive research design in investigating the electronic banking system and services quality offered by Access Bank Rwanda. Cooper and Chandler (2006) indicated that a descriptive study aims at finding out who, what, where and how of a phenomenon as a descriptive study. The design is preferred because it entails complete description of the situation, thus limiting the level of biasness in the collection of data and eventual reduction of errors in interpreting the data collected. Descriptive research allows the researcher to evaluate the states of a defined population with respect to certain variables.

Explanatory research, also known as causal research is conducted in order to identify the extent and nature of cause-and-effect relationships. Explanatory research can be conducted in order to assess impacts of specific changes on existing norms, various processes etc (Zikmund & Griffin, 2012). Therefore the researcher used inferential research design to assess the relationships between

electronic banking system and services quality offered by Access Bank Rwanda main branch and in order to assess impacts of specific changes on existing norms, various processes.

3.2. Population of the Study

Population is a group of individuals who have one or more characteristics in common (Kothari, 2004). The target population for this study was made up for customers of Access Bank Rwanda Ltd Main Branch. The total number of customers of Access Bank Rwanda Ltd is 5,456, 7 staff of Access Bank Rwanda Ltd main branch specifically manager and 6 employees working in IT departments of Access Bank Rwanda Ltd main Branch.

3.3. Sampling design of the Study

Sampling is the process of selecting a portion of the population to represent the entire population (Orodho, 2009).

3.3.1. Sample Size

A sample is a set of individuals selected from a population and is usually intended to represent the population in a research study. Therefore the goal of a research is to examine a sample and then generalize the results to the population. How accurately we can generalize results from a given sample to the population depends on the representativeness of the sample. According to Mugenda (1999), when the population is more than 10,000 are

recommended as the desired, representative sample. In this study the accessible population was 5,456 and as such the recommended sample was calculated as follows by using formula of Taro Yamane (1967) provides a simplified formula to calculate sample size. This formula is used to calculate the sample size to be questionable in the research study.

Where n is the sample size, N is the population size, and e is margin error. All those

$$n = \frac{5456}{1 + 5456(0.1)^2} = \frac{5456}{5.5} = 991.8 \approx 992 \text{ customers of Access}$$

Bank Rwanda Ltd Main branch

Therefore, this study collected data on 98 customers of Access Bank Rwanda Ltd Main branch plus 6 staff of IT department and 01 manager of Access Bank Rwanda Ltd main branch, therefore the total sample size is 105 respondents.

3.3.2. Sampling techniques

Sampling technique is the procedure a researcher uses to gather people, places or things to study (Orodho & Kombo, 2006). In this study the researcher used convenience sampling technique and purposive sampling technique.

3.3.2.1. Convenience Sampling Techniques

Convenience sampling techniques is set of techniques in which respondents are selected by convenience due

to their proximity, availability, accessibility or other way that researcher decides (Abrams, 2010). That is the research spent some days at Access Bank Rwanda Ltd Main Branch offices to distribute questionnaires to customers used Electronic banking services offered by Access Bank Rwanda Ltd Main Branch.

3.3.2.2. Purposive Sampling

Purposive sampling is one of the non-probabilities sampling techniques that is used when we want purposely choose a particular sample. In this study manager and 6 employees working in department of IT in Access Bank Rwanda Ltd main branch were purposively selected because they have more information regarding the effects of electronic banking on services quality offered by Access Bank Rwanda main Branch.

3.4. Data Collection Technique Questionnaire

The questionnaire was the main data collection instrument used in this study. One set of questionnaire with both open and closed questions were developed and administered to customers of Access Bank Rwanda Ltd Main branch. The questionnaire focused on issue of electronic banking band services quality of Access Bank Main branch. The questionnaire was chosen due to its flexibility in data collection as it generates data that is simple to code for analysis particularly when closed ended questions are used. As observed by Kothari (2004), a questionnaire lends itself the best for collecting information on different

dimness of opinions, which were in line with this study.

3.5. Validity and Reliability Tests

Validity and reliability of the collected data should be checked in order that the findings depict the reality and the desired outcome (Saunders, *et al.*, 2007). The validity and reliability has been highly considered in this research through the use of different methods of data collections like questionnaires and Interview has been used. The combination of these methods enables any research to be meticulous, broad and precise. During the study, the researcher has made reasonable efforts to ensure validity by ensuring that data were collected in a valid way, reliable and accurate.

3.5.1. Validity

The validity of instrument is the extent to which it does measure what it is supposed to measure. According to Mugenda (2003), validity is the accuracy and meaningfulness of inferences, which are based on the research results. It is the degree to which results obtained from the analysis of the data actually represent the variables of the study. The research instrument was validated in terms of content and face validity. To ensure validity, the questionnaire was presented to the supervisor for review. Recommendations made were incorporated in the final questionnaire.

3.5.2. Reliability

Reliability of data refers to the extent to which one can rely on the source of the data and the data itself. Questionnaires were pre-distributed to see if the respondents understood the data to ensure if the questions were precise and clear. A pilot study was conducted on 12 customer of Access Bank Rwanda Main branch to evaluate the validity and reliability of the research instrument. The purpose of pre-testing was to assess the clarity of the items on the instrument so that those items found to be inadequate in measuring the variables could either be discarded or modified to improve the quality of the research instrument. The reliability ensured by testing the instruments for the reliability of values (Alpha values) by calculating Cronbach alpha values. In this research, with a view to establishing the reliability of the research instrument used, the Cronbach's Alpha statistic was computed for the 68 variables used. The results are shown in the Table 3.1 below.

Table 3.1: Reliability Statistics

Concepts	Number of items	Cronbach's alpha	Decision
Mobile Banking	5	0.77	Acceptable
Internet banking	5	0.89	Acceptable
Electronic card	5	0.94	Acceptable
Personal computer banking	4	0.86	Acceptable
Point of sales	5	0.93	Acceptable
Branch network	4	0.91	Acceptable
Quality services	33	0.85	Acceptable
Challenges	7	0.71	Acceptable
Overall	68	0.85	Acceptable

Source: Primary data

The computed Cronbach's Alpha for the 68 items was found to be 0.85. This being greater than 0.7, it shows that there is greater internal consistency of the items in the scale, and that the research instrument used was very reliable.

RESEARCH FINDINGS

4.1. The major electronic banking services offered by Access Bank Rwanda Ltd

The study sought to assess the major type of electronic banking services offered by Access Bank Rwanda Ltd to their customers. The respondents were asked to indicate to what extent to which Access Bank has adopted electronic banking services. The respondents were provided with a

range of services and were required to rate the extent to which the services could be accessed through electronic banking. The key ranged between 1-5 where 1 represents 'strongly disagreed (SD), disagree (D), neutral (N), agree (A), and 5 'strongly agreed (SA), fi to mean the frequency. The responses obtained were subjected to descriptive statistics such as percent, mean and standard deviation obtained. The study are interest in the following electronic banking services such as mobile banking services, internet banking services, electronic card, personal computer, Branch network and point of sales. The findings are presented in the following tables.

Table 4.1: Extent of Mobile banking adoption

	SD		D		N		A		SA		Mean	St. Dev
	fi	%	fi	%	fi	%	fi	%	fi	%		
I used mobile banking to transfer money from my account to another bank account	3	3.1	2	2.0	4	4.1	24	24.5	65	66.3	4.49	.91
I used mobile banking to withdraw money to my account	2	2.0	6	6.1	8	8.2	21	21.4	61	62.2	4.36	1.01
Balance inquiry	2	2.0	1	1.0	6	6.1	20	20.4	69	70.4	4.56	.83
I used mobile banking to save money to my account	4	4.1	10	10.2	6	6.1	20	20.4	58	59.2	4.20	1.18
I used mobile banking to pay electricity and water bills	1	1.0	8	8.2	8	8.2	15	15.3	66	67.3	4.40	1.01
Overall mean											4.40	0.98

Source: Primary data

The statement of funds transfer from account to other has the highest mean of 4.49 and standard deviation of 0.91. This is a confirmation that most of the customers agreed that they are able to transfer money from their account to others to a great extent. The statement of mobile banking are used to withdraw money to clients account has the very high mean of 4.36 and standard deviation of 1.01. This is a confirmation that most of the customers agreed that they are able to withdraw money from their account using mobile banking services to a great extent.

It was also clear from the study results that balance inquiry has a mean of 4.56 and standard deviation of .83. This implies that most of the customers confirm that they use they are able to access their bank balances through mobile banking to a great extent. This study also established that a number of customers prefer accessing their bank account balances through the mobile banking platform and also to request for bank statements through the same platform.

The statement on using mobile banking to save money to their account has high mean score of 4.2 which implies that the fact appear more that mobile banking are used by clients to save money to their account and standard deviation of 1.18 which implies that heterogeneity responses. Payment of bills direct from the bank account has a very high mean of 4.4 and this confirms that most of the customers agreed that they can be able to pay their bills direct from their Access bank accounts to a great extent.

The overall view of respondents on mobile banking services was very high mean score of 4.4 which implies that there strong evidence of existing fact that mobile banking services are used by clients of Access Bank at very high extent and standard deviation of 0.98 which implies that there is heterogeneity responses. It was also clear from the research findings that mobile banking has enabled customers to access timeless banking that can be done from anywhere anytime. It was further confirmed that mobile banking improves customer service delivery through reduction in time to complete transactions and also the convenience of not walking into the bank.

Table 4.2: Extent of internet banking adoption

	SD		D		N		A		SA		Mea n	St. Dev
	fi	%	fi	%	fi	%	fi	%	fi	%		
I use internet banking services for check my account balance and review transaction history	0	0.0	12	12.2	11	11.2	1	1.0	74	75.5	4.40	1.10
I use internet banking services for online fund transfer	1	1.0	6	6.1	2	2.0	6	6.1	83	84.7	4.67	.87
I use internet banking services for card to card fund transfer	0	0.0	4	4.1	6	6.1	10	10.2	78	79.6	4.65	.77
I request a cheque book using internet banking services	1	1.0	5	5.1	10	10.2	23	23.5	59	60.2	4.37	.93
I Lock and activate debit cards /ATM by using internet banking services	0	0.0	11	11.2	5	5.1	15	15.3	67	68.4	4.41	1.01
Overall mean											4.5	0.93

Source: Primary data

The statement has very high mean score of 4.4 which implies that there is strong evidence of existing fact that clients of Access bank used internet banking for check my account balance and review transaction history and standard deviation of 1.1 which implies that heterogeneity responses.

The table above revealed very high mean score of 4.67 which implies that there is strong evidence of existing fact that clients of Access bank used internet banking to transfer their fund to other account and standard deviation of 0.87 which implies that heterogeneity responses. This implies that clients of Access Bank used internet banking services in transfer funds between customer accounts at the Bank, transfer funds to same Bank customers and also transfer funds to other customers in different domestic banks. The findings indicated high mean score of 4.65 which implies that there is strong evidence of existing fact that clients of Access bank used internet banking for card to card fund transfer.

The results show that a very high mean value of 4.37 which implies that there is strong evidence of existing fact that clients of Access bank used internet banking for requesting a cheque book. The results show that 68.4% of respondents strongly agreed that they lock and activate debit cards / ATM by using internet banking services. This statement has very high mean score of 4.41 which implies that there is strong evidence of existing of fact that clients of Access Bank used internet baking to lock and activate debit cards / ATM by using internet banking services.

The overall view of customer on using internet banking services was excellent with mean score of 4.5 which means that most of customers of Access Bank used internet banking services at very high extent and standard deviation of 0.93 which implies that heterogeneity responses. It might be easy for the customer to shop around among other Internet banks, but since banking has to do with the customers' private economy, the claim for confidence and security is very important; you know what you have but not what you get. It is therefore a big step to change banks.

Table 4.3: Extent of using electronic card

	SD		D		N		A		SA		Mea n	St. Dev
	fi	%	fi	%	fi	%	fi	%	fi	%		
I used electronic card to deposit cash on my account	0	0.0	3	3.1	4	4.1	13	13.3	78	79.6	4.69	.69
I used ATM machine to withdraw money from my account	0	0.0	0	0.0	1	1.0	11	11.2	86	87.8	4.87	.37
I used ATM machine to check my account balance	2	2.0	3	3.1	3	3.1	11	11.2	79	80.6	4.65	.85
I used Visa card to access my account at outside of my country	10	10.2	51	52.0	0	0.0	8	8.2	29	29.6	2.95	1.49
I used visa credit card to purchase goods and services in whole country	0	0.0	21	21.4	8	8.2	2	2.0	67	68.4	4.17	1.27
Overall mean											4.26	0.93

Source: Primary data

The study sought to assess the perception of respondents on the electronic card adopted by Access bank. The table above has very high mean score of 4.69 which implies that there is strong evidence of existing of fact that clients of Access Bank used electronic card for deposit cash on their account. The findings show very high mean score of 4.65 and standard deviation of 0.85 which implies that there is strong evidence of existing fact that clients of Access Bank used ATM to check their account balance.

The findings showed the majority 87.8% strongly agreed that they used ATM machine to withdraw money from their account with very high mean score of 4.87 and standard deviation of 0.37 which implies that there very strong evidence of existing of fact that client of Access bank used ATM for used to withdraw money from their account and the responses are homogeneous.

The results show that the majority 68.4% of the respondents strongly agreed that they used visa credit card to purchase goods and services in whole country with mean score of high 4.17 which implies that the fact appear more that clients used visa credit card to purchase goods and services in whole country.

The findings indicated that the majority 52% of the respondents disagreed that they used visa used Visa card to access my account at outside of their country with low mean score 2.95 which implies that there is fact appear less that clients used Visa card to access their account at outside of country. The overall view of respondents

on using electronic card was very high mean 4.26 which implies that there is strong evidence of existing of fact electronic card was used by customers and heterogeneity responses with standard deviation of 0.93. This implies that different electronic card of Access Bank are not used equally by customers. The most card used by customers was ATM card while others were used less by customers.

4.2. Quality services offered by Access Bank

The study sought to analyze the level of quality service offered by Access Bank in Rwanda.

Table 4.4: The level of reliability services in relation to electronic banking

	SD		D		N		A		SA		Mean	St. Dev
	f _i	%	f _i	%	f _i	%	f _i	%	f _i	%		
Cash is always available in the system	1	1.0	5	5.1	4	4.1	18	18.4	70	71.4	4.54	.88
Cash processing time is reliable	1	1.0	7	7.1	4	4.1	30	30.6	56	57.1	4.36	.93
Using electronic banking is reliable for performing transactions	1	1.0	4	4.1	5	5.1	17	17.3	71	72.4	4.56	.85
The bank keeps its promises to deliver a service on a specified date.	2	2.0	1	1.0	5	5.1	21	21.4	69	70.4	4.57	.81
Services are accurately delivered by the bank at the first attempt.	1	1.0	4	4.1	5	5.1	32	32.7	56	57.1	4.41	.85
Access Bank insists on error free records	3	3.1	1	1.0	3	3.1	14	14.3	77	78.6	4.64	.85
Electronic banking of Access Bank has relevant and up-to-date information	0	0.0	7	7.1	14	14.3	8	8.2	69	70.4	4.42	.98
Overall mean											4.5	0.87

Source: Primary data

The results show that most 71.4% of respondents strongly agreed that cash is always available in the system with very high mean score of 4.54 and standard deviation of 0.88 which implies that there is strong evidence of existed fact that cash is always available in the system and heterogeneity responses. The findings indicated that the most 57.6% of respondents strongly agreed that cash processing time is reliable with very high mean score of 4.36 and standard deviation of 0.93 which implies that there is strong evidence of existed fact that cash processing time is reliable in the system and heterogeneity responses.

