

The Impact Of Technological Change On The Monitoring And Evaluation Of Imports and Exports On China And South Africa's Economies.

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Abstract: *China is one of the fastest growing and developing countries in the world and South Africa is one of the fastest developing countries in Africa. Trade has increased between China and South Africa and both countries' economies are growing. Technological change is playing a huge role in the development of economies and China is one of the leading economies that have used technology as a means of advancing its economy. Imports and exports are important constituents with regards to the growth of the economy. The imports from China to South Africa weigh more in the trading basket compared to the exports from South Africa to China, this indicates a trade deficit for South Africa's economy, however since it is still a developing country skills and knowledge can be transferred in terms of technology from China to South Africa. It is essential to keep track and progress through a monitoring and evaluation system to ensure the aims and objectives are met with regards to the growth of the economy and to keep track on the types of investments that can assist the country. The monitoring and evaluation system is one of the tools used to assess performance in South African departments, it would be essential for the system to be implemented in the trade arena. The aim of this paper is to assess the impact of technological change in the monitoring and evaluation of imports and exports in China and South Africa's economy using qualitative and quantitative assessments to assess the different theories and models.*

Keywords: *Technological change, imports, exports, monitoring, evaluation*

Date of Submission: 09-05-2018

Date of acceptance: 24-05-2018

I. Introduction

Technological change is when efficiency of a product or process is increased and results in an increase in output, without input being increased. People are able to increase the ways in which wealth is created and this causes a ripple effect. Monitoring and evaluation are seen as tools that are important for the management in tracking progress and facilitating decisions. Trade is about transferring goods and services to a person or entity in exchange for other services or money. Trade is not only done between individuals and entities domestically but it is done internationally. Imports and exports play an important role in trading internationally as it involves different countries their trade tariffs and policies, and a relationship between countries on supporting each other with resources that the other country lacks. When there is a change in technology it facilitates and changes how we live. Societies have integrated and have evolved from traditional hunting and gathering to being industrialized. This has resulted in fewer people growing crops and more people moving into other industries. Monitoring is defined as a function that aims to continue to provide the tools of management and main stakeholders of an intervention that is ongoing with early indications of progress, or lack thereof, in the achievement of results. An ongoing intervention might be a project, program or other kind of support to an outcome (Sera and Beaudry, 2007:1). Organizations are assisted by monitoring a regular collection of information that assists in decision making, ensuring accountability, and the basis for evaluation and learning being provided (Sera and Beaudry, 2007:1).

Evaluation is the assessment of a systematic and objective that is an on-going or a project program, or policy that is completed for its design, implementation and results. The aim is to determine the relevance and fulfilment of objectives, development efficiency, effectiveness, impact, and sustainability. An evaluation should provide information that is credible and useful that enables the incorporation of lessons learned into the decision making process of both recipients and donors (Sera and Beaudry, 2007:1). International trade is the goods and services that are exchanged along international borders. Greater competition and competitive prices in the market are permitted through this type of trade. Competition results provide products that are affordable for the consumer. The supply and demand of the exchange of goods and services affects the economy, through making it possible to acquire goods and services that could not be acquired by consumers globally (Business Dictionary, 2015:1).

II. Literature Review

There are different theories regarding international trade such as the mercantilist theory which focuses on exporting which brings more money to the country more than importing and this will cause a defect in resources that are not available in a certain country (International Trade, 2012:3). According to Adam Smith Absolute advantage is known as when a country uses the same amount of resources as other countries but produces an output of goods and services that is greater than the other countries. According to Smith, trade permits countries to specialize in producing goods or services that they have absolute advantage in. This is done both by using a minor quantity of resources at a lower resource cost compared to another country, and by using the equivalent amount of production yet yielding more product and service than other countries. This idea of trade envisages that all countries will benefit from international trade with condition that free trade is experienced and specialisation is done in accordance with their absolute advantage (Donaldson, 2011:7)

Comparative advantage was introduced by David Ricardo in 1817 and it states that a country should specialise in producing and exporting the products where the cost advantage is comparative or relative compared with the other countries (Donaldson 2011:4). Ricardo reworked Smith's ideas through an indication that a country might produce goods at lower opportunity cost compared to another country and specialize in goods in which the country has the comparative advantage in a more efficient way. Ricardo thus pointed out the importance of the law of comparative opportunity costs instead of financial costs (Krugman and Obstfeld, 2006).

