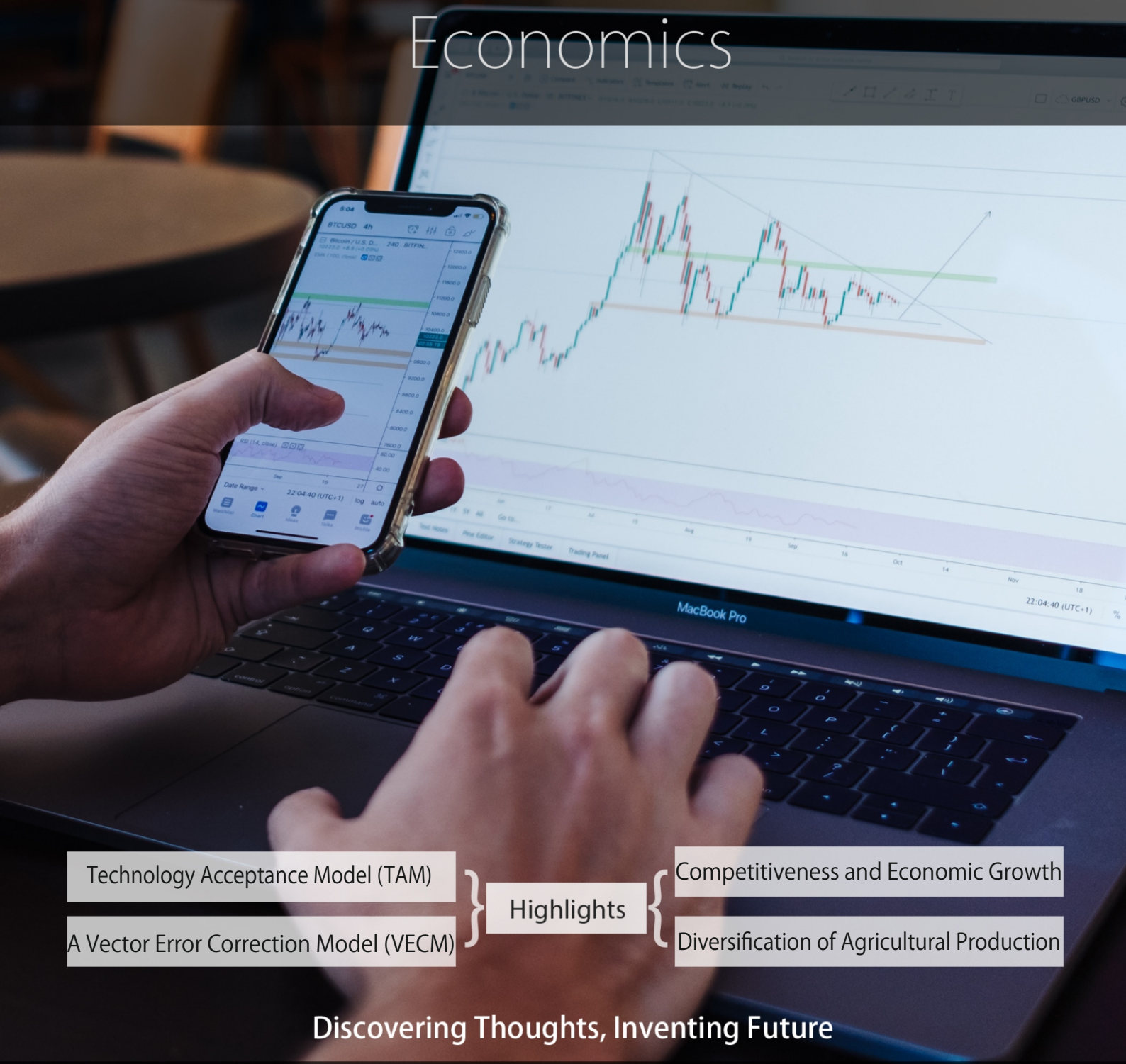


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Economics



Technology Acceptance Model (TAM)
A Vector Error Correction Model (VECM)

Highlights

Competitiveness and Economic Growth
Diversification of Agricultural Production

Discovering Thoughts, Inventing Future



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Competitiveness and Economic Growth: A Model with Application to 105 Countries (2006 To 2017)

By Fábio Gama, Suzana Bastos & André Martins

Federal University of Juiz de Fora

Abstract- This study aims to establish a link between economic growth and competitiveness based on data from the World Economic Forum (WEF). WEF outlines the competitiveness of countries in 12 pillars, which are grouped into three sub-indices – basic requirements, efficiency enhancers, and innovation and sophistication factors. In particular, this paper presupposes a model in which efficiency enhancers and factors of innovation and sophistication depend on the evolution of basic requirements in earlier periods. The analytical solution suggests that the level of economic activity of countries is a function of the current and lagging growth rate of basic requirements. An empirical application of the model is performed for 105 countries using the Pooled Ordinary Least Squares (POLS) and Fixed Effects (FE) methods. In sum, the results show that the level of economic activity of the countries is positively related to the competitiveness indicators, besides corroborating the conclusion of the model that the current and lagged rate of the basic factors are the main determinants of the activity level of the countries.

Keywords: *economic growth; world economic forum; global competitiveness index; basic investment; panel data.*

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Competitiveness and Economic Growth: A Model with Application to 105 Countries (2006 To 2017)

Fábio Gama ^α, Suzana Bastos ^σ & André Martins ^ρ

Abstract- This study aims to establish a link between economic growth and competitiveness based on data from the World Economic Forum (WEF). WEF outlines the competitiveness of countries in 12 pillars, which are grouped into three sub-indices – basic requirements, efficiency enhancers, and innovation and sophistication factors. In particular, this paper presupposes a model in which efficiency enhancers and factors of innovation and sophistication depend on the evolution of basic requirements in earlier periods. The analytical solution suggests that the level of economic activity of countries is a function of the current and lagging growth rate of basic requirements. An empirical application of the model is performed for 105 countries using the Pooled Ordinary Least Squares (POLS) and Fixed Effects (FE) methods. In sum, the results show that the level of economic activity of the countries is positively related to the competitiveness indicators, besides corroborating the conclusion of the model that the current and lagged rate of the basic factors are the main determinants of the activity level of the countries.

Keywords: economic growth; world economic forum; global competitiveness index; basic investment; panel data.

I. INTRODUCTION

The term competitiveness is related to productivity and quality gains resulting from an interaction of factors, internal and external to the company, that make economic production more efficient, such as infrastructure, education, health, innovation and macroeconomic policy. Thus, competitiveness can be seen as the sum of productivity and quality gains related to important factors for building companies competitive advantages and, consequently, contributing to the countries own development. For the World Economic Forum (WEF, 2017, p. 11), competitiveness “is the set of institutions, policies and factors that determine a country's level of productivity”. Productivity is the element that sustains the economic prosperity of nations. Porter (1990, 2003) argues that a country's competitiveness depends on its industry's ability to innovate, keep up to date, and achieve continuous productivity and quality gains. Thus, the wealth of nations and the quality of life of populations depend on the ability of companies to innovate and increase productivity gains permanently. For Krugman (1996a, 1996b), competitiveness is defined as the ability to

produce goods and services that meet the test of international markets, while maintaining high and sustainable income levels or, more generally, the ability to generate, being exposed to external competition, relatively high levels of income and employment.

Esser *et al* (1994) argue that the concept of competitiveness involves four levels of variables that affect the competitive capacity of companies and countries, calling it systemic competitiveness, namely: micro level, which considers the ability of companies to increase revenues; meso level, which deals with industrial and regional competitiveness related to infrastructure and the ability to network and make improvements to innovation systems; macro level, related to national macroeconomic factors that affect companies' competitiveness, such as interest and exchange rates, trade and payment balance and public debt; and target level, related to the cultural factors of the country, such as the ability of society to reach consensus to achieve the jointly defined objectives. In addition, the authors consider it important for countries to be competitive so that they can acquire more markets and consequently higher income levels.

Given the preponderant role of competitiveness in the economic performance of countries, it was necessary to understand the factors that determine the level of competitiveness of nations. In the meantime, since 2004, the World Economic Forum (WEF) has developed a methodology for measuring the level of competitiveness of countries. The assessment is based on a nation's level of competitiveness, using the Global Competitiveness Index (GCI), which is published annually and contains a ranking among countries, as a parameter. The purpose of the report is to identify the factors that determine a nation's economic growth and development by trying to explain why some countries can grow more than others.

With a focus on long-term economic performance, the Global Competitiveness Index combines a set of variables that are relevant to determining a country's prosperity. These variables are grouped into twelve pillars and divided into three non-independent sub-indices. They are: basic requirements (institutions; infrastructure; macroeconomic stability; health and primary education); efficiency enhancers

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(higher education and training; goods market efficiency; labor market efficiency; financial market sophistication; technological readiness; market size); and innovation and sophistication factors (business sophistication; innovation)^(note 1). According to WEF (2017), this division is important because it allows specifying in which areas a particular country needs to improve.

In this context, the objective of this paper is to verify the relationship between competitiveness and economic growth from the Global Competitiveness Index. Therefore, a model is used in which it is assumed that efficiency enhancers and factors of innovation and sophistication depend on the evolution of basic requirements in previous periods. An application of the model is developed using the Pooled Ordinary Least Squares (POLS) and Fixed Effects (FE) methods. Evidence suggests that GCI competitiveness indicators are positively correlated with countries' economic performance. Moreover, they point out that the growth rate of the level of economic activity is a function of the current and lagged growth rate of two basic requirements.

In addition to this introduction, the paper is further subdivided into four sections. The second section presents the concept of competitiveness of the World Economic Forum from the 12 pillars, as well as relates each pillar to the countries' economic growth. The third section develops the model. The fourth presents the database. The fifth exposes and discusses an application of the model. And the sixth section brings the final remarks.

II. ECONOMIC GROWTH DRIVEN BY THE GLOBAL COMPETITIVENESS INDEX: THEORETICAL ASPECTS

According to WEF (2017), a country's competitiveness is a set of 12 pillars, structured in three groups. The first group is related to the basic requirements of (i) institutions, (ii) infrastructure, (iii) macroeconomic stability, (iv) health and (v) primary education. The second group represents the sources of efficiency – (vi) higher education, (vii) commodity market efficiency, (viii) labor market efficiency, (ix) financial market development, (x) technological readiness, size and sophistication of the financial market. The third group includes factors of (xi) innovation and (xii) business sophistication. Pillars are important for all economies; however, due to the different stages of development of countries, they affect them in different ways. Basic requirements are crucial for countries that are still in the factor-oriented stage, and efficiency enhancers are important for countries that have progressed in the efficiency-oriented stage. The factors of innovation and sophistication affect countries at the innovation stage. All countries between two of the three stages can be considered in transition. For each of the

12 pillars of a country's competitiveness, there is empirical evidence of its impact on economic growth.

The quality of a country's institutions (i), which can be determined by the legal framework in which individuals, businesses and governments interact to generate wealth, has been proven to be a factor in economic growth in several studies (eg, Acemoglu *et al* (2002); North 1989; Rodrik *et al* (2002). According to Miller *et al* (2014), public institutions can impose significant economic costs on companies and slow down the process of economic development (eg, excessive bureaucracy, over-regulation, corruption, dishonesty in dealing with public procurement, lack of transparency, inability to provide appropriate business services, inadequate management of public finances, and political dependence on the judiciary.) In addition to public institutions, good governance of private institutions and maintaining the trust of investors and consumers are also important elements of the process of generating wealth (ZINGALES, 1998).

The quality and breadth of infrastructure networks (ii) that integrate the domestic market and connect it at low cost to markets in other countries, allow companies to market their products and services securely and timely, enable a fast and cheap flow of information, determine the location of economic activities, facilitate the movement of workers, prevent interruptions and shortages of energy supply, among others. It's positive impact on economic growth has been identified, for example, by Canning and Pedroni (1999) and Calderon and Servén (2004).

Although Fischer 1993 found only weak effects of macroeconomic stability (iii) on productivity and growth, there is evidence of its impact on short-term economic activity. For example, the positive impacts of low and moderate inflation levels are studied by Goodfriend (2007) and Temple (2000), the impacts of government debt levels are examined by Reinhart and Rogoff (2010) and the tax structure and the way the government spends money are analyzed by Johansson *et al* (2008), among others.

Healthy workers are vital to a country's productivity. Thus, investment in the provision of health services (iv) is a factor of economic development and growth (SACHS, 2001). The amount and quality of basic education (v) received by the population increases worker efficiency and contributes to the creation or execution of innovations. Secondary and tertiary enrollment rates, as well as the quality of higher education (vi), are also key factors for economies wishing to move up the value chain (KRUEGER AND LINDAHL, 2001).

Commodity market efficiency (vii) is related to producing the right mix of products and services, given a country's specific supply and demand conditions, as well as the effectiveness of trade with these products (WEF, 2017). The best environment for commodity

exchange requires a high level of competition in the market and a minimum of government intervention that hinders commercial activities (BRANSTETTER ET AL, 2010). Opening up to international competition via trade and investment allows a country to improve productivity, expand its most productive local industries, and access more advanced knowledge and technologies from abroad (DELGADO ET AL, 2012). A positive relationship between openness and prosperity was found by Alesina *et al* (2005); Baldwin (2003); Dollar and Kraay (2003) among others, as well as the positive influence of trade on knowledge transfer and innovation in a country (BRANSTETTER, 2006). Market efficiency also depends on demand conditions, such as customer orientation and buyer sophistication (PORTER, 1998). More demanding customers force companies to be more innovative and customer-oriented and thus impose the discipline necessary for market efficiency.

To achieve labor market efficiency (viii), workers must be allocated to their most effective use in the economy and given incentives to invest their best efforts in their jobs. Thus, the labor market creates support for economic growth if it is flexible enough to move workers from one economic activity to another quickly and at low cost, and to allow wage fluctuations without much social disruption (KAPLAN, 2009).

Efficient access to capital (ix) is important for companies to make the long-term investments needed to increase productivity levels (LEVINE, 2005). Financial market development is reflected in the allocation of financial resources to business or investment projects with the highest expected rates of return rather than politically connected ones. To fulfill these functions, the financial market needs appropriate regulation to protect investors and other actors in the economy.

For an economy to thrive, it is important to be agile in adopting technologies to increase the productivity of its industries (BARRO AND SALA-IMARTIN, 2003). Thus, contemporary technological readiness (x_a) is reflected in the access and use of information and communication technology (ICT).

Market size (x_b) affects productivity through opportunities to achieve economies of scale. In the age of globalization, international markets have become a substitute for domestic markets, especially for small countries. Thus, exports and participation in regional integration (which allows cheaper and simpler access to other markets) can be a substitute for domestic demand in determining the size of the market for companies in a country. The effects of international markets on the economic growth of countries are shown by Parteka and Wolszczak-Derlacz (2013).

The positive impact of technological innovation (xi) (including innovation support institutions and policies) on productivity has been empirically proven by Grossman and Helpman (1991) and Furman *et al* (2002). According to Romer (1990), technological

innovation is particularly important for economies that can no longer improve their productivity simply by integrating and adapting exogenous technologies.

Business sophistication (xii) is concerned with the quantity and quality of local suppliers, service providers and institutions and the extent of their interactions. The companies' advanced operations and strategies (brands, marketing, distribution, advanced production processes and unique and sophisticated product production) spread throughout the economy and lead to sophisticated and modern business processes in the country's business sectors, which contributes to higher productivity (WEF, 2013). Bloom and Van Reenen (2007) confirm the importance of business operations and productivity strategies.

III. THE MODEL

Starting from the relationship between competitiveness and economic growth, the first equation of the model assumes that the level of production Y (economic growth proxy) is a function of the level of Competitiveness, C , of the country in period t .

$$Y_t = C_t^\rho \quad (1)$$

Where ρ is the elasticity of the output rate relative to the competitiveness growth rate.

However, according to the Global Competitiveness Report, a country's competitiveness can be expressed in twelve pillars, divided into three sub-indices: basic requirements (B) efficiency enhancers (E) innovation and sophistication factors (I). Therefore, it is possible to represent the degree of competitiveness of a country in a given period of time t from equation 2:

$$C_t = I_t^\alpha E_t^\phi B_t^\beta \quad (2)$$

According to WEF (2017), the twelve pillars of competitiveness are not independent, but sequentially interdependent, forming three stages/steps that countries must go through to become competitive and consequently achieve higher growth. The country starts at the first stage driven by its endowment of factors – mainly unskilled labor and natural resources. However, as the country develops the basic requirements indicators, it becomes competitive, allowing it to reach the developmental stages towards efficiency and innovation, respectively. Thus, there is a relationship of dependence of one stage on the other. For a country to enter stage 2, there is a need for deep development of the stage 1 pillars. For a country to enter stage 3, there is a need for improvements to the stage 1 and 2 pillars. Stage 1, being the most basic, is the one that contains the most relevant pillars, which will provide the evolution of the other pillars contained in stages 2 and 3.

Therefore, based on WEF (2017), it appears that the performance of a country in efficiency enhancers

and factors of innovation and sophistication in a given period t , is a function of the growth rate of lagged basic requirements, $g_{B_{t-\tau}}$ and $g_{B_{t-j}}$.

$$E_t = N e^{t\theta g_{B_{t-j}}} \tag{3}$$

$$I_t = M e^{t\gamma g_{B_{t-\tau}}} \tag{4}$$

Log-linearizing and deriving from t equations 3 and 4, we have the growth rate of the efficiency enhancers and the innovation and sophistication factors, respectively.

$$\frac{E}{E} = g_E = \theta \frac{B}{B} = \theta g_{B_{t-j}} \tag{5}$$

$$\frac{I}{I} = g_I = \frac{B}{B} = \gamma g_{B_{t-\tau}} \tag{6}$$

Substituting equation (2) into equation (1), one can rewrite the product as a function of the basic requirements, efficiency enhancers, and innovation and sophistication factors (7):

$$Y_t = (B_t^\beta E_t^\phi I_t^\alpha)^{\rho} \tag{7}$$

Log linearizing (7) and deriving from time, we have the product growth rate, as a function of the growth rates of the basic requirements, the efficiency enhancers and the innovation and sophistication factors (8):

$$g_{yt} = (\beta\rho)g_{Bt} + (\phi\rho)g_{Et} + (\alpha\rho)g_{It} \tag{8}$$

Substituting (5) and (6) for (8), the product growth rate is a function of the current and lagged growth rate of the basic requirements (9):

$$g_{yt} = (\beta\rho)g_{Bt} + (\phi\rho\theta)g_{B_{t-j}} + (\alpha\rho\gamma)g_{B_{t-\tau}} \tag{9}$$

IV. DATA BASE

For the application of equation 9, data were considered for 105 countries in the period from 2006 to 2017. As a proxy for economic performance, we used the Gross Domestic Product at constant 2010 prices, present in the World Bank database. For information on basic requirements, efficiency enhancers, and innovation and sophistication factors, we used the scores of the respective indices presented in the Global Competitiveness Reports of the World Economic Forum. From table 1, it is observed the impact that the increase of the score in the basic requirements sub-index would have in the two other sub-indices. Overall, it is noted that a positive 0.36 change in the average of the basic requirements sub-index score over a 2-year average yields an average increase of 0.15 point in the efficiency stimulant sub-index over a medium range 3.86 years, and a 0.18 point increase in the sub-index of innovation and sophistication factors over an average range of 4 years. In addition, the data show that 81 countries have improved in either or both sub-indices (efficiency drivers and innovation and sophistication factors) following the prior development of the basic requirements sub-index.