The findings indicated the majority 72.4% of respondents strongly agreed that using electronic banking is reliable for performing transactions with very high mean score of 4.56 and standard deviation of 0.85 which implies that there is strong evidence of existed fact that using electronic banking is reliable for performing transactions and heterogeneity responses. The findings indicated the majority 70.4% of respondents strongly agreed that the bank keeps its promises to deliver a service on a specified date with very high mean score of 4.57 and standard deviation of 0.81 which implies that there is strong evidence of existed fact that the bank keeps its promises to deliver a service on a specified date and different responses.

The findings indicated the majority 57.1% of respondents strongly agreed that services are accurately delivered by the bank at the first attempt with very high mean score of 4.41 and standard deviation of 0.85 which implies that there is strong evidence of existed fact that services are

accurately delivered by the bank at the first attempt on a specified date and heterogeneity responses. The results show the majority 78.6% of respondents strongly agreed that Access Bank insists on error free records with very high mean score of 4.64 and standard deviation of 0.85 which implies that there is strong evidence of existed fact that Access Bank insists on error free records and heterogeneity responses.

The results show the majority 70.4% of respondents strongly agreed that electronic banking of Access Bank has relevant and up to date information with very high mean score of 4.64 and standard deviation of 0.85 which implies that there is strong evidence of existed fact that electronic banking of Access Bank has relevant and up to date information and heterogeneity responses.

4.3. Challenges faced by clients in using electronic banking services of Access Bank

The study sought to examine the key challenges associated with e-banking from the perspective of customers and the bank.

Table 4.5: Challenges faced by clients in using electronic banking services of Access Bank

	SD		D		N		A		SA		Mean	St.D ev
	fi	%	fi	%	fi	%	fi	%	fi	%		
Difficulties in transacting electronic banking	6	6.1	19	19.4	9	9.2	11	11.2	53	54.1	3.88	1.40
Unreasonable prices	11	11.2	13	13.3	0	0.0	23	23.5	51	52.0	3.92	1.44
Insecurities of e-banking	0	0.0	13	13.3	4	4.1	5	5.1	76	77.6	4.47	1.07
System errors	0	0.0	21	21.4	8	8.2	2	2.0	67	68.4	4.17	1.27
Electricity power supply problem	32	32.7	7	7.1	1	1.0	2	2.0	56	57.1	3.44	1.88
Insufficient awareness of the service	2	2.0	6	6.1	15	15.3	23	23.5	52	53.1	4.19	1.04
Lack of access to internet and personal computers	5	5.1	3	3.1	5	5.1	14	14.3	71	72.4	4.46	1.08
Overall mean											4.18	1.21

Source: Primary data

The results show the majority 54.1% of respondents strongly agreed that difficulties in transacting electronic banking with mean score of 3.88 and standard deviation of 1.4 which implies that the fact appear more that difficulties in transacting electronic banking. The results show the majority 52% of respondents strongly agreed that unreasonable prices with mean score of 3.92 and standard deviation of 1.44 which implies that the fact appear more that unreasonable prices

The results indicated that 77.6% of respondents strongly agreed that security is a major challenge hindering their

patronage of e-banking services. Also, a large majority of the respondents (57.1%) of respondents strongly agreed that the instability in electricity power supply is a major challenge hindering their patronage of e-banking services. This may be the case especially with internet and mobile banking platforms where constant electricity is a prerequisite. If power supply is erratic powering computers and mobile phones becomes highly impossible thereby rendering electronic banking virtually impossible.

The results show the majority 72.4% of respondents strongly agreed that there is lack of access to internet and personal computers with mean score of 4.46 and standard deviation of 1.08 which implies that there is existing of fact that there is problem of lack of access to internet and personal computers. Some of the difficulties that respondents said they face are system and network failures. The results show the majority 68.4% of respondents strongly agreed that they faced the problem of system errors. The results show the majority 53.1% of respondents strongly agreed that there is insufficient awareness of the service.

4.4. Relationship between electronic banking used by Access Bank and quality services

Table 4.6: Correlation between electronic banking used by Access Bank and Quality Services.

			Electronic banking services	Quality services offered by Access Bank	
Spearman's rho	Electronic banking services	Correlation Coefficient	1.000	.689**	
		Sig. (2-tailed)	.	.000	
		N	98	98	
	Quality services offered by Access Bank	Correlation Coefficient	.689**	1.000	
		N		.000	.
		98	98		

***.* Correlation is significant at the 0.01 level (2-tailed).

The table above shows that there is a moderate and positively significant correlation between relationship between Electronic banking adopted by Access Bank and quality services. This was shown by the Spearman correlation value of .689** tested at 0.01 equivalent to 10% level of significance. This implies that Electronic banking services adopted by Access Bank have great effect on quality

services offered by Access Bank. This is an indication that electronic banking service has assisted customers to save time requesting for bank statements without visiting the branch. It was also clear that ordering statements through the mobile banking platform has enabled customers to reduce paperwork and this is supported by a correlation of 0.689 which is positive and moderate.

Multiple Linear Regressions

The four objectives of this study sought to examine the relationship between electronic banking used by Access Bank and quality services offered by Access Bank. In this study, a multiple regression analysis was conducted to test the influence among predictor variables. The research used statistical package for social sciences (SPSS V 20.3) to code, enter and compute the measurements of the multiple regressions. $y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$: where y is the dependent variable (quality services), β_0 is the constant (intercept), β_i are the regression coefficients and x_1, x_2, x_3, x_4 are Mobile Banking services, Internet Banking services, Electronic card, Personal computer banking, Point of sales and Branch network respectively. $\{\beta_i; i=1,2,3,4,5 \text{ and } 6\}$ = The coefficients representing the slope of various independent variables. ε = the error term which is assumed to be normally distributed with mean zero and constant variance. The results were summarized in the tables below:

Table 4.7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.763 ^a	.582	.555	.63685

Predictors: (Constant), Branch network, Point of sales, Electronic card, Personal computer banking, Mobile Banking services, Internet Banking services

R-Squared is a commonly used statistic to evaluate model fit. R-square is 1 minus the ratio of residual variability. Adjusted R² is called the coefficient of determination and tells us how customer satisfaction was affected by quality services such as branch network, point of sales, electronic card, personal computer banking, mobile banking services and internet banking services. The coefficient of determination is a number that indicates how well the statistical model used fit the data. It is a measure of how well observed outcomes are replicated by the model. From the analysis, the six electronic banking services adopted by Access Bank contribute 55.5% towards quality services as represented by the coefficient of determination (R²). Other factors contribute 45.5% towards quality services.

Table 4.8: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	51.429	6	8.572	21.134	.000 ^b
	Residual	36.908	91	.406		
	Total	88.337	97			

a. Dependent Variable: Quality services offered by Access Bank

b. Predictors: (Constant), branch network, point of sales, electronic card, personal computer banking, mobile banking services and internet banking services

Analysis of variance is established to show if there is significance difference between the means of the variable and under study and also to examine the overall significance of the model. Overall significance of the model is important in establishing whether the model is fit to giving true estimate of the variables. In this study, ANOVA was used to establish whether there exist a significance relationship between electronic banking services (Independent variable) and quality services (Dependent variable). From the analysis, the p-value = 0.000 indicates that all the coefficient estimates in the model are different from zero.

Therefore, it is evident from the results that null hypothesis is rejected and alternate hypotheses is accepted as electronic banking services has positive effect on quality services offered by Access Bank Rwanda Main Branch.

Table 4.9: Multiple regression coefficients

Model		Un-standardized Coefficients			t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.984	.669		4.472	.025
	Mobile Banking	.584	.112	.575	5.218	.001
	Internet Banking	.832	.166	.140	5.479	.000
	Electronic card	.499	.298	.206	2.022	.046
	Personal computer banking	.021	.097	.015	.211	.834
	Point of sales	.012	.065	.013	.192	.848
	Branch network	.142	.171	.102	.931	.075
a. Dependent Variable: Quality services offered by Access Bank						

From the research findings, the following values were obtained; $\beta_0=0.984$, $\beta_1=0.584$, $\beta_2=.832$, $\beta_3=0.499$ and $\beta_4=.142$, $\beta_5=-.012$ and $\beta_6=-.021$. The regression model can therefore be expressed as follows: quality services = .984 + .584 Mobile Banking + .832 Internet Banking + .499 Electronic card + .021 Personal computer banking + 0.012 Point of sales + .142 branch network and. These findings further indicate that internet banking contributes most towards quality services offered by Access Bank followed by Mobile Banking while Point of sales and personal computer banking were seen to contribute the least to quality services. However, all the variables were highly rated by the respondents and therefore Access Bank

cannot ignore any electronic services as they influence good quality services though at different levels.

The coefficients for each of the variables indicates the amount of change one could expect in customer satisfaction given a one-unit change in the value of that variable, given that all the variables in the model are standardized basing on the standardized coefficients. Results reveal standardized regression coefficient for Mobile Banking =0.584, implies that a unique increase in standard deviation in mobile Banking result in an increase of 0.584 of quality services offered by Access Bank.

Results reveal standardized regression coefficient for internet banking =0.832, Results reveal standardized regression coefficient for electronic card =0.499, Results reveal standardized regression coefficient for personal computer = 0.021, Results reveal standardized regression coefficient for point of sales =.012, Results reveal standardized regression coefficient for branch network =0.142.

From the models above among the variables of electronic banking services only four variables such as Mobile Banking, Internet Banking, electronic card and Branch network is not statistically significance at 5% level of significance while point sales and personal computer does not significantly affect quality services at Access Bank Rwanda. This may be due to low utilization of point sales and personal computer among clients of Access Bank in Rwanda. From the regression analysis table, $P < 0.05$ is

sufficient to show relative importance.

Banks should be strongly committed to look after their Automated Teller Machine usage because this can foster quality services and secure greater customer commitment which can warrant an increase in market performance. This implies that organizations should offer more active support for mobile banking usage in order to engender high levels of services quality.

CONCLUSION AND RECOMMENDATIONS

CONCLUSION

Access Bank has adopted a number of mobile banking, internet banking and branch network to great extent and electronic card and services to great extent while personal computer banking and point of sale banking was low extent. These services include: balance enquiry, funds transfer from funds transfer from Access Bank to another bank, cash deposits and withdrawals, ordering of statements using the mobile banking platform and ordering of cheque books. Electronic banking services has assisted greatly in improving various aspects of customer service delivery such as providing timeless banking to the customers, reduction of queues and reduction of time to access banking services. The study confirmed that electronic banking services are contributing positively on good quality services offered by Access Bank Rwanda Main branch to their customers.

RECOMMENDATIONS

The study has established that mobile banking service has not assisted in significantly reducing the cost of doing banking for customers. The bank needs to explore ways of making the mobile banking service more affordable and less costly than the conventional banking service.

It is also clear that mobile banking is yet to qualify as the most efficient way of providing customer service delivery. The bank should seek more innovative ways of making the mobile banking service the most efficient and effective way of providing customer service delivery.

Based on this finding it recommended that the banks need to incorporate into such products mechanisms that will make it possible for clients to understand how to use them with very little effort. This is so because complicated procedures increase the likelihood of clients making mistakes which may have severe financial consequences.

The study recommended that management of Access Bank should improved personal computer and point sales services and encourages the customers to use them. There is the need to educate customers extensively on the use of electronic services such as internet banking, SMS (mobile) banking services which are not well patronized.

Further, the study revealed that ignorance on the part of the customers with regard to the use of electronic banking services was a challenge. The only cure to ignorance is spreading awareness. Based on this it is recommended

that the banks should embark on rigorous mass public education to sensitize the customers on the usage of electronic banking services. This can be done on public forums, print media, television shows to mention a few.

The study recommends management of Access Bank should introduce free network for customers in banking room and provides adequate of space. The bank management should build strong system security to attract customers and develop their trust by ensuring that they meet all the promises delivered to customers during marketing advertisements. Since quick response can increase quality services, personal contact can establish good relationship and trust with customer. It is recommended that the banks can provide live support over the internet instead of support through emails.

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**EFFECT OF PRICE FLUCTUATION ON
AGRICULTURE PRODUCTION IN RWANDA
(2008-2013)**

By:

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ABSTRACT

Considering the importance of agriculture sector in the life of the country, especially in that of the developing countries like Rwanda, this topic aimed at assessing how the changes in food commodities prices impacted the agriculture production in Rwanda during the period of 2008 to 2013. To achieve this objective, the researcher collected the data both on prices and agriculture production from MINAGRI and NISR, treated them using STATA Software to find out the relationship between the price fluctuation and production change and then proposed required policy actions based on the research findings.

These findings showed that there is a statistical significant relationship between prices change and production as an increase of one unit of price of Maize, Sweet Potatoes, Irish Potatoes and Beans, caused the increase of production from Maize, Sweet Potatoes, Irish Potatoes and Beans by 1798, 2905, 2174, and 442 Metric Tons respectively.

This research contributed a lot in showing challenges faced by agriculture sector needing attention from government and partners in the sector. The research showed also how the market food commodities prices can motivate or demotivate the farmers as the more prices increase, the more production increase to respond to the market pressure. Based on this, the researcher is recommending to the GoR and other actors in agriculture sector to increase their support to the farmers, so to increase agriculture production both in quantity and quality to respond to the high demand on the market.

Key words: Price Fluctuations, Agriculture Production; STATA Software

1. Introduction

The demand and supply laws state that the quantities both supplied and demanded in the market dependent to the market prices. For the supply law, the more market price rises, the more the quantities to be supplied increase to the market and vice versa, *ceteris paribus* as here shown in short: $\uparrow P \rightarrow \uparrow Q_s$ or $\downarrow P \rightarrow \downarrow Q_s$. This inversely to the law of demand which states that when the market prices increase, the quantities demanded decrease as here shown: $\uparrow P \rightarrow \downarrow Q_d$ or $\downarrow P \rightarrow \uparrow Q_d$. In their production, the farmers are also guided by these laws where they produce or supply more when market prices are good. This research aimed at analyzing the change in both prices and production of the selected agriculture products and finding out the relationship between the two variables.

According to Israel M. Kirzner (2000), supply and demand theory is recognized almost universally as the first step toward understanding how market prices are determined and the way in which these prices help shape production and consumption decisions which make up not only the essential, but also the flesh and blood of the economic system.

According to the author, when price is “too high” sellers or suppliers will be with unsold goods (because in this time the buyers will reduce their consumptions), and buyers will be without the goods they wish to buy when it is “too low” (because the sellers or suppliers will not be interested of producing and supplying for a lower market

prices leading them to lose their investment).

Israel M. Kirzner: (2000) emphasizes however that this happens when the market is free of completion, without Adam Smith's famed invisible hand: "Supply-and-demand theory revolves around the proposition that a free, competitive market does in fact successfully generate a powerful tendency toward the market-clearing price".

Based on the above, the more food commodities market prices change, and the more the agriculture production or supply quantities change. As worldwide known and also highlighted by Alkali and Lawal (1997), agriculture production is the source of food security and nutrition for households, so, needed by everyone. Food commodities contribute hugely in helping to maintain a healthy population worldwide. That is why the governments worldwide fight against food insecurity.