According to Donaldson (2011) Chipman (1965) highlighted the mathematical structure which dealt with the values of international trade theory by dividing the theory into three components which are classical theory by Torrens, neo-classical approach by Ricardo and Mill; and modern theories by Heckscher and Ohlin. He found that, while Ricardo observed the mobility of goods within countries and among countries, factors of productions were in fact immobile among countries but absolutely mobile within countries. Ricardo (1817) did acknowledge that all industries were well integrated with the production of one output and the use of one crucial input labour which is internally mobile, but the mobility of capital was limited on the inside. Goods in a country should be imported where there is a comparative disadvantage (International trade, 2012). According to the Heckscher-Ohlin theory a country specialises in the production of goods that it is suited to produce. Countries differ with the availability of the factors of production such as capital and labour. The Ricardian theory is described as when a country exports commodities in which it has a comparative labour-productivity advantage. According to Donaldson (2011:5) the Ricardian theory assumes only one factor of production and factor proportions such as the Heckscher-Ohlin/Ricardo-viner which rules out technological differences. The Ricardian theory works in correlation with technological trade to form the Ricardian model and the effects on welfare and labour in a country.

2.1 The Endogenous Growth Theory

The construction of the endogenous growth theory was constructed from the shortcomings of the neoclassical model of the economic growth (Kargbo,2012) The new growth theory acknowledges the importance of endogeneity of capital in the growth process of increasing returns as opposed to constant returns of capital typical in the theory of the neoclassical growth that attributes a difference. The theory emphasizes the importance of human capital and the process of growth (Kargbo, 2012). The foreign aid is assessed on economic growth fits into the new growth theory. The aid in the form of the technical assistance is an important attribute that influences the building of capacity and human capital in countries that are most aid-recipient (Kargbo,2012) An assumption made by Lucas is that investment in education leads to the production of human capital that is the determinant that is crucial of the process of growth. The theory implies that countries that are developing benefit more from trade with countries that are developed that draw on new knowledge in research and development and new technologies and this will encourage the openness of trade. The importance of the new growth theory recognizes the importance of the public policy to the growth of the economy and this is justified when policy variables in empirical aid-growth regressions are included. The increase of the returns to capital of the new growth model implies foreign aid in the long run will improve growth (Kargbo, 2012:1).

III. Technological Change

Technology focuses on the conversion of resources to commodities. There are many ways to model technological change such as global uniform technological change which causes the increase of welfare everywhere. The foreign uniform technological change which also increases welfare everywhere using the Cobb-Douglas assumption and lastly international transfer of technology that is most efficient, meaning that it will lose from international transfer and there will be no gains of trade (Giovanni, Levchenko and Zhang, 2012:19)

According to Giovanni, Levchenko and Zhang (2012:6-7) Chinas productivity is high in sectors such as wearing apparel which are common because in those sectors countries productivities are high. The sectors with

comparative disadvantage such as office, accounting and computing machinery are scarce. Balanced growth in China keeps it similar to the typical country and it is different with the unbalanced growth.

The impact of technological change is that there will be a gain on welfare if the growth of China is unbalanced and this is because pattern of comparative advantage in China is common world-wide and the unbalanced growth of China makes it different than the average country. This will result in taking into account the nature of both the Ricardian comparative advantage and trade flows that evaluate the welfare of China (Giovanni, Levchenko and Zhang, 2012:32)

3.1 Technological Change Studies

Both China and South Africa are developing countries and there are economic activities in which the developing countries may continue to have a competitive edge that arises from natural conditions that are supplemented by technological change such as natural resources in particular minerals and tropical products. This is an indication that technological change and innovations in the can contribute towards solving trade and growth issues that will in return enhance comparative advantage based on the endowments of natural resources (David, 1991).

