

Impact of Globalization on Industrial Development in Vietnam: Evidence from Time Series Analysis

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Abstract

This study aims at investigating the impact of globalization on industrial development in Vietnam. Empirical analysis is done by using time series data for the period from 1995 to 2015. The paper tested the stationary, cointegration of time series data and utilized error correction modeling technique to determine the short-term relationships among industry value added, globalization, foreign direct investment, balance of trade, exchange rate and reserves variables. The results show that globalization, measured by the KOF index, promotes industrial development and that Vietnam has gained from integrating into the global economy. The overall index of globalization has positively and significantly impacted on the industrial development in Vietnam in the short run as well as in the long run. The results also indicate that foreign direct investment has had a massive effect on the development of the Vietnamese industrial sector in the long run. The study further reveals that balance of trade has affected industrial development positively in the long run. Moreover, the exchange rate was found to be positively influential toward industrial development in the long run but it has had a negative effect on the industrial sector in the short run. In addition, reserves have negatively affected industrial performance in the long run but have had an insignificant impact in the short run.

Keywords: Exchange rate; foreign direct investment; industrial development; globalization; trade balance.

JEL code: F63, C32.

1. Introduction

Industrialization has been seen as a major force in structural change, a crucial and powerful engine in the overall development process. It will remain crucial to the future growth of developing countries (The United Nations Industrial Development Organization - UNIDO, 2016). This therefore explains the reason why governments in developing countries such as Vietnam emphasise industrialization as a way of transforming the economy in the direction of modernization.

In the last three decades, Vietnam has pursued industrialization to transform the economy from a centrally planned industrial sector dominated by administrative allocation of inputs and outputs to an industrial sector governed mainly by market forces. Yet a lot of effort has been put into the industrialization process. Plan after plan, various industrial development policies and many other macroeconomic policies have been designed, renewed and fine tuned with the hope of creating a competitive environment that drives industrial growth and increases industrial productivity for all industries where competition among industrial firms flourish.

One of the most important policy decisions for Vietnam during the Doi Moi process was the shift from a strategy of import substitution to one of export orientation. Obviously, Vietnamese policy makers wanted to avoid the failure of Latin American economies and to learn from the successes of the industrialized nations and newly industrialized economies in East Asia (Nguyen et al., 2016). The Doi Moi process and integration into the world economy strongly influenced the development of Vietnamese industry. Vietnam's industry value added increased

from 5.96 billion United States (US) dollars in 1995 to 67.16 billion U.S dollars in 2016. Vietnamese industry grew at an average annual rate of 7.5 percent in the period 1995-2016. The share of industry in gross domestic product (GDP) expanded from 28.7 percent to 33.2 percent, and employment in industry rose from 10 percent to 24 percent during 1995-2016.

However, despite numerous policies introduced to date since 1986 by the government to facilitate the industrialization process in an economically conducive manufacturing environment, the performance of the industrial sector remains undesirable. Vietnam is still in the early stages of the industrialization process. Vietnam's industry is dominated by food processing, textiles and garments, footwear, and a variety of other labour intensive industries. Even though Vietnam pursued an export-oriented manufacturing policy, this policy aimed at the development of low-cost labour and low skill assemblage products for export, as opposed to the development of high value, high skill industrial manufacturing (Do, 2016). Vietnam's industrialization strategy and industry policy seem to have placed greater emphasis on achieving a high rate of economic growth rather than on building up industrial competitiveness and new competitive industries for future growth (Nguyen et al., 2016).

Globalization is one of the most important factors of today's economic development, fundamentally influencing all fields, including production. Globalization has challenged the way industrial development takes place (Lee et al., 2016). The consequences of globalization have long been a subject of interest in many researches. Interesting trends observed in the

impact of globalization on certain sectors of an economy, in particular the industrial sector, have attracted studies on the subject of globalization. However, the results of these studies show that the industrial development consequences of globalization remain controversial. Moreover, the relationship between globalization and industrial development in Vietnam has not been deeply evaluated by previous researchers and there is apparently a need to fill this research gap.

The prime objective of the paper is to highlight the impact of economic globalization on industrial development in Vietnam for the period from 1995 to 2015. Unlike previous empirical studies, which had employed various proxies for globalization such as foreign direct investment (FDI), openness, trade, etc., this paper uses the composite KOF index of globalization to prevent excessive oversimplification of complexities involved in understanding the ongoing process of globalization. It is hoped that the current study contribute to the existing literature of globalization by answering the research question: How does globalization affect the Vietnamese industrial development? The findings of the study provide policy directions to policy makers on how to influence the industry sector, and in addition serve as reference material to researchers interested in the current topic.

This paper is organised as follows: after a short literature review of relevant studies on the impact of globalization on industrial development the methodology of the study is presented. The next section exposes the main findings, and the final section concludes the paper with important issues on policy recommendations.

2. Literature review

The relationship between globalization and industrial development is a heated and highly debated topic in the development literature. Theoretical studies report a contradictory discussion on the relationship between globalization and industrial development. Some studies have found a positive effect of globalization on industrial development, others have argued that globalization has a harmful effect on industrial development. Despite the conflicting theoretical views, many studies have empirically examined the impact of globalization on industrial development in developed countries as well as developing ones. The results of these researches have been somewhat divergent, so that globalization has been described as a two-edged sword that has brought benefits to some and misery to others.

Around the world, many empirical studies have been conducted to investigate the effects of globalization through its indicators on industrial development in various regions, sub-regions and countries. These studies have examined the effects of globalization on growth, productivity and efficiency of the industrial sector, sub-sectors and at a firm-level in the industrial sector.

Many studies conclude that globalization is good for industrial development. Sulaiman et al. (2012) did work on the impact of globalization on the total factor productivity (TFP) performance of the Malaysian manufacturing sector in the period from 1990 to 2008. In the study, the variables representing globalization comprised of foreign labour, technology, FDI and the openness of the economy. The analysis comprised of two parts: the manufacturing sector and 15 industries of that sector. The

findings showed that FDI and openness of the economy were statistically significant and positively contribute to the performance of the TFP of the manufacturing sector. On the other hand, foreign labour and the number of technology agreements were not statistically significant. Both variables did not contribute to the TFP performance of the manufacturing sector. In terms of analysis by industry, three industries in which the effects on TFP performance were at the highest were machinery and equipment products, scientific and measuring equipment products and electronic and electrical products.

Zhang (2014) explored the role of globalization on industrial performance in China in the six years 2005-2010. Using the data on 21 manufacturing sectors for 31 provinces, the panel estimating results suggested that both foreign direct investment and foreign trade (proxies of globalization) generated strong positive effects on manufacturing output and manufacturing exports, but the contributions to industrial upgrading and technological complexity seemed to be limited.

In an attempt to find the impact that globalization exerts on the manufacturing sector in Nigeria, Ojo and Ololade (2013) used ordinary least square (OLS) econometric technique on time series data of relevant variables such as manufacturing output (as a measure of the manufacturing sector performance), trade openness and current account balance (both proxies for