As highlighted by Maharjan and Chhetri, (2006), the food insecurity is the opposite to the food security which is lack of access to sufficient quality and quantity of save nutrition food for an active and healthy life; the inability of households or individuals to meet the required consumption level in the face of fluctuating production, price, and income.

According to Gillespie and Haddad (2001), food insecurity boils down to inability of households to have reliable access to food in sufficient quantity and quality to enjoy active and healthy life.

According to FAO “Food and Agriculture Organization” (1996), there is a food security in a country, when all people, at all-time, have physical and economic access to sufficient, safe and nutritious food for a healthy and active life. In a wide-ranging sense, food security has to do with having at all times an adequate level of food and food products to meet growing consumption demand to mitigate fluctuations in output and price (Idrisa et al., 2008). Food security, as a function of food production level, means high level of food production (Ladele and Ayoola : 1997).

For Oriola (2009), food security requires producing food for every inhabitant both in quality and quantity. To achieve this, agricultural production should be enhanced with adequate knowledge of the weather conditions, good preparation in case of disasters, application of agricultural techniques, use of good storage facilities, good transportation system, knowing the market conditions, and be aware of price mechanism.

Despite to considerable effort to develop the agriculture around the world, the food insecurity continues to rise in many countries, especially in sub Saharan countries, including Rwanda. In its report of 11 September 2018, UN (the State of Food Security and Nutrition in the World) says that “global hunger continues to rise worldwide: 821 million people now hungry and over 150 million children stunted, putting hunger eradication goal at risk The number of hungry people in the world is growing - reaching one in every nine people - while limited progress

is being made in addressing the multiple forms of malnutrition. The report continues saying that the Hunger has been on the rise over the past three years, returning to levels from a decade ago. This reversal in progress sends a clear warning that more must be done and urgently if the Sustainable Development Goal of Zero Hunger is to be achieved by 2030”.

Like in other Sub Saharan Africa countries, agriculture is the main economic activity in Rwanda as the majority of employed population or 67.6% work in agriculture sector followed by whole sale and retail trade (10%) and construction with 5% (NISR, EICV4, 2016, page 19).

In Rwanda, the supply of food, as measured by kilocalorie availability, has increased over the last ten years. However, household food consumption has remained an important foundational issue where by 2014, 38 % of children under five years were still stunted, noted by Nsengiyumva Fulgence, Minister of State in MINAGRI, (February 15, 2017). “Despite the gains, agricultural productivity remains low and the levels of chronic malnutrition remain unacceptably high at 38 percent for children under 5 years old. Through Feed the Future, USAID “United States of America for International Development” is promoting inclusive agricultural growth throughout the country” (USAID: May 11, 2018)

As noted by Isife and Albert (2009), the development of agriculture sector and its associated institutions is of great importance for every country as none country has become

great without having developed its agriculture sector and its associated institutions. This as the more agriculture sector is developed, the more agriculture products are increasing and the more market prices decrease.

According to NISR “National Institute of Statistics of Rwanda”, in CFSVA report of 2012, one in five Rwandan households had unacceptable food consumption and could be considered to be food insecure. It added that out of the total population, 4% of Rwandan households equivalent to 82,000 homes, had poor food consumption, which represents an extremely insufficient and unbalanced diet. Although 85 percent of households in Rwanda cultivate land and rely on agriculture or livestock as the main livelihood activity, low income agriculturalists are described to be the category that have a lower food consumption on score than households that are relying on livelihoods such as employment and business.

During the last decades, agriculture had a lot of transformation. It contributed more than 30% of the GDP and employing over 70% of the population. (NISR, Seasonal Agriculture Survey 2015, published January 2016, page 1)

Concerning the price fluctuation in Rwanda, the general CPI and CPI for Food and Beverage from 2009 to 2013 were as follows:

Years	2009	2010	2011	2012	2013
General Consumer Price Index (CPI)	84.4	84.6	91.6	95.2	98.6
CPI for Food and Beverage	81.3	79.1	87.9	94.9	98.6

Source: Researcher based on the NISR data on CPI calculated monthly

As shown in this table, the prices of goods, especially those of food and beverage changed by increasing from 81.3 in 2009 to 98.6 in 2013.

Based on all above, the researcher intended to know if the food commodities prices changed and if these changes impacted either negatively or positively the change on agriculture production in Rwanda during the research period of six years from 2008 to 2013. This because the changes in prices by increasing is the good sign for farmers or other actors in agriculture sector to increase production and supply and verse versa.

Specifically, the research objectives are the following:

1. To analyze the change in prices of selected agriculture products
2. To examine the change in agriculture products on the Rwandan markets
3. To find out the effect of price fluctuation on the agriculture production

Based on the above, the following are the research questions:

1. Did prices for agriculture products change significantly?
2. Did quantity of selected agriculture products change meaningfully?
3. Is there any effect of price fluctuation on the agriculture?

Hypothesis are the following:

1. H0: There is significant relationship between change in prices and agriculture production
2. H1: There is no significant relationship between change in prices and agriculture production

2. Literature Review

The chapter makes a review on topic related concepts which are agriculture sector, price and discuss about topic empirical studies.

2.1 Literature review on agriculture sector

The section provides brief on agriculture (Meaning, contribution and Challenges), agriculture development in Rwanda, Factors hindering the development of agriculture sector in Rwanda, Agriculture Growth in Rwanda and Strategies for agriculture sector development in Rwanda

2.1.1 Brief on Agriculture (Meaning, Contribution and Challenges)

Agriculture is defined as the act of cultivating the land and rearing animals and plants to provide food, fiber, medicinal plants and other products to sustain and enhance life. Agriculture involves the cultivation of crops and animal keeping. As noted by Jimmy Lishabi (2018), archaeologist discoveries have shown that agriculture was developed during 10,000 BC when human started settlements and began farming.

Agriculture is among the economic activities done by people to earn income. In Africa, agriculture sector offers a great potential for poverty reduction and job creation, especially in rural areas where it is the main economic activity. In Africa, it contributes to GDP “Gross Domestic Product” more than 30% as indicated by Jimmy Lishabi (2018), “Statistical data indicates that agriculture accounted for 32 per cent of GDP in Africa in 2016”. Sixty-five per cent of the workforce in Africa is employed in agriculture.

However, as highlighted by the same author, the sector suffers many problems such as diseases, price instability, poor seeds and sustained negligence, which has resulted in Africa becoming a great importer of agricultural products and food processing products from rich countries. Importation due to the low agriculture production versus to the needs.

But many countries have undertaken efforts to promote sustainable agriculture to fight against hunger, poverty and increase the value of agricultural products to export processed output instead of raw material.

2.1.2 Agriculture development in Rwanda

As highlighted in different literature, including FAO report (Rwanda at Glance),” Rwanda is a landlocked country in the Great Lakes region of East Africa. Its 26,338 square kilometers are dominated by highlands, giving it the name “Land of A Thousand Hills”. The lowest altitude in the country is 950 m above the sea level and it is estimated that 90% of domestic cropland is on the slopes ranging from 5% to 55%. Rwanda’s climate is conditioned by its landscape: the lower the altitude, the warmer the temperature.”

According to the Jean.Jacques Mbonigaba (2013), arable land in Rwanda is on 2,294,390 ha, representing 91% of 24,700 sq. km as total land area. Cash and Food Crops are cultivated on 1,735,025 Ha. The cultivation period in Rwanda is divided into three cultivation seasons as follows: the first named A starts from September to January; the second called B starts from February to June while the third termed C starts from July to August in the marshlands where water is abundant. The country experiences a long dry season from June to August with heavy rainfall between March and May.

As noted by the same above author, from 80's to 90's, agriculture growth was respectively 0.5% and -3.9%. This observed low agriculture growth was mainly due to declining soil fertility and exceptionally low utilization of modern agricultural inputs. In addition to this, used agricultural tools were rudimentary and did not receive much attention; control of water and especially water for irrigation was little ensured; animal husbandry was not sufficiently developed, hence less productive, etc.

From this background, agriculture and livestock have become a major concern of the Government in the reconstruction period after the Genocide of the Tutsi. From then, intensive agriculture has then been considered, and necessary measures were undertaken like introducing the application of chemical fertilizers, the soil erosion control, the use of interest in organic manure, etc.

Like in other African countries, the agriculture sector in Rwanda, contributes considerably to the national economy or GDP. The share is between 32-34% (Jean Jacques Mbonigaba, : 2013). In addition, the majority of employed population work in agriculture sector with 68% followed by whole sale and retail trade (10%) and construction (5%) as noted in EICV4 "Enquete Integrale pour les Conditions de Vie des Menages" (NISR, 20169). For instance, while agriculture sector employs 76% of all employed population in rural area, the corresponding proportion in urban areas is only 23%.

Due to shortage in land availability, the Government of Rwanda is promoting intensification as a strategy to increase production and farmers' incomes. The use of chemical fertilizers in Rwanda saw a steady rise in 2007 when the Government of Rwanda (GoR) started the Crop Intensification Program (CIP). Under the program, subsidized fertilizers are provided to farmers for the cultivation of six priority crops. Despite this, farmers' adoption of fertilizers remains quite low when compared to other countries in the region.

According to the Ministry of Agriculture and Animal Resources in its Strategic Plan for the

Transformation of Agriculture in Rwanda Phase III (2013), "In the long term, the goal is to move Rwandan agriculture from a largely subsistence sector to a more knowledge-intensive, market-oriented sector, sustaining growth and adding value to products." To do so, in line with the document for EDPRS II, the GoR considers agriculture as a catalyst sector and will promote the development of value chains with a stronger links with the private sector. The crops of interest include coffee, dairy, horticulture and cereals among others.

2.1.3 Factors hindering the development of agriculture sector in Rwanda

As highlighted in FAO report on Rwanda, despite consistent strategies over the years, the agricultural sector in Rwanda is still facing many following challenges:

1. "Land degradation and soil erosion which are among the main challenges faced by agriculturalists. Around 90% of Rwandan territory lies on slopes with the consequent effect of soil loss, erosion and decreasing fertility. It is estimated that 1.4 millions of tons of soil per year is lost, accounting for a loss of 320.000 US dollars. The pressure of a growing population also has a negative effect on land availability. As a result, land holdings are becoming more and more fragmented.
2. Land use and distribution. In Rwanda, land categorized as rural is nearly 98% of the total land area, with around 49% classified as arable. A Land Law passed in 2005 established a private market for land titles and eliminated customary land tenure systems. Under the law, land owners are obliged to register their land holdings and land titles are equally available for women and men. However, in some cases informally married women have insecure land rights and women in general face difficulties in claiming inheritance.
3. Rwandan agriculture presents a strong dependence on rainfalls and vulnerability to climate shocks. The low level use of water resources for irrigation makes agricultural production unpredictable from one season to another.
4. Low levels of productivity for both crops and livestock due to low input use, poor production techniques and inefficient farming practices.

5. Weak processing capacity and higher value-added products placed on the market. Between 1999 and 2008 the share of food crops processed never exceeded 6.5%. Furthermore, of the total food produced in the country, only 34% reaches the market. The reasons for unexploited processing capacity lies in lack of appropriate technologies, expertise, financing incentives and rural infrastructure. Lack of access to an adequate water supply and at times energy supply makes it difficult for processing businesses to function”

To the above challenges, Jean Jacques Mbonigaba added the following:

1. “Low involvement of the private sector in agriculture sector: Low investments, weak capacity of local private entrepreneurs in agriculture infrastructure, ...
2. Access to Finance: Reluctance of Financial institutions in lending agriculture
3. Insufficient skills in key domains such as irrigation, mechanization, breeding, post-harvest....
4. Public Investment and funding Agriculture vs. Targets”

For FAO (1996), the most important factor challenging the agriculture sector in Rwanda is climate change to it to following two can be added:

1. Inadequacy, if not absence, of supplies of high-quality seeds and planting material, especially for cassava, maize and soybeans;

2. Inadequate availability and, above all, the high cost of pesticides (dithane in particular) to combat such pests and diseases as the black aphid on beans and peas, the mosaic and ascariasis diseases of cassava, the defoliant caterpillar on sweet potatoes and the potato mildew.

2.1.4 Agriculture Growth in Rwanda

As highlighted in National Strategies for Transformation, NST1 (2018), economic growth of Rwanda was in average 6.1% against targeted 11.5% over the period 2013-2020 where agriculture sector achieved in average 4.1% compared to 8.5% targeted. This was mainly due to crop diseases and climate change effects to them are added the following: small holding sizes of land, challenges in accessing credit due to risk perception, low value chain development, market connectivity and low farmer professionalization., external factors such as global market price fluctuations which also affected the performance of the economy.

2.1.5 Strategies for agriculture sector development in Rwanda

As expressed in seven-year government or NST1, Government of Rwanda, has the following key strategies for agriculture sector:

1. Modernize and increase the productivity of agriculture and livestock
2. Increase agriculture and livestock quality, productivity and production

3. Increase Agricultural exports by increasing the volume of traditional agriculture export crops and products. Coffee productivity per tree to be increased from 2.8kg to 4kg; and tea from 7MT/ha to 8MT/ha. This will involve an expansion of cultivated area, replacement of old trees and most importantly through increased fertilizer application from 7,000MT to 9,000MT per year and through adoption of innovative system in combating climate change. Coffee planted will increase from 37,500 ha (2017) to 40,000 ha by 2024 while area planted with tea will increase from 26,879 ha (2017) to 32,800 ha by 2024 working with the private sector.
4. Strengthen the commercialization of crop and animal resource value chains by increasing private sector engagement, promoting market-oriented agribusinesses, and capturing greater in-country surplus and value added. This will be done by increasing volumes of investment in the agriculture sector through the promotion of public private partnerships (PPPs). The existing market information system, e-soko+ will be strengthened with the aim of expanding this service to provide ICT solutions to a broader set of challenges faced in the agricultural sector.
5. Put in place mechanisms to increase access to finance for farmers. A comprehensive agricultural ecosystem financing program including lease financing and insurance with a focus on priority value chains will be established. As a result, Credit to Agriculture sector

(primary farming and agro processing in agriculture, fisheries & livestock) as percentage of total loans (all sectors) is expected to double from 5.2% (2017) to 10.4% in 2024.

2.2 Literature Review on Price

After providing the meaning of price, this section discusses about elasticity, how to determine the market prices and effect of price on demand and supply.

2.2.1 Meaning of Price

As topic is dealing with price fluctuation or price change, the meaning of price is very important. According to the electronic source (<http://www.businessdictionary.com>), price is a value that will purchase a finite quantity. It is also a weight, or other measure of a good or service. At the market, price is determined by what a buyer or seller is willing to pay or accept respectively, and the level of competition. It is the same meaning used in this topic where a seller farmer and buyer consumer are respectively willing to accept or pay RWF 300 for a kilo of beans for example.

As observed in the various businesses, price plays a considerable role in exchange for transfer of ownership and then constitutes an essential basis in businesses. However, its determination depends generally to the 8Ps marketing Mix or strategies. As highlighted by Tan Tran Cong (2014), these include Product, Place, Promotion, Price, People, Process, Packaging and Physical evidence.

Elasticity of demand as topic related concept is discussed in the below paragraphs.

2.2.2 Price Elasticity of Demand (Meaning and types)

As the topic aims at assessing how the changes in prices of agriculture products influence the agriculture production in Rwanda, this sub section is going to discuss about different types of elasticity of demand after providing its meaning.