Table 1: Subindexes Evolution – WEF (2006-2017)

ST	ECONOMY	B		E		I	
		TV	SV	TV	SV	TV	SV
STAGE 1	Benin	2007/2011	0.3	2011/2015	-0.1	2011/2015	0.1
	Burundi	2006/2007	0.3	2007/2017	0.3	2007/2017	0.5
	Cambodia	2009/2011	0.4	2011/2012	0.1	2011/2012	0.2
	Cameroon	2007/2010	0.3	2010/2012	0.3	2010/2014	0.4
	Chad	2010/2012	0.4	2012/2014	-0.2	2012/2014	-0.3
	Ethiopia	2010/2011	0.5	2011/2015	0.1	2011/2016	0.6
	Gambia	2007/2008	0.4	2008/2017	0.2	2008/2012	0.2
	Ghana	2009/2012	0.5	2012/2017	0.1	2012/2017	0.4
	Haiti	2012/2013	0.3	2013/2014	0.2	2013/2014	0.1
	India	2014/2016	0.4	2016/2017	0.1	2016/2017	0.1
	Kenya	2007/2008	0.3	2008/2014	0.2	2008/2017	0.2
	Kyrgyz Republic	2009/2013	0.3	2013/2014	0.2	2013/2014	0.3
	Lesotho	2012/2013	0.5	2013/2017	-0.2	2013/2015	0.6
	Malawi	2009/2011	0.3	2011/2015	-0.2	2011/2016	-0.4
	Mali	2006/2007	0.4	2007/2012	0.2	2007/2014	0.2
	Mauritania	2008/2012	0.3	2012/2017	-0.4	2012/2016	-0.6
Mozambique	2007/2009	0.3	2009/2012	-0.1	2009/2015	0.3	



	Nepal	2010/2013	0.5	2013/2017	0.4	2013/2017	0.2
	Rwanda	2010/2012	0.3	2012/2016	0.1	2012/2017	0.2
	Sierra Leone	2012/2014	0.3	2014/2017	-0.1	2014/2017	0.1
	Tajikistan	2009/2011	0.5	2011/2016	0.3	2011/2016	0.5
	Uganda	2008/2009	0.3	2009/2012	0.2	2009/2016	0.3
	Zambia	2007/2010	0.3	2010/2014	0.3	2010/2014	0.5
	Zimbabwe	2009/2010	0.3	2010/2017	0.2	2010/2013	0.1
TRAN 1-2	Algeria	2012/2014	0.4	2014/2017	0.4	2014/2016	0.2
	Azerbaijan	2007/2012	0.4	2012/2017	0.3	2012/2017	0.5
	Botswana	2007/2008	0.4	2008/2014	0.1	2008/2012	0.2
	Brunei Darussalam	2008/2012	0.3	2012/2013	0.1	2012/2013	0.2
	Kazakhstan	2009/2011	0.3	2011/2015	0.4	2011/2014	0.5
	Mongolia	2009/2010	0.5	2010/2015	0.4	2010/2015	0.3
	Nicaragua	2009/2010	0.3	2010/2017	0.2	2010/2013	0.4
	Nigeria	2010/2012	0.4	2012/2017	-0.1	2012/2015	-0.3
	Philippines	2009/2011	0.3	2011/2014	0.3	2011/2014	0.5
	Ukraine	2010/2011	0.3	2011/2012	0.1	2011/2015	0.3
	Vietnam	2009/2010	0.4	2010/2015	-0.2	2010/2012	-0.4
STAGE 2	Albania	2007/2010	0.6	2010/2017	0.2	2010/2017	0.5
	Armenia	2008/2012	0.4	2012/2016	0.1	2012/2017	0.3
	Bosnia	2009/2010	0.4	2010/2013	0.2	2010/2013	0.5
	Brazil	2007/2010	0.5	2010/2012	0.1	2010/2015	-0.4
	Bulgaria	2009/2010	0.3	2010/2016	0.3	2010/2016	0.4
	Cape Verde	2013/2014	0.3	2014/2015	0.1	2014/2015	0.1
	China	2007/2010	0.5	2010/2017	0.3	2010/2017	0.2
	Colombia	2009/2010	0.3	2010/2016	0.3	2010/2015	0.1
	Ecuador	2010/2011	0.3	2011/2013	0.4	2011/2013	0.5
	Georgia	2011/2012	0.3	2012/2016	0.3	2012/2016	0.2
	Indonesia	2007/2010	0.5	2010/2017	0.3	2010/2017	0.2
	Jamaica	2012/2014	0.3	2014/2017	0.2	2014/2017	0.2
	Montenegro	2009/2010	0.5	2010/2012	-0.1	2010/2015	-0.3
	Morocco	2007/2011	0.4	2011/2017	0	2011/2017	0.2
	Namibia	2006/2008	0.3	2008/2010	0.2	2008/2015	0.3
	Paraguay	2007/2010	0.3	2010/2012	0.2	2010/2017	0.4
	Peru	2007/2010	0.3	2010/2011	0.1	2010/2013	0.1
	Russian	2009/2012	0.4	2012/2016	0.3	2012/2017	0.6
	Serbia	2006/2007	0.3	2007/2017	0.4	2007/2013	-0.3
	Sri Lanka	2009/2010	0.3	2010/2017	-0.2	2010/2017	-0.2
Swaziland	2012/2013	0.3	2013/2015	-0.1	2013/2017	-0.4	
TRAN 2-3	Chile	2009/2011	0.3	2011/2016	0.3	2011/2016	-0.2
	Costa Rica	2007/2008	0.4	2008/2017	0.3	2008/2016	-0.2

	Hungary	2008/2012	0.4	2012/2017	0.1	2012/2016	-0.3
	Latvia	2009/2012	0.3	2012/2014	0.2	2012/2014	0.1
	Lithuania	2012/2014	0.3	2014/2015	0.1	2014/2015	0
	Malaysia	2009/2011	0.4	2011/2015	0.1	2011/2015	0.4
	Mauritius	2009/2013	0.4	2013/2017	0.1	2013/2017	0.1
	Oman	2007/2009	0.3	2009/2013	0.3	2009/2013	0.3
	Panama	2009/2010	0.3	2010/2012	0.3	2010/2013	0.3
	Poland	2009/2010	0.4	2010/2012	0.1	2010/2013	-0.1
	Romania	2009/2010	0.3	2010/2015	0.2	2010/2014	0.3
	Saudi Arabia	2010/2011	0.4	2011/2014	-0.2	2011/2016	-0.5
	Trinidad and Tobago	2008/2009	0.3	2009/2017	0.3	2009/2014	0.1
	Turkey	2009/2011	0.3	2011/2012	0.2	2011/2013	0.3
	Uruguay	2008/2010	0.3	2010/2016	0.2	2010/2016	0
STAGE 3	Bahrain	2006/2010	0.3	2010/2011	0.1	2010/2016	0.3
	Cyprus	2006/2008	0.5	2008/2010	0.1	2008/2009	0.2
	Czech Republic	2013/2015	0.5	2015/2017	0.1	2015/2017	0.1
	Denmark	2013/2014	0.4	2014/2017	0.2	2014/2015	0.1
	Estonia	2009/2010	0.3	2010/2017	0.4	2010/2016	0.3
	Hong Kong	2009/2011	0.3	2011/2013	0.1	2011/2017	0.4
	Iceland	2007/2008	0.3	2008/2012	-0.4	2008/2014	-0.4
	Ireland	2012/2015	0.4	2015/2017	0	2015/2017	-0.1
	Israel	2009/2011	0.3	2011/2017	0.2	2011/2017	0.2
	Italy	2009/2010	0.4	2010/2017	0.2	2010/2017	0.4
	Korea. Republic	2010/2012	0.3	2012/2014	-0.2	2012/2014	-0.2
	Luxembourg	2007/2012	0.3	2012/2014	0.1	2012/2016	0.2
	Malta	2014/2016	0.3	2016/2017	0.1	2016/2017	0.2
	Netherlands	2009/2014	0.3	2014/2017	0.2	2014/2017	0.2
	New Zealand	2007/2013	0.3	2013/2016	0.2	2013/2017	0.3
	Norway	2010/2011	0.3	2011/2015	0.1	2011/2015	0.4
	Qatar	2007/2010	0.3	2010/2015	0.4	2010/2015	0.7
	Singapore	2009/2011	0.3	2011/2014	0.1	2011/2012	0.1
	Switzerland	2009/2015	0.3	2015/2016	0.1	2015/2017	0.1
	United Arab Emirates	2007/2008	0.3	2008/2014	0.6	2008/2016	0.8
United Kingdom	2009/2010	0.3	2010/2016	0.3	2010/2012	0.3	
United States	2014/2016	0.3	2016/2017	0.2	2016/2017	0.2	

¹ Key: ST: Stages; B: Basic Requirements; E: Efficiency Enhancers; I: Factors of Innovation and Sophistication; TV: Temporal Variation; SV: Score Variation.

Source: WEF (2017)

Stage 1 countries had an average increase of 0.1 point in 4 years in the second sub-index and an average increase of 0.2 point in the third sub-index in 4.25 years, with emphasis on four countries –

Cameroon, Nepal, Tajikistan and Zambia –, which had the most significant evolution.

For countries in the transition from stage 1 to stage 2, they had an average improvement of 0.18

points over 4.1 years in the efficiency stimulators sub-index, and an average evolution of 0.22 points over 3.2 years in the sub-index of innovation and sophistication factors. From this group of countries, the most evolving in the period were: Algeria, Azerbaijan, Kazakhstan, Mongolia and the Philippines.

Stage 2 countries had an average improvement of 0.17 point over 4.2 years in the second sub-index and a high average of 0.15 point over 5 years in the third sub-index. Noteworthy are Ecuador and Russia.

Countries transitioning from stage 2 to stage 3 had an average increase of 0.17 points over 4 years in the efficiency drivers sub-index and an average evolution of 0.04 points over 4 years in the innovation and sophistication factors sub-index. The best performing nations were Oman, Panama and Turkey.

Stage 3 countries had an average improvement of 0.14 points in 3.3 years on efficiency enhancers, and a high average of 0.22 points in 3.6 years on innovation and sophistication factors. Highlighting the development of Estonia, Qatar, the United Arab Emirates and the United States.

Considering the stages of development, it can be said that the transition countries from stage 1 to stage 2 had the highest average evolution in the sub-indices of efficiency enhancers and factors of innovation and sophistication, after a previous increase in the basic requirements sub-index. This confirms the arguments of the World Economic Forum that nations in this rating range already have improvements in the pillars of institutions, infrastructure, the macroeconomic environment, and health and primary education (pillars

of the first basic requirements sub-index), enabling the subsequent pillars, that are responsible for the performance of the second and third sub-indices, to be developed. Therefore, there is a dependence on innovation, business sophistication, the goods, labor and financial markets, technological capacity, higher education, training and market size in relation to institutions, infrastructure, the macro environment, health and primary education. From the improvement of these last four pillars, there will be greater evolution of the pillars contained in the subsequent stages (sub-indices).

V. APPLICATION AND DISCUSSIONS

To estimate the parameters of equation 9, we used Pooled Ordinary Least Squares and Fixed Effects methods for panel data. The use of the methods is justified by the fact that the first one works with the unfiltered variables, allowing a purer analysis of the relations, and second because it controls the bias of omitted variables, making the analysis more robust^(note 2). The second column of table 2 presents the estimated coefficients by POLS for the ratios of equation 9 – Mod 1. Considering a two-year lag for the growth rate of the basic factors^(note 3), the estimates indicate that the activity level is positively related to current and time-lagged basic requirements, corroborating the implications of the model. That is, a positive 1% change in the growth rate of basic requirements in the current period, g_{Bt} , and the same two-phase lag, g_{Bt-2} , increases the growth rate of the domestic product, g_{yt} , by 0.274% and 0.162%, respectively.

Table 2: Results for country growth rate – g_{yt} – as dependent variable

Explanatory Variables \ Model	POLS			EF		
	Mod1 Coefficient	Mod2 Coefficient	Mod3 Coefficient	Mod4 Coefficient	Mod5 Coefficient	Mod6 Coefficient
g_{Bt}	0.274*** (0.000)	0.124*** (0.000)	0.263*** (0.000)	0.230*** (0.000)	0.100*** (0.001)	0.226*** (0.000)
g_{Bt-2}	0.162*** (0.000)	-	0.163*** (0.000)	0.127*** (0.000)	-	0.127*** (0.000)
g_{Et}	-	0.164*** (0.000)	0.039 (0.492)	-	0.09*** (0.018)	-0.005 (0.916)
g_{It}	-	-0.013 (0.691)	0.027 (0.482)	-	-0.014 (0.667)	0.033 (0.343)
Constant	0.015*** (0.000)	0.018*** (0.000)	0.015*** (0.000)	0.016*** (0.000)	0.019*** (0.000)	0.015*** (0.000)
Number of observations	945	1155	945	945	1155	945

Source: Own elaboration

† p-value in parentheses with *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

As a comparison, two more exercises using the POLS method were implemented – Mod2 and Mod3. In Mod2, we estimate the effect of the growth rate of the basic requirements, g_{Bt} , efficiency enhancers, g_{Et} , and innovation and sophistication factors, g_{It} , on the GDP

rate, g_{yt} . The objective is to test the current relationship between economic performance level and WEF sub-indices (2018). In the third exercise, Mod3, the growth rate of the two-phase lagged requirements, g_{Bt-2} , is added to Mod2. The purpose of this application is to

verify how the significance and magnitude of the coefficients related to the current variables – g_{Bt} , g_{Et} and g_{It} – change by adding the conclusion of the model – the basic requirements are the main determinants of the efficiency enhancers and the power innovation factors and sophistication of countries in subsequent periods.

In the third column of Table 2, the estimated coefficients for Mod2 indicate that the growth rate of the basic requirements, g_{Bt} , and the efficiency enhancers, g_{Et} , are significant at 99% confidence and present signal as proposed by the Forum. Economic growth, that is a positive 1% change in the growth rate of basic requirements and efficiency enhancers, raises the product growth rate by 0.124% and 0.163%, respectively. On the other hand, the growth rate of innovation and sophistication factors, g_{It} , is negative and not significant. The non-significance may be due to the joint dependence of this sub-index with the efficiency enhancers on time-lagged basic requirements, which makes g_{Et} and g_{It} highly correlated^(note 4) – Appendix 1.

For Mod3 – fourth column of table 2 –, it is noted that both the growth rate of the current basic requirements, g_{Bt} , and lagged in two periods, g_{Bt-2} , are significant at 99% confidence and positive, that is, a positive change of 1% in g_{Bt} and g_{Bt-2} , raises the product growth rate by 0.263% and 0.163%, in due order. Otherwise, g_{Et} and g_{It} are not significant to explain variations in product growth rate, g_{yt} . The non-significance of the efficiency enhancer sub-indices and the innovation and sophistication factors have similar characteristics to the previous one, that is, since these indices are highly correlated with the time-lagged basic requirements, g_{Bt-2} , this may have captured the full effect, making g_{Et} and g_{It} nonsignificant and reinforcing the outcome of the model that, at the limit, changes in the growth rate of countries are essentially explained by changes in the current and lagged rate of basic factors (institutions; infrastructure; macroeconomic stability; health and primary education).

In order to make the predicted ratios of POLS estimates robust, the previous exercises are redone using the Fixed Effects method, with columns 5, 6 and 7 representing the modeling structures of columns 2, 3 and 4, respectively. The estimation of fixed effects equation 9 – Mod4 – confirms the results presented in column 2, that is, the positive values of the g_{Bt} and g_{Bt-2} coefficients indicate that the current and lagged rate of the basic requirements positively affects the activity level. Concerning columns 6 (Mod5) and 7 (Mod6), the evidence corroborates the estimates presented in columns 3 and 4, indicating that the basic requirements tend to attract the full effect on the activity level, making the coefficients of g_{Et} and g_{It} . In general, both POLS and EF estimates corroborate the

implications of the model, suggesting that in the limit the GDP growth rate is a function of the current and lagged rate of the basic requirements.

VI. CONCLUSION

This article sought to broaden the discussion between competitiveness and economic growth by focusing on the Global Competitiveness Report (GCR) developed by the World Economic Forum (WEF). A model was developed, in which the solution is that the growth rate of a country's level of economic activity over a given period of time is a function of the current and lagged growth rate of basic requirements.

Using data for 105 countries from 2006 to 2017, six econometric exercises were performed to test the implications of the model. Based on the estimation coefficients, the evidence suggests that GDP growth rate and economic competitiveness growth are positively related, corroborating the studies by Canning and Pedroni (1999), Calderon and Servén (2004), Acemoglu *et al* (2002); North 1989; Rodrik *et al* (2002), Barro and Sala-i-Martin (2003), Grossman and Helpman (1991) and Furman *et al* (2002), Romer (1990), Van Reenen (2007) among others. Moreover, the results indicate that the growth rate of the economic activity level is a function of the current growth rate and lagged in two periods of the factors, thus corroborating the conclusions of the model.

Thus, for a country to achieve a satisfactory and sustainable level of economic performance, it is recommended that there be high investments in the basic requirements pillars, in order to allow the full performance of the other pillars referring to the most advanced stages of stimulators – efficiency, innovation and sophistication – in subsequent periods.

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APPENDIX

Appendix 1: Correlations between EE, FIS and RB lagged by two periods

Variables	EE _t	FIS _t	RB _{t-2}
EE _t	1		
FIS _t	0.914	1	
RB _{t-2}	0.908	0.847	1

Source: Own elaboration from WEF data (2017)

Note 1: The 3 (three) sub-indices have different weights in the calculation of the global competitiveness index. The measurement varies depending on the stage of development of each country's economy, which is measured by GDP per capita. The weighting of each index is performed by looking at the country classification at stage 1 (one), stage 2 (two) or stage 3 (three), or at some stage of transition.

Note 2: For more information, see Greene (2012), Maddala and Lahiri (2006), Davidson and MacKinnon (1993), and Judge *et al* (1985).

Note 3: Given the evidence that on average basic factors have an effect on innovation potential and efficiency over 2.5 years, it was decided to work across the application with the basic factor growth rate, g_b , lagged by 2 years. In addition, to corroborate the evidence of dependence on the Efficiency Stimulators (E) and Innovation and Sophistication Factors (I) in relation to the basic factors lagged in 2 periods, (B) a correlation test was applied (Appendix 1). The evidence is highly correlated.

Note 4: In the process of parameter estimation, when there are highly correlated explanatory variables, usually one attracts every effect, rendering the others meaningless.





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Abstract- The strategic management of agricultural enterprises is to create conditions and develop mechanisms for the sustainable development of the enterprise, providing employment and income for the rural population. Diversification strategies are an integral part of the enterprise's corporate strategies, namely, growth strategies that allow, firstly, to determine the direction of development of the enterprise in accordance with market requirements, and secondly, the availability of its own resources and the appropriateness of external acquisitions. The article analyzes the regional features of agricultural production in the Republic of Karakalpakstan. The Republic of Karakalpakstan is divided into 4 conditional zones and the current market conditions for agricultural products and food are also analyzed. The degree of saturation of regional markets with agricultural products was studied. The country's self-sufficiency in main agricultural products are determined. Based on the analysis, proposals and recommendations for the development of each zone were developed.

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Use of Marketing Methods in the Development of Strategies for Diversification of Agricultural Production in the Republic of Karakalpakstan

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Ismailov Kuvatbay Sarsenbaevich ^ρ & Bekbosinov Kuralbay Kdirbaevich ^ω

Abstract- The strategic management of agricultural enterprises is to create conditions and develop mechanisms for the sustainable development of the enterprise, providing employment and income for the rural population. Diversification strategies are an integral part of the enterprise's corporate strategies, namely, growth strategies that allow, firstly, to determine the direction of development of the enterprise in accordance with market requirements, and secondly, the availability of its own resources and the appropriateness of external acquisitions. The article analyzes the regional features of agricultural production in the Republic of Karakalpakstan. The Republic of Karakalpakstan is divided into 4 conditional zones and the current market conditions for agricultural products and food are also analyzed. The degree of saturation of regional markets with agricultural products was studied. The country's self-sufficiency in main agricultural products are determined. Based on the analysis, proposals and recommendations for the development of each zone were developed. Scientific conclusions and practical recommendations on the cultivation of agricultural products in the region, the provision of food to the population, increasing the income of the rural population are given.

I. INTRODUCTION

Diversification strategies of the agricultural enterprise - a set of management decisions for the development of an agricultural enterprise fundamentally new areas of activity, allowing to meet the needs of the market, while achieving certain advantages aimed at improving the financial stability of the enterprise, creating new jobs and stabilizing the socio-economic situation in rural areas. Studies from the developing world show that agricultural growth has a larger effect on poverty reduction, compared to the growth of non-farm sectors [1]. The development of agricultural enterprises and the strategic planning of diversification is based on an analysis of the marketing opportunities not only of the enterprise itself, but also of the rural administrative district, since significant areas of activity of agricultural enterprises cannot be developed independently, therefore, it is necessary to identify potential partners among entrepreneurs in this territory, to study the labor potential of the region or agricultural zone as a whole. The socio-political consequences of persistent agrarian distress could be disastrous, and call

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for pre-emptive strategic interventions in both farm and non-farm sectors to re-invigorate agricultural growth and enhance farmers' income. Within the farm sector, diversification towards high value crops (HVCs), including vegetables, condiments spices, fruits and plantations, is claimed to be an important means of securing agriculture-based livelihoods, accelerating growth and reducing rural poverty [2]. Higher levels of diversification reflect a wider availability of productive capabilities, implying—under the assumption that capabilities are complementary—a positive effect diversification on income and subsequent growth [3]. A somewhat related idea—connected with urbanization economies, in particular those operating through increased flows of knowledge—goes under the name of Jacobs externalities: diversity can foster technological dynamism, i.e. innovation and adoption of new technologies [4].

II. MATERIALS AND METHODS

When developing diversification strategies, it is necessary to take into account the large differentiation of the natural, economic and social conditions of rural administrative regions of the Republic of Karakalpakstan. The Republic of Karakalpakstan is located in the northwestern part of Uzbekistan on an area of about 166,600 km². The overwhelming part of the territory of Karakalpakstan is lowlands (from 50,200 m above sea level), and flatness is its most noticeable feature. Most of the population lives and works on irrigated river plains in the Amu Darya River Delta. It is bordered by Kazakhstan to the north and west, the Republic of Turkmenistan to the south, the Navoi region of Uzbekistan to the east, and the Khorezm region to the southeast. The arable land of the republic is relatively limited.

The area of irrigated land is 510.4 thousand hectares, or 3.1% of the total land area.

The arable land in 2018 was 231.1 thousand hectares, or 45.3% of irrigated land.

This situation indicates that Karakalpakstan cannot use its potential land due to a lack of water supply for irrigation.

The criterion of economic efficiency of the placement and development of a particular industry and

the determination of promising areas of diversification of agricultural enterprises is the saturation of the market with products that agricultural producers can produce in a specific rural administrative region.

The provision of food itself means satisfying the need for it, first of all, through domestic supplies with minimal dependence on foreign trade. To achieve the country's self-sufficiency in food, it is necessary to produce high-quality products in volumes that can satisfy the population's need for it at a threshold level at prices that guarantee the availability of most products for all social groups throughout the country. Broad changes are taking place in agrifood systems worldwide. These changes are driven by economic development, increase in per caput incomes, changing technology and urbanization. Consumers are changing their dietary preferences and shopping habits, resulting in substantial organizational and institutional changes throughout the food marketing chain. Growing concentration at all levels is taking place, particularly in the retail sector, and private sector standards for food quality and safety are proliferating [5].

Initially, we should analyze the current market conditions for agricultural products and food to determine the country's self-sufficiency in food.

For this, the potential market capacity is determined for each of the types of produced products, then the characteristics of the consumption of the main

groups of food products and the structure of agricultural production are investigated, which allows to determine the prospects for the development of the sector. When determining the level of self-sufficiency republic's main types of food the author used the following formula:

1. The potential capacity (P_c) of the food market is determined on the basis of standards for the consumption of food products (S_c) and the size of population (S_p). $P_c = S_c * S_p$
2. We introduce the Degree of saturation (D_s) of the food market: $DS = A_p P_c * 100\%$

where

P_c - potential capacity of the food market

S_c - standards for the consumption of food products

S_p - size of population

D_s - degree of saturation of the food market,

A_p - actual food production

III. DISCUSSION

The analysis of the saturation of the product market allows you to determine product groups for which customer demand is not fully satisfied. Using these formulas, we can determine the potential capacity of the regional product market and the degree of saturation of the market with the main agricultural products.

Table 1: Analysis of the saturation of the market for main agricultural products in the Republic of Karakalpakstan

The main types of agricultural products	Standards for the consumption of food products per capita (kg)	Size of population (01.01.2019)	Potential capacity of the food market (tons) (2*3=4)	Actual food production (thousand ton)	Degree of saturation of the food market (%) (5:4*100=6)	Actual consumption of population per capita (kg) (5:2=7)
1	2	3	4	5	6	7
Potato	54,6	1869734	102085,6	67736	66,4	36,2
Vegetables	116		216885,2	247319	114	132,3
Fruits	68		127139,6	49750	39,1	26,6
Grapes	13,9		25988,8	7323	28,2	3,9
Meat	60		112182	106514	95	56,9
Milk	140		261758	376486	143,8	201,4
Eggs	295		551561,5	303195	55	162,1
Honey	2,4		4487,3	596,1	13,3	0,3
Fish	13,4		25054	9626,2	38,4	5,1

The data in the table 1 indicates that the republic reached its self-sufficiency only in vegetables and milk. The situation with other agricultural products is

still far from satisfying. Grape growing in the country does not exceed 28% of the market potential, fruits and berries – 39%, and egg products - 55%, potatoes - 66%.

This, in turn, once again justifies the need to increase the volume of these products as a priority in the diversification of agricultural production.