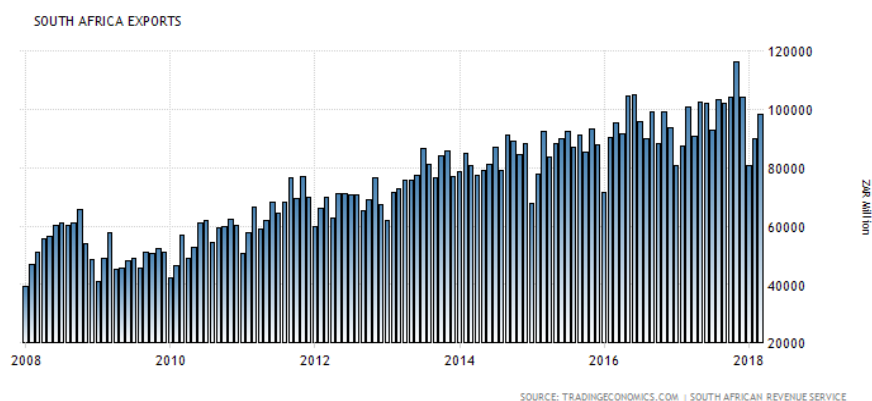
Technological capability and the adoption of new technologies that were applied on exploration, exploitation and processing various natural resources can make a difference through tapping the potentials of natural resource endowments. In the area of primary commodity production increases in productivity are important in the level of returns being influenced from factors that are used in the production of the commodities. The capabilities of technology in the production of commodities can have a positive influence on the terms of trade. An example regarding this would be the experience of Malaysia's efforts of diversification into the production of cocoa that has indicated that that although Malaysia has higher labour costs than West Africa and Brazil, it has been successful in gaining relative competitiveness in cocoa production through achieving very high yields from the new hybrid varieties that are developed by its crop-breeding programmes (Wangwe,1993).

IV. Trade Between China And South Africa

The Chinese economy has increased rapidly compared to other developing countries. According to the EW World Economy Team (2013:1) China is the leading nation in exports and comes in second for imports, From the year 2009 to 2011 its trade to GDP ratio was 53.1% while its trade Capita was \$2413, China's share in trade has doubled to 10.38% of the world's trade exports and 9.43% of trade imports. China is becoming the most important bilateral trade partner. China is South Africa's single largest bilateral commercial partner, with total trade that is worth R270 billion in 2013. In turn, South Africa is China's main trading partner in Africa that accounts for a 31 percent share of Beijing's trade with the continent in 2013 (Daniel and Virk, 2014). Total Chinese foreign direct investment (FDI) stock in South Africa increased from \$59 million in 2004 to \$5 billion in 2012, making Tshwane the leading recipient of investment flows from China to the African continent.

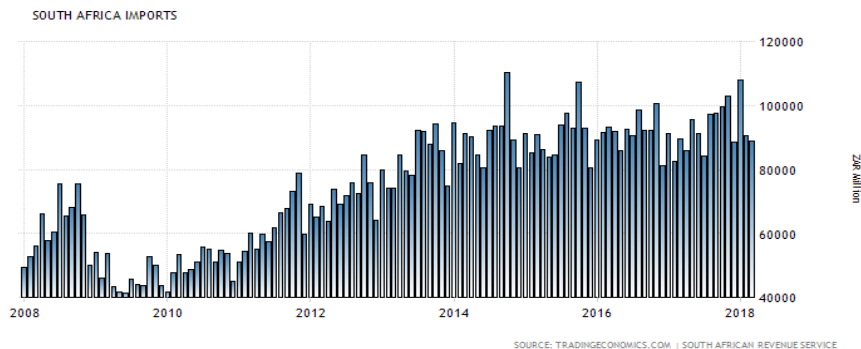
According to trading economics (2018) South African Exports increased 9.2 percent month-over-month to ZAR 98.3 billion in March of 2018, this was as a result of the higher sales of minerals which account for 12% precious metals and stones which accounted for 15% base metals which accounted for 19% and machinery and electronics which accounted for 10% The most important export partners were China which had a total percentage of exports which is 10.2% , the US amounted to 7.1 % , Germany 7%, Japan amounted to 4.7 % and India amounted to 4.7%. Exports in South Africa averaged R 17796.38 Million from 1957 until 2018, this resulted in as the highest amount of 116185.90 ZAR Million in November of 2017 and the lowest amount of R55.80 Million in August of 1958.This is indicated in chart 1.