Vinish Parikh (2010) defines the price elasticity of demand as a measure of change in quantity demanded to the corresponding change in price.

Jim Woodruff (2018), defines elasticity as a ratio of how much one variable changes in percentage versus a one percent change in a different variable. In economics, price elasticity is a measure of how much demand changes with an increase or decrease in price. Elasticity is calculated as follows: $= (\% \text{ change in quantity demanded}) / (\% \text{ change in price})$. When a one percent price change results in a greater than one percent change in quantity demanded, the demand curve is elastic. If a one percent change in price leads to a less than one percent change in demand, the demand curve is considered inelastic. For example, if a price of Irish Potatoes increased by 20% and demand dropped by 30%, the price elastic would be $-30\%/20\% = -1.5$. In this case, the price elasticity for a Irish Potatoes is highly elastic; in other words, demand is very sensitive to changes in prices. Higher absolute numbers indicate more price elasticity.

As generally known from the literature and noted by Vinish Parikh (2010), there are five following types of elasticity of demand: Elastic Demand, Inelastic Demand, Unitary Demand, Perfectly Elastic Demand and Perfectly Inelastic Demand.

- **Elastic Demand.** The good is said “price elastic” when the change in price of this good leads to greater change in quantity of this good. As example: when price of good X falls by 10%, this leads to a 20% increase in quantity demanded of this good.
- **Inelastic Demand.** The demand for good is inelastic, when the change in price of this good leads to less than proportional change in demand.
- **Unitary Demand.** The demand for good is unitary when the change in price of this good leads to equal change in demand. For example, a 5% increase in price leads to 5% decrease in demand.
- **Perfect elastic Demand.** This refers to a situation when any change in price will see quantity demanded fall to zero.
- **Perfectly Inelastic Demand** – This occurs when any change in price will not affect the demand for a good.

All above theories are relevant to this topic as they often occur in the daily life.

2.2.3 Determination of Market Price

As highlighted by Jim Woodruff (2018), the market price of a product is determined by the demand supply laws. The producers manufacture as guided by the Consumers who express the desire to acquire their products. The more desire increases the more demand increase; the more producers supply more. The equilibrium market price of a good will be when the price at which quantity supplied equals to the quantity demanded. Graphically, the supply and demand curves intersect at the equilibrium price.

2.2.4 Effect of Price on Demand

Based on the above demand supply laws as underlined by Jim Woodruff (2018), when the price of a good increases, the consumers decrease buying it. Conversely, consumers will buy more of a product if the price falls. However, economic forces are not always simple like that. There are other factors like Consumer preferences, Income of consumers, Price of other consumer products-substitutes or complements, Expectations about the future which influence the equilibrium price.

- **Consumer preferences:** Due to often changes in technology, consumer tastes are also constantly changing. A number of examples can be observed through clothing fashions, electronic devices, phones, etc.
- **Income of consumers:** The more income increase, the more income earner increases his/her consumption,

shift from traditional brand to the modern one, diversify the consumption, etc. Changes in consumer incomes will shift the demand curve. As example, consumers with higher incomes are more likely to buy brand-name grocery products than generic ones; consumers with higher income buy cars than taking the bus, thereby reducing the demand for bus services., etc

- **Price of complement goods:** When a price of a complement good increases, the demand for another falls. If the prices for computer increase for example, the demand for them decreases and the software will be less used, and consequently so the demand for software applications will drop.
- **Expectations about the future:** Expectations about the future affects consumer behavior. If consumers believe that prices for a product will rise in the future, they will purchase more of the product now, shifting the demand curve to the right.

2.2.5 Effect of Price on the Supply

The law of supply says that when the price of a good increases, the producers will increase output or supply. Sometimes, prices increase when consumers are willing to pay more for a product fearing it will not be available in the future. A shortage of supply will increase prices. An excess of supply decreases price as this will cause producers to cut prices to reduce the inventory that is building up in their warehouses.

However, there are other factors that shift the supply curve as Input prices, Number of sellers, and technology

- **Input prices:** When the prices of raw materials increase, the expected profits on certain products decrease. As a result, producers will reduce production of these less profits products and focus on products with higher profits.
- **Number of sellers:** The more number of sellers increase, the more pressure on prices decrease as more products become available through the competition.
- **Technology:** The more technology advances, the more productivity in the manufacturing processes increase, the more goods re more profitable and this pushes manufactures to produce or supply more.

2.3 Empirical Studies

In his research on how instability of agricultural price can be addressed, Jimmy Lishabi (2018) found that prices tend to decline after a good harvest while they rise during poor harvests. This means that the market prices decrease when agriculture production or supply increases, and vice versa. The author further reveals that, among the challenges in agriculture sector is that price volatility has a negative impact on farmers' income due to the decline in prices at the marker leading to get less money than he expected. "The effect of unstable prices undermines the efforts to alleviate poverty, especially in rural areas where large populations are engaged in agriculture." These findings

are directly related to this research dealing with the effect of price fluctuation on the agriculture production.

The changes in market prices for agricultural products are not only due to the factors behind the changes in agriculture production but also to other such as change in prices of inputs, change in technology, etc as highlighted by Jim Woodruff (2018).

Viale delle Terme di Caracalla (2009) reveals in the study on Food Price Fluctuations, Policies and Rural, that these factors include population growth, intensity of agricultural research funding, and rising incomes and changing tastes. In Europe and Central Asian countries, during 2007 -2008 period, these factors had contributed to the sharp increase in major food commodity prices by 57% compared to a 9% increase in 2006.

Other factors reflect more recent short-term shocks to global supply and demand for agricultural products such as high energy price spikes and poor harvests due to adverse weather conditions. This is in direct relationship with this research as the more population increase, as it is in Rwanda, the more price increase due to the increase of demand. The same for increase of income and variation of tastes. The more revenues and tastes increase, the more prices increase and supplier increase.

The author also found how better harvest of agriculture product leads to the fall in prices as here stated: "The world price of wheat doubled within a year and then

decreased by 40% in mid-2008, mainly because of better harvest forecasts around the world". These findings on how better harvest on increase on production and decrease in prices are in direct relationship with this study as the more agricultural season in Rwanda is good, the more agricultural production is good and hence food price decrease.

Joseph N. NZOMOI (2008) stated that in insecurity or violence periods in the country, as a mass feeding sector, the agriculture sector change more by declining due to that farmers are in insecurity and so don't cultivate. In trouble, agricultural production and distribution chains for essential commodities including food items are affected and thereby pushing their prices up. Due to the post-election violence arising out of the disputed presidential elections held in December 2007, "the prices of essential commodities in Kenya have increased by more than 50 percent in the last six months making it difficult for ordinary Kenyans to afford a decent meal three times. As stated by Joseph N. NZOMOI (2008), the food scarcity leads to the rise of commodity prices and poverty. All these findings are similar to the expected from this research.

Lingyu Yan (2012) in Analysis of the International Oil Price Fluctuations and Its Influencing Factors, found that the changes in oil prices contributes to the changes in food commodity prices worldwide in the following words: "Oil price fluctuation is always regarded as the barometer of worldwide economy whose each change would be the hot issue to be concerned and discussed generally in political

and economic circle in every country". These findings are in the same line with the expected findings on this topic where the research assumes that there is a significant relationship between the changes in prices of food commodities and the changes in agriculture production.

3. Research Methodology

To achieve the above set research objectives, the researcher collected data on quantity of produced or supplied agricultural selected products (maize, Sweet Potatoes, Irish Potatoes and Beans) and their respective market prices from ministry of agriculture (MINAGRI) and National Institute of Statistics of Rwanda (NISR) and then treated them using STATA Software to find out the relationship between the two variables, price fluctuation and agriculture production. The Mathematical Model Specification, Expected Signs, used data, test and analysis are explained in the following sections.

3.1. Mathematical Model Specification, Expected Signs and used data

The section deals with Model specification and expected signs of the model, source of used data and how treaded and selected food commodities.

3.1.1 Mathematical Model Specification

Mathematical specification of the model is as follows:
 $production = \beta_0 + \alpha(price)$ In this model β_0 is the

autonomous production or intercept of the model and α is the coefficient of agriculture production. This model has been applied to each product and its market price. The α is going to indicate the change in produced quantity depending to the change in price.

$$\text{Average}(\text{production}) = \beta_0 + \alpha[\text{average}(\text{price})]$$

There is no difference in the model interpretation for single model approach and the combined model approach. Just the differences are in the values of price and production computed are the combined average values for each year. This method allowed to estimate the effect of price fluctuation on the agriculture production in Rwanda during the period of 2008 to 2013.

3.1.2. Expected signs of the model

The expected signs must be positive as when the food commodities prices increase, the agriculture production increase. This because, the producers or suppliers will be motivated by the prices on the market.

3.1.3. Data

In this analysis, the researcher used both secondary and primary data from the survey reports of NISR and MINAGRI on prices and production of Maize, Sweet Potatoes, Irish Potatoes and Beans. These data have been analyzed by using STATA Software. While prices are considered as independent variables, agriculture products are considered as dependent variables.

3.1.4. Selected Food Commodities

The selection of these four agriculture products (Beans, Maize, Irish Potatoes and Sweet Potatoes) was based on that they are the most produced and consumed products as captured from Seasonal Agricultural Survey (SAS)-2015.

This report shows that the agricultural products are classified by share of crop production as follows: 41.4% for Tubers and roots; 27.2% for Banana; 7.5% for Cereals and 6.4% for Legumes & Pulses; 4.4% for Vegetables and Fruits and remaining percentages for other products. From 6.4% of Legumes & Pulses, selected Beans has 5.8% while from 7.5% of Cereals, selected Maize has 2.3%. More than half (23%) of total share of 41.4% for Tubers and roots are occupied by selected Sweet Potatoes and Irish Potatoes with 12.9% and 10.1% respectively.

3.2. Test and analysis of the data

In this analysis, the researcher introduced the ordinal least square (OLS) method since the dependent variable is numeric. The relationship has been calculated by considering the coefficient of prices in the model. In addition, R^2 is used to estimate the level at which the independent variable explains the variation in dependent variable. Just at which level prices explain the variation in the production. The F test and its probability also have been considered to check if the model is fitting well. The F test which is high, explains that the model is fitting well; while the probability which is less than 5% indicates the

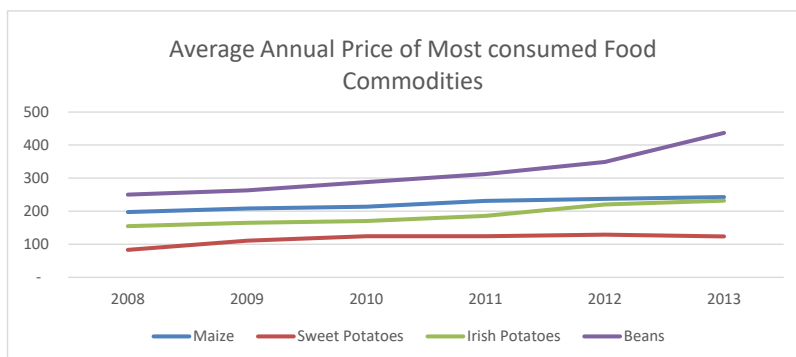
level of significance.

4. Research Findings

The chapter is presenting and analyzing the change in both prices and quantities of selected agricultural products during the research period of 2008 to 2013 and the relationship between the two variable, change in price and change in agriculture products.

4.1 Price Trend for selected agriculture products (Kg)

Presented graphically as follows:



Source: Author's Calculations based on the data from MINAGRI

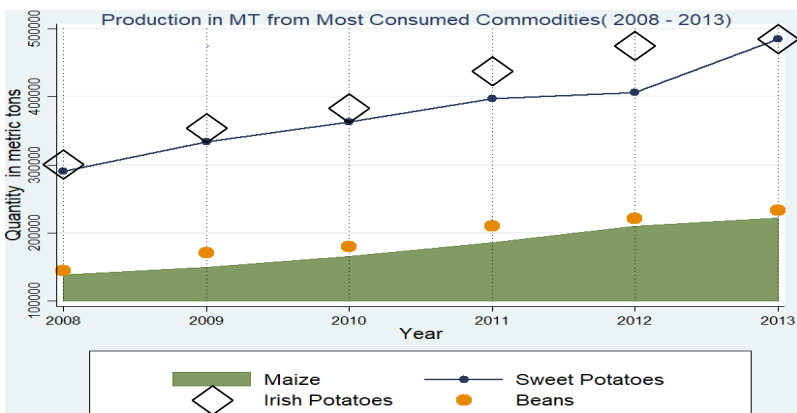
Based on the above information, the price for Maize, Sweet Potatoes, Irish Potatoes and Beans changed by increasing during the whole research period of six years.

The increase of market prices was due mainly to the following reasons:

1. High population density = 407 person / sq. km (Jean Jacques. Mbonigaba: 2013); majority of them (52%) are young in the age of high consumption
2. Increase in GDP during the research period
3. Increase in GDP per Capita or income during the research period
4. Increase in money supply during the research period
5. Increase in Foreign Exchange Rates during the research period
6. International oil prices as noted by Lingyu Yan (2012) during the research period

4.2 Trend in quantity produced from selected agricultural products (Metric Tons or MT)

The below graph is presenting the trends in quantity of selected agricultural products from 2008 to 2013. On the vertical line at the left side, there are quantities for selected agricultural products (Maize, Beans, Irish potatoes and sweet potatoes). On horizontal line, there are years from 2008 to 2013



Source: Author's Calculations based on the data from NISR

As above explained, this graph aimed at showing the changes in quantities of Maize, Irish potatoes, sweet potatoes and beans during the research period of six years from 2008 to 2013. As observed, the produced quantities from Maize, Sweet Potatoes, Irish Potatoes and Beans changed by increasing during the whole research period of 2008 to 2013.

The increase of production was due mainly to the following reasons:

1. Pressures from the market on food commodities
2. Progressive use of modern agriculture techniques as use of fertilizers, selected seeds, applying irrigation systems, etc
3. Increase in money supply which lead to the increase of investments, including that on agriculture. The more investments increase the more outputs increase.

4.3 Relationship between price fluctuation and agriculture production

This section analyzes the econometric relationship between price fluctuation and agriculture production. To reach to this objective, the researcher developed the model specification, applied it to the data on both produced quantity of selected agriculture commodities and their prices by using STATA Software and finally determined the relationship between the two variables.

4.3.1 Maize price and Maize production model

```
regress production_of_maize_tons price_maize
```

Source	SS	df	MS	Number of obs =	6
Model	5.4305e+09	1	5.4305e+09	F(1, 4) =	127.33
Residual	170589355	4	42647338.8	Prob > F =	0.0004
				R-squared =	0.9695
				Adj R-squared =	0.9629
Total	5.6011e+09	5	1.1202e+09	Root MSE =	6530.5

price_maize	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
price_maize	1798.251	159.3593	11.28	0.000	1355.799 2240.704
_cons	-220226.1	25425.12	-8.69	0.003	-318592 -121860.2

By looking in this model, $\alpha = 1798.25$ and it is statistically significant since its $P.value = 0.000$ which is less than 5%. This means that if other factors remain constant, for an increase of one unit of price of maize, the produced quantities of maize will increase by 1,798 units. $R^2 = 96.95\%$ this means that the price of maize explains the variation in its maize production at 96.95%.