In 2019, the sown area of Karakalpakstan amounted to 232.1 thousand ha, accounting for 7% of the total sown area of Uzbekistan. In Karakalpakstan,

cotton has the largest sowing area of 88 560 ha which is 38.1% of the total sown area. Second place by sown area is wheat. It occupied 85 767 ha., which equals 36.9% of the total sown area. 75% of the total arable land is allocated for cotton and wheat (fig 1).

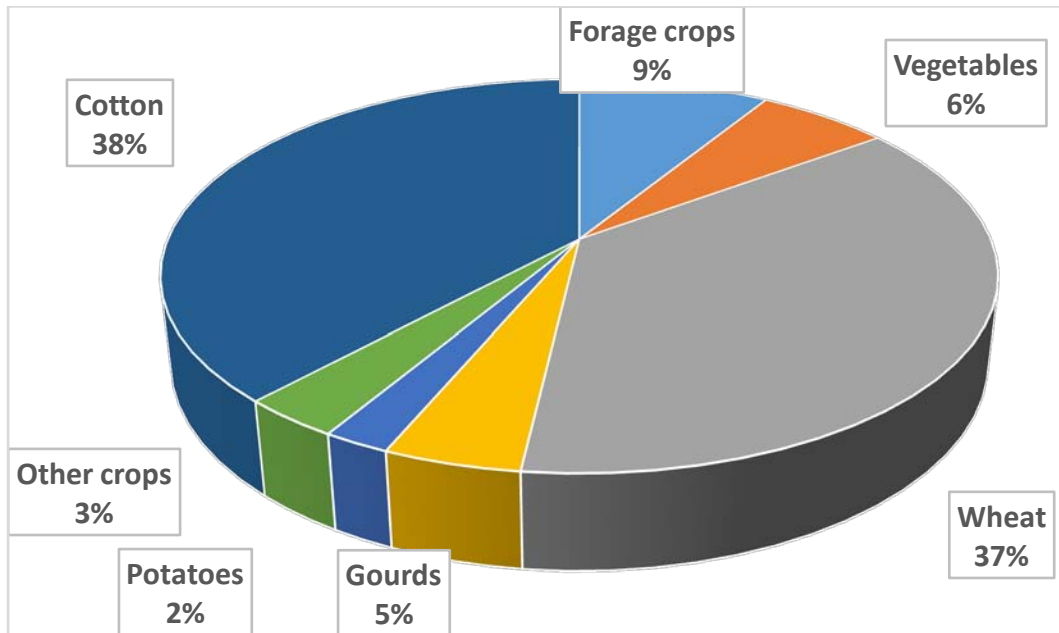


Figure 1: The proportion of planted area of Republic of Karakalpakstan (2019)

Other crops have a small share in the sown area. Service infrastructure, supply of material resources and most research and educational institutions are designed for the cultivation of raw cotton and grain crops.

The level of use of land, water, labor and other opportunities varies in different regions of the Republic.

In order to find solutions to this problem and increase the level of diversification, it is expedient to study the territory of the Republic of Karakalpakstan by separating into 4 conditional zones: South-eastern, Central, Northern, North-western (fig2).

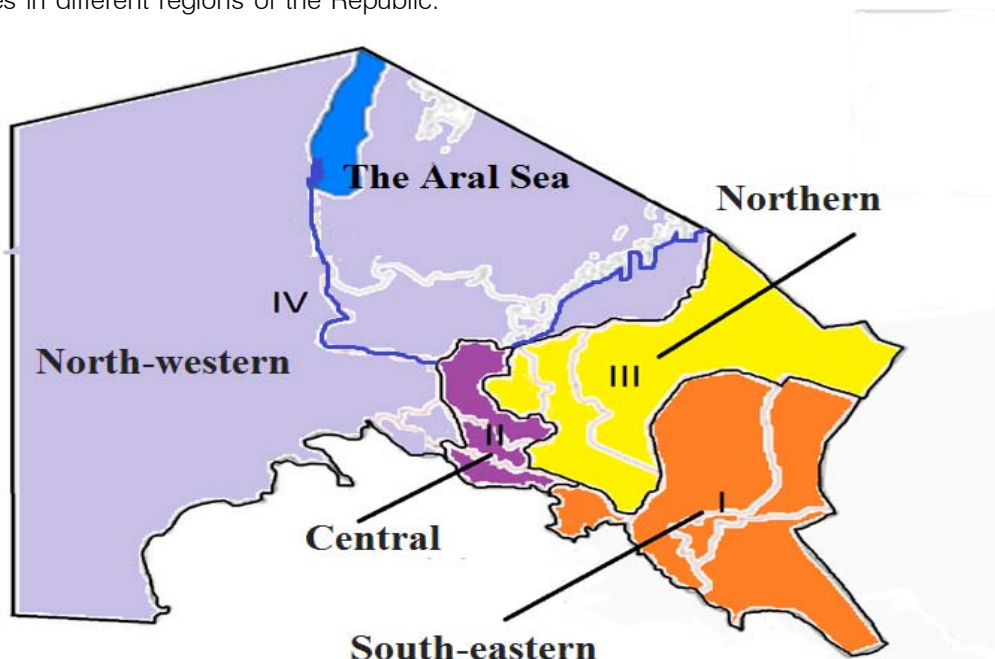


Figure 2: Territorial division of the Republic of Karakalpakstan

South-eastern and Central zones: Currently, relatively favorable conditions for the development of agricultural production exist in the South-eastern and Central zones. Despite the fact that the total land area of South-eastern region is 10.7%, 43.2% of the planted land of the Republic is located in this area and 40 % of the population of Karakalpakstan lives in this area. The

share of the region in agricultural production is 52.9%. This means that the use of available resources and opportunities in the region is well established. It is expedient to strengthen the system of processing of agricultural products in this region, to strengthen services in the sale of products, to organize the sale of surplus products to other regions.

Table 2: Indicators of use of available resources in different zones of the territory of the Republic of Karakalpakstan

Conditional zones	Total land area (%)	Irrigated land (%)	Planted land (%)	Percentage of population living in the area	Share in gross agricultural output
South-eastern	10.7	27,1	43,2	40,1	52,9
Central	2.5	22,8	21,4	34,6	17,9
Northern	17.5	24,2	17,5	11,1	15,1
North-western	69.3	25,9	17,8	14,2	14,1

The level of water supply in this area is relatively stable. The degree of the saturation of the local market with the main agricultural products is higher than in other zones. The early arrival of spring is favorable for

the cultivation of the main types of agricultural products in the region, including: cotton, wheat, melons, fruits and vegetables [6].

Table 3: The saturation of the local market for main agricultural products (%)

Conditional zones	Potatoes	Vegetables	Fruit	Grape	Meat	Milk	Egg	Honey	fish
South-eastern	96,9	160,7	71,8	42,5	116	193,2	76,9	17,2	18,8
Central	33	63,53	13,8	15,9	50,7	79,9	24,5	7,9	8,0
Northern	97,5	131,7	33,7	27,5	143	162,3	62,5	19,1	43,1
North-western	37,1	91,65	13,2	18,1	105	146,1	61,3	10,7	164,3
Republic of Karakalpakstan	66,4	114	39,1	28,2	94,9	143,8	55,0	13,3	38,4

The data of table 2 indicates that the planted are of Central zone account for 21.4% of the total sown area, the share of gross agricultural output is 17.9%. Due to the fact that the capital is located in this area, this area is convenient for the processing and storage of the main types of agricultural products [7].

Northern and North-western zones: The degree of the saturation of the local market with the main agricultural products is lower in these zones. The main reasons for

the relatively low indicators are the low level of water supply in the region, the quality of land and low crop yields and high salinity of lands. There are favorable conditions for the development of animal husbandry in these zones. Despite the fact that 52.1% of the republic's hayfields and pastures are located in this region, only 14% of cattle, 26.3% of sheep and goats, 31.3% of horses and camels account for this region.

Table 4: Territorial distribution of pastures and livestock of the Republic of Karakalpakstan (%)

Conditional zones	Pastures	Cattle	Sheep and goats	Horses	Camels	Poultry
South-eastern	19,8	49,8	40,5	24,2	25,2	56,9
Central	5,7	19	11,7	24,8	15	13,7
Northern	52,1	14	26,3	31,3	30	17,4
North-western	22,4	17,2	21,5	19,7	29,8	12
Republic of Karakalpakstan	100	100	100	100	100	100

Due to the availability of pastures and fodder base for livestock in Northern zone, it is possible to start processing of livestock products, including dairy products, leather products in this zone.

IV. CONCLUSION

There are many approaches to using the potential to diversify regional agricultural production on the basis of marketing tools: one of them is development of a diversification program by regional public administration bodies, where the main focus is on the social significance of the issue and ensuring food security for the population of the region. The other is a diversification approach by direct agricultural producers, focusing on the production of highly value crops or economic activities.

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A Vector Error Correction Model (VECM) Approach in Explaining the Relationship between Fixed Investment and Economic Growth in Rural China

By Nsabimana Leonard, Khan Humayun, Zhong Haiyue & Tang Yunjie

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Abstract- A rural economy can be affected by fixed investment in a rural area positively or negatively. Investment in fixed assets is one of the core measures of capital spending in rural China and the rural economy is a prominent part of china's national economy. It is important to study the dynamic relationship between fixed investment and economic growth in rural China. Based on time-series data from 1990 to 2016, this paper employed a Vector Error Correction Model (VECM) approach to lead the stationarity test, Cointegration test, stability test, and granger causality test. The result indicated that, in the long term, Fixed Investment fluctuation promotes GDP growth in rural China while GDP fluctuation is not the source of fixed investment increase in rural China.

Keywords: *fixed investment in rural china, rural china, economy in rural china, vector error correction model.*

GJHSS-E Classification: *FOR Code: 149999*



AVECTORERRRRCORRECTIOMDELVCEMAPPROACHINEXPLAININGTHERELATIONSHIPBETWEENFIXEDINVESTMENTANDECONOMICGROWTHINRURALCHINA

Strictly as per the compliance and regulations of:



A Vector Error Correction Model (VECM) Approach in Explaining the Relationship between Fixed Investment and Economic Growth in Rural China

Nsabimana Leonard ^α, Khan Humayun ^σ, Zhong Haiyue ^ρ & Tang Yunjie ^ω

Abstract- A rural economy can be affected by fixed investment in a rural area positively or negatively. Investment in fixed assets is one of the core measures of capital spending in rural China and the rural economy is a prominent part of china's national economy. It is important to study the dynamic relationship between fixed investment and economic growth in rural China. Based on time-series data from 1990 to 2016, this paper employed a Vector Error Correction Model (VECM) approach to lead the stationarity test, Cointegration test, stability test, and granger causality test. The result indicated that, in the long term, Fixed Investment fluctuation promotes GDP growth in rural China while GDP fluctuation is not the source of fixed investment increase in rural China.

Keywords: fixed investment in rural china, rural china, economy in rural china, vector error correction model.

I. INTRODUCTION

China as the world's most populous country, many of its population is living in rural areas and since the 1980s, it experienced a lot of its population moving from rural areas to cities for a better life which lead to vacating out of the countryside (Futian et al., 1994). To surmount unbalanced development between rural and urban areas, China's central government within recent years has adopted policies oriented towards coordinating what is termed a harmonious economic development of urban and rural areas. Among those policies, the most important issues that need to be settled every year are planned to favor the development of rural areas through countryside investment development projects and infrastructure investment as the engine of rural livelihood improvement and economic growth (Han Wang and Yi Zhuo, 2018). The inequalities of the economy between rural and urban regions in China were high but stable during the centrally planned period. Since the establishment of reforms in 1978, China has experienced over three decades of rapid economic growth, the Swift development of transformation from a pre-industrial to an industrial state and growth of cities has pushed economic development and improved international competitiveness while also deeply influencing its vast rural areas and has affected China's transformations of

regional rural-urban relationships, with also unbalanced between rural and urban areas in income, infrastructures, together with the change in the quick development of rural industries (Yang et al., 2006). Fixed investment in the rural area refers to the investment in infrastructure construction and purchase of productive fixed assets by the individual, Private companies, government, or any sources of Funds for investment in fixed assets state budgetary appropriation, domestic loans, foreign investment, self-raised funds investment in rural areas while. GDP can be broken down into the contribution of each industry or sector of the economy. The ratio of GDP to the total population of the region is the per capita GDP or mean standard of living which is referred to GDP in the rural area of china in our study. Referring to the inequalities in rural and urban areas to both infrastructural development and economic growth, and as china investment in fixed assets is one of the main measures of capital spending to invest in construction projects in both rural and urban areas, this paper has discussed the relationship between fixed investment and economic growth in rural China as an objective of study. It provided an answer to the question assuming that fixed investment promotes economic growth in rural China and provides the size of its effect. Yet, carry the recommendations; in rely on the promotion of coordinated sustainable development of fixed investment and economy in rural China.

II. INDICATOR SELECTION AND DATA SOURCES

Basing on the research of the relationship between fixed investment and economic growth in rural China, this study selected Total Investment of Farm Households in Fixed Assets and Buildings Construction in Rural Area as the index representing the speed of fixed investment in rural China (RFI) and Gross Social output in the rural area (Term used from 1990-1992) and Total output value, intermediate consumption and value-added of agriculture, forestry, animal husbandry and fisheries (Term used from 1993-2016) as the index representing GDP in rural China (RGDP) which also represents China's rural economic growth. The study used time series annual data from 1990 to 2016. All indicators were collected and arranged according to the

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China Statistical Year Book and China Rural Statistical Year Book, as shown in Figure 1.

RMB 100 Million

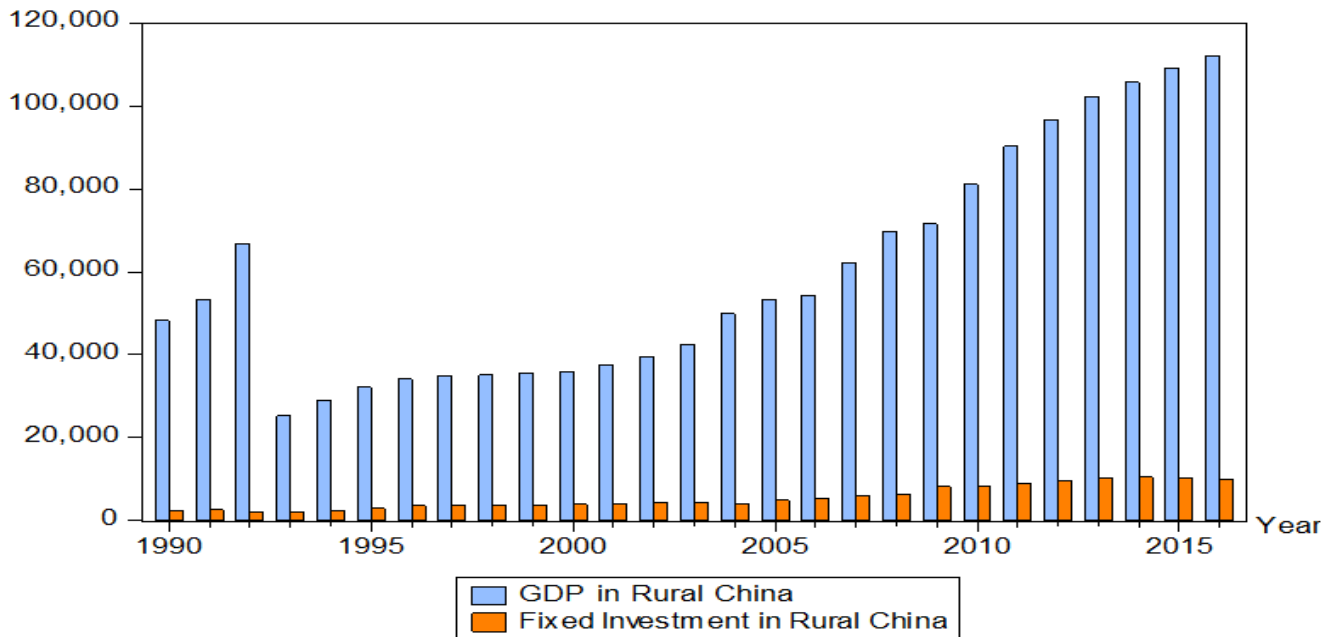


Figure 1: Time Series Plots indicating the comparison of trends of fixed investment and economic growth in rural China

III. STUDY METHODS

The time series variables are non-stationary. If directly making regression to this time series, there will be the problem of spurious regression (Pseudo-regression). To overcome that problem of spurious regression, we firstly used the ADF unit root test to judge whether variables are stationary. If not stationary, it is essential to test whether the variable is single co-integrated and make different processing to make it become a stationary series. So, we make a co-integration test to determine long term relations between variables. The co-integration test needs a Granger causality test. Thus, based on a cointegration test, we

tested granger causality to make further analysis of the relationship between fixed investment and GDP in rural China. We used E Views 8.0 software to perform the statistical analysis and test of related data.

IV. EMPIRICAL TEST AND RESULTS

a) Unit root test

The unit root test is used to test the stationarity of time series variables (Fixed investment and GDP in rural China), ADF (Augmented Dickey-Fuller) test is the common unit root test method for avoiding the problem of spurious regression. If a time series contains a unit root, it is non-stationary.

Table 1: Results of unit root test

Variable	ADF value	1% critical value	5% critical value	10%critical value	P-value	Conclusion
RGDP	0.168377	-3.711457	-2.981038	-2.629906	0.9649	Non-stationary
dRGDP	-5.726859	-3.724070	-2.986225	-2.632604	0.0001	Stationary
RFI	0.423920	-3.711457	-2.981038	-2.629906	0.9801	Non-stationary
d RFI	-3.330422	-3.724070	-2.986225	-2.632604	0.0241	Stationary

Note: RGDP denotes GDP in rural China, RFI denotes Fixed Investment in rural China and d denotes first-order difference processing of variable series.

The results in Table 1 show that the time series of variables are non-stationary but after their first order difference processing, the series are stationary which means that the original series is a first-order single co-integrated series, I (1).

b) Co-integration Test

The role of co-integration test in Fixed Investment and GDP in rural China is to deal with the economic model using non-stationary time series data and the idea is that if there is a long-run relationship

between Fixed Investment and GDP in rural China, then no matter the changes of the variable over time, there will be a common trend to link them together. The literature indicates that co-integration tests include Engle-granger (1987), Johansen (1988), Johansen and Juselius (1990), Pesaran et al (2001), Sørensen and Katarina(1990), etc. are used to confirm the presence of potential long-run equilibrium relationship between variables. To conduct the co-integration test in this study, we adopted the Johansen methodology.

Johansen's approach derives two likelihood estimators for the co-integration; one is a trace test and a maximum Eigenvalue test. The Co-integration can be formally tested with the trace and the maximum Eigenvalue statistics. After applying the Johansen procedure as shown in Table 2, we note that both the Trace test and Max-eigenvalue test indicate only one vector of co-integration that means a long-term relationship among the level of fixed investment and GDP in Rural China within the period 1990-2016.

Table 2: The estimation of co-integration vectors

Sample (adjusted): 1990- 2016
 Included observations: 24 after adjustments
 Trend assumption: No deterministic trend
 Series: RGDP RFI
 Lags interval (in first differences): 1 to 1
 Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.559647	22.41455	12.32090	0.0008
At most 1	0.107529	2.730275	4.129906	0.1164

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
 Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.559647	19.68428	11.22480	0.0013
At most 1	0.107529	2.730275	4.129906	0.1164

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

Because both trace statistic and Maximum Eigenvalue reject the null hypothesis of no co-integration among variables i.e. Trace Statistic and Maximum Eigenvalue values are more than Critical Value at 5% ($22.41455 > 12.32090$; $19.68428 > 11.22480$) and are significant ($0.0008 < 0.05$, $0.0013 < 0.05$). Since the variables are cointegrated, we then proceed to use the Restricted VAR Model (VECM) and not Unrestricted VAR model in modeling the selected variables.

VECM Model checking which is most important in time series data analysis. The results in table 3 the maximum values from each of the information criteria are shown by a star (*) which indicated the lag optimum is at lag2 by the selection criteria of the AIC, FPE, HQIC, LR, and SBIC. So we preceded further tests with lags (2) and one co-integration between variables. Checking of the VECM model is which helps to check order if the fitted model is appropriate.

c) *Model Estimation*

Determination of optimum lag by comparing every lag to the criteria used is the first step taken in

Table 3: VECM lag order selection

Lag	LR	FPE	AIC	SC	HQ
0	-	1.73e+14	38.46113	38.56032	38.48449
1	95.84936	1.61e+12	33.78006	34.07762	33.85016
2	16.20309*	9.05e+11*	33.19058	33.68650*	33.30740*
3	2.939937	1.10e+12	33.35822	34.05252	33.52177
4	1.415685	1.50e+12	33.61295	34.50563	33.82324
5	5.355699	1.46e+12	33.48971	34.58075	33.74673

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

For further Model checking, Roots of Characteristic Polynomial stability condition tests for Model stability test, Breusch-Godfrey Serial Correlation LM Test, Breusch-Pagan-Godfrey of Heteroskedasticity test, and Jarque-Bera test for Normality tests were applied to check for the adequacies of VECM model. The Results from Roots of Characteristic Polynomial stability condition (Fig. 2) below showed that the VECM model satisfies stability conditions since all the roots lie inside the unit circle.

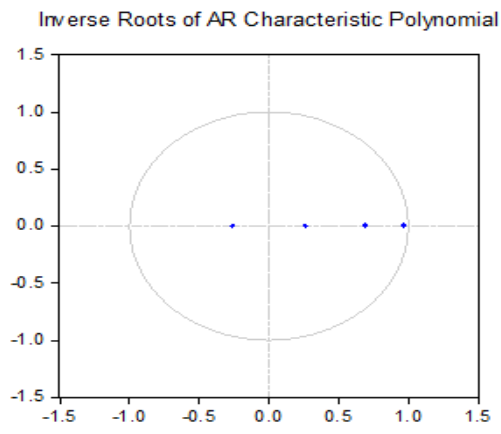


Figure 2: Stability graph for VECM

The results also showed that the null hypothesis of no serial autocorrelation was accepted for the Godfrey LM test for all lags undertaken and the test of heteroskedasticity of data showed that the null hypothesis of no heteroskedasticity meaning that the residuals are homoscedastic was accepted for Breusch-Pagan-Godfrey of Heteroskedasticity test. Hence we

decided that the model has no serial autocorrelation and no Heteroskedasticity. Finally, we tested the normality of the model, and the results (fig. 3) from Histogram residual and the value of the Jarque-Bera test of normality, Null hypothesis (H_0) are rejected for all residuals which indicate that they are all normal.