Chart-1: South Africa's Exports



South Africa's main imports are mainly machinery which accounts for 23.5%, mineral products which are 15.1%, vehicles and aircraft vessels which is 10% chemicals which are 10.9 %, equipment components which are 8.1 % and iron and steel products which are 5.3 %. The main trading partners are: China with the percentage of 18.3%, Germany with 11.5%, United States amounted to 6.6%, India with 4.7 %, Saudi Arabia with 4.6 % and Japan with 3.4%. The other trading partners are the United Kingdom, Thailand, Italy and France.

Chart-2: South Africa's Imports



The above charts indicate the imports and exports of South Africa to several countries. The diagrams also depict that China has the largest trading relations with South Africa compared to the other countries. This is shown with the percentages of both the imports and exports of China and South Africa. The bilateral trade between the two countries also indicate that there is a trade imbalance where exports from South Africa to China account for 10% and imports account From China to South Africa account for 18%, this however can be remedied by South Africa learning from China the necessary skills and development and they type of industries will contribute towards the economy. Technological change is one of the contributing factors to the Chinese economy and South Africa's technological industry still needs to grow.

V. Research And Development

There are challenges regarding new technologies in ways which are consistent with capabilities in different countries at present and over time. There are indications that market opportunities for the non-frontier technologies will continue to be presented by the market conditions of the changing world market. The dominance of small firms in the apparel industry is explained by the rapid variation in style and colour that is required by the production of small-sized lots and the ability to respond quickly to the change of demand (David, 1991). With regards to the framework of intra-industry trade with the case of the US, it has been found that trade is dominated by intermediate goods which are primarily of the made-to-order type which are produced by small firms (Wangwe, 1993). The US-Brazil intra-trade was found to be dominated by made-to-order goods produced by small firms using labour intensive production techniques. In order to cope with the changing patterns of market opportunities it is important that the process of growing competitiveness be continuous and dynamic. For instance, comparing the kinds of products exported by Korea and India it has been found that in 1966 high-tech products were measured by their research and development intensity that represented a very small share of exports. In 1986 the share of such products in exports had increased considerably in Korea this indicated competition in progressive industries that were characterized by technological change while the share was stagnant in the case of India (Keller, 1991). The unchanging nature of Research and Development intensity in India's exports reflects the unwillingness to import modern technology and exposure to foreign technology is limited. The relevant challenge for policy in developing countries seems to be how to avoid the outcome of the Indian case and how to enhance competition in progressive activities in ways which are closer to the Korean case. Both Korea and India have their different views and functions regarding technology, however it's essential for countries to keep up to date with modern technology as this will help the growth of the economy, skills transfer and the reduction of unemployment.

VI. Conclusion

As illustrated above the quantitative and qualitative approach will be used to outline how the economy of China and South Africa is affected by technological changes through the different approaches of international trade theories and to also look at how imports and exports are monitored and evaluated in the Chinese and South African economy and the world at large. China and South Africa's trading balance is not equal, South Africa has a trade deficit, while China has a trade surplus so it is essential that both economies benefit from their trade relations. A monitoring system will assist with tracking the development of both countries and making sure that

the goals and objectives for fostering economic growth are implemented. Technological change has advanced the economy of China and it is essential as one of the biggest trading partners for South Africa to ensure that both economies benefit from each other with regards to trade, skills and knowledge transfer.

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Vuyelwa Jeanett Moledi "The Impact Of Technological Change In The Monitoring And Evaluation Of Imports And Exports In China And South Africa's Economy." IOSR Journal of Economics and Finance (IOSR-JEF), vol. 9, no.3, 2018, pp. 63-67.