As seen above, there is a positive relationship between price of maize and the quantities of maize produced during the period of 2008 to 2013.

4.3.2 Price of Sweet Potatoes and Sweet Potatoes Production Model

```
regress production_of_sweetpotatoes_tons price_sweetpotatoes
```

Source	SS	df	MS	Number of obs =	6
Model	1.2734e+10	1	1.2734e+10	F(1, 4) =	8.29
Residual	9.6372e+09	4	2.4093e+09	Prob > F =	0.0830
				R-squared =	0.8692
				Adj R-squared =	0.8625
Total	2.2371e+10	5	4.4743e+09	Root MSE =	49055

production_of_swe-s	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
price_sweetpotatoes	2905.125	1263.645	2.30	0.083	-803.3155 6413.565
_cons	41899.83	149254.8	0.28	0.791	-369474.2 483219.2

As seen in the above model, $\alpha = 2,905.12$ and $P.value = 0.083$. This is statistically significant as the $P.value$ is less than 10%. This means that if other factors remain constant, for an increase of one unit of price of sweet potatoes, the produced quantities of sweet potatoes will increase by 2,905 MT. $R^2 = 56.92\%$, this means that the price of Sweet Potatoes explains the variation in its Sweet Potatoes production at 56.92% the remaining percentage is explained by other factors which are not in the model. As observed above, there is a positive relationship between price of Sweet Potatoes and the quantities of Sweet Potatoes produced during the period of 2008 to 2013.

4.3.3 Price of Irish Potatoes and Irish Potatoes Production

```
regress production_of_irishpotatoes_tons price_irishpotatoes
```

Source	SS	df	MS	Number of obs =	6
Model	2.8201e+10	1	2.8201e+10	F(1, 4) =	31.49
Residual	2.9469e+09	4	736725000	Prob > F =	0.0050
				R-squared =	0.8873
				Adj R-squared =	0.8591
Total	2.6149e+10	5	5.2298e+09	Root MSE =	27142

production_of_irishpotatoes_tons	Coeff.	Std. Err.	t	P> t	[95% Conf. Interval]
price_irishpotatoes	2174.646	297.506	7.31	0.005	1098.757 3250.535
_cons	-2019.566	73669	-0.04	0.971	-207412 201774.3

As observed in the above model, $\alpha = 2,174.6$ and $P.value = 0.005$ which is statistically significant since it is not greater than 5%. This means that for an increase of one unit of price of maize, the produced quantities of maize will increase by 2,174.6 MT. $R^2 = 88.7\%$, this means that the price of Irish Potatoes explains the variation in its Irish Potatoes production at 88.7%.

From these findings, there is a positive relationship between price of Irish Potatoes and the quantities of Irish Potatoes produced during the period of 2008 to 2013 as the more prices of Irish Potatoes increase, the production or supply of Irish Potatoes increase to respond the market pressure. This in compliance with the supply law.

4.3.4 Price of Beans and Beans Production Model

```
. regress production_of_beans_tons price_beans
```

Source	SS	df	MS			
Model	4.6231e+09	1	4.6231e+09	Number of obs =	6	
Residual	1.0989e+09	4	274732426	F(1, 4) =	16.65	
Total	5.7260e+09	5	1.1456e+09	Prob > F =	0.0148	
				R-squared =	0.8081	
				Adj R-squared =	0.7602	
				Root MSE =	16575	

price_beans	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
price_beans	442.0211	107.6823	4.10	0.015	143.0398 740.9823
_cons	53226.17	34746.4	1.53	0.200	-43243.32 149699.6

As observed in the above model, $\alpha = 442.01$ which is statistically significant and $P.value = 0.015$ which is less than 5%. This means that for an increase of one unit of price of maize, the produced quantities of maize will increase by 442 units. This is significant as the probability is less than 5%. While $R^2 = 80.8\%$, this means that the price of Irish Potatoes explains the variation in its Irish Potatoes production at 80.8%.

From the findings, there is a positive relationship between price of Beans and the quantities of Beans produced during the period of 2008 to 2013 as the more prices of Beans increase, the production or supply of Beans increase to respond the market pressure. This in compliance with

the supply law.

4.3.5 Price of Combined Food Commodities and Production of Combined Food Commodities Model

```
regress average_in_commodities average_in_price
```

Source	SS	df	MS			
Model	1.2597e+10	1	1.2597e+10	Number of obs =	5	
Residual	378815416	4	94703853.9	F(1, 4) =	133.02	
Total	1.2976e+10	5	2.5953e+09	Prob > F =	0.0003	
				R-squared =	0.9708	
				Adj R-squared =	0.9635	
				Root MSE =	9732.6	

average_in_commodities	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
average_in_price	1563.168	135.5342	11.53	0.000	1286.865	1939.471
_cons	-39830.92	28805.21	-1.38	0.239	-119807	40145.17

As observed in the above model, $\alpha = 1,563.16$ and $P.value = 0.000$ which is statistically significant since it is less than 5%. This means that for an increase of one unit of price of combined selected agriculture products, the produced quantities of combined selected agriculture products will increase by 1,563 units. $R^2 = 97\%$, this means that the price of combined selected agriculture products explains the variation in their combined selected agriculture products at 97%.

The above findings show that there is a positive relationship between price of combined selected agriculture products and the quantities of combined selected agriculture products produced during the period of 2008 to 2013 as the more prices of combined selected agriculture products increase, the production or supply of combined selected

agriculture products increase to respond the market pressure. This in compliance with the supply law.

5. CONCLUSION AND RECOMMENDATIONS

5. 1. CONCLUSION

Based on the above analysis, it is concluded that the price of selected agriculture products (Maize, Sweet Potatoes, Irish Potatoes and Beans) and their corresponding quantity produced or supplied have been significantly changed by increasing during the research period of six years (2008 -2010). This is confirmed by the findings from Economic Model applied in the STATA Software.

With this Software, it has been seen that there is significant relationship between the change in price and change in production. This means as above observed that for an increase of one unit of price of Maize, Sweet Potatoes, Irish Potatoes and Beans, their production will be increased by 1798, 2905, 2174, and 442 units respectively. The same findings have been observed for combined selected agriculture products where an increase of one unit of price of combined selected agriculture products will increase by 1,563 units.

So, based on these findings, the first hypothesis, stating that there is significant relationship between change in prices and agriculture production during research period of 2008 to 2013 has been verified and confirmed.

5. 2 Recommendations

Based on the above analysis, following four recommendations can be formulated:

1. Based on that in Rwanda investment is growing fast from the growth of contributing factors such as money supply leading to the increase of market prices, the same increase is observed in the increasing demand of agriculture quantities in the Rwandan markets due to the population growth, increase in GDP per capita, etc the famers and other actors in agriculture sector should be aware of this situation and develop it accordingly. It is in this regard, the researcher is requesting the GoR and other actors or supporters in agriculture sector to increase their support to the farmers, so to increase agriculture production both in quantity and quality to respond to the high demand on the market.
2. The above requested support would be to find answers to the above shown and detailed challenges to the agriculture sector such as soil degradation and erosion by increasing radical terraces, find solutions to the people with insecure land rights, solutions to the strong dependence on rainfalls and vulnerability to climate shocks by increasing the irrigation system, issue of poor production techniques and inefficient farming practices by enforcing and applying the modern agriculture techniques, issue of weak processing capacity versus market needing higher

value-added products due to lack of combined factors such as appropriate technologies, expertise, financing incentives and rural infrastructure (access to an adequate water supply and at times energy supply), facilitating the financial sector to finance the agriculture sector by setting up appropriate interest rates and different financial products for agriculture sector, facilitating private sector to invest in agriculture sector, etc.

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**EUTHANASIA AND HUMAN RIGHTS
PERSPECTIVES: DOES THE RIGHT TO LIFE
ENCOMPASSTHE RIGHT TO DIE ?**

BY Dr MURANGIRA Thierry

ABSTRACT

The issue of euthanasia has assumed prominence throughout the world because of a number of social and legal developments. These include: the advent of modern medical technology and the availability of artificial measures to lengthen life, landmark court cases challenging laws criminalizing euthanasia, the growing elderly population and the increase in the number of people affected by incurable diseases such as cancer, HIV/AIDS; Hepatitis and the declining influence of organized religion.

Earlier, majority of patients died before they reached the hospital but now it is converse. Euthanasia or mercy killing continues to draw much attention and debate. Recently, this kind on debate occurred between Members of the Parliamentary Standing Committee on Political Affairs and Gender and State Minister for Constitutional and Legal Affairs, on former Rwanda Penal Code review in regards of introduction of a provision that provides euthanasia as crime punishable by imprisonment.

In this debate, one Member of Parliamentary Standing Committee on Political Affairs and Gender wondered why a terminally ill person who is in serious pain and in some cases has little time left to live should not be assisted and relieved of their suffering instead. This issue has drawn attention in the mind of the author to know whether right to life encompasses the right to die.

The Constitution of Rwanda in its article 12 states that everyone has right to life. Again, article 109 of Law N°68/2018 of 30/08/2018 determining Offences and Penalties in general punishes any person who, upon the patient's request, ends the

patient's life to relieve the patient's unbearable suffering caused by an incurable illness.

This paper explores the issue of euthanasia under human rights law and examines the constitutional arguments for and against the 'right to die'. It also examines the argument of why a terminally ill person who is in grave pain and in some cases has little time left to live should not be assisted and relieved of their suffering, describing the concerns that the Member of Parliamentary Standing Committee on Political Affairs and Gender had with the details of the proposal to allow terminally ill patients to request medical assistance to voluntarily end their lives.

Key Words: Euthanasia, Mercy Killing, Physician Assisted Suicide,

Quote

"Treatment can only be in the interests of the patient, and therefore seen as beneficial to the patient, if it achieves one of three ends, namely; saving life, ensuring improvement or preventing deterioration. It would be wrong to argue that causing death could be seen as falling within the notion of reducing suffering as this would almost certainly be a case of instigating deterioration rather than preventing it. To hold otherwise would be to distort the doctrine and the result would be the legalization of euthanasia".

-Lord Brandon-

**Retrieved from *Airedale NHS Trust v. Bland* [1993]
1 All ER 821, at 860**

1. INTRODUCTION

Assuring the right to life is undoubtedly the fundamental point in the concept of the protection of human rights.³ Physical survival is a prerequisite for benefiting from various rights and liberties enshrined under Constitution of the Republic of Rwanda⁴ and Convention for Human Rights and other international documents ratified by Rwanda.⁵

A right to have one's life taken on request has never been recognized in medical codes of ethics⁶ or laws of Rwanda⁷. Its assumption conflicts directly with the genuine right to one's life, acknowledged and protectively enunciated in various international and well as national laws in

3 Article 12 of the Constitution of the Republic of Rwanda states that everyone has the right to life. No one shall be arbitrarily deprived of life. Official Gazette n° Special of 24/12/2015.

4 Ibid,

5 Article 6 of International Covenant Civil and Political Rights (ICCPR) stipulates that; every human being has the inherent right to life. This right shall be protected by law. No one shall be arbitrarily deprived of his life. See also article 3 of Universal Declaration of Human Rights which states that; everyone has the right to life, liberty and security of person.

6 Article One of Code of Medical Ethics in Rwanda Medical Association stipulates that; it is a physician's duty to protect human life and alleviate suffering, with the promotion and establishment of health as the principal aim. This means that every Physician should be driven by the motive of alleviating suffering, protecting and saving human life of every patient without discrimination whatsoever.

7 Article 109 of Law N°68/2018 of 30/08/2018 determining Offences and Penalties in general punishes any person who, upon the patient's request, ends the patient's life to relieve the patient's unbearable suffering caused by an incurable illness.

Rwanda.⁸ Right to life as natural rights⁹ did not come into existence only when or because they were articulated. If a natural right is genuine, it always existed, even before it had been discerned. Genuine rights cannot be created just by claiming them, unless it can be agreed they have always existed, in nascent form.¹⁰

Request for premature ending of life has contributed to the debate about the role of such practices in contemporary health care. This debate cuts across complex and dynamic aspects such as, legal, ethical, human rights, health, religious, economic, spiritual, social and cultural aspects of the civilized society.¹¹

First, the subject matter being examined this paper is to know whether right to life encompass the right to die. The author discusses euthanasia and right to life from medical and human right point of views given the background of the recent debate which occurred between Members of the Parliamentary Standing Committee on Political Affairs and Gender and State Minister for Constitutional and Legal Affairs, on Rwanda Penal Code review in regards of introducing an article which provides euthanasia as crime punishable by imprisonment.

8 Supra notes, 1,3 & 4

9 W. K. Frankena, "Natural and Inalienable Rights," *Philosophical Review* 64 (1955)

10 Hurtubise, Mark Francis, "Philosophy of Natural Rights According to John Locke" (1952). Master's Theses. Paper 1057. http://ecommons.luc.edu/luc_theses/1057. Accessed on 18th October, 2018.

11 Suresh Bada Math and Santosh K. Chaturvedi, Euthanasia: Right to Life versus Right to Die; *Indian J Med Res.* 2012 Dec; 136(6): 899–902.

1.1. MEANING OF KEY CONCEPTS

1.1.1. The Concept of Right to Life

The right to life is not a right without limitations. Article 12 of the Rwandan Constitution stipulates that: “Everyone has the right to life. No one shall be arbitrarily deprived of life”.¹² Universal Declaration of Human Rights under its article 3 states that everyone has the right to life, liberty and security of person. This Declaration was supplemented by International Covenant on Civil and Political Rights of 1966. ICCPR¹³ under article 6 also provides that: “Every human being has the inherent right to life. This right shall be protected by law. No one shall be arbitrarily¹⁴ deprived of his life”. The above mentioned provisions show that right to life specifies restrictions (exceptions) to the scope of this right. This connotes that human life cannot be intentionally terminated, aside from exceptional conditions.

12 Article 12 of the Constitution of the Republic of Rwanda states that everyone has the right to life. No one shall be arbitrarily deprived of life. Official Gazette n° Special of 24/12/2015. Official Gazette n° Special of 24/12/2015

13 International Covenant on Civil and Political Rights. Adopted and opened for signature, ratification and accession by General Assembly resolution 2200A (XXI) of 16 December 1966, entry into force 23rd March, 1976, in accordance with Article 49.

14 The word “arbitrarily” connotes that no right to life shall be taken in arbitrarily manner unless it is provided by the law.

The author argues that words such as ‘equal’¹⁵ ‘without discrimination’¹⁶, ‘inherent’¹⁷, ‘inalienable’¹⁸, and ‘arbitrary’¹⁹ were meant to define the essence of natural rights particularly that they do not depend on circumstance or personal preference. Natural rights are not be taken away and, just as importantly, are not be given away. The right to life is to be protected by law, invariably, equally, and life is not to be taken for reasons based on opinion. The right to one’s life is declared to be the fundamental natural right, on which every other right depends for its existence and its validity.²⁰

When an attempt is made to justify euthanasia by using claims about human rights, it will be seen how problematical these claims become when they focus only on a single right, and when that one is of doubtful validity.

1.1.2. Concepts Euthanasia

The word ‘*euthanasia*’, originated in Greece means a good death.²¹ Euthanasia encompasses various dimensions, active and passive euthanasia. The former means introducing something to cause death while the latter

15 Article 26, ICCPR,

16 Ibid,

17 Article 6, ICCPR

18 Preamble, ICCPR

19 Article, 9 & 17 ICCPR

20 Joel Feinberg, Voluntary Euthanasia and the Inalienable Right to Life, p.224-226; the University of Michigan April 1, 1977. Available at: https://tannerlectures.utah.edu/_documents/a-to-z/f/feinberg80.pdf. Accessed on 18th October, 2018.