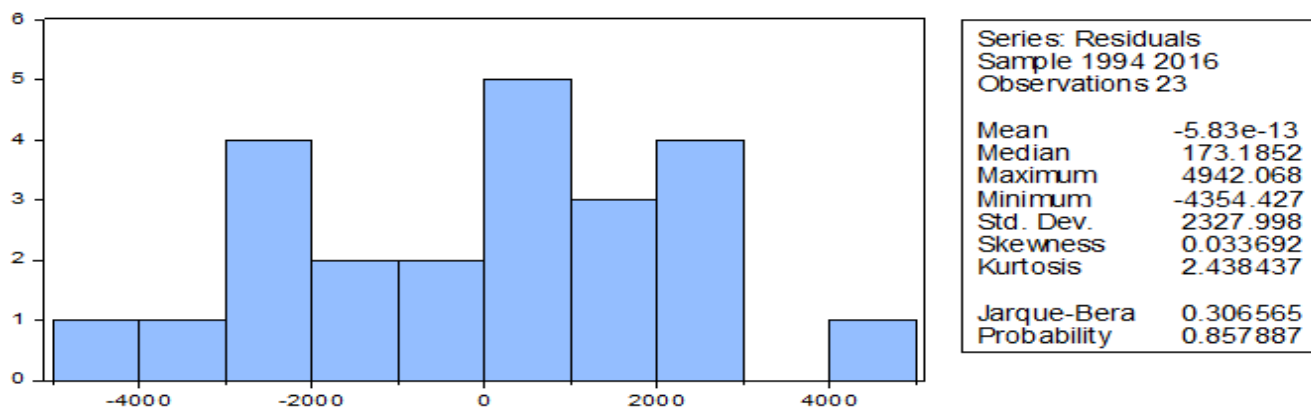


Figure 3: Normality graph for VECM model

d) Granger Causality Analysis

Through difference processing, the above indicators are stationary and have long-term co-integration relations. Then, we carried out a Granger causality test for these variables. The use of the Granger Causality Analysis test suggests a cause and effect relationship between Fixed Investment and GDP in rural China. Here, the results for the analysis of causality are presented and the causality between the variables (if

any) and the direction of the causality of the systems are determined. The results estimate of the test in Table 4 shows that at 5% fixed investment is Granger-causal for GDP, while GDP is not granger cause of fixed investment in rural China. However, there is a unidirectional causality between GDP growth and fixed investment in rural China. The finding implies that fixed investment can promote economic growth in rural China.

Table 4: Results of the Granger causality test

Null Hypothesis	F-statistics	Probability	Decision
RFI does not Granger Cause RGDP	5.06622	0.0172	Reject
RGDP does not Granger Cause RFI reject	0.06344	0.9387	Do not

RFI: Fixed Investment in Rural China
RGDP: GDP in Rural China

e) Impulse Response Functions (IRFs)

The performance of Impulse Response Function analysis was used in this study as an additional check of the co-integration test findings and provided information for the long-run relationship between Fixed Investment and GDP in rural China and also provided information to analyze the dynamic

behavior of a variable due to a random shock or innovation in other variables and shows the effects on current and future values of the endogenous variables of one standard deviation shock to a variable. We used Cholesky-dof adjusted type of contemporaneous identifying restrictions to draw a meaningful interpretation as shown in figure 4.

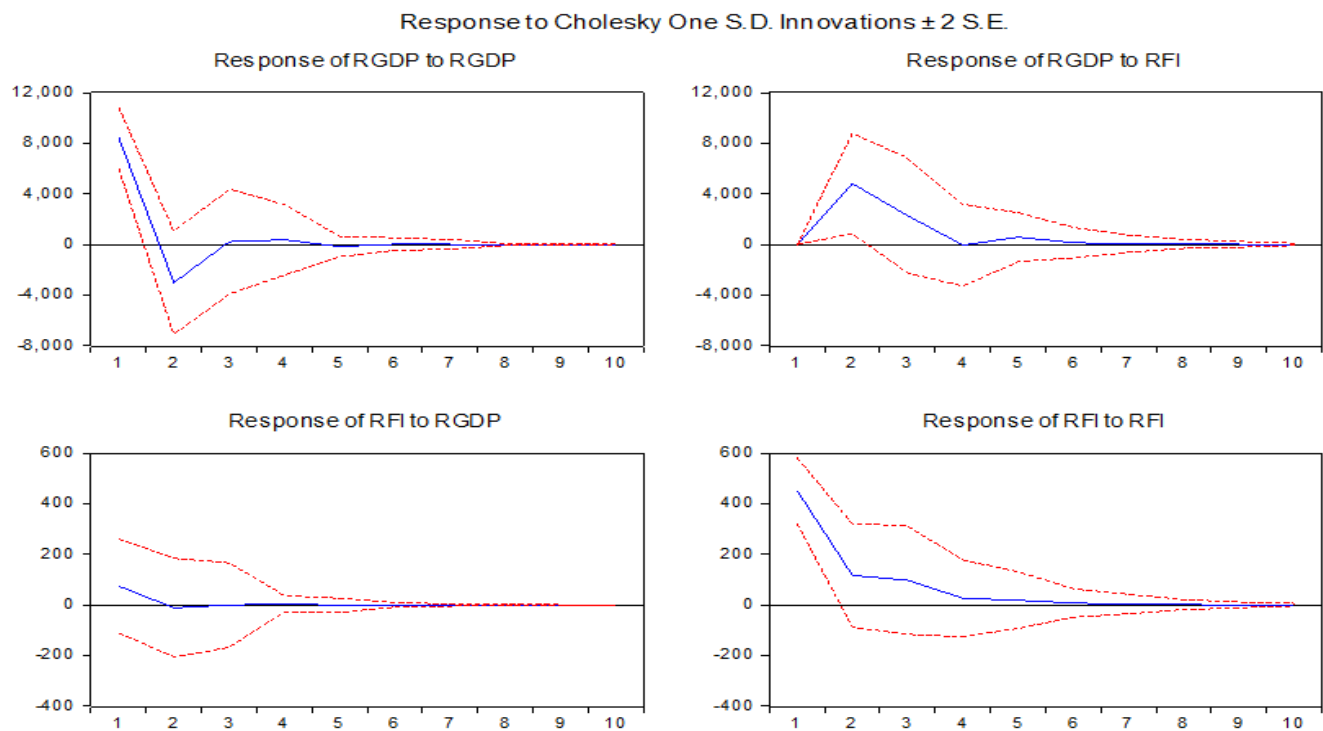


Figure 4

Impulse response functions as shown in the above figure shows that a unit shock of RGDP to RFI creates strong positive fluctuations increasing into the future until 10 years from zero and finally dies off. And the response of RFI to a shock in RGDP also creates positive fluctuations, increasing positively into the future for up to 10 years and also finally dies off. It implies the meaningful reciprocal effect between Fixed Investment and GDP in Rural China with the time.

V. CONCLUSIONS

By the empirical test of the relationship between fixed investment and economic growth in rural china, we concluded that fixed investment promotes economic growth in rural China. There found also a unidirectional causality between GDP growth and fixed investment and

has a long-term relationship in rural China. Thus, to promote fixed investment development to economic growth and to raise the guidance function of developing economy to fixed investment development in rural China, the following recommendations can be proposed for maintaining rural china sustainable development in the future:

Extending financial investment system and improving institutions organization in rural China. The study shows that fixed investment promotes economic growth in rural China. Thus, the Government should focus more on the improvement of capital investment in rural areas invest and local industries to boost domestic production. Improve the allocation of rural investing projects and more focus on the construction of rural

industrial institutions and services which promotes an increase in the total output of rural China.

Enhance rural farming technology, Services, and infrastructure development. It is recommended to guide rural farmers to centralize funds to develop a rural large scale economy by plantation of cash crops to obtain economic benefits and famous brand benefits to boost the rural economy. The government should also help farmers to use better technology and method for farming, reduction of corruption and misbehavior of local government officials and economic assistance to farmers, coordination, and supervision of investment in rural infrastructure development as an investment priority for economic development. Strengthening the cooperation between government, stakeholders, enterprises and private sectors is also a good choice as they respond to the call actively, providing more employment opportunities in the rural areas of China.

Improve countryside revitalization designing measures. The economic development growth through rural fixed investment in rural China also needs to take rural area as a unit to classify different rural areas and urban areas from top to bottom, connect the national and provincial rural revitalization of rural areas, clarifying the spatial structure and designing of township construction, establishment of new governance mechanisms for rural communities and upgrading social security guarantee for rural residents.

Rise of rural output by investing in other rural activities. Even if the study indicated that fixed investment promotes rural economic growth, Taking rural area as a place where is many population living considering to urban area, and considering to the inequalities between rural-urban per Capita income, Investment into Products of agriculture, forestry, fisheries, aquaculture, tourism,... And other rural sectors can affect China's rural economic growth positively. This will not only bring new vitality improvement to the rural population but also relieve urban pressure and contributing to the realization of the Chinese vision for sustainable development.

Abbreviations

VECM: Vector Error Correction Model

GDP: Gross Domestic Product

RFI: Fixed Investment in Rural China

RGDP: GDP in Rural China

ADF: Augmented Dickey-Fuller

I (1): First-order single co-integrated series

No. of CE(s): Number of Cointegrating Equation (s)

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final Prediction Error

AIC: Akaike Information Criterion

SC: Schwarz information Criterion

HQ: Hannan-Quinn information criterion

Fig. : Figure

H_0 : Null hypothesis

Std. Dev.: Standard Deviation

S.D: Standard Deviation

Declarations:

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data

The datasets used during the current study are available from the corresponding author on a reasonable request.

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

Nsabimana Leonard is the First and corresponding author who collected the data, analyzed them during the research, and writing of the manuscript. All co-authors contributed and assisted the researcher in editing the manuscript. The author(s) read and approved the final manuscript.

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Keywords: *agriculture, foreign agricultural aid, subsaharan africa, volatility.*

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Does Official Development Assistance Volatility Influence Agricultural Productivity Growth in Sub-Saharan Africa?

Sophie Michelle Eke Balla ^α & Boris Odilon Kounagbè Lokonon ^ο

Abstract- Agriculture is of paramount importance of Sub-Saharan African (SSA) countries. Owing to that, governments and donors invest in the agricultural sector in order to meet the sustainable development goals. However, gaps are observed between official development assistance (ODA) disbursements and commitments. Therefore, this paper investigates the effect of ODA and its volatility on agricultural productivity growth in SSA over the period 2002-2015, using a random effect model. The findings reveal a negative and significant effect of ODA volatility on agricultural productivity growth. The findings suggest that SSA countries partners may continue helping them to boost the agricultural productivity growth through ODA and reduce the gap between ODA disbursements and ODA commitments, to make ODA more predictable.

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I. INTRODUCTION

Sub-Saharan African (SSA) countries are characterized by high level of poverty and low economic diversification associated with low productivity (IMF, 2014). In these countries, around 60-70% of the population are in the rural areas and depend largely on rain-fed agriculture which needs to undergo a structural transformation (ACET, 2014). Actually, the agricultural sector which is mostly rain-fed is the main contributor to employment generation in these countries. However, the contribution of agriculture to the gross domestic product (GDP) is about 17.4% in 2016 (World Bank, 2018), which is quite low depicting low agricultural productivity, as between 60% and 70% of the population do not contribute at least to 50% of GDP. This fact appeals for policies towards improving agricultural productivity. It is acknowledged that support to the agricultural sector is of paramount importance for poverty reduction. Certainly, agricultural growth has a larger poverty-reducing effect compared to non-agricultural growth (Lewis, 1954; Mellor, 2001; Dercon and Christiaensen, 2005; Christianensen *et al.*, 2010). Actually, a powerful way to increase farmers' income and to reduce rural poverty could be to improve agricultural productivity (Gollin *et al.*, 2002; Fox and Pimhidzai, 2011; ACET, 2014). Therefore, policies

aiming to trigger or boost the transformation of the agriculture are of paramount importance in SSA. It should be noted that the transformation of the agricultural sector has the potential to lead to the overall transformation of the economies. Due to huge differences in well-being across developed and developing countries which are staggering, there is a demand for transfers of income from the former to the latter (Alesina and Weder, 2002). These transfers may help SSA countries to boost and sustain agricultural growth and in-fine to boost the overall economic growth.

Actually, to boost agricultural growth, SSA countries rely among others on official development assistance (ODA) (Herdt, 2010). Indeed, two components of agricultural investment are of paramount importance, namely, foreign agricultural aid and public domestic expenditures on agriculture (Alabi, 2014). According to Alesina and Weder (2002), bilateral aid, multilateral aid from international organizations, grants at below-market rates, technical assistance, and debt forgiveness programs are among the international programs to alleviate poverty. Many developing countries depend highly on ODA and SSA is the largest recipient of ODA; this region receives about 35% of total ODA and hosts thirteen out of the twenty largest ODA recipients (Kumi *et al.*, 2017). However, Ssozi *et al.* (2018) argued on the one hand that until recently, aid for agriculture in volume and in terms of share out of the total aid was declining, and in the other that ODA is neither an automatic panacea nor an immutable curse (constraint), as its effects differ across areas receiving it. It should be noted that according to Knack (2001), the dependence of aid has the potential to undermine the quality of governance and public sector institutions through weakening accountability, encouraging rent-seeking and corruption, fomenting conflict over control of aid funds, siphoning off scarce talent from the bureaucracy, and alleviating pressures to reform inefficient policies and institutions.

There is a strand of literature on the role of ODA in boosting agricultural growth, especially in SSA. These studies include Alabi (2014); Ssozi *et al.* (2018). However, the link between ODA volatility and agricultural growth in SSA remains open. For Chauvet and Guillaumont (2009), ODA volatility may lower and possibly cancel the beneficial effect of aid on economic

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growth when it is pro-cyclical with regard to exogenous shocks. It may happen that aid disbursements may be different from aid commitments, which gap may affect agricultural productivity growth. This may be due to donor countries' prevailing economic and political conditions, and also to weak institutional structures in recipient countries, and thereby leading to aid unpredictability (Kumi *et al.*, 2017). Therefore, the objective of this paper is to investigate the effect of official development assistance (ODA) volatility on agricultural productivity growth in SSA. Indeed, there is a rising concern about the problems raised by aid volatility (Chauvet and Guillaumont, 2009). This paper contributes significantly to the literature since it aims at providing insights on the extent to which aid volatility hampers the beneficial effects of aid to agricultural productivity growth in the context of SSA. In addition, the paper makes use of rainfall and temperature shocks instead of average temperature and total rainfall.

The remainder of the paper proceeds as follows. Section 2 present a literature review. The methodology used are described in section 3. Section 4 presents the findings as well as their discussion. Finally, section 5 concludes the paper and presents some policy implications.

II. LITERATURE REVIEW

Agriculture usually plays a vital role in the economy of every nation that exists. Not only for the reason that it tends to feed the entire population of a country but also in the sense that agriculture correlates and interacts with all the related industries. A country is usually considered to be a social and politically stable nation if it possesses a very stable agricultural basis. In fact agriculture plays a pivotal role in the development of SSA as the major source of income, food, employment, and in its effectiveness in reducing poverty. Most donors aim at promoting poverty reduction, by strengthening agricultural sectors in the recipient economies. One of the reasons of development assistance flows from donor countries to low income developing countries is to achieve the Sustainable Development Goals (SDGs). Agriculture is considered to have an active role in the development process and is often seen as a vehicle to help the poor. Because of the impact of agricultural growth on poverty reduction, this suggests that, agriculture is an aid sector.

The term aid sector signifies the sector of the recipient's economy that the aid activity is designed to assist. Foreign aid can be simply defined as economic assistance provided to a country by another country or organization. In recent years the impact of aid has been more favorably viewed in the literature. Alesina and Dollar (2000) argued that donor's decision on the allocation of foreign aid is guided by political and strategic considerations as much as by the economic

needs and policy performance of recipient countries. However, the volatility of foreign aid flows is another issue discussed in the economics literature related to aid. Volatility is a hurdle in achieving sustained economic growth which is an important objective of any economy. The issue is relatively new to the economics literature, especially in relation to agricultural growth. Indeed a key pledge from the Paris Declaration of 2005 was to make aid more predictable.

Bulir and Hamann (2003) found that aid inflows are more volatile than domestic revenues, corroborated by their subsequent study (2008). In the similar vein, Pallage and Robe (2001) found that aid is twice as volatile as real output. Whether or not such aid flows are pro- or anti- cyclical, however, remains controversial; Bulir and Hamann (2003) found that aid tends to move in the same direction as GDP and revenues, while Pallage and Robe (2001) showed that for African countries aid is pro-cyclical differently from recipients outside Africa. Pallage and Robe (2001) observed that aid is highly volatile with an average volatility of about 25% in African recipients and 29.5% in non-African recipients. Aid volatility has been demonstrated to have a negative impact on economic growth (Bulir and Hamann, 2003; Bulir and Hamann, 2008), investment and government expenditure (Hudson and Mosley, 2008a). Celasun and Walliser (2008) argued that unexpected aid shortfalls can force governments to disproportionately cut investment.

Bulir and Hamann (2003, 2008) argued that the volatility of aid is (i) greater than that of government revenue, (ii) increasing over time, and (iii) pro-cyclical (that means that aid flows are inversely correlated with the level of government expenditures). The tendency for aid to be pro-cyclical makes aid-dependent countries more prone to external shocks, reduces the effectiveness of counter-cyclical policy tools (Bulir and Hamann, 2008) and adversely affects the ability of governments to plan expenditure (Bulir and Hamann, 2003). Hudson and Mosley (2008a) found that volatility as a whole reduces growth given the level of aid, but not in a uniform way, differentiating between upside and downside volatility.

Much work of aid volatility has focused on the impact of volatility on the macroeconomic factors. For instance, Lensink and Morrissey (2000) concluded that volatility damages the macroeconomic effectiveness of aid. Arellano *et al.* (2009) examined the effects of aid and its volatility on consumption, investment, and the structure of production in the context of an inter-temporal, two-sector general equilibrium model. They argued that a permanent flow of aid mainly finances consumption rather than investment and that aid volatility results in substantial welfare losses to consumers, equivalent to 8% of the aid budget. Bulir and Hamann (2003) empirical work is based on a sample of 76 countries from 1975 to 2003. They use a

Hodrick–Prescott filter to derive aid residuals from a trend. The square of those residuals then measure volatility in a specific year for a given country. Critical in all this is how one scales aid, particularly when comparing volatilities between different variables. Bulir and Hamann (2003) specified aid in US\$ and government revenue in domestic currency. Both series were transformed into proportions of nominal GDP, PPP GDP, and constant US dollars per capita. Bulir and Hamann (2003) found that volatility was highest in the countries which are most aid-dependent, which are generally the poorest and most vulnerable. However, in their 2008 paper, they found that the pattern to be more complex, and that both those countries that are little dependent on aid and those that are heavily dependent on aid display high aid volatility relative to government revenue.

Rodrik (1990) also analyzed the problems revenue volatility can cause in developing countries, while Mosley and Suleiman (2007) showed that the ability of the recipient country's public sector to implement coherent investment programs and fiscal policies is reduced by aid volatility. Chauvet and Guillaumont (2009) concluded that aid tends to neutralize volatility in export flows and also income volatility, while aid volatility reduces its effectiveness in these respects. They also showed that the higher effectiveness of aid in vulnerable countries is, to a large extent, due to this stabilizing effect. Hudson and Mosley (2008a) in a subsequent paper found no evidence for highly aid dependent countries to have higher volatility. Indeed, they concluded that volatility declines as the aid-revenue ratio increases. But to a large extent they were able to confirm many of the conclusions of Bulir and Hamann (2003, 2008), for example that the ratio of aid to government revenue volatility was in excess of one for almost all countries. The volatility of overseas aid was also noted to be severe, in relation to the volatility of domestic revenue, and increasing over time. Hudson and Mosley (2008a) differentiated between positive/upside and negative/downside volatility. Both reduce the impact of aid on growth, but subsequently some of this adverse impact is reversed, although only for positive volatility. With negative volatility there is no such reversal.

Hudson and Mosley (2008b) analyzed the impact of aid volatility on GDP/Gross National Product (GNP) shares of expenditure. Negative volatility reduces investment and government expenditure shares and also the import share. This may be because of the type of aid which is subject to volatility, or because consumers are better able to absorb shocks by drawing on savings and/or borrowing than other agents. The results also suggest a limited ability of governments to rearrange revenue flows to reduce the impact of volatility upon their expenditure priorities. Positive volatility also reduces investment and government expenditure

shares, as well as increasing consumers' expenditure share. Some studies have examined other macroeconomic factors such as public sector behavior in developing countries (Mavrotas and Ouattara, 2006a, 2006b). Fielding and Mavrotas (2005) distinguished between sector aid and total aid in examining aid volatility in 66 countries over 1975–2004. They built on the conclusion by Levin and Dollar (2005) that aid is more volatile in countries identified as having weak political institutions and historically poor macroeconomic policies. Consistent with this, Fielding and Mavrotas (2008) concluded that institutional quality and macroeconomic stability affect aid volatility, as does reliance on a small number of donors. However, the relative importance of these effects varies across different aid types.

Reflecting this, countries that have recently agreed to International Monetary Fund (IMF) conditionality experience higher total aid volatility, but not higher sector aid volatility. This suggests that having agreed to such conditionality is a sign of weakness in existing macroeconomic policy. They also found that the factors driving up sector aid volatility are different to those impacting on total aid volatility. In addition, a number of individual donors (in particular, Germany, the United States and the European Commission) appear to be associated with relatively high volatility sector aid flows. Neanidis and Varvarigos (2009), using the Creditor Reporting System (CRS) database, found that aid disbursements used for productive sectors have a positive effect on growth, but pure transfers reduce growth. Aid volatility is found to hurt growth, only when aid is used productively, while the volatility of pure aid disbursements is associated with higher growth.

Wolf (2007) and Stuckler *et al.* (2011) focused on the effects of aid volatility on micro targets. Wolf (2007) analyzed the effects of the volume and volatility of aid on education, health, water, and sanitation outcomes. Overall the share of ODA that is provided for education and health seems to have a positive impact on outcomes in these sectors, whereas total aid seems to be negatively associated with these. Aid volatility is associated with better outcomes in sanitation, water, and infant mortality, contrary to expectations. The merits of this paper are in its focus and the use of sector aid as well as total aid. But the research measures aid volatility as the coefficient of variation for total aid during 1980–2002, while the regressions themselves relate to just 2002. Hence, this is entirely different to the concept of volatility as used by most of the literature, and it is not really clear what this is picking up. Stuckler *et al.* (2011) focused on one of the possible consequences of volatility. They found that for each \$1 of development assistance for health, about \$0.37 is added to the health system. Evaluating IMF borrowing versus non-IMF borrowing countries reveals that non-borrowers add about \$0.45, whereas borrowers add less than \$0.01 to

the health system. This, they argued, could be because World Bank and IMF macroeconomic policies specifically encourage governments to divert aid to reserves to cope with aid volatility.