21 Lewy G. Assisted suicide in US and Europe. New York: Oxford University Press, Inc; 2011.

means withholding treatment or supportive measures; voluntary (consent) to involuntary (consent from guardian) and physician assisted (where physician's prescribe the medicine and patient or the third party administers the medication to cause death).²² The term euthanasia has also been defined as knowingly and intentionally performing an act or practice that ends a person's life in order to release the person from an incurable disease, intolerable suffering or undignified death.²³ In the context of this paper, euthanasia means painless ending life of a patient suffering from an incurable, painful disease or irreversible coma.

1.1.3. Physician Assisted Suicide (PAS)

Pom Beauchamp, a leading bioethicist, defines Physician Assisted Suicide (PAS) as a patient's voluntary choice of death with the assistance of a physician.²⁴ The World Medical Association (WMA) identifies Physician Assisted Suicide as "knowingly and intentionally providing a person with the knowledge or means or both required to commit suicide, including counselling about lethal doses

22 Dowbiggin I.A merciful end: The euthanasia movement in modern America. New York: Oxford University Press, Inc; 2003. See also, *Aruna Ramchandra Shanbaug v. Union of India & Ors. Writ Petition (Criminal) no. 115 of 2009*, Decided on 7 March, 2011. Available from: <http://www.supremecourtindia.nic.in/outtoday/wr1152009.pdf>. Accessed on 23/11/2017.

23 World Medical Association. Medical Ethics Manual, February 3, 2010. Available at: http://www.wma.net/en/30publications/30ethicsmanual/pdf/ethics_manual_en.pdf. Accessed on 25/11/2017

24 Ryan M, White S. Francis Inglis, Killed Son "With Love in Her Heart" Feb 27, 2010. Available at: http://news.bbc.co.uk/2/hi/uk_news/8466140.stm. Accessed on 24/11/2017.

of drugs, prescribing such lethal doses or supplying the drugs".²⁵ In other words, the physician provides the means for death but the patient administers the lethal medication, thus committing suicide.

1.1.4. Distinction between Euthanasia and Physician Assisted Suicide (PAS)

Beauchamp makes a distinction between Physician Assisted Suicide and euthanasia on the basis that Physician Assisted Suicide; patients do not need to be deeply suffering or terminally ill to request to die.²⁶ The bioethicist Gregory Pence describes euthanasia as "the killing of one person by another for allegedly merciful reasons".²⁷

Assisted death is a model that includes both what has been called physician assisted suicide and voluntary active euthanasia. It suggests a difference in the degree of involvement and behavior. Physician assisted suicide entails making lethal means available to the patient to be used at a time of the patient's own choosing or by withholding treatments in order to bring about the death of the patient.²⁸ By contrast, voluntary active euthanasia entails the physician taking an active role in carrying out the patient's request, and usually involves intravenous

25 Beauchamp TL, Walters L, Khan JP, Mastroianni AC. Contemporary Issues in Bioethics (7thed.). USA: Thomas Wadsworth, 2008.

26 Supra note, 21

27 Pence G. Classic Cases in Medical Ethics (4th ed.). New York: McGraw-Hill, 2004.

28 Ibid

delivery of a lethal substance.²⁹

Euthanasia can be further classified into non-voluntary, involuntary, voluntary, active and passive. Non-voluntary euthanasia occurs when “the person killed is not capable of making or refusing to make such a request”, whereas involuntary euthanasia occurs “when the person killed is capable of making such a request but has not done so”.³⁰ Voluntary euthanasia occurs when the patient is fully competent and requests that the physician end his/her life. Active euthanasia entails an act in relation to end of life that has as its organized objective the termination of life.³¹ An omission can be defined as neglecting to do something that is vital to the survival of the patient. Therefore, by omitting treatment, life support or resuscitation, the physician is theoretically letting the patient die naturally. In end-of-life cases, this is termed ‘passive euthanasia’, and an important distinction is made between overseeing a refusal of treatment and assisting in a suicide.³²

1. ARGUMENT SUPPORTING EUTHANASIA

Arguments advanced by people supporting euthanasia, state that the right to die should be a fundamental

29 Ibid,

30Keown J. *Euthanasia Examined* (1st ed.). Cambridge: Cambridge University Press, 2004.

31 Beauchamp TL, Walters L, Khan JP, Mastroianni AC. *Contemporary Issues in Bioethics* (7th ed.). USA: Thomas Wadsworth, 2008.

32 Beauchamp TL, Childress J. *Principles of Biomedical Ethics* (6thed.). New York: Oxford University Press, 2009.

freedom of each person.³³ This freedom of choice derives from a series of landmark cases from *In re Quinlan* (1976),³⁴ wherein the Supreme Court of New Jersey stated that a patient's rights and autonomy should prevail over the medical doctor's judgment regarding the decision to end life.³⁵

It is also argued by the UK group Dignity in dying that "mentally capable, terminally ill adults should have the choice of an assisted death, within strict legal safeguards, if they feel their suffering has become unbearable".³⁶ This group believe that one should die with dignity and not have to endure a drawn out, painful death. Derek Humphrey of the Hemlock Society in USA, a national right to die organization, writes: "It is not just a question of pain. It is a question of dignity, self-control and distress. If you cannot eat, sleep or read, and there is certainty that you are dying, it is a matter of dignity to be able to end your life".³⁷ From point of view of above mentioned Scholars, it can be argued that their arguments in terms of taking the decision to seek for euthanasia is based on patient's autonomy.

33 Supra note 29

34 *In re Quinlan*, 70 N.J. 10 (1976), 355 A.2d 647

35 Supra note 29

36 Dignity in Dying, 2010. Cited February 3, 2010. Available at: <http://www.dignityindying.org.uk/sitemap.html>. Accessed on 27/11/2017.

37 Pence G. *Classic Cases in Medical Ethics* (4thed.). New York: McGraw-Hill, 2004.

1.1. Autonomy of the Patient

An argument for the legitimizing euthanasia or physician assisted suicide is based on principle of the patient's autonomy. Autonomy of the person is another aspect of bioethics supporters of euthanasia and physician assisted suicide have based their arguments. They argue that autonomy is self-determination which is much connected with the informed consent. To be able to attain respect for autonomy, one has to respect the principle of informed consent and vice versa.³⁸

Respect for autonomy is said to strengthen and support the law of consent, which is hypothetically intended to protect the right of individuals to take decisions based on their own values and motives.³⁹ An individual is to be given autonomy by virtue of being a person, autonomous. The debate over informed consent came in the 20th century, because principally as it relates to the ethics of medicine and bioethics.⁴⁰ The prerequisite of informed consent to medical treatments is always justified with appeal to individual (patient) autonomy. Certainly, it is generally assumed that there is a theoretical connection between the principle of respect for autonomy and the prerequisite of informed consent.⁴¹

38 Thierry MB. Forensic use of Genetic Information under Criminal Investigation and Prosecution in Rwanda: Is there any Ethical and Genetic Privacy Violation? *Int J Forens Sci* 2017, 2(3): 000130.p.4.

39 Sheila A M McLean, *Autonomy, Consent and the Law* (Routledge 2010) p.214

40 Natalie Ram, *Tiered Consent and the Tyranny of Choice*, (2008). Available at: http://scholarworks.law.ubalt.edu/all_fac/873. Accessed on 05/12/2017.

41 Beauchamp and Childress, *Principles of Biomedical Ethics*, 4th ed. Ox-

Autonomy can be defined as a “self-rule or freedom of the will that is free from both controlling interference by others and from limitations, such as inadequate understanding, that prevent meaningful choice”.⁴²

The Manual of Ethics of World Medical Association (WMA) elucidates that Medical Doctor are under obligation to respect the decision-making capacities of autonomous persons.⁴³ From above mentioned arguments, supporters of euthanasia and physician assisted suicide, advocates that decisions about dying is individual, hence, they believe that any competent person has the right to make decisions about when to end his or her own life.⁴⁴ They added that absolute ban of euthanasia and physician assisted suicide encroaches on upon the patient’s rights to make choice free from interference. These arguments evolve around the belief that the State laws should not impose a view of when or how its citizens should die.⁴⁵

1.2. Right to Live with Human Dignity

Right to life is inalienable basic right of man. Naturally, this right requires the highest protection. It denotes the significance of human existence for this reason it is

ford. 1994 <http://www.utcomchatt.org/docs/biomedethics.pdf>. Accessed on 05/12/2017.

42 Beauchamp TL, Childress J. Principles of Biomedical Ethics (6thed.). New York: Oxford University Press, 2009.

43 Supra Note 21,

44 Supra note 40

45 Maria Alisha Gabriel: Physician-Assisted Suicide: The Right To Life Or The Right To Death? Available At: <Http://Www.Rcsismj.Com/Wp-Content/Uploads/Rcsismj-Vol4-Perspective-Physician-Assisted-Suicide.Pdf>. Accessed On 23/11/2017.

widely called the highest fundamental rights.⁴⁶ Right to life is one of the important fundamental rights of the citizen. Everyone has the right to life. The word “human dignity” has been derived from a Latin “*dignitas*” which means worth, merit, quality or state worthy of esteem and respect or high status, reputation.⁴⁷ The term dignity means simply ‘worthiness’ or ‘excellence’. It is any quality of a person entitling them to be regarded, respected and honored by others.⁴⁸ Human dignity is closely connected with the honor of the person.

The supporter of euthanasia argue that right to life means living a dignified life. This does not mean mere living or living animals’ lives but living with human dignity. The pay much attention of quality of life not the sanctity of it.

46 The conceptual dimensions of human dignity were established in 1948 as the foundational concept of the UDHR. The preamble of UDHR says, ‘where as recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice and peace in the world’. Human dignity mentioned at the outset of the Article 1 of the Universal Declaration of Human Rights 1948, which is the most important document in the world. The Universal Declaration of Human Rights provides the preliminary work out for protecting and development of right to life with human dignity in the various constitutional laws of various countries in the world. Every person has inalienable right to live with dignified life without discrimination. They are entitled to claim equal respect from the state as well as from other persons. It is one of primary duties of each state to protect fundamental rights to the human dignity and implement welfare schemes in order to improve the dignified life of the citizens. See also the Preamble and Articles 11, 23, 38 of the Constitution of the Republic of Rwanda.

47 English dictionary

48 Ravi Rajan, ‘Interrogating the Conceptualization of Human Dignity: A Human Rights Perspective’ *Social Action Journal*, Vol. 65, No. 03, July-Sept. 2015, ISSN No. 0037-7627, P. 26

Under right to life many more rights are included. Hence, right to life includes anything which is essential to live life with dignity.⁴⁹ They also argue that every person shall have the right to die with dignity; this right shall include the right to choose the time of one's death and to receive medical and pharmaceutical assistance to die painlessly. No physician, nurse or pharmacist shall be held criminally or civilly liable for assisting a person in the free exercise of this right to die with dignity.⁵⁰

The author argues that, human dignity is connected with the individual life and it is having a constitutional jurisprudential value as fundamental rights. Dignity refers to presentation of honor and personal merits of individual. The idea of human dignity is associated with the protection against the exploitation, and violation of inalienable rights. The term human dignity is commonly used for protecting the status and honor of the person without it, that person cannot live in the earth. Human dignity attaches with their own behavior and role of the person in the society. Every human life is precious and beautiful. Therefore, one must pay respect to one's human dignity.⁵¹ Field, J. observed that the term 'Life' means something more than mere animal existence. The inhibition against its deprivation extends to

49 *Oliga Tellis v. Bombay Municipal Corporation and others*; AIR 1986 SC 180

50 *Corlie Mullin v. Administrator and Union Territory of Delhi*, AIR 1981 SC 746

51 In case of *Kharah Singh v. State of Uttar Pradesh*, AIR 1963 SC 1295; right to life has been given much importance by Justice Krishna Iyer. In the case He opined that right to life does not mean that mere existence of life but it must be a dignified quality life. The Supreme Court held that the expression 'Life' was not limited to bodily restraint or confinement to prison only but something more than mere animal existence.

all those limbs and faculties by which life is enjoyed.⁵²

1.3. Caregivers Burden

Supporters of right to die argue that people who have an incurable, degenerative, disabling or debilitating condition should be allowed to die in dignity. This argument is further defended for those, who have chronic debilitating illness even though it is not incurable such as severe mental illness. Majority of such requests are filed by the sufferers or family members or their caretakers.⁵³ The caregiver's burden is huge and cuts across various domains such as financial, emotional, time, physical, mental and social. Supporters argue that letting a person in persistent vegetative state has a grave impact on finance, emotions, health and poses a heavy burden on caregiver. Hence, letting this person to live this kind of life is mockery to right to life.⁵⁴

The right to life incorporates the right to dignity. It is more than mere existence; it is a right to be treated as a human being with dignity. Without dignity, human life is substantially diminished. In the Constitutional Court of South Africa, O'Regan Judge explained in case of the State v. Makwanyane⁵⁵ that, the right to life is in one sense, antecedent to all rights. 'Without life in the sense of

52 *Munn v. Illinois*; 153(1877)94 U.S. 113

53 Margaret Pabst-Battain, "Manipulated Suicide," *Bioethics Quarterly* 2 (1980), pp. 123, 134.

54 K.M. Foley, "The Relationship of Pain and Symptom Management to Patient Request for Physician-Assisted Suicide," *Journal of Pain and Symptom Management* 6 (July 1991) 290.

55 *The State v. Makwanyane* (1995) I LRC 269

existence, it would not be possible to exercise rights or to be the nearer of them. But the right to life was included in the Constitution not simply to enshrine the right to existence. It is not life as mere organic matter that the Constitution cherishes, but the right to human life; the right to live as a human being, to be a part of a broader community, to share in the experience of humanity this concept of human life is at the center of Constitutional value.⁵⁶

1.4. Refusing Care/ Treatment

Right to refuse medical treatment is well recognized in law, including medical treatment that sustains or prolongs life.⁵⁷ For example, a patient suffering from blood cancer can refuse treatment or deny feeds through nasogastric tube. Recognition of right to refuse treatment gives a way for passive euthanasia.⁵⁸

The author argues that although the right to refuse medical treatment is universally recognized as a fundamental principle of liberty of the patient, this right should not always honored. A refusal can be thwarted either because a patient is unable to competently communicate or because

⁵⁶ Ibid,

⁵⁷ Article 4 of Code of Medical Ethics in Rwanda Medical Association stipulates that; a physician shall not use his/her authority to undermine a patient's right to make decisions concerning himself. Even where the patient cannot convey his own will, it is incumbent upon the physician to act in the patient's best interest. If a physician is compelled to make decisions concerning examinations or therapy irrespective of the patient's will, such decisions shall always be made on medical grounds.

⁵⁸ Sheldon T. Dutch legal protection scheme for doctors involved in mercy killing of babies receives first report. *BMJ*. 2009:339.

providers insist on continuing treatment.⁵⁹ Moreover, the right to refuse treatment goes hand in hand with another patient right; right to informed consent. Patient should only consent to medical treatment if he/she have sufficient information about her/his diagnosis and all treatment options available in terms he/she can understand.⁶⁰ Before a physician can begin any course of treatment, the physician must make the patient aware of what he/she plans to do.⁶¹ For any course of treatment that is above routine medical procedures, the physician must disclose as much information as possible so he/she may make an informed decision about her/his care.⁶²

1.5. Right to Die

Many patients in a persistent vegetative state or else in chronic illness, do not want to be a burden on their family members. Euthanasia can be considered as a way to uphold the 'right to life' by honoring 'right to die' with dignity.⁶³

59 Martín Hevia and Daniela Schnidrig; Terminal Patients and the Right to Refuse Medical

Treatment in Argentina; Health and Human Rights Journal, Volume 18 Number 2; December 2016. Available at: <http://bibliobase.sermais.pt:8008/BiblioNET/Upload/PD>. Accessed on 28th January, 2019.

60 Derrick K. S. Au, Right to refuse medical treatment: Legal and Ethical Considerations in End-of-life Care of Mentally Incompetent Patients; 2013 Asia Pacific Regional Conference on End-of-Life and Palliative Care in Long Term Care Settings. Available at: <http://www.hkag.org/Conference>. Accessed on 28th October 2018.

61 Legal Advisors Committee- Concern for Dying; The Right to Refuse Treatment: A Model Act, American Journal of Public Health; August 1983, Vol. 73, No. 8. Available at: <https://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.73.8.918>. Accessed on 28th October, 2018.

62 Ibid,

63 Supra note 56;

1.6. Encouraging the Organ Transplantation

Euthanasia in terminally ill patients provides an opportunity to advocate for organ donation. This in turn will help many patients with organ failure waiting for transplantation. Not only euthanasia gives right to die for the terminally ill, but also right to life for the organ needy patients.⁶⁴

1.7. Self-Determination, Consent And Refusing Life-Saving Treatment

Guiding principles of medical law requires that the consent of patient be sought before anything is done on patient's body.⁶⁵ There are only a limited number of scenarios such as best interest of the patient whereby a doctor can enforce treatment without the patient's consent and it is submitted that all of these exceptions are designed to prevent harm to others.⁶⁶ This focus upon the need for consent demonstrated the application of the guiding principle of self-determination.

The question to be addressed now is whether or not the courts will continue to respect the patient's right to refuse treatment when that refusal carries with it the almost certain consequence of death.

64 Law Commission report no.196 on medical treatment to terminally ill patients. Available from: <http://lawcommissionofindia.nie.in/reports/rep196.pdf>. Accessed 20th October, 2018.

65 Adam Peter Bunting; Guiding Principles in Medical Law: The Ability to Treat. A Thesis Submitted to the University of Birmingham for the Degree of Master of Laws; p.7, 2005. Available at: <https://etheses.bham.ac.uk/id/eprint/968/1/Bunting05LLM.pdf>. Accessed on 28th October, 2018.

66 Ibid, at 9

In *Airedale NHS Trust v. Bland*,⁶⁷ in this case Judges were not preoccupied to decide on the issue of a patient who wished to refuse life-saving treatment but still thought it necessary to comment on the law in relation to such a patient. *Lord Goff* mentioned that:

*“The principle of self-determination requires that respect must be given to the wishes of the patient so that if an adult patient of sound mind refuses, however unreasonably, to consent to treatment or care by which his life would or might be prolonged, the doctors responsible for his care must give effect to his wishes, even though they do not consider it to be in his best interests to do so.”*⁶⁸

Lord Keith reinforced this statement by stating that in relation to a conscious patient of sound mind the law sees such a person as being at liberty to decline treatment even if the result of doing so will be death.⁶⁹

In Re B (Adult: Refusal of Medical Treatment) the patient, Ms. B, was paralyzed from the neck down and suffering from respiratory problems. After she requested that the ventilator be turned off psychiatrists diagnosed her as incompetent and her request was disregarded. At this point she expressed relief that she would not die but at a later point she reaffirmed her initial request. *Butler-Sloss* stated that *“the right of the competent patient to request cessation of treatment must prevail over the natural desire of the*

67 *Airedale NHS Trust v. Bland*, [1993] 1 All ER 821

68 *Ibid*, at 866

69 *Ibid*, at 860

medical and nursing professions to keep her alive."⁷⁰

It was also stated that where the medical team involved felt that they could not carry out the patient's request it was their duty to find a team which could do so.⁷¹

This shows well that, in relation to competent adult patients, the principle of self-determination prevails over providing treatment. If there were no protection of the right to refuse treatment in such situations then it would make a mockery of the idea that adults have the right to determine their own treatment. It would be pointless to say that an adult has the right to refuse treatment if that right cannot be exercised.

The author argues that the approach taken in *Bland* and *Re B* to the adult patient's right to refuse treatment gives significance upon the patient's competency.⁷² *Butler-Sloss* reinforced this by stating that the question of whether a refusal should be respected is one of competency rather than perceived best interests.⁷³ *Re B* clearly demonstrates that a competent patient can effectively refuse life-saving treatment and that the court will not regard a patient as incompetent purely so that such treatment

70 *Ibid*, at 457

71 *Ibid*, at 475. This does not mean that a patient may demand treatment which the doctors are not willing to provide, rather its application is limited to the refusal of treatment.

72 One factor which supports this is the fact that the majority of the judgment of *Re B* was concerned with whether or not Ms B was competent rather than whether or not a competent adult should be able to refuse lifesaving treatment.

73 *Re B (Adult: Refusal of Medical Treatment)* [2002] 2 All ER 449, at 455

can be provided. This once more asserts that the guiding principle when dealing with competent adults is that of self-determination.⁷⁴

It has been argued that, in practice, consent to treatment is frequently given in advance.⁷⁵ An example of this would be a patient who consents to the surgical removal of a diseased kidney the consent in such a case will probably be given some hours before the procedure takes place. It seems illogical, therefore, to reject the validity of advance directives as a means of refusing consent in a similar manner. *Lord Keith* has stated that:

*“The liberty to decline treatment extends to the situation where a person, in anticipation of his... entering into a condition such as persistent vegetative state, gives clear instructions that in such an event he is not to be given medical care... designed to keep him alive.”*⁷⁶

It is clear that if advance directives are to be respected then certain conditions must be fulfilled so as to ensure their validity. *Francis* and *Johnston* list these requirements as: capacity to refuse, freedom from vitiating influence, intention to cover situation in question and possession of knowledge of nature and effect of decision.⁷⁷ Whilst the majority of these requirements reflect those attached to a valid consent, the need for knowledge goes further.

74 *Ibid*,

75 R. Francis & C. Johnston, *Medical Treatment; Decisions and the Law* (London: Butterworths, 2001), p.22

76 *Supra* note 65, at 860

77 *Supra* note 73.

Competency can be seen as including the ability to understand, but normally the lack of actual knowledge will not render the consent invalid.⁷⁸ It has rightly been suggested that, despite there being no legal requirements to the effect, it would be good practice to record advance directives in writing and review them frequently⁷⁹ so as to ensure that they represent the patient's current feelings.⁸⁰

2. ARGUMENTS AGAINST EUTHANASIA

2.1. Eliminating the Invalid

Arguments against euthanasia is that if State embraces 'the right to die, people with incurable and devastating illnesses will be disposed from civilized society. The practice of palliative care counters this view, as palliative care would provide relief from distressing symptoms and pain, and support to patients. Palliative care is an active, compassionate and creative care for the dying.⁸¹

78 It has, however, been argued that informed refusal is more important than informed consent as the patient who dies due to a misinformed decision to withhold consent to treatment will have no opportunity to bring legal action, see S. Hornett, 'Advance Directives: A Legal and Ethical Analysis' in J. Keown (ed.), *Euthanasia Examined* (Cambridge: Cambridge University Press, 1998)

79 Ibid, pp.23-24, see also J. Montgomery, 'Power Over Death, The Final Sting', p.43

80 The validity of advance directives will be secured under the Mental Capacity Bill 2004. Under s.25 an advance directive will be valid so long as the patient is incompetent and has not withdrawn the directive or acted in a manner which is contrary to its content. An advance directive will be capable of covering life-saving treatments so long as this is expressly referred to, see s.26(5).

81 Saunders C. Terminal Care in Medical Oncology. In: Begshawe KD, editor.

The author argues that living a full life is multifaceted but most would agree that autonomy is essential. A person's ability to control their own body and do what they like, as long as it doesn't harm anyone else, is crucial to the human existence. Opponents of euthanasia argue that there is a moral distinction between actively ending a patient's life and withdrawing or withholding treatment which ends a patient's life. Letting a patient die from an incurable disease may be seen as allowing the disease to be the natural cause of death without moral culpability.⁸² The author argues that physician-assisted suicide as well as euthanasia; believes that if a doctor takes on the role of the "executioner", his role as a healer will be corrupted and the trust that exists between patient and doctor will be violated.

2.2. Symptom of Mental Illness

It is argued that the attempts to suicide or completed suicide are commonly seen in patients suffering from depression,⁸³ schizophrenia⁸⁴ and substance users.⁸⁵ It is also documented in patients suffering from obsessive

Medical oncology. Oxford: Blackwell; 1975. pp. 563–76

82 Kerridge I., M. Lowe, C. Stewart. Ethics and Law for the Health Professions. 3rd ed. New South Wales: Federation Press; 2009. Web. 22 October 2013.

83 Brådvik L, Mattisson C, Bogren M, Nettelbladt P. Long Term Suicide Risk Of Depression In The Lundby Cohort 1947-1997-severity and gender. Acta-Psychiatr Scand. 2008; 117:185–91. [PubMed]

84 Campbell C, Fahy T. Suicide and schizophrenia. Psychiatry. 2005; 4:65–7.

85 Griffin BA, Harris KM, McCaffrey DF, Morral AR. A prospective investigation of suicide ideation, attempts, and use of mental health service among adolescents in substance abuse treatment. Psychol Addict Behav. 2008; 22:524–32. [PMC free article] [PubMed]

compulsive disorder.⁸⁶ Hence, it is essential to assess the mental status of the individual seeking for euthanasia. In classical teaching, attempt to suicide is a psychiatric emergency and it is considered as a desperate call for help or assistance. In USA, several guidelines have been formulated for management of suicidal patients in psychiatry.⁸⁷ Hence, attempted suicide is considered as a sign of mental illness.⁸⁸

2.3. Malafide Intention

In this era morality has dropped. There is a possibility of misusing euthanasia by family members or relatives for inheriting the property of the patient. The Supreme Court of India has also raised this issue of malafide intention in the case of *Gian Kaur v. State of Punjab*.⁸⁹ It stated that “mercy killing” should not lead to “killing mercy” in the hands of the noble medical professionals.

2.4. Importance on Care and Commercialization of Health Care

Earlier majority of patients were dying while trying to reach the hospital but now it is the opposite. Now sciences had advanced to the extent, life can be prolonged. This

86 Alonso P. Suicide in patients treated for obsessive-compulsive disorder: A prospective follow-up study. *J Affect Disorders*. 2010; 124:300–8. [PubMed]

87 Bongar BME. *Suicide: Guidelines for assessment, management, and treatment*. USA: Oxford University Press; 1992.

88 Lonqvist J. *The Oxford Textbook of Suicidology and Suicide Prevention*. Oxford: Oxford University Press; 2009. Major psychiatric disorders in suicide and suicide attempters; pp. 275–86.

89 *Gian Kaur v. State of Punjab*; 1996(2) SCC 648

phenomenon has raised a complex situation.⁹⁰ Earlier diseases outcome was discussed in terms of cure but in the contemporary world of diseases such as cancer, HIV/AIDs, diabetes, hypertension and mental illness are debated in terms best care, since cure is distant. The principle is to add life to years rather than years to life with a good quality palliative care. The intention is to provide care when cure is not possible by low cost methods.⁹¹ The expectation of society is, cure from the health professionals, but the role of medical professionals is to provide care. Therefore, euthanasia for no cure illness does not have a logical argument. Whenever, there is no cure, the society and medical professionals become frustrated and the fellow citizen take extreme measures such as suicide, euthanasia or substance use. In such situations, palliative and rehabilitative care comes to the rescue of the patient and the family.⁹²

Moreover, passive euthanasia occurs in majority of the hospitals, where poor patients and their family members refuse or withdraw treatment because of the huge cost involved in keeping them alive.⁹³ Research has revealed

90 PA Riley MD(Lond), MRCPPath, Commercialization of health services: implications for the laboratories; Malaysian J Pathol 1996; 18(1): 21 – 25. Available at: <https://pdfs.semanticscholar.org/.pdf>. Accessed on 30th January, 2019.

91 Ibid,

92 Zyllicz Z, Finlay IG. Euthanasia and palliative care: reflections from The Netherlands and the UK. J R Soc Med. 1999; 92:370–3. [PMC free article] [PubMed]

93 If euthanasia is legalized, then commercial health sector will serve death sentence to many disabled and elderly citizens of India for meagre amount of money. This has been highlighted in the Supreme Court Judgment of Aruna Ramchandra Shanbaug v. Union of India & Ors. Writ Petition (Criminal) no.

that many terminally ill patients requesting euthanasia, have major depression, and that the desire for death in terminal patients is correlated with the depression.⁹⁴ A strong desire for death among advanced cancer patients, HIV/AIDS, etc have a severe depression.⁹⁵ They need palliative and rehabilitative care. They want to be looked after by enthusiastic, compassionate and humanistic team of health professionals and the complete expenses need to be borne by the State so that right to life becomes a reality and succeeds before right to death with dignity. Palliative care actually provides death with dignity and a death considered good by the patient and the care givers.⁹⁶

2.5. The Slippery Slope Argument

As pointed out by Beauchamp, a law that allows physicians to participate in terminating life of patients who are in persistent vegetative state is under the risk of misuse. This argument is not based on the fear that serious abuses will occur immediately, but that they will grow slowly as the time goes on.⁹⁷ A system that does not have clear-cut boundaries may be open to abuse. Additionally, legalizing euthanasia or physician assisted suicide would effectively

115 of 2009, Decided on 7 March, 2011. See also, Gursahani R. Life and death after Aruna Shanbaug. *Indian J Med Ethics*. 2011; 8:68–9. [PubMed]

94 Chochinov HM, Wilson KG, Enns M. Desire for death in the terminally ill. *Am J Psychiatry*. 1995; 152:1185–91. [PubMed]

95 Gandhi A, Chaturvedi SK, Chandra P. Desire for death in cancer patients - an Indian Study. Presented at the International Congress of the International Psycho Oncology Society, Copenhagen 2004

96 Ibid,

97 Beauchamp TL, Childress J. *Principles of Biomedical Ethics* (6th ed.). New York: Oxford University Press, 2009.

cause a decline in the quality of palliative care, and vulnerable patients may be manipulated into ending their lives against their original wishes. Although there is no extensive evidence to support this argument, Beauchamp suggests to the precautionary principle that, it is better to be safe than sorry. He cautions against taking the chance of eroding the general attitude of respect for life in the society.⁹⁸

3. DOCTRINE OF DOUBLE EFFECT & EUTHANASIA

There is complicated circumstance; wherein a single set of action may be double standardized wherein; one apparently having a good effect and another having bad effect. The principle which regulates this kind of cases is normally known as "*double effect standard*".⁹⁹ In terms of euthanasia, the doctrine of double effect justifies the provision of treatment that will have a positive medical impact upon the patient, usually by way of relieving the pain, with consequence of shortening the patient's life.¹⁰⁰ On

98 Ibid,

99 Supra note 36, p.6.

100 Keown states that the requirements for double effect are; the act is not bad in itself, the bad consequence is not a means of achieving the good consequence, the bad consequence is not intended but may be foreseen, there is a sufficiently serious reason for allowing the bad consequence, see J. Keown, Euthanasia, Ethics and Public Policy, p.20. There is some doubt, however, as to whether or not it is possible to distinguish between intention and foresight in the way proponents of double effect claim, see J. Griffiths, A. Bood & H. Weyers, Euthanasia and Law in the Netherlands (Amsterdam: Amsterdam University Press, 1998), p.161

the acceptability of such forms of medical treatment Lord Donaldson held that:

*“The use of drugs to reduce pain will often be fully justified, notwithstanding that this will hasten the moment of death. What can never be justified is the use of drugs or surgical procedures with the primary purpose of doing so.”*¹⁰¹

Lord Goff, in the case of *Airedale NHS Trust v. Bland*,¹⁰² also reinforced the acceptability of such treatment. In the criminal case of *R v. Adams*¹⁰³ a Physician was charged with administering large doses of heroin and morphine to a patient prior to her death. In this case Lord Devlin J. stated that:

“If the first purpose of medicine... could no longer be achieved, there was still much for the doctor to do, and he was entitled to do all that was proper and necessary to relieve the pain and suffering even if the measures he took might incidentally shorten life by hours or perhaps even longer.”