Although there is a vast literature on aid effect on economic growth, a very limited number of studies tried to address the relationship between foreign assistance given to the agricultural sector and productivity. Norton *et al.* (1992) used a total aid variable to look at its effect on agricultural growth. A sub-set of studies look specifically at the effect of agricultural aid on agricultural productivity and finds a strong positive correlation between these two variables (Norton *et al.*, 1992; Mosley and Suleiman, 2007; Akpokodje and Omojimiti, 2008; Kaya *et al.*, 2008; Islam, 2011; Umbadda and Elgizouli, 2013). Kaya *et al.* (2008) employed a cross-section time-series econometric model to analyze the impact of agricultural aid on agriculture in developing countries. They employed annual data from 1974 through 2005 for developing countries that are aid recipients from World Bank's World Development Indicators 2007 (WDI) and the Statistical Database of the Food and Agriculture Organization of the United Nations (FAO). They used agriculture value added as the dependent variable and variables related to cross country differences are incorporated in the model to control for their impacts on the dependent variables: GDP per capita, fertilizer consumption, irrigated land, land under cereal production, livestock production index, rural population, sum of exports and imports of goods and services measured as a share of gross domestic product, agricultural machinery (tractors) and crop production index. Their results indicated a positive and statistically significant relationship between growth in the agricultural output and agricultural assistance for rural development.

Alabi (2014) investigated the impact of foreign agricultural aid on agricultural GDP and productivity in SSA. He used secondary data regarding foreign agricultural aid, agricultural GDP, and productivity indicators from 47 SSA countries spanning 2002-2010 and employs a Generalized Method of Moments (GMM) framework. The econometric analysis suggests that foreign agricultural aid has a positive and significant impact on agricultural GDP and agricultural productivity at 10% level of significance. The study also reveals that bilateral foreign agricultural aid influences agricultural productivity more than multilateral foreign agricultural aid and that multilateral foreign agricultural aid influences agricultural GDP more than bilateral foreign agricultural aid. Scaling up foreign agricultural aid will increase its impact on agricultural productivity and its contribution to the economy of SSA, and sectorial foreign agricultural aid allocation should give priority to factors that will enhance this productivity.

Ssozi *et al.* (2018) used the system two-step GMM to examine whether ODA for agriculture and rural development is helping to boost agricultural productivity, through a Cobb-Douglas production function. The dataset is made up of 36 SSA countries, covering the 2002-2015 time periods. They found that, there is a positive relationship between development assistance and agricultural productivity in general. However, when broken down into the major agricultural recipient sectors, there is a substitution effect between food crop production and industrial crop production. Better institutions and economic freedom are found to enable agricultural productivity growth, and to increase the effectiveness of development assistance.

There has always been a debate about the empirical correlation between aid and economic growth, and agricultural productivity. The association could be spurious if aid is increasingly flowing into countries where agricultural productivity has been already increasing as a result of another factor. Fluctuations in aid inflows can result in instability of employment, changes in government budgets and uncertainty about the degree to which resources will be utilized in the future. All this has welfare consequences. Aid effectiveness literature primarily follows two main streams. Earlier studies mostly focused on the effect of aggregate aid on overall economic performance. Later studies concentrated on the effect of sector specific aid on sectoral and aggregate economic performance as comprehensive sectoral aid data became more available from bilateral and multilateral aid agencies. These studies investigated the possibility that the effect of different kinds of aid may be of importance for understanding the macroeconomic effect of aid in aid recipient countries. The literature on the nexus between foreign aid and agriculture has not assessed whether ODA for agriculture is relevant in increasing productivity in agriculture.

This paper switches the attention from the macroeconomic effects of aid unpredictability by linking aid volatility and agricultural productivity.

III. MATERIAL AND METHODS

a) *Specification of the model*

This study makes use of an agricultural growth model as it aims to investigate the impact of ODA volatility on agricultural productivity growth, following the existing literature on the subject summarized in the previous section. Consider the following Cobb-Douglas agricultural production function:

$$Y = AK^{\alpha}L^{\beta}LA^{\gamma}ODA^{\delta} \quad (1)$$

Where Y is the agricultural value added, K refers to the level of capital used during the production process, L denoted the level of labor, LA is land and ODA refers to ODA to the agricultural sector. The Cobb-Douglas

production function is chosen due to its flexibility compared to other production functions such as the transcendental logarithmic production function (translog production function) and the linear production function. In this specification, ODA is considered as a form of input which contributes directly to agricultural growth. Dividing the two sides of (1) by the number of

agricultural workers yields the per capita agricultural production function specified as follows:

$$y = ak^{\alpha} la^{\gamma} oda^{\delta} \quad (2)$$

In (2) the variables are expressed in per capita. Linearizing (2) through making use of the natural logarithm, and adding the error term leads to:

$$\ln y = \ln a + \alpha \ln k + \gamma \ln l + \delta \ln o + \varepsilon \quad (3)$$

Where ε is the error term. This study is particularly interested in the effect of ODA volatility on agricultural productivity growth. Therefore, a variable capturing this volatility is added to (3). ODA volatility is captured in this study by the difference between ODA disbursements and ODA commitments. As climate factors are important for agricultural activities due to the mostly rain-fed nature of the agriculture in SSA countries, rainfall and temperature must be included in the equations. We use

rainfall and temperature shocks instead of average temperature and total rainfall. Rainfall and temperature shocks are computed as the deviation of mean annual temperature and total annual rainfall of each year from the historical mean annual rainfall and temperature of the country. The historical period used in the paper is the 1981 – 2010 reference period set by the World Meteorological Organization (WMO). Thus, we have the following specification:

$$\ln y = \ln a + \alpha \ln k + \gamma \ln l + \delta \ln o + \theta \text{volatility} + \rho \text{Rain} + \tau \text{Temp} + \varepsilon \quad (4)$$

Capital is captured by government expenditures in the agricultural sector. We include the base year value of agriculture value added per worker (the value in the first year of the sample) in the regression. Thus the coefficient associated with this variable is expected to be negative, and thereby will relate to the speed of convergence. Owing to this, we prefer to estimate a random effects model, as fixed effect estimation is not possible with the presence of this variable. It is worth noting that we thought about the non-linearity between

aid volatility and agricultural productivity growth. Indeed, we explore the threshold effect of aid volatility on agricultural productivity growth via a Fixed-effect panel threshold model (Hansen, 1999; Wang, 2015) under the assumption that when ODA volatility exceeds a given threshold, ODA ceases to affect agricultural productivity growth. However, the threshold appears to do not be significant rejecting the non-linear model. Therefore, the estimated model is specified as follows:

$$\ln y_{it} = \ln a + \alpha \ln k_{it} + \gamma \ln l_{it} + \delta \ln ODA_{it} + \theta \text{volatility}_{it} + \rho \text{Rain}_{it} + \tau \text{Temp}_{it} + \sigma \ln \text{Baseline}_{y_{it}} + \varepsilon_{it} \quad (5)$$

Where $i = 1, \dots, N$ and $t = 1, \dots, T$.

b) Data

The data used in this study are from three sources. Data on ODA for the agricultural sector are collected from the Organization for Economic Co-operation and Development (OECD) Statistics (CRS). These data are related to ODA commitments and ODA disbursements. As aforementioned, ODA volatility is computed as the gap between disbursements and commitments and is in the form of a ratio. Data related to government expenditures in the agricultural sector are the Food and Agriculture Organization of the United Nations (FAO) database. The remaining data are collected from the World Development Indicators (World Bank, 2018). All variables except land which is expressed in hectares are in US \$ constant. We use a panel data ranging from 2002 to 2015. This period is chosen because ODA disbursements are available from 2002, and therefore we are constrained by this availability period. Thirty four SSA countries are accounted for in the estimations due to data availability on the study period.

IV. EMPIRICAL RESULTS AND DISCUSSION

Table 1 presents the summary statistics of the variables before turning to the estimation results. The average agricultural value added per worker amounted to US\$ 1,717.89 over the period from 2002 to 2015, which is higher compared with the US\$ 1.25 international daily poverty line. However, there are disparities across countries as indicated by the standard deviation of 2,154.10, and the minimum of 200.30 which is far below the maximum of 9,824.97. Land use per worker is also unevenly distributed across SSA countries of the sample (average of 16.21 ha and a minimum and a maximum of 0.05 ha and 152.24 ha, respectively). The extent of climate shocks differs across space and over time. On average, over 2002-2015 all countries in the sample have experienced positive rainfall and temperature shocks. This indicates that on average the annual rainfall is greater than the historical mean, denoting more water. As for temperature, this reveals that the average temperature has increased, suggesting

that this may be detrimental to the agricultural sector. Disparities in ODA per worker are also observed within SSA countries included in the sample. Actually, the average ODA per worker amounted to US\$ 14.48 over the study period, with a minimum of 0.03 and a maximum of 310.97. Gaps are observed between ODA commitments and ODA disbursements. On average,

ODA disbursements are higher of about 62% to ODA commitments (on average the upside volatility outweighing the downside volatility). The minimum gap is about -95%, while the maximum gap amounts to 6,931%. As for government expenditures in the agricultural sector per worker, its average amounts to US\$ 5,720.94.

Table 1: Descriptive statistics of the variables used in the estimations

Variables	Observations	Mean	Std. Dev.	Min	Max
Agricultural value added per worker	490	1,717.89	2,154.10	200.30	9,824.97
ODA	490	14.48	32.88	0.03	310.97
ODA volatility	490	0.62	4.25	-0.95	69.31
Land per worker	490	16.21	34.56	0.05	152.24
Government expenditures	330	5,720.94	11,481.43	53.05	62,323.11
Rainfall shock	490	26.39	116.21	-568.45	473.07
Temperature shock	490	0.27	0.33	-0.57	1.57

Table 2 reports summary statistics on ODA volatility in the countries included in the sample over 2002-2015. Most of the countries recorded upside ODA volatility between 2002 and 2015. The countries that recorded downside ODA volatility include Botswana, Burundi, Democratic Republic of Congo, Ethiopia, Kenya, Mali, Rwanda, Senegal, and Tanzania. Although

all the countries experienced at least once downside ODA volatility (as shown by the minimum value which is negative for all countries), none of them have recorded only this type of volatility (the maximum value is positive for all countries). The estimation results will reveal the effect of this volatility on the agricultural productivity growth in SSA.

Table 2: Average ODA volatility in the countries included in the sample

Countries	Observations	Mean	Std. Dev.	Min	Max
Benin	14	0.003	0.56	-0.70	1.37
Botswana	14	-0.004	0.38	-0.93	0.53
Burkina Faso	14	0.04	0.45	-0.82	0.96
Burundi	14	-0.29	0.32	-0.62	0.55
Cabo Verde	14	0.93	1.31	-0.89	4.60
Central African Republic	14	1.68	2.46	-0.72	9.51
Congo, Dem. Rep.	14	-0.23	0.22	-0.70	0.06
Congo, Rep.	14	0.40	0.68	-0.85	2.10
Côte d'Ivoire	8	0.15	0.69	-0.55	1.50
Ethiopia	14	-0.06	0.47	-0.56	1.33
Gambia, The	14	1.05	1.59	-0.82	4.73
Ghana	10	0.08	0.64	-0.80	1.49
Guinea-Bissau	14	0.24	0.71	-0.74	1.97
Kenya	14	-0.13	0.37	-0.71	0.43
Lesotho	14	0.41	0.99	-0.60	2.82
Liberia	14	0.35	1.80	-0.96	5.70
Madagascar	14	0.10	0.36	-0.35	1.12
Malawi	14	0.13	0.66	-0.63	2.15
Mali	14	-0.12	0.39	-0.79	0.51
Mauritius	13	10.32	18.17	-0.95	69.31
Mozambique	14	0.04	0.40	-0.65	0.67
Namibia	14	0.09	0.61	-0.90	1.46
Nigeria	14	0.51	1.89	-0.86	6.30
Rwanda	14	-0.11	0.29	-0.62	0.36
Sao Tome and Principe	14	0.81	1.61	-0.85	5.88
Senegal	14	-0.02	0.37	-0.82	0.56

Seychelles	13	0.49	1.21	-0.83	3.51
Sierra Leone	14	0.22	1.00	-0.38	3.67
South Africa	14	0.08	0.38	-0.61	0.68
Swaziland	14	0.39	1.83	-0.90	5.49
Tanzania	14	-0.12	0.30	-0.61	0.46
Togo	14	0.74	1.56	-0.77	5.28
Uganda	14	0.06	0.49	-0.63	0.95
Zambia	14	0.07	0.64	-0.77	1.80

The presence of random effects is tested through the Breusch and Pagan Lagrange multiplier tests. The Breusch and Pagan Lagrange multiplier test indicates the presence of random effects ($\text{Prob} > \chi^2_{(2)} = 0.00$), suggesting that pooled Ordinary Least Squared (OLS) would be inappropriate. The estimation results are reported in Table 3. Three equations are estimated depending on the inclusion of ODA and its volatility. Model 3 is the preferred estimation as it includes both ODA and its volatility. The signs of the estimated parameters are consistent in the three equations, except for ODA. In the three specification the coefficient associated with the initial value of agricultural value added per worker is positive and highly significant. Therefore, the finding suggests that there is no convergence in agricultural productivity growth in SSA during the period of analysis. Actually, all the countries are not allocating at least 10% of the national budget to agriculture as they have committed themselves in Muputo in 2003. The finding may perhaps be due to the study period covering 2002-2015. Land appears to do not significantly influence the agricultural value added per worker in SSA, although its associated coefficient has the expected positive sign. Similarly, rainfall and temperature shocks do not influence significantly the agricultural productivity growth. The finding related to the effect of rainfall and temperature shocks is simply about the average effect on all countries included in the sample over the study period. In addition, the effect may be different when it comes to the individual countries.

The findings indicated that although the effect of ODA on agricultural productivity growth in SSA

countries is positive, it is not significant. This finding is not in line in terms of significance with previous literature (e.g., Kaya *et al.*, 2008; Alabi, 2014; Ssozi *et al.*, 2018) which indicates that ODA affects positively and significantly agriculture in SSA. The non-significance of the positive effect of ODA may be due to the study period. As for ODA volatility, it has a negative and significant effect on agriculture value added per worker, indicating that this volatility is destabilizing for the agricultural sector in SSA countries. This finding is consistent with our expectation as volatility damages the macroeconomic effectiveness of aid (Lensink and Morrissey, 2000). Thus, ODA volatility is detrimental to agricultural productivity growth in SSA. Nevertheless, this finding is not consistent with that of Wolf (2007) that found that aid volatility is associated with better outcomes in terms of sanitation, water, and infant mortality. It should be noted that the summary statistics reveal that, on average, the upside volatility outweighs the downside volatility over the study period. So, even the upside volatility is not, on average, beneficial to agricultural productivity growth in SSA. Nonetheless, the situation is not uniform in all countries; some countries experience negative volatility while others a positive one and the effect of ODA volatility may vary across countries. Government expenditures per worker appear to be very important in boosting agricultural productivity growth in SSA. The result reveals that a one per cent increase in government expenditures per worker leads to a 0.13 per cent increase in agricultural value added per worker, *ceteris paribus*. Therefore, this result indicates the effectiveness of government expenditures in the agricultural sector of SSA countries.

Table 3: Estimation results

Dependent variable: Agricultural value added per worker			
Variables	Model 1	Model 2	Model 3
ODA per worker	-0.002 (0.01)		3.10e-04 (0.01)
ODA volatility		-0.002*** (0.001)	-0.002** (0.001)
Land per worker	0.05 (0.04)	0.05 (0.04)	0.05 (0.04)
Rainfall shock	2.61e-05 (5.2e-05)	2.62e-05 (5.16e-05)	2.61e-05 (5.18e-05)
Temperature shock	0.04 (0.04)	0.04 (0.04)	0.04 (0.04)

Government expenditures per worker	0.13*** (0.04)	0.13*** (0.04)	0.13*** (0.05)
Initial value of agricultural value added per worker	0.85*** (0.08)	0.85*** (0.08)	0.85*** (0.08)
Constant	0.16 (0.36)	0.14 (0.35)	0.15 (0.36)
Number of observations	330	330	330

Note: Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

V. CONCLUSION AND POLICY IMPLICATIONS

Support to the agricultural sector is of paramount importance for poverty reduction in SSA. Owing to that, this paper investigates the effect of aid and its volatility on agricultural productivity growth in SSA countries. The empirical evidence is based on a random effects model, using data on 34 SSA countries for the period 2002-2015. The summary statistics indicate that, on average, over the period of study, the upside volatility outweighs the downside volatility of aid for the agricultural sector. The estimation results show that government expenditures in the agricultural sector, and the initial value of agricultural value added have a positive and significant effect on agricultural productivity growth. ODA volatility is found to be detrimental to agricultural productivity growth. Climate shocks appear to do not affect significantly agricultural productivity growth in SSA. Owing to the positive sign of the coefficient associated to the initial value of the agricultural value added per worker, the findings reject the hypothesis of convergence between SSA countries included in the study over 2002-2015. The findings suggest that SSA countries partners may continue helping in terms of boosting the agricultural productivity growth through ODA and reduce the gap between ODA disbursements and ODA commitments. However, SSA countries have to use ODA to attain the objectives set and eliminate corruption inherent to the utilization of ODA. Based on the results, governments must increase expenditures allocated to the agricultural sector in order to improve its productivity and at the end of the day structurally change agriculture in SSA countries in line with the Malabo declaration on accelerated agricultural growth and transformation for shared prosperity and improved livelihoods of 2014. Alternative ways of capturing ODA volatility may be used for robustness checks. Moreover, disaggregated ODA may be used to capture the specific effects. Furthermore, alternative specification may be used.

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Analysis Development of Accounting Information System Implementation using Technology Acceptance Model (TAM)

By Siti Rahmi

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Abstract- Current technological developments have penetrated the field of information, especially in the field of accounting information in organizations and companies, because of technological developments, many companies are switching to using computer-based information technology.

This study aims to analyze the influence of infrastructure, human resources, costs, usefulness perceptions, and perceived ease of implementation of computerized accounting information systems. The population in this study were employees of the Padang Primary Tax Service Office. Based on the purposive sampling method, this study uses a sample of 47 respondents who work as employees of the accounting and finance department.

For the dependent variable (y) of this study is the implementation of computerized accounting information systems. While for the independent variables are infrastructure (x1), human resources (x2), costs (x3), perceived usefulness (x4), and perceived ease (x5).

Keywords: *infrastructure, human resources, costs, perception of use, perception of convenience, implementation of computerized accounting information systems.*

GJHSS-E Classification: FOR Code: 349999



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Abstract- Current technological developments have penetrated the field of information, especially in the field of accounting information in organizations and companies, because of technological developments, many companies are switching to using computer-based information technology.

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For the dependent variable (y) of this study is the implementation of computerized accounting information systems. While for the independent variables are infrastructure (x1), human resources (x2), costs (x3), perceived usefulness (x4), and perceived ease (x5). The method used is quantitative research methods. This study uses primary data from the questionnaire. Data were analyzed using multiple regression analysis which was processed through IBM SPSS Statistic software ver 20.

The results of this study indicate that human resources, perceived usefulness and perceived convenience have a positive and significant effect on the implementation of computerized accounting information systems. But infrastructure and costs do not affect the implementation of computerized accounting information systems.

Keywords: *infrastructure, human resources, costs, perception of use, perception of convenience, implementation of computerized accounting information systems.*

I. INTRODUCTION

Before the development of technology as it is today, individuals in companies carry out accounting information systems such as recording, processing, and using information manually. With the existence of computer-based information technology in companies, it can provide benefits and convenience to users in implementing the system. This is consistent with the research of Wijayanti et al. (2009) in Devi and Suartana (2014: 170) which shows that the higher the level of personalization, computer self efficacy, and trust, the user will feel the use of information systems is more useful and easier for him.

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Companies that have sophisticated (computerized and integrated) information technology and are supported by modern technology supporting applications are expected to have a positive impact on the sustainability of the company's performance by producing timely, accurate, and reliable financial reports. (Ratnaningsih and Suaryana, 2014: 2).

The process of developing accounting information systems often experiences obstacles and becomes a serious problem for the company. With these obstacles and constraints, the company must be able to face the risk of failure and understand how the accounting information system applied in the company is said to be successful.

Future events are difficult to predict so that the planning process to achieve company goals becomes heavier. Management needs tools to coordinate and plan limited resources to be able to compete in ever-changing environmental conditions. (Dharmayanti and Suardhika, 2015: 410).

The combination of individuals, hardware, software, communication networks, and data resources that collect, change, and distribute information in an organization is an information system. Information obtained from information processing can be used as material in decision making by the authorities in order to advance the company. (Rosani, 2011 in Devi and Suartana, 2014: 168).

The success of a system is closely related to the performance possessed by the system. The benchmark in determining the good and bad performance of an information system will be seen through the satisfaction of the user of the accounting information system itself and the user of the accounting information system. (Soegiharto, 2001 in Mardiana et al., 2014: 2).

The development of DGT's information technology began in early 1990, namely by implementing the New Payment Control System (NPCS) which serves to monitor and evaluate tax payments. In 1994, the Tax Information System (SIP) and SIPMOD (SIP Modification) were introduced to replace NPCS. (Saputra et al., 2014: 1).

In line with the development of information technology and to further improve performance, better ability to process information and ensure the security of

information stored, the application of SIDJP (Information System of the Directorate General of Taxes) since 2004 has replaced SIP and SIPMOD developed in database software. as a database processing standard. (Lestari et al., 2013: 2).

Modern use of SIDJP is not only for one particular DGT unit, but for all KPPs throughout Indonesia. KPP which is a work unit of DGT has undergone a modernization of the system and organizational structure into a function-oriented agency not on the type of tax since 2002. So that there are three types of modern KPP: Large KPP, Medium KPP, and Primary KPP. (Lestari et al., 2013: 2)

The Attorney General's Office determined six suspects in the case namely Bahar as Chairman of the Management Information System Procurement Process Committee, Pulung Sukarno as Commitment Making Officer. Riza Noor Karim, former Director of Tax Information for the Special Jakarta Regional Office, and Achmad Sjarifuddin Alasah, former Secretary General of the Directorate General of Taxes. While from the private sector from PT Berca Herdaya Perkasa namely Mikael Surya Gunawan and Liem Wendra Halilingkar. The suspects are subject to Articles 2 and 3 of the Law on Corruption Crime (Tipikor) and Presidential Decree (Presidential Decree) Number 80 of 2003 concerning Guidelines for the Implementation of Procurement of Goods and Services. (<http://news.liputan6.com>, 2014)

The ALshbiel and Al-Awaqleh (2011) and Haleem (2016) studies examine the same thing, namely the influence of infrastructure and human resources on the implementation of computerized accounting information systems. The results of ALshbiel and Al-Awaqleh (2011: 50) and Haleem (2016: 137) studies show that infrastructure and human resources have a significant positive effect on the implementation of computerized accounting information systems. But the Soerosemito study (2014: 73) has different results than research conducted by ALshbiel and Al-Awaqleh (2011) and Haleem (2016). The results of this study indicate that there is no influence between infrastructure and human resources on the implementation of computerized accounting information systems.

II. LITERATURE REVIEW

a) *Technology Acceptance Model (TAM)*

Some models are built to analyze and understand the factors that influence the acceptance of the use of technology, including the Theory of Reasoned Action (TRA), Theory of planned Behavior (TPB), Technology Acceptance Model (TAM). (Muslichah, 2015: 171). The Technology Acceptance Model was introduced by Fred D. Davis in 1986 adopted from the Theory of Reasoned Action (TRA). The aim of the Technology Acceptance Model is to give the theory of developers the success of design, evaluation of

planning and implementation of information systems. The Technology Acceptance Model is said to adopt the Theory of Reasoned Action because TRA is the basis for developing a technology acceptance model to specifically adapt information systems. The two models have something in common, they both find the underlying reason for the user to accept or reject the information system.

Theory of Reasoned Action suggests that interest in behaving is closely related to individual specific behavior, while subjective attitudes and norms are antecedents of such behavior. According to Davis (1989: 320) in the concept of Technology Acceptance Model there are two main constructs that predict interest in behaving in using information technology, namely perceived usefulness and perceived ease of use. (Davis, 1989: 320).

The development models in the Technology Acceptance Model are (1) determining how to measure the relevant behavioral components of attitudes, (2) differentiating between beliefs and attitudes, and (3) determining how external stimulation, such as objective features and causal objects connected with beliefs, attitude, and behavior. (Muslichah, 2015: 171)

Overall, the Technology Acceptance Model consists of five concepts, namely (1) perceived usefulness, (2) perceived ease of use, (3) attitudes towards use, (4) intention to use, and (5) actual use. (Davis, 1989: 320)

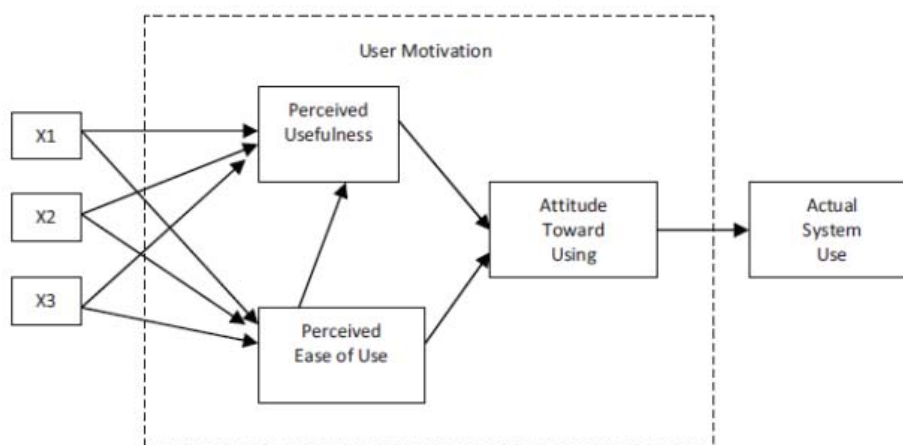


Figure 1: Original Model proposed by Fred Davis in 1989

b) *Accounting information system*

According to West Churchman in Krismiaji (2015: 1) the system is a series of components that are coordinated to achieve a series of goals. The system has three characteristics, namely (1) the component is something that can be seen, heard or felt, (2) the process is an activity to coordinate the components involved in a system, and (3) the goal is the ultimate goal to be achieved from the coordination of these components.

Krismiaji (2015: 14) defines information as data that has been organized, and has uses and benefits. The characteristics that must be present in the information to be useful are as follows: (1) relevant, (2) trustworthy, (3) complete, (4) timely, (5) easy to understand, (6) verifiable.

Accounting Principles Board (APB) is a committee for the preparation of accounting principles established by the American Institute of Certified Public Accounts (AICPA). The committee defines accounting as the art of recording, classifying and summarizing financial transactions and events in an efficient manner and in the form of units of money and interpretation of the results of the process.

c) *Directorate General of Tax Information System*

Currently the modern taxation information system used is SIDJP (Directorate General of Tax Information System). SIDJP is a tax administration system application that replaces SIP (Tax Information System) and SIPMOD (Modification Tax Information System). (Saputra et al., 2014: 2)

The definition of SIDJP according to Directorate General of Tax Regulation Number PER-160 / PJ / 2006 dated November 6, 2006 is "information systems in tax administration in the Directorate General of Tax's modern office environment by using hardware and software associated with a network at the Head Office". Whereas according to SE-19 / PJ / 2007 dated April 13, 2007 the application of SIDJP is "the Directorate General

of Tax Information System application that combines all taxation applications available at DGT, namely SIP, SAPT, SISMIOP, SIG, and SIDJP in the current version". (Saputra, 2014: 4)

The Information System of the Directorate General of Taxation provides supporting facilities for the creation of accurate taxpayer data with the active participation of each section in monitoring taxpayer data. The system produces reports that can be accessed by KPP, Regional Offices and DGT Headquarters.

d) *Implementation of Computerized Accounting Information Systems*

According to ALshbiel and Al-Awaqleh (2011: 45) the implementation of computerized accounting information systems is the integration of manual accounting science and applying it to computers by balancing tasks performed manually with computer activities.

System implementation is the process of installing hardware and software and making accounting information systems become and can be run. This process generally consists of developing plans, developing and testing software, preparing locations, installing and testing systems. (Romney and Steinbart, 2005: 395)

e) *Infrastructure*

According to Romney and Steinbart (2014: 11) information technology infrastructure is technology-based equipment to be used in order to process data, including computers, peripheral devices and equipment for network communication. This component together allows an accounting to fulfill three important functions in the organization, namely:

1. Collect and store data about the activities carried out by the organization, the resources affected by these activities, and the actors involved in the various activities, so that the management,

employees, and other interested parties can reviewing things that happened.

2. Change the data in information that is useful for management to make decisions in planning, implementing and monitoring activities.
3. Provide adequate controls to safeguard organizational assets, including organizational data, to ensure that the data is available when needed, accurate, and reliable.

f) *Human Resources*

Human resources include all people who are members of an organization, each of which has roles and functions. Human resources are human potential that is inherent in someone who includes physical and non-physical potential. Whereas human resources in the context of public organizations are understood as human potential inherent in an employee consisting of physical potential and non-physical potential. Physical potential is the physical ability that accumulates in an employee, while non-physical potential is the ability of an employee to accumulate both from the background of knowledge, intelligence, expertise, skills, human relations. (Sulistiyani and Rosidah, 2009: 10)

The performance of human resources is the ability of a person or individual, an organization (institution) or a system to carry out its functions or authority to achieve its objectives effectively and efficiently. Its capacity must be seen as the ability to achieve performance, to produce outputs and results. (Winidyaningrum and Rahmawati, 2010: 6)

Rivai and Sagala (2011: 6) explain that human resources need to be managed properly and professionally in order to create a balance between human resource needs and the guidance and progress of business enterprises. This balance is the main key to success for companies to be able to develop and grow productively and naturally. The development of the company's business is very dependent on the productivity of the workforce in the company. If human resource management can be carried out professionally, it is expected that HR can work productively. Professional HR management must start from recruitment, selection, classification, placement according to ability, upgrading or training and career development.

g) *Cost*

According to Mulyadi (2010: 8) costs in the broadest sense are sacrifices of economic resources measured in units of money that have occurred or that are likely to occur for certain purposes. In the narrow sense of costs can be interpreted as a sacrifice of economic resources to obtain assets.

Seyal and Rahim (2006) in Haleem (2016: 135) concluded that costs have a direct and significant relationship to technology adoption. Organizations are

reluctant to adopt computerized accounting systems when setting up initial costs is high.

Donaldkiso (2009) in Haleem (2016: 135) states that the cost of a computerized accounting system consists of equipment costs, assembly costs, installation costs and testing costs. Specially trained staff is needed to operate the system. Therefore, large training costs are incurred to understand hardware and software usage continuously because newer types of hardware and software are needed to ensure the effectiveness and efficiency of the use of computerized accounting systems. (Haleem, 2016: 135)

h) *Perception of Benefit*

Benefit perception is a level where someone believes that the use of a particular system can improve performance. The concept can describe the benefits of the system for its users relating to productivity, task performance, effectiveness, importance of tasks and overall usefulness. (Davis, 1989: 320)

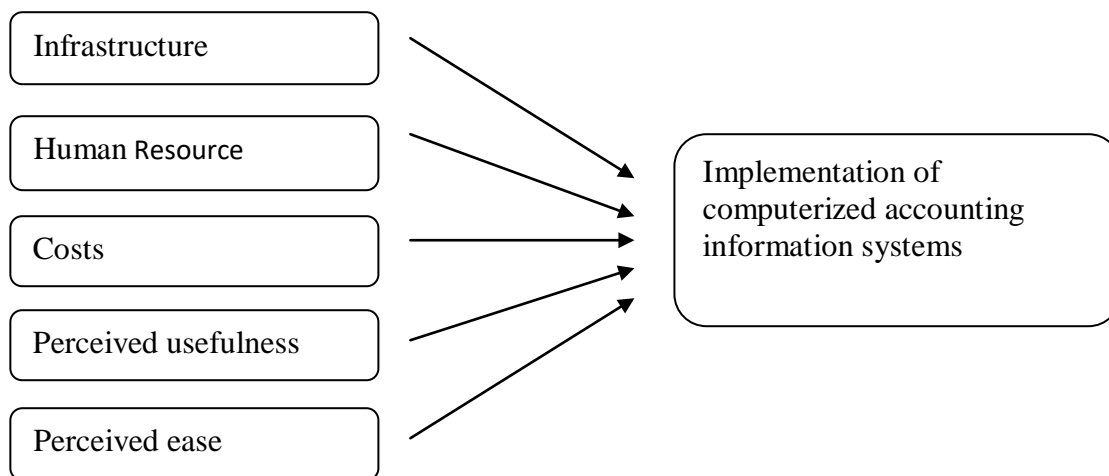
When users feel confident and the use of technology is not difficult, users will provide greater benefits and improve performance. So, the higher the quality of information technology systems will further improve the usefulness so that it can determine the success of the implementation of information technology systems. (Davis, 1989: 320)

i) *Ease of Perception*

Ease of perception is a level where someone believes that a system used is easy to understand and use, so no heavy effort is needed. This concept provides an explanation that the use of information systems and the ease of use of the system to achieve goals in accordance with the wishes of users. (Davis, 1989: 320)

Ease perception is a person's belief about the decision making process. If someone feels confident that the information system is easy to use, that person will use it. Conversely, if someone does not believe that the information system is not easy to use, that person will not use it. (Davis, 1989: 320)

j) Framework ness



III. METHOD, DATA AND ANALYSIS

The type of research used in this study is quantitative research. Quantitative methods are methods by which research data is in the form of numbers as a result of observation or measurement (Widoyoko, 2012: 21). This method is used to examine the effect of infrastructure, human resources, costs, perceived usefulness and perceived ease of implementation of computerized accounting information systems at the Pratama Tax Office in Padang.

The sample in this study were employees of the Padang Primary Tax Service Office who used or played a role in the implementation of computerized accounting information systems, employees who worked in accounting and finance, and employees who were allowed to become respondents. The sample collection technique used was purposive sampling method.

a) *Data Sources*

The data sources used in this study are primary data and secondary data, primary data, obtained from respondents' answers to questionnaires that have been given to respondents. Respondents in this study were employees of the Padang Primary Tax Service Office. Secondary data, obtained from literature, journals, books, articles and internet sites.

b) *Data collection technique*

The data collection technique used in this study is survey research because it is done using a questionnaire as a primary data collection tool that uses written questions given to respondents. The technique of data collection is done through a questionnaire survey that is distributed by a public relations officer at the Primary Tax Office.

c) *Data analysis technique*

Data processing techniques in this study are directed to test hypotheses and answer all existing problem formulations. Data analysis techniques used in this study are as follows:

1. Test Reliability

According to Ghozali (2011: 47), a questionnaire is said to be reliable if the answer to the question given to someone is consistent or stable over time. To find out whether or not a variable is reliable, Cronbach Alpha statistical tests are carried out. A construct or variable is said to be reliable if it gives the Cronbach Alpha value > 0.70 so the statement used is reliable. If Cronbach Alpha is <0.70, the statement used is not reliable.

d) *Validity test*

Validity tests are used to measure the validity or validity of a questionnaire. Ghozali (2011: 52) explains that a questionnaire is said to be valid if the question in the questionnaire is able to express something measured by the questionnaire.

e) *Descriptive Analysis*

Descriptive analysis is a statistic that functions to describe or explain the distribution of data from one variable under study, without analyzing and making conclusions that apply to the public (Indriantoro and Supomo, 2002).

f) *Classic assumption test*

The classic assumption test is used to detect the presence or absence of classic assumption deviations or multiple regression equations used.

g) *Multiple linear regression*

Multiple linear regression analysis is used to determine the effect of infrastructure, human resources, costs, usefulness perceptions, and perceived ease of computerized accounting information systems. Model Accuracy Test

h) *Test F*

The F test basically shows whether the model used in this study is feasible or not feasible continued in this study. Testing is carried out using a significance level of 0.05 (alpha = 5%). If the value of Fcount >

Ftable then the independent variables together have an effect on the dependent variable.

i) Determination Coefficient Test (R2)

R2 test is used to measure how far the ability of the model to explain the variation of the dependent variable. According to Ghozali (2012: 97) in the regression equation that uses more than one independent variable, then

R2 value that is well used to explain the regression equation is the adjusted coefficient of determination, because it has considered the number of independent variables in a regression model.

j) T test

According to Ghozali (2011: 98) the t test basically shows how far the influence of one independent variable individually explains the variation of the dependent variable. If $t_{count} > t_{table}$ or $p\ value < 0.05$, it can be concluded that the independent variable influences the dependent variable. Conversely, if $t_{count} < t_{table}$ or $p\ value > 0.05$ then the independent variable does not affect the dependent variable.

IV. RESULT AND DISCUSSION

a) Reliability Test Results

To measure reliability, the Cronbach's Alpha test was used. A variable is said to be reliable if it gives the Cronbach's Alpha value > 0.60 .

Table 1: Reliability and Reliability Test Results

Variables	Cronbach's Alpha	Corrected item	Keterangan
Infrastruktur	0,761	0,444	Reliabel and valid
Sumber Daya Manusia	0,678	0,528	Reliabel and valid
Biaya	0,689	0,666	Reliabel and valid
Persepsi Kebermanfaatan	0,623	0,816	Reliabel and valid
Persepsi Kemudahan	0,702	0,477	Reliabel and valid
Implementasi SIA Komputerisasi	0,885	0,528	Reliabel and valid

Source: Primary data processed, SPSS 20

The table above shows Cronbach's Alpha value for infrastructure variables of 0.761, human resources of 0.678, costs of 0.689, usefulness perceptions of 0.623, ease of perception of 0.702 and implementation of computerized SIA of 0.85. Thus, it can be concluded that the statement in this questionnaire is reliable because the value of Cronbach's Alpha is greater than 0.60. The table above shows the variables of

infrastructure, Human Resources, Costs, Perceptions of Use, Perception of Ease and Implementation of SIA Computerization has valid criteria for all question items with a calculated r value (0.444, 0.528, 0.666, 0.816, 0.477, 0.528) greater than r table (0.3338) and has a positive value so the questions or indicators used are declared valid.

b) Normality Test Results

In this study, the normality test was carried out using the Kolmogorov Smirnov test. The results of the Kolmogorov Smirnov test can be seen in the table below:

Table 2: Normality Test Results Using Kolmogorov Smirnov

One-Sample Kolmogorov-Smirnov Test

		TI	TSDM	TB	TPKEB	TPKEM	TISIAK
N		47	47	47	47	47	47
Normal Parameters ^a	Mean	12.98	20.74	11.26	17.11	23.85	21.28
	Std. Deviation	1.310	2.221	1.799	2.139	1.978	2.243
Most Extreme Differences	Absolute	.198	.156	.192	.154	.190	.124
	Positive	.198	.135	.119	.144	.172	.124
	Negative	-.165	-.156	-.192	-.154	-.190	-.119
Kolmogorov-Smirnov Z		1.357	1.069	1.319	1.053	1.300	.847
Asymp. Sig. (2-tailed)		.050	.203	.062	.218	.068	.470

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	Negative	-.165	-.156	-.192	-.154	-.190	-.119
Kolmogorov-Smirnov Z		1.357	1.069	1.319	1.053	1.300	.847
Asymp. Sig. (2-tailed)		.050	.203	.062	.218	.068	.470
a. Test distribution is Normal.							

That data is normally distributed. This can be seen from the value of Asymp. Sig. (2-tailed) in the amount of 0.050,0.203,0.062,0.218,0.068,0.470 which is greater than 0.05. So that this research model meets the test of the classical assumption of normality.

c) *Multicollinearity Test Results*

The following are the results of multicollinearity tests using tolerance values and VIF, as follows:

Table 3: Multicollinearity Test Results

Model	Collinearity Statistics		Keterangan
	Tolerance	VIF	
(Constant)			
I	0,803	1,245	There is no multicollinearity
SDM	0,731	1,368	There is no multicollinearity
B	0,914	1,094	There is no multicollinearity
PKEB	0,811	1,233	There is no multicollinearity
PKEM	0,728	1,374	There is no multicollinearity

Source: Primary data processed, SPSS 20

Based on the table above, the tolerance value is close to 1 or > 0.10 and the VIF value is around 1 or <10 for each variable. Tolerance value for infrastructure is 0.83, human resources are 0.731, costs are 0.914, usefulness perceptions are 0.811, and convenience perceptions are 0.728. Whereas for VIF value for

infrastructure is 1,245, human resources are 1,368, costs are 1,094, usefulness perceptions are 1,233, and perceived convenience is 1,374. Thus it can be concluded that the regression model used does not have a multicollinearity problem and can be used in this study.

d) *Heteroscedasticity Test Results*

The following are the results of the heteroscedasticity test using the values of the glejser method, as follows:

Table 4: Heteroscedasticity Test Results

Variable	Sig	Information
I	0,623	There is no heteroscedasticity
SDM	0,570	There is no heteroscedasticity
B	0,153	There is no heteroscedasticity
PKEB	0,611	There is no heteroscedasticity
PKEM	0,667	There is no heteroscedasticity

Based on the table above, the probability values of infrastructure are 0.623, human resources are 0.570, costs are 0.153, benefit perceptions are 0.611, and ease of perception is 0.667. Thus it can be concluded that

there is no heteroscedasticity in all independent variables because the probability value is more than 0.05.

e) *Multiple Linear Regression Test Results*

To find out the multiple linear regression equation used in this study, it can be seen in the table below:

Table 5: Multiple Linear Regression Test Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.193	4.445		1.618	.113
	TI	-.261	.243	-.153	-1.076	.288
	TSDM	.363	.150	.359	2.418	.002
	TB	.129	.166	.103	.777	.442
	TPKEB	.351	.148	.335	2.375	.022
	TPKEM	.104	.169	.092	.618	.540

a. *Dependent Variable: TISIAK*

Source: Primary data processed, SPSS 20

From the table above it is known that the equation in multiple linear regression in this study is

$$ISIAK = 7,193 - 0,261 X_1 + 0,363 X_2 + 0,129 X_3 - 0,351 X_4 + 0,104 X_5 + e$$

The interpretations of each variable coefficient are as follows:

1. The constant value in this study is 7.193 which means that if the five variables are 0, then the value of the implementation of the computerized accounting information system (Y) is constant at 7.193.
2. The infrastructure variable coefficient (X1) is -0.261 which means that if the infrastructure value rises by 1 unit then the value of the implementation of computerized accounting information system (Y) will decrease by 0.261 assuming other variables remain.
3. The variable human resource coefficient (X2) is 0.363 which means that if the value of human resources rises by 1 unit then the value of the implementation of computerized accounting information system (Y) will increase by 0.363 assuming other variables remain.

4. Cost variable coefficient is 0.129 which means that if the cost value (X3) rises by 1 unit then the value of the implementation of computerized accounting information system (Y) will increase by 0.129 assuming other variables remain.
5. The variable usefulness perception coefficient (X4) is 0.351 which means that if the value of the usefulness perception rises by 1 unit then the value of the implementation of the computerized accounting information system (Y) will decrease by 0.351 assuming other variables remain.
6. The ease of perception variable coefficient (X5) is 0.104 which means that if the perceived ease of value rises by 1 unit then the value of the implementation of computerized accounting information system (Y) will increase by 0.104 assuming other variables remain.

f) *Model Accuracy Test*

i. *F Test Results*

The F test results can be seen in the table. The F test is used to see the suitability of the regression model that has been made, the rejection area is p-value (Sig.) < α

Table 6: F Test Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.220	5	15.644	4.187	.004 ^a
	Residual	153.184	41	3.736		
	Total	231.404	46			

a. *Predictors: (Constant), TPKEM, TI, TB, TPKEB, TSDM*

b. *Dependent Variable: TISIAK*

Source: Primary data processed, SPSS 20

In the above table it is known that the F count value is 4.187 which means that it is greater than the F table value of 2.55 with a significance level of 0.004 which means it is smaller than 0.05, simultaneously has a significant effect and it can be concluded that the chosen regression model is appropriate for this research.

ii. *Determination Coefficient Test Results (R2)*

The coefficient of determination test (R2) is used to determine how much the ability of the

dependent variable can be explained by independent variables. In this study using independent variables namely infrastructure, human resources, costs, usefulness perceptions, and perceived ease. While the dependent variable is the implementation of computerized SIA. The results of the determination coefficient test (R Square) are presented in the following table:

Table 7: Determination Coefficient Test Results (R2)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.581 ^a	.338	.257	1.933

a. Predictors: (Constant), TPKEM, TI, TB, TPKEB, TSDM

In the table above shows that the R square value is 0.338. This explains that 33.8% of computerized SIA implementation variables can be explained by infrastructure variables, human resources, costs, usefulness perceptions, and perceived ease. While the remaining 66.2% is explained by other variables outside the research model.

iii. *Test Results t*

The t test is used to determine the influence of each independent variable individually on the dependent variable. The table presents the results of the t test as a whole in this study, namely:

Tabel 8: Test Results t

Model	t count	t tabel	Sig	Information
(Constant)	1,618	2,045	0,000	
I	-1,076	2,045	0,288	No effect
SDM	2,418	2,045	0,002	Significant Positive Effect
B	0,777	2,045	0,442	No Effect
PKEB	2,375	2,045	0,022	Significant Positive Effect
PKEM	2,618	2,045	0,040	Significant Positive Effect

Source: Primary data processed, SPSS 20

This test shows a significance level of 0.05. In the table above, we can see the value of t count for each independent variable. If t count is greater than t table then H0 is rejected, which means that there is an influence of independent variables on the dependent variable.

g) *Infrastructure variable*

The results of t-test analysis for infrastructure variables obtained t count value of -1.076 < t table of 2.045 with a probability value of 0.288 which means greater than 0.05 then H0 is accepted or it can be said that infrastructure does not affect the implementation of computerized SIA.

h) *Variable human resources*

The results of t-test analysis for human resource variables obtained t count value of 2.418 > t table of 2.045 with a probability value of 0.002 which means

smaller than 0.05 then H0 is rejected or it can be said that human resources have a significant effect on the implementation of computerized SIA.

i) *Cost variable*

The results of the t test analysis for the cost variable obtained by the value of t arithmetic of 0.777 < t table of 2.045 with a probability value of 0.442 which means greater than 0.05 then H0 is accepted or it can be said that the cost does not affect the implementation of computerized SIA.

j) *Variables of usefulness perception*

The results of the t-test analysis for the usefulness perception variable obtained a value of t count of - 2.375 < t table of 2.045 with a probability value of 0.022 which means smaller than 0.05 then H0 is rejected or it can be said that useful perceptions have a significant effect on computerized SIA implementation.

k) *Variable perception of ease*

The results of t-test analysis for perceived convenience variables obtained t count value of 0.618 > t table of 2.045 with a probability value of 0.540 which means it is more than 0.05 then H₀ is accepted or it can be said that perceived ease does not affect the computerized SIA implementation.