It is submitted that there are two important distinctions between lawful and unlawful treatment. The first of these is the effect of the treatment in question. If the treatment carries with it the possibility of benefit then it may be lawful. This raises the question of what type of outcomes will be classified as being of benefit to the patient.

101 Re J (A Minor)(Wardship: Medical Treatment) [1990] 3 All ER 930, at 938

102 Supra note 65, at 868

103 R v. Adams, [1957] Crim LR 365

Lord Keith has stated that:

“The object of medical treatment and care is to benefit the patient. It may do so by taking steps to prevent the occurrence of illness, or, if an illness does occur, by taking steps towards curing it. Where an illness or the effects of an injury cannot be cured, then efforts are directed towards preventing deterioration or relieving pain and suffering.”¹⁰⁴

Lord Brandon has also stated that:

“Treatment can only be in the interests of the patient, and therefore seen as beneficial to the patient, if it achieves one of three ends, namely; saving life, ensuring improvement or preventing deterioration.¹⁰⁵ It would be wrong to argue that causing death could be seen as falling within the notion of reducing suffering¹⁰⁶ as this would almost certainly be a case of instigating deterioration rather than preventing it. To hold otherwise would be to distort the doctrine and the result would be the legalization of euthanasia”.

It has also been suggested that the principle of allowing treatment is limited according to the definition of treatment.

¹⁰⁴ Supra note 65, at 860

¹⁰⁵ F v. West Berkshire Health Authority [1989] 2 All ER 545, at 551

¹⁰⁶ Pabst Battin argues that in some instances the only way to reduce pain is to render the patient unconscious and that, for the patient, this is the same as death and, therefore, mercy killing in such circumstances ought to be allowed, see M. Pabst Battin, *The Least Worst Death: Essays in Bioethics on the End of Life* (Oxford: OUP, 1994), p. 105. If, however, there is no difference between death and unconsciousness then maintaining the patient in an unconscious state cannot harm them.

Lord Keith and *Lord Brandon's* definitions of treatment focus upon the need for treatment to provide some benefit to the patient. They also make it clear that this benefit can only be provided through saving the patient's life, reducing their pain or preventing the deterioration of the condition. The same approach applies in relation to the principle of allowing treatment. In order for the principle to support treatment it is necessary for it to offer a benefit in one of the ways identified by *Lord Keith* and *Lord Brandon*.

Another important distinction relating to double effect is based upon the intention of the doctor providing treatment. Medical ethics suggest that any treatment administered with the intent of causing the patient's death will be unlawful. However, should the intention be to alleviate the pain and suffering of the patient, then the fact that life may be shortened will not prevent treatment being lawful. If the prime intention of the doctor is to cause the death of the patient then the doctrine of double effect no longer applies. In such instances the doctor will be charge of committing active euthanasia and murder.

Lord Goff stated that:

*"It will never be lawful for a doctor to administer treatment which is designed to end the patient's life. This remains true regardless of the extent of the suffering and pain which may give rise to the decision to administer such treatment."*¹⁰⁷

107 *Supra* note 65, at 867

Ognall J stated that:

“If the primary purpose of treatment is to end life then the doctor is guilty of murder regardless of the motivation which drove him to that act.”¹⁰⁸

In this case, it is clear that the law does not permit doctors to act in a manner which is designed to end the patient’s life.

4. POSITION OF RWANDA IN REGARDS OF EUTHANASIA OR PHYSICIAN ASSISTED SUICIDE

4.1. Constitution of the Republic of Rwanda

Right to life is a natural right embodied in Article 12 of the Constitution of the Republic of Rwanda. Suicide is an unnatural termination or extinction of life and, therefore, incompatible and inconsistent with the concept of right to life.¹⁰⁹ It is the duty of the State to protect life and the physician’s duty to provide care and not to harm patients. The Government of Rwanda cannot entertain any practice which is against the fundamental rights of human being.¹¹⁰

108 R v. Cox (1992) 12 BMLR 38

109 Article 116 of Law N°68/2018 of 30/08/2018 determining offences and penalties in general. Incitement to and assistance with suicide: States that: Any person who incites another person to commit suicide, assists him/her in committing suicide or causes him/her to commit suicide due to harassment, commits an offence. Upon conviction, he/she is liable to imprisonment for a term of not less than three (3) years and not more than five (5) years.

110 Article 13 of the Constitution of the Republic of Rwanda of 2003 Revised In 2015. Official Gazette n° Special of 24/12/2015. Inviolability of a hu-

Euthanasia is one of them. It is submitted that, if euthanasia is legalized, then there is a grave apprehension that the State may refuse to invest in health in view of improving right to life. For instance, in Netherlands, legalized euthanasia has led to a severe decline in the quality of care for terminally-ill patients.¹¹¹ Hence, in a welfare state there should not be any role of euthanasia in any form.

4.2. Rwandan Law Determining Offences and Penalties in General

Whilst it has been shown that doctors are not permitted to actively end or shorten a patient's life, the question remains as to whether they can take the halfway step of helping a patient end their own life. Right to life is most cherished right under Rwandan legislations. In Rwanda, suicide is not punishable, however, any person who; incites, assists or causes another person to commit suicide he/she is liable to imprisonment for a term of not less than three (3) years and not more than five (5) years.¹¹²

The author argues that it is possible to assert that Rwandan law recognizes a limited right to die.¹¹³ The basis of this argument is that the Law N°68/2018 of 30/08/2018

man being. The provision state that "A human being is sacred and inviolable. The State has an obligation to respect, protect and defend the human being".

111 Caldwell S. Now the Dutch Turn Against Legalized Mercy Killing. Available at: http://www.hospicevolunteerassociation.org/HVANewsletter/0120_Vol6No1_2009Dec9_Now-The-DutchTurn-Against-Legalised-MercyKilling.pdf. Accessed on 25/11/2017.

112 Article 116 of Law N°68/2018 of 30/08/2018 determining offences and penalties in general.

113 J. Montgomery, 'Power Over Death, The Final Sting', p.37

determining offences and penalties in general does not punish suicide. The reason for the decriminalization of suicide was not an acceptance of any right to die however, rather it was due to the ineffectiveness and harshness of punishing people who had taken their own lives.¹¹⁴ Another reason is that no one can be an offender as well as victim. Based on this, the author admits that it may be more correct to argue that the law recognizes the right to be allowed to die rather than a right to die.¹¹⁵

4.3. Does the Right to Life Encompass the Right to Die?

There is an intense opposition from the religious groups and people from the legal and medical profession that right to die is not an addendum to right to life. According to them legalizing euthanasia is not granting right to die rather it should be called right to kill.¹¹⁶ Respect for a person, entails respect for an individuals' autonomy. It recognizes that respect of individuals' ability should be valued to make decision for his or her own interest in accordance with their own values. In case of medical procedure, for instance, a person to be said to be autonomous he/she must be able to make free choice on what has to be done

¹¹⁴ R (Pretty) v. DPP [2002] 1 AC 800, at 825. Kasimar states that: "The fact that we no longer punish suicide or attempted suicide does not mean that we approve of the acts or that we recognize that an individual's right to self-determination or personal autonomy extends this far", see Y. Kasimar, 'Physician Assisted Suicide: The Last Bridge to Active Voluntary Euthanasia' in J. Keown (ed.), *Euthanasia Examined*, p.229

¹¹⁵ *Supra* note 111, p.40

¹¹⁶ Manbir Kaur: *Right to Die- To be or not to be?*, Indian Streams Research Journal, ISSN 2230-850 Volume 3, Issue- 12, Jan, 2014.

on his/her body. He/she must decide whether to undergo medical procedure based on what he/she considers best to him or her, taking into consideration of all risks, benefits, beliefs and cost.¹¹⁷

However much respect for the autonomy of the patient can be given, autonomy of the patient is important under medical principles, but it has limitations.¹¹⁸ The author submit that; although much importance and value is given to the opportunity of living in a free society, but also recognizes that personal autonomy has its limits. Rights need protection, but must be balanced against responsibilities and restrictions if we are to be truly free. Human being is not free to do things which limit or violate the reasonable freedoms of others. No man is an island. No person makes the decision to end his or her life in isolation. There are others who are affected: friends and relatives left behind, and the healthcare staff involved in the decision-making process.

Although, supporters of euthanasia base their arguments on two fundamental principles: mercy and self-determination. They argue that for many individuals, quality of life is important, not the sanctity of life or its length. If quality of life is unbearable because a patient is suffering from intolerable pain, the patient should receive mercy and compassion from a physician by direct assistance in the dying process.

¹¹⁷ Ibid,

¹¹⁸ Supra note 63, p.9,

The purpose of patient to seek medical service is to save life not to seek for death. Medical ethics also make it clear that patient's benefit can only be achieved through saving his/her life, reducing their pain or preventing the deterioration of the condition. It is stated that the same approach applies in relation to the principle of allowing treatment by the patient. It should be understood that medical ethics and Rwandan legislations recognizes the principle of self-determination¹¹⁹ of patients such as autonomy to refuse or accepting treatment; but this should not be understood that this is an indication of a desire to legalize euthanasia. The author argues that, regardless of the arguments in support of the practice all forms of euthanasia are unlawful, no matter what the motivation.¹²⁰

Constitution of Rwanda reads 'right to life' is in positive direction of protecting life.¹²¹ Hence, there is an urgent need

119 The importance of autonomy and consent in medical law has already been emphasized. It is submitted that these two factors can be combined to form the guiding principle of self-determination. The law, both in the medical context and in more general scenarios, can be seen as placing great importance upon the idea that adults who are of sound mind ought to be able to determine their own lives and that nothing ought to be done to, or for, that person without his express permission or approval. The guiding principle of self-determination would acknowledge, and protect, the individual's right to control his own life and the right of that individual to be free from the undesired interference of others. See, Adam Peter Bunting; Guiding Principles in Medical Law: The Ability to Treat. A Thesis Submitted to the University of Birmingham for the Degree of Master of Laws; p.13, 2005. Available at: <https://etheses.bham.ac.uk/id/eprint/968/1/Bunting05LLM.pdf>. Accessed on 28th October, 2018.

120 *Airedale NHS Trust v. Bland* [1993] AC 789, 865. Lord Goff argued that "euthanasia is not lawful at common law").

121 Article 12 of the Constitution of the Republic of Rwanda of 2003 Revised In 2015. Official Gazette n° Special of 24/12/2015.

to fulfil this obligation of right to life by providing health care¹²². The state does own the responsibility of promoting, protecting and fulfilling the socio-economic rights¹²³ right to health care, which are basic essential ingredients of right to life. Right to die is not an addendum to right to life. Therefore, right to life encompass the right to die.

5. CONCLUSION

The Hippocratic Oath taken by medical doctors does not entertain the idea of euthanasia and physician assisted suicide which renders them unethically acceptable. It provides that: *“To please no-one will I prescribe a deadly drug, nor give advice which may cause his death”*.¹²⁴

The definition attached to treatment seems to greatly favor the preservation of life. It is the author’s view that the role of doctors is to safeguard the lives of patients. Whilst this can be done by reducing pain or lengthening life, it cannot be done by deliberately shortening that life. It is for this reason that the administration of a deadly injection

122 Ibid, Article 21, 22 and 45

123 Article 2 of International Covenant on Economic, Social and Cultural Rights (ICESCR), states that “. Each State Party to the present Covenant undertakes to take steps, individually and through international assistance and co-operation, especially economic and technical, to the maximum of its available resources, with a view to achieving progressively the full realization of the rights recognized in the present Covenant by all appropriate means, including particularly the adoption of legislative measures.

124 Whilst it could be argued that the Hippocratic Oath is outdated, for example it rejects payment for a physician’s work and for teaching others the profession, similar statements can be found in the Declaration of Geneva and the International Code of Medical Ethics.

would be unlawful. To accept requests for death at face value without providing adequate care would be a form of patient abandonment, by taking advantage of their vulnerability in such states. In so doing, their autonomy would be abused, in the name of honoring it.

It is submitted that when a patient is approaching death in a natural manner, meaning that the time of that death should not be advanced by medical intervention. The guiding principles are those of allowing treatment motivated by best interests of saving life of the patient.

From the above discussions, it can be concluded that no such law in Rwanda could support euthanasia. The Constitution of Rwanda clearly states that right to life is a natural right embodied in article 12 but suicide is an unnatural termination or extinction of life and, therefore, incompatible and inconsistent with the concept of right to life. It is the duty of the State to protect life and the physician's duty to provide care and not to harm patients. If euthanasia is legalized, then there is a grave apprehension that the State may refuse to invest in health.

Legalizing euthanasia devalues human dignity and will offend the principle of sanctity of life. Euthanasia will leave sick, disabled or vulnerable people with less protection than the rest of population and could even be seen as providing a cover for murder. Today, advanced medical research is constantly being made in the treatment of pain and diseases. Many diseases which have no cure in the past are curable and controlled today with the help of

research in medical field. Legalizing euthanasia would be involving physicians in directly causing death. Thus, right to life does not include right to die.

6. SCOPE FOR FURTHER RESEARCH

Opponents of abortion have been in the forefront of opposition to physician assisted suicide surveys and are the main drive for lethal dose legislation that would use drug control laws to make it illegal for a doctor to prescribe enough painkillers to help a patient commit suicide. In addition they have been pursuing laws that would limit the ability to relatives to halt the artificial feeding or life support of patients who cannot make such decision themselves.¹²⁵ Here the points to examine will be whether or not attitudes about physician assisted suicide and euthanasia fit the pattern of views about the classic right to life issue abortion by trying to answer four questions:

1. What is the level of public support for physician assisted suicide and euthanasia?
2. What are the main differences in the pattern of subgroup responses concerning physician assisted suicide and euthanasia as compared with those pertaining to abortion?

Major organization of health care professionals make careful distinctions when discussing end of life care.

¹²⁵ Amy Goldstein, "Pro-Life" Activists Take on Death, "Washington Post, November, 10, 1998.A1.

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