V. CONCLUSION

This study examines infrastructure, human resources, costs, perceived usefulness and perceived ease of implementation of computerized accounting information systems at the Pratama Tax Office in Padang. The analysis was carried out using the multiple regression analysis method with the Statistical Package for Social Science (SPSS) program Ver. 20.

Based on the results of the research that has been obtained, it can be concluded as a few points below:

1. Infrastructure does not affect the implementation of computerized accounting information systems. The results of this study can be seen in the results of the t test which shows that the value of t count (-1,076) is smaller than t table (2,045) with a probability value of 2,888 which means greater than 0.05.
2. Human resources have a significant positive effect on the implementation of computerized accounting information systems. The results of this study can be seen in the results of the t test which shows the value of t arithmetic (2.418) greater than t table (2.045) with a probability value of 0.002 which means it is smaller than 0.05.
3. Costs do not affect the implementation of computerized accounting information systems. The results of this study can be seen in the results of the t test which shows that the value of t count (0.777) is smaller than t table (2.045) with a probability value of 0.442 which means greater than 0.05.
4. Perception of usefulness affects the implementation of computerized accounting information systems. The results of this study can be seen in the results of the t test which shows the value of t count (2.377) smaller than t table (2.045) with a probability value of 0.022 which means it is smaller than 0.05.
5. Perception of ease has a significant positive effect on the implementation of computerized accounting information systems. The results of this study can be seen in the results of the t test which shows the value of t arithmetic (2.618) greater than t table (2.045) with a probability value of 0.040, which means smaller than 0.05.

VI. IMPLICATION

There are several limitations in this study. The limitations in this study are:

1. The questionnaire distributed in this study was 60 questionnaires to the accounting and finance staff at the Pratama Padang Tax Office one and two. However, the questionnaire returned only 47 questionnaires. The number of samples used in the study can affect the results of the study.
2. Data collection techniques in this study are using questionnaires. The limitations of the study using a questionnaire that is sometimes the answers given by respondents do not show the real situation, so that the effect on the results of hypothesis testing.

VII. SUGGESTION

By looking at the conclusions and limitations that have been stated above, the researcher gives suggestions as follows:

1. In this study only 47 respondents were collected. It is hoped that subsequent research can use even more samples.
2. It is better if further research uses more than one research object. If you continue to use Primary KPP as the object of research, it is better if you use the object of research more than one Primary Tax Office or a Province.
3. Further research can add other independent variables, such as managerial performance, internal control systems, interests and attitudes.
4. Preferably the Pratama Tax Office of Padang uses an optimal computerized accounting information system both for, infrastructure improvement and human resource improvement through training that can be used as development and improvement so that the system used becomes more efficient and effective and improves employee performance.

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Performance of SMEs: Special Focus on Small Size Businesses (SSBs) Determinants of Growth at the Tangail using Logistic Regression

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Abstract- Small scale enterprises (SMEs) take possession of dominant position in any developing countries like Bangladesh. Small scale enterprises (SMEs) specially focused on the study of Small scale business (SSBs) at tangail which is significant contribution of countries economy where density of population is very high because it offers large number of employment generation opportunities and income generation at low cost which is reduction poverty. Considering the importance this study has strived to identify those were collecting primary data which is statistically significant. First using educational level of entrepreneur's, loan facilities,' sector of loan collecting, employment generation and poverty reduction analyze frequency of statistics and later using logistic regression determinant of gross profits, asset growth at tangail district. The study shows that entrepreneurs of SSBs 82% influences of profit rising by educational levels and ownership of business is 58% and 72% profits rising when loan facilities of SSBs.

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PERFORMANCE OF SMEs SPECIAL FOCUS ON SMALL SIZE BUSINESSES SSBs DETERMINANTS OF GROWTH AT THE TANGAIL USING LOGISTIC REGRESSION

Strictly as per the compliance and regulations of:



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Joynab ^α & Rokhsana Akhter ^σ

Abstract- Small scale enterprises (SMEs) take possession of dominant position in any developing countries like Bangladesh. Small scale enterprises (SMEs) specially focused on the study of Small scale business (SSBs) at tangail which is significant contribution of countries economy where density of population is very high because it offers large number of employment generation opportunities and income generation at low cost which is reduction poverty. Considering the importance this study has strived to identify those were collecting primary data which is statistically significant. First using educational level of entrepreneur's, loan facilities, sector of loan collecting, employment generation and poverty reduction analyze frequency of statistics and later using logistic regression determinant of gross profits, asset growth at tangail district. The study shows that entrepreneurs of SSBs 82% influences of profit rising by educational levels and ownership of business is 58% and 72% profits rising when loan facilities of SSBs. Finally, problems of SSBs profits, asset growth at tangail, and the study conclude on limitation and recommendation those can increase of SSBs profits and asset growth rising of economic development.

Keywords: SME, small size of businesses (SSBs), poverty reduction, logistic regression, predictors' growth.

I. INTRODUCTION

Small and medium-sized enterprises (SMEs) are alternative driving forces of economic growth in any developing country likes Bangladesh. The government and the central bank have taken various initiatives for SMEs. Chairperson of SME foundation K.M Habib ullah said Prorating the SME; among the small entrepreneurs in our country small entrepreneur have greater prospects for generating employment, reducing unemployment and achieving economic growth. At least 40% of the total disbursement target of SME credit should be reserved for small entrepreneurs and the rest allocated to the medium entrepreneurs. The government has been putting emphasis on the SMEs and taking different measures for its development considering the sector as driving forces to transform the country's huge population into human resources, as it contributes 25% to the GDP. But the SME entrepreneurs especially women, are still facing difficulties in ruining viable

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businesses, meanly due to difficult access to finances, high costs and poor infrastructure and marketing facilities. SME sector has the highest opportunity to create employment, in a country like Bangladesh. The SME sector can play a major role as it is great force for the domestic market. But to play the due role, the sector has to provide enough facilities. The problem of SME sector has limited access to the global market. it needs to increase the SME market in the outside world.

Besides, the entrepreneurs have to provide technological support to enhance productivity. The other major obstacles that SME entrepreneurs have been facing are storage of skilled manpower, inadequate training facilities and inadequate access to online E-Commerce platforms, the recent data from Bangladesh Bureau of statistics (BBS) shows that the contribution of the industrial sector in the country's GDP was 32.42 percent in 2016-17 while it was 31.54 percent in 2015-16.but, the contribution of industrial sector in the country's GDP increasing day by day recent year the contribution of industrial sector in GDP is 33.71 percent 2017-2018.

With the 25 % contributions to the country's GDP (SME) have been accelerating the country's industrialization as well as economic growth. Chairperson of SME foundation K.M Habib ullah told the independent that SMEs could play an important role to improve a country's economic growth, as they required minimum capital, generated large employment were easy to start and contribution to export earnings. A percent around 78 lakh jobs have been created in the SME sector. The total number of SMEs in Bangladesh is expected to be 85000 among then over 90% are small and 7% medium he said.

In Bangladesh small size of businesses defined as an enterprises would be treated as small if, in current market prices, the replacement cost of plant, machinery and other parts/components, fixtures, support utility, and associated technical services by way of capitalized costs (of turn-key consultancy services, for example), etc. excluding land and building, were to up tk.15 million and it has less than 25 workers, in full-time equivalents.

With the vision of reaching its millennium development goals (MDGs), the government of Bangladesh has given the maximum inclination toward the development of small and medium enterprises

(SMEs) at all levels in Bangladesh. Now a day it offers the biggest opportunity to create new ventures with new employees. However, it is worth mentionable that SMEs in Bangladesh provide near about its 80% industrial employment .without any doubt SMEs are in fact the mainstay of the economy of Bangladesh to ensure working opportunities especially for young people and female workers who want to work. Though it suffers from various internal and external problems such as paucity of self-fund, poor knowledge of trade, lack of stability unskilled personal, high burden of interest, lack of transparency and accountability, lack of technology, know how, intense competition, lack of facilities in the field of research and development etc.

Bangladesh owns a history of SMEs in the ancient period. Bengal was rich in different small and cottage industries in those times. Cottage industries in Bangladesh have their roots in the ancient past which included cloth, pottery, carpentry, iron, silver, gold works, preparing paper from bamboos etc. Before British invasion in the Buddhist, Hindu and Muslim regimes those industries developed day by day. During Muslim rule in India, Jamdani, muslin and silk sharee became very popular all over the world. Beside these, in that period, industries related to sugar, salt, and oil production, making of combs and buttons were also important cottage industries.

II. LITERATURE REVIEWS

Nagaya (2017) state that the significant of SMEs in economic growth and development, numerous studies have assessed the role of SME sectors in light of various sectors stimulating growth and development. He is also examines the impact of SMEs on the economic growth using data set for India and found that SMEs activities are growth enhancing through various channels like employment and poverty reduction. Aremu and Adeyemi (2011) find similar evidence that SMEs are vital agent in creating job opportunities and reducing poverty.

World bank 2012 report suggests that financial access is vital for the growth and development of SME's in Bangladesh. The availability of external finances impacts of productivity and the growth of this industry. Dhaka chamber of commerce and industries (DCCI) in its economic policy working paper of 2004 enumerate the demand side (lack of collateral, lack of limited business experience, lack of information etc.) and supply side (terms and condition, lack of access to start up finances, availability of funds to banks etc.) the problems in getting access to finances for SME in Bangladesh.

Otugo Nkiru Esther, Edoko Tonna David., and Ezeanolue Uju Scholastica (2018) shows that the title –effect of small and medium enterprises on economic growth in Nigeria it is examine the effect of SME on

economic growth in Nigeria. Specially shows that growth rate of Nigeria economy, employment generation growth rate and level of corruption as well as central bank or commercial bank credit facilities which increase SME by raising economic growth rate of Nigeri Acho Yunusa and Abuh A.Paul (2018) show the title –Assessment of the contributions of small scale enterprises to the development of the Nigerian economyll the paper shows the SSB can make profits for the enterprises to survive good and services to the society in order to the society in order to the improve the standard of living of the society and important contribution on the society lead to the growth and development of the economy. an economy.

Sidika Basci and Aysegul Durucan (2017) shows the title –A review of Small and medium sized enterprises (SMEs) in turkeyll state the turkey economic development by SME is increases in growth rate.

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Syed Abidur Rahman and Seyedeh khadijeh taghizadeh-nastaran (2017) shows the –on the road to SME sector development in Bangladesh: A guideline based on current challenges and opportunitiesI. It is shows the economic development some major challenges which is solve by some micro and macro level recommendation on the economic development of Bangladesh.

Above the study literature reviews shows that many different sources of SMEs but this study shows that specially SSBs at tangail. Understanding the relationship among SMEs profit, saving, asset growth, poverty reduction, in macro level have been interested many researcher and there are many attempts to establish statistical relationship. But, still there has been limited work in Bangladesh at micro level to focus only the small size business (SSB) and their contribution for the economic development. So, this study attempts to relationship of profits growth and assed growth by using logistic regression.

a) Objectives of the study

- i. To determinate performance and the accumulation of small scale business (SSBs) relation on asset growth, and profits growth at tangail
- ii. To analyze the impact of employment generation and poverty reduction of SMEs investment.
- iii. To find out the problem of limitation and recommendation of SMEs at tangail, in Bangladesh.

III. METHODOLOGY

a) Primary Data collection

A structured questionnaire was developed on the basis of some valuable indicators to which the respondents were asked to put the right mark against to

the dichotomous questions and asked to put the quantitative data in the given spaces for monthly data and total years income profit saving and reinvestment capital or capital structure. At the end of each questionnaire it has blank space for mentioning the problems of doing small business and suggesting as well.

Sample size distributed by the SSBs as following sectors bellows-

Table 1: Collecting data from different SSBs institution.

Valid sectors	Frequency	Percentage
Service	34	8.9
Grocery	91	23.7
Handloom	63	16.4
Cottage	60	15.6
Cloth store	59	15.4
Other small business	77	20.1
Total=	384	100

Source: Author construct with data from the SSBs institution

Quantitative sampling technique was then used to select the SSBs sectors. The technique is very useful since it helped to reach targeted samples quickly and also help to get easily the opinions of the target population.

- Profits growth (dependent variable): (positive gross profits growth=0 (Yes), decline or no change in growth =1 0(No) and independent variable nominal or ordinal as, educational level, categories of the sectors, loan facilities ,ownership of business etc.
- Asset growth (dependent variable) :(positive assent growth=0(Yes), decrease or change in assed growth=1(No) and independent variable as: educational level, profit of SSBs, loan facilities etc.

c) *Participants*

Although sample size is unknown, we determine the value of sampling technique use, finally participants of sampling is 384 persons for unknown population, do not any missing values include.

d) *Instruments*

Quantitative data was collected from the owners or managers of the sampled SSBs using a questionnaire. The data gather was analyzed with statistical software programs, SPSS software versin.25. The purpose is to combine the advantage of the software programs; data entry, reliability of data by Cohen's kappa measurement technique, frequency statistics, and chi2 data analysis were done in SPSS Versions 25. The data is coded or imported into SPSS software version. 25 are used for the binary logistic

b) *Secondary data collection*

The secondary data collection has been collected from ministry of industries, SME foundation, Bangladesh bank (BB), BSCIC,MIDAS, Financial institutions and from other SME related organizations, different books, national and international papers, proceedings, magazines etc.

regression. also use excel software by secondary data analysis.

e) *Procedure and timeline*

The procedure of the study is 384 questionnaires deliberated by personal interview of SSBs entrepreneurs at tangail district. The data collection procedure was field work personal interview of SSBs owners at tangail. The data was recorded by questionnaires. Since, I an student, I have no financial ability survive any other procedure to maintain to recording and collecting data. The procedure fill-up data questionnaire and recording and analyzing estimating technique I have six month of date line to complete thesis study.

f) *Analysis*

The study of paper shows that SPSS Software using by data entry, manipulation, data reliability test, model specification, and analyzing results of the model. At first introduced of SSBs institution at tangail six categories of SSBs and then entrepreneur's educational levels as well as loan facilities of SSBs or which sector is getting loan of SSBs manufacturer at tangail. it is only shows the statistical software of frequency analysis before using this procedure, analyze crosstab of data reliability of measurement. The data analyze also shows that, data reliability of measurement Cohen's kappa. The value of kappa measurement is refers to p-value which is less than .05% and 1% levels of significant. the study paper also find that logistic regression model which shows predicted profit of SSBs, accumulation of asset growth and saving of SSBs at tangail. I choose

logistic regression analysis test because of primary data collection it is not tested on homogeneity of degree. The study find the SSBs owner's at tangail any relationship of profit; saving and re-investment of SSBs. Loan facilities of SSBs can positive or negative impact on SSBs at tangail. Before using logistic regression I see chi2 test and Cohen's kappa reliability of measurement. I also find that the value of kappa is 5% level of significant. so, I hope that, the quantitative data of logistic regression is the perfect model of SSBs sector because of I want to find the relationships of profit saving and re- investment.

g) *Ethics and limitation of the study*

The collecting data from primary sources, I would face many difficulties because it is first task collecting data. so there are many problem arising data collection, to maintain SSB entrepreneurs confidentiality

they avoid some questions. so, it was quite difficult for me to get in-depth knowledge about some of my task. The time constant is another limitation. The secondary source of collecting data, I do not have sufficient book information, publication and information is not available. Lack of available up to date information, the entrepreneurs have no provide to some internal data which is not strong information about SSB in tangail district, Lacks of previous practical experiences about these topics as I am a newcomers . Lack of In-depth knowledge and analytical ability is writing such report. Only few days' internship report experience is not enough to find out all the limitation of such a vast project.

If these limitations were not been there, the report would have been more useful.

IV. RESULTS ANALYSIS AND DISCUSSION

a) *Educational level of entrepreneur*

The study of SSBs at tangail shows that, educational level of entrepreneurs test on frequency test of statistics on SPSS software as following bellows.

Table 2: Education educational level of entrepreneur

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Primary	242	63.0	63.0	63.0
secondary	101	26.3	26.3	89.3
higher secondary	32	8.3	8.3	97.7
Graduate	9	2.3	2.3	100.0
Total	384	100.0	100.0	

The frequency of statistics analysis shows that small scale business (SSB) of tangail total numbers of observation 384 there is no missing values the 100 percent respondent ensure their feedback. The educational levels of entrepreneur are primary levels 63% and secondary 26% as well as higher secondary, graduate 8.3% and 2.3 % respectively. The maximum rate of educational level is primary and secondary levels most of the entrepreneur so that the productivity measured hampers because level of education is low. Small scale business (SSB) entrepreneur is ensured secondary or higher secondary school certificates among the promoters which are rapidly increasing growth rate of SSBs. the benefits of economy when ensure educational level they increase productivity, it is also measure the growth rate of economy by providing tax with raising living standards of entrepreneurs that directly or indirectly tax increasing growth rate of consuming expenditure. The prospects improving SSBs of tangail face many problems. Women are highly participates in SSBs specially (Handicrafts and Handloom) producing at home but most of the women are illiterates or primary level education so they do not increasing a modern or advance level technology used.

They using of old acquaintance or equipment's which are not increasing productions rapidly. so, government ensure raising qualification of man and women in producing SSBs such as: education, infrastructural facilities, bank credits, etc. which increase SSBs at tangail.

b) *Category of small scale business (SSBs)*

Table 3: Categories category of the sectors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Services	34	8.9	8.9	8.9
	Grocery	91	23.7	23.7	32.6
	handloom	63	16.4	16.4	49.0
	Cottage	60	15.6	15.6	64.6
	cloth store	59	15.4	15.4	79.9
	other small business	77	20.1	20.1	100.0
	Total	384	100.0	100.0	

The collection of data is randomly selected by study areas which are selected of six categories of business. The cumulative percentage shows above table of about six categories. The small scale business(SSBs) taken for the studies are service sectors, grocery shops, tea stole, retail and whole sale shop, cottage industries, tangail handloom industries, hard ware shop, stationary, jewelry shop, electronics, furniture's, book house etc. Bellow's the table shows that, frequency of data 8.9% of the service sectors, 23.7 % of grocery, 16.4% of cottage industries, 15.6% of handlooms, 15.4% of cloth store, 20.1% of other small business.

c) *Loan facilities of SSBs*

The bellows table shows that the access to finances of SSBs credit is different way such as non-govt. organization (NGO), private banking, and government banking sectors, or other sources of credit finances by SSBs at tangail. The loan facilities of the SSBs at tangail out of 384 sample excess to finances as 284 other 100 remain do not have loan facilities of their SSBs sectors.

Table 4: Loan Facilities of Business

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	284	74.0	74.0	74.0
	No	100	26.0	26.0	100.0
	Total	384	100.0	100.0	

d) *Sectors of loan SSBs*

The loan facilities of SSBs at tangail 1.3% is government banking, 16.9% is private banking, non-government organization(NGO) provide is a large amount of loan facilities 51.3%. other sources of SSBs loan facilities is 15.6% and no-loan facilities is SSBs of tangail is 14.8%.there are many restriction of getting loan of SSBs, such as: morgues, types of SSBs, roles

and regulation of different types organizations, higher interest rate etc., which is discourage to getting loan facilities of SSBs at tangail. If SSBs get access to loan facilities is available than previous regulation is flexible to excess to get credit which is provide more employee opportunities and contribution of economic growth in Bangladesh.

Table 5: Sectors the loan sectors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Govt. banking	5	1.3	1.3	1.3
	private banking	65	16.9	16.9	18.2
	NGO	197	51.3	51.3	69.5
	Others	60	15.6	15.6	85.2
	No loan facilities	57	14.8	14.8	100.0
	Total	384	100.0	100.0	

Non –government organization (NGO), can provide loan easily or flexible ways SSBs at tangail. It is more improving to SSBs, increasing production which is

indicators of re-investment facilities of SSBs sectors. The study of this paper shows that SSBs at tangail is more adequate than other areas such s:cottage

industries and tangail shares (handloom industries) which is not enough to get loan facilities that he get is restricted on higher interest rate and restriction of morgues, and role regulations of financial institutions which do not increase investment of SSBs at tangail. so, the studies find that government can ensure flexible loan facilities which is increasing investment of SSBs. Government ensure adequate loan facilities of SSBs than it would improve better performance of SSBs. The reasons can help economic development Bangladesh.

e) *Impact of employment generation and poverty reduction*

Small and medium enterprises (SMEs) have made great contribution of eradicating poverty of Bangladesh economy. SSBs are regarded as the engine

of economic growth to any nation's development. The major advantage of this sectors are it ability to employee at low capital cost. The labor industry of the SMEs is much higher than that of the large enterprises. SMEs as a nursery of entrepreneurship are often driven by individual creativity and innovation. The SMEs sector is the engine of economic growth process which is contribute a chains of development of any developing countries like Bangladesh. SMEs of Bangladesh are main drivers of new innovation, job creation, poverty reduction, wealth creation, income distribution and reduction in income disparities, after economic reform on 1986, the SMEs are seen as a key to Bangladesh economy's growth and poverty alleviation and unemployment reduced in the country.

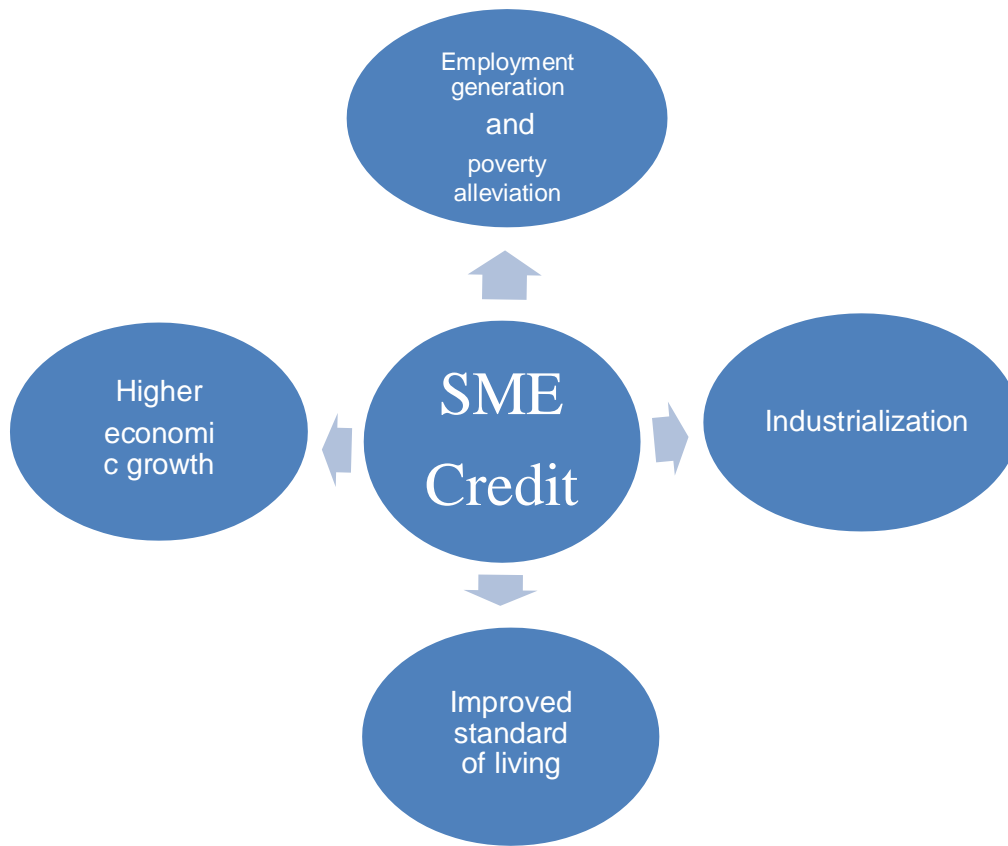


Figure 1: Representation of SME how credit contribution to establish the employment generation and poverty reduction the economy of Bangladesh (author self).

Therefore, it is need to promotes such SSBs enterprise in any developing countries like Bangladesh because, since SMEs brings about a great distribution of income and wealth, economic self-dependence, entrepreneurial development employment and other positive economic growth of Bangladesh. Awosika (2011), Schmiz (2010), and Aremu (2010) explain that SMEs provides income, saving and employment generation. They are seen as veritable engines for the development of entrepreneurial capabilities and indigenous technology which will generate employment

in the country. This study of paper shows that the SSBs entrepreneurs have great contribution on business. Sample of study is 384 which 85% people is getting SSBs profit gain that provide their living of standard, consumptions pattern changes their raising profits of SSBs at tangail.

V. THE LOGITIC REGRESSION MODEL

- Model specification
These sections explain the development of a model using Logistic regression analysis (Logit). The

assumption of Logit dependent variable is binary or dichotomous. Taking value 0 when increasing of SSBs and value 1 represent non- increasing of SSBs. The Logit model is a non- linear specification ensure that the predicted probability is (0, 1) for all value of t is known as the Logit model.

• Dependent variables

In the binary logistic regression, dependent variable is dichotomous thus, it only contains data

coded as 0(success) or 1 (failure). This paper success and failure were operationally defined as yes and No respectively. Each of the dependent variables is give dichotomous definitions as (by Eva Atu Alhassan)

- Profits growth: (positive gross profits growth=0 (Yes), decline or no change in growth =1 (No).
- Asset growth: (positive assent growth=0(Yes), decrease or change in assed growth=1(No).

Table 6: Variables Descriptions

Variables	Description
Gross profit growth	Change in profit over time
Saving growth	Increase saving rate of over time
Asset growth	Acquisition of new assets after accessing profits, saving, ownership, microcredits
Enterprises size	Number of employees
Loan profile	Loan receives from different sectors.

In Logit regression models, the goal is to predict the chances of dependent variable occurring given values of independent variable(s). To predict the probability of Y, the equation below is transforming to use Logit function.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_k X_k \tag{1}$$

Logit transformation of the probability of event can express as:

$$\text{Logit (P)} = \ln \left(\frac{P}{1-P} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_k X_k \tag{2}$$

β_0 , is the model constant.

$\beta_1, \beta_2, \beta_3, \dots, \beta_k$ are the parameters of the independent variables and the set of independent variables ($X_1, X_2, X_3, \dots, X_k$). The range of logistic regression function is between 0 and 1, which makes it suitable for use as probability model.

Logit function, Logit (p) is defined as:

$$\text{Logit (p)} = \ln \left(\frac{P}{1-P} \right)$$

Where

P is the probability that an event will occur and it ranges from 0 and 1. By taking the exponential of both sides of above Logit (p) equation, the equation is rewriting as:

$$\text{Odds} = \frac{P}{1-P} = e^{\beta_0} \times e^{\beta_1 X_1} \times e^{\beta_2 X_2} \times e^{\beta_3 X_3} \times \dots \times e^{\beta_k X_k}$$

a) Logistic regression results on the predictors of profits growth

The table () shows that set of variables affecting gross profit growth, educational level which is put in charge of the day by day running of the business enterprises had a significant relationship with the growth of profits of the entrepreneur. Specifically, the model revealed that when business run day to day basis the entrepreneurs educational level is primary it is more significant the standard deviation of X value is 98% increasing profits when entrepreneur is secondary level of education, than other the results is (b=-.003, S.E=0.739, p-value=0.047, odds ratio=0.97 % std. 98.35). on the other hands, the educational level of entrepreneur is secondary or higher secondary educated the profit of the businessman is large than the graduate or higher educational levels, because of the

value is insignificants lower educational levels poor managerial skill and higher educational level problems with high standards of livings. The value is secondary and higher secondary level education persons is b=-.498. S.E=.763, odds ratio=.61, p-value=.026, % std. 51.418 and b=-.242, S. E=.833 odds ratio=.79, p-value=.084 5std. 77.15) respectively. The value of primary secondary and higher secondary levels educated entrepreneurs receive more than value of probability. The category of the business size is not more important by increasing profit growth in SSBs which indicates that grocery shops of SSBs and other small scale business is more significant value of SSBs at tangail. The loan facilities of SSBs is likely quite importance of SSBs because of higher rate of interest rate at tangail like, NGO, private banking and other sources of SSBs loan facilities. There are many

problems of crating loan on SSBs because of loan requirement morgues' is high levels. The increasing profit growth at tangail (b=-.333, S.D=.275, p-value=0.44, odds ratio=.72) depends on loan facilities. So there are many reasons for getting access to loan of SSBs at tangail. We ensure microcredit on SSBs at tangail in interest rate is flexible than can profits raise on the business of SSBs at tangail. Ownership of the SSBs land is rental or own land is important because of own land improve their productivity by reducing rent cost or infrastructural facilities cost minimize low rate. So, one percent raise in profits increase by less than one percent

own and establish their business. SSBs at tangail own land ownership (b=-2.500, S.E=-2.97, p-value=.004, odds ratio=.58,%std. of X 96.95%).so, the study shows that, ownership of the business is an important role plays. Productivity of the SSBs sector is less important raising profits of SSBs. the labor and capital intensive business are depend on other reasons to increasing profits. Because the value of odds is greater than one probability of occurring is more than profit raising (b=.195, S.E=.233, p- value=.701,odds ratio=1.22,% std. of X=40.250%).

Table 7: Logistic regression results on the predictors of gross profits.

	b	S.E.	p> z	Odds ratio e ^b	%Std. X	S.D.of X
educational level of entrepreneur			3.236		.357	
educational level of entrepreneur(1)	-.003	.739	.047**	.97**	98.353	.994
educational level of entrepreneur(2)	-.498	.763	.026**	.61**	51.418	.608
educational level of entrepreneur(3)	-.242	.833	.084	.79	77.175	.785
categories of the sectors			9.250		10.995	
categories of the sectors(1)	.259	.458	.319	1.29	57.222	1.295
categories of the sectors(2)	-.390	.368	1.128	.67	28.824	.677
categories of the sectors(3)	.212	.379	.313	1.24	57.590	1.236
categories of the sectors(4)	.700	.372	3.537	2	6.000	2.013
categories of the sectors(5)	.312	.384	.660	1	41.657	1.367
ownership of the enterprises			1.519		46.788	
ownership of the enterprises(1)	-2.500	-2.970	.004**	.58**	96.959	.000
ownership of the enterprises(2)	-.285	.231	1.519	.75	21.776	.752
loan facilities of business(1)	-.333	.275	.044**	.72**	57.441	1.395
productivity of the business(1)	.195	.233	.701	1.22	40.250	1.216
Constant	-1.045	.822	1.619	.35	20.324	.352

Significant at 1%, significant at .05%,

b) *Logistic regression results on the predictors of asset growth*

The primary levels of education is a major part of continue of SSBs at tangail but the lack of knowledge, no new innovation of technology dot not have any ideas to creating asset savings on SSBs at tangail, but the significant effect on asset growth of is secondary and higher secondary levels of educated entrepreneurs can improve on the asset growth. The value of study time is primary level entrepreneurs are (b=-.204, S.E=.721,p-value=.050,odds ratio=.82,%std.77.75) and secondary and higher secondary entrepreneurs are (b=-.008, p=.010, odds ratio=.99,% of std.=99.5,) above value shows that the odd ratio is less than 1, when one unit change in asset growth it is significant value measures increasing asset on SSBs at tangail. The value of asset growth on that entrepreneur's is 99% of odds ratio logistic regression which is important parts of SSBs at tangail. the SSBs at tangail shows that increasing profit of the business and educational level have a great effect on asset growth of SSBs. The loan facilities of SSBs is

an significant part because, it is a major contribution of SSBs build on growth which is an area entrepreneur's can get a loan facilities of SSBs financing. The credit facilities of SSBs is narrow sense because higher rate of interest rate, regulation of institutions, and morgues etc. it cannot provide many SSBs entrepreneur's which is not increasing asset growth of SSBs at tangail. The loan facilities of asset growth are hampered on asset growth. The value of odds ratio is 1.19 that is great impact on SSBs growth at tangail. On the other hands, profits and saving rate are an important part of asset growth which can play role of asset growth such as: (b=-.067, S.E=.235, p-value=.050, odds ratio=.94, %std. 77.54) and (b=-.163, S.E=.230,p-value=.040,odds ratio=.849,% std.87.94) respectively. The SSBs owners who are increasing amount of profits that raises to saving on the reinvesting business. so, educational level, ownership of the business, profits and saving which are increasing asset growth on SSBs at tangail positively, but loan facilities are not positive impact on growth of asset on tangail SSBs.

Table 8: Logistic regression results on the growth of gross asset growth.

	B	S.E	p> z	Odds ratio e ^b	%Std. of X	S.D of X
educational level of entrepreneur			1.002		80.069	
educational level of entrepreneur(1)	-.204	.721	.050**	.82**	77.759	.816
educational level of entrepreneur(2)	.008	.740	.010**	1.00	99.501**	1.005
educational level of entrepreneur(3)	-.342	.796	.184	.71	66.775	.710
ownership of the enterprise			.492		78.185	
ownership of the enterprise(1)	-.537	40192.969	.037**	.61	85.960	.667
ownership of the enterprise(2)	-1.293	.218	.492	.37	48.296	.858
profits of the business(1)	-.067	.235	.050**	.94**	77.543	.935
the amount of saving on profits(1)	-.163	.230	.040	.849	87.946	1.177
loan facilities of business(1)	.173	.243	.005	1.19	94.519	1.017
Constant	.717	.783	.839	2	35.958	2.048

VI. LIMITATIONS AND RECOMMENDATIONS

a) *Statement of the limitation of SSBs in Bangladesh*

Despite their critical role in the country, small scale enterprises in Bangladesh has experience high failure rate due to the existences of large scale business enterprises which might serve as a competitive forces to them .Small scale business has been observed to experience high failure rate in Bangladesh due to inadequate finances, lack of technical and managerial manpower. Structural imbalances facing this sector have curbs competitiveness along with the problems. The deficiency approaches and strategic leadership is also significant reason for the failure of small scale enterprise in Bangladesh. One cannot expect an economy to develop and sustained economic growth and development if the environment is not conducive enough for small scale enterprise. Therefore, the study shall appraise the contributions of small scale enterprise to the development of Bangladesh economy.

i. *Higher interest rate*

SMEs in the tangail district have safer from many problems in small scale business one of them are higher rate of interest rate. Higher interest rate from micro finances institutions banks is another barrier to SSBs in tangail. Interest rate 16% to 17% discourages new SSBs and act as a barrier to the expansion of small scale businesses in tangail.

ii. *Paucity of wealth problems*

The Paucity of own founds is major challenge in the small business. They have to either borrow capital/fund personally or from different micro finance or financial institutions. This is a major problem for SSBs in tangail. The survey reveals that among the respondent 87% strongly agree that paucity of found is major barrier to SSBs in tangail, 13 percent agreed while none of them were indifferent, disagreed or strongly disagreed in this regard.

iii. *Lack of financial institutions*

The survey also reveals that lengthy process of getting fund from financial institution is another problem to SBs in tangail. This hampers their growth, 50% of the respondents strongly agreed, 42% agreed higher interest rate is another problem in SSBs in tangail, 8% remained indifferent and none were disagreed of strongly disagreed in the expansion of SSBs in tangail.

iv. *Lack of education in SSBs*

The problem faced by SSBs in tangail that graduate and post graduates and post graduates are not interested in SSBs. They always run for better job in the capital city. As a consequence educated people who can implement the business strategy efficiently are not interested in SSBs. So lack of graduates and post graduates in operating SSBs is another problem. That lack of graduates and post graduates is a barrier in SSBs in tangail. Since most of the owners are not

graduates, they do not possess the knowledge about marketing strategies. This creates a problem marketing is their product and retaining customers.

v. *Lack of Participation of women employees*

Participation of women entrepreneurs in SSBs is not so satisfactory. in SMEs women entrepreneur are taking active part. But in tangail, women's involvement in SSBs is not satisfactory compared with other SMEs and this is also another problem. Competition has been increased among different businesses. SSBs must also compete with other SMEs, and other businesses to gain market share, in tangail the number of SSBs has increased. As a consequence, competition among them (SSBs) and SMEs has increased. Intense competitions among them have led to a problem that to survive they must compete and win.

vi. *Lack of transportation facilities*

Transportation facilities are vital for every business enterprise. Products produced by the small scale businesses (SSBs) must be transported to different part of the country and in the hands of consumers. This will increase revenue. For this purpose an efficient transportation network is essential. In tangail, SSBs face the problem of transporting their goods to the customers timely. Poor transportation facility is the reason for this delay. Among the respondent, transportation facilities is the major barrier in tangail district.

vii. *Lack of technology*

Technological advancement and technological know- how are essential for modern business. Use of internet, mobile phone, mobile internet, and computers are essential elements for successful business. This requires knowledge as well as expenditure. SSBs does not have sufficient fund to bear these expenses and avail these modern technological services. Nor do they have the expertise or skilled people to avail these services for their business. Net-work coverage is not sufficient in this area. The study reveals that lack of technological know-how and facility is a problem for SSBs in tangail.

viii. *Burden of government rules and regulation*

Government's tax, trade policy and registration fees also hamper the growth and expansion of SSBs in this area. Study reveals that 20 percent of the respondents agreed, 77 percent strongly agreed that government policy sometimes becomes a barrier to small scale business (SSBs) while 3 percent remained indifferent in this regard.

ix. *High employee turnover problems*

High employee turnover is the major barrier faced by small scale businesses (SSBs) in the tangail as well as whole Bangladesh. Lack of sustainability, efficiency in operation, unskilled or semi-skilled worker makes these businesses financially insolvent. Because of these employees leave these organizations for agreed that high turnover is problem of SSBs in tangail.

x. *Lack of employee experience*

Small scale business (SSBs) do not have any training facilities of unskilled or semi- skilled labor who are doing in the business. The lacks of experience of SSB are the major problem in tangail. The research paper reveal that 93% SSBS do not have training facilities and other 7% agree with the some specific region do have their training facilities of them small scale business (SSBs).

VII. RECOMMENDATION

Increasing entrepreneur's education: Entrepreneurship education is one of the important means of development of SME sectors in Bangladesh. Still in the education system the entrepreneurship courses are not been made mandatory. The entrepreneurship education should start from the higher secondary level in the country. Entrepreneurships courses found to be taught only in business related programs in the country. However, it is important for bangladesh. in addition, there should be separate courses as practical, where student need to create an entrepreneurship venture within their institutional premises and run the business for at least one year. Perhaps based on the running the business students will be evaluated in the exam.

Increasing training facilities: Entrepreneurship training facilities programs should be formalized in each district town of the countries likes tangail. Entrepreneurship training programs certification could be pre-requisite to obtain financial assistance for the business. During the training facilities, entrepreneurs should be given information technology related training as well which will increasing their competencies. From the study by Rahman et al (2015b), it has been revealed that strategic competencies are important for small scale business (SSBs).

Creating strong well-built network: There should be creating strong well- built network among the SSBs in Bangladesh. SME foundations of Bangladesh should play an important role to create a network among the SMEs. Unfortunately, still there is no database for the SMEs operating in the country. Such data based would not only assist to build network.

Increasing study incubation center: A study incubation center based on sub sector is important for the development of the SME sector. This incubation center will generate new business ideas for the particular sub-sector and source for the potential market of the product and services.

To ensure market oriented economy: It is important to ensure market oriented economy is based on the sound legal and regulatory structures for the development of the SME sector in Bangladesh. For SSBs is smooth functioning of the marked economy. Bangladesh needs a sound legal and regulatory structure backed by the

rule of law so that existing business can thrive and new businesses can emerge freely.

To create entrepreneurial environment: To create an entrepreneurial environment that is driven by friendly rules and regulation encourages the development of SMEs and the foremost role in this scenario is played by government institutions. Effective government institutions must be open and decentralize their administrative structure which will allow a smooth flow of procedures. The governments of Bangladesh should also be free from corruption and create conditions for all citizens to participate and compete in the market place without too much regulation.

To accelerate export and building favorable conditions for the SMEs with foreign partners: Inspiring SME to accelerate export and building favorable conditions for the SMEs with foreign partners, multiplying goods and service export market. The government of Bangladesh can come up with export promotion-support program, that will enable them meet up extra cost to create linkage with the foreign partners.

VIII. CONCLUSION

The study of SSBs growth at tangail in terms of growth in gross profits, and asset growth levels using logistic regression is estimated. The study shows that are operated area are mostly SSBs sectors. The mostly entrepreneurs are no formal education. The predictor's variable relating to those of the owner and entrepreneurs as well as financial institution is considered. The results shows that gross profits of SSBs is raise by loan facilities and educational levels which is not depend on categories of SSBs owner at tangail. Asset growth depends on educational level, profit of SSBs, amount of savings, ownership of SSBs. so, we ensure that SSBs above problem slave than get a major amount of profit which gives reducing poverty by employment generation, living standards, rising saving amount etc. This is increase reinvestment of SSBs, by asset growth. SMEs is an important sources of solution to the unemployment problem when is growing in developing countries like Bangladesh.

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APPENDIX QUESTIONNAIRE

What is yours name?

1. Gender---

- a. male b. female c. others

2. Name of the enterprise/business?

3. Address of the business?

4. Martials status ---

- a. married b. single c. divorces d. engaged

5. How many family members of your family?

6. Educational level of owner?

- (i)Primary (ii) Secondary (S.S.C) (iii) H.S.C (iv) Graduate

8. What are the categories of the sectors?

- (a) Services (b) grocery (c) handloom (d) cottage (d) cloth store (e) other small business

9. Capital structure-

(a) Initial capital amount----- lace/million taka

(b) Current capital amount-----lace/million taka

10. Is your enterprise established on your own land?
 - (a) Yes
 - (b) No
 - (c) Owned and rent
11. Productivity of the enterprise?
 - a) Capital intensive
 - b.) Labors intensive
12. If enterprise is labor intensive, then number of labor?
13. Is the employed manpower skilled?
 - a. Skilled
 - b. Semi-skilled
 - c. unskilled
14. Have any training facilities yours labors?
 - a.) Agree
 - b.) Disagree
 - c.) Neutral
 - d.) Strongly agree
 - e.) Strongly disagree
15. How many income earned yours own business?
16. How many cost maintaining your family?
17. How many profits owned your business?
18. What is the amount of saving on profits?
19. Have any loan facilities yours business?
 - a. Yes
 - b. No
20. If yes—which is the sectors?
 - a. govt. banking
 - b. commercial banking
 - c. private banking
 - d. NGO
 - e. others
21. How much interest rate of loan?
22. Have any loan requirement to get loan facilities?
 - a. Yes
 - b. No

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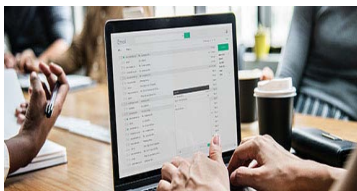
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Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.



Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

- a) A title which should be relevant to the theme of the paper.
- b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
- c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
- d) An introduction, giving fundamental background objectives.
- e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
- f) Results which should be presented concisely by well-designed tables and figures.
- g) Suitable statistical data should also be given.
- h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

- i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
- j) There should be brief acknowledgments.
- k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.



FORMAT STRUCTURE

It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

All manuscripts submitted to Global Journals should include:

Title

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in a research paper?" Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.



Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

PREPARATION OF ELETRONIC FIGURES FOR PUBLICATION

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

TIPS FOR WRITING A GOOD QUALITY SOCIAL SCIENCE RESEARCH PAPER

Techniques for writing a good quality homan social science research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of homan social science then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow [here](#).



6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

19. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.



20. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

21. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

22. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium through which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

INFORMAL GUIDELINES OF RESEARCH PAPER WRITING

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.



Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.



The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.



Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."



Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

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Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

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BY GLOBAL JOURNALS

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Topics	Grades		
	A-B	C-D	E-F
<i>Abstract</i>	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
<i>Introduction</i>	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
<i>Methods and Procedures</i>	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
<i>Result</i>	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
<i>Discussion</i>	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
<i>References</i>	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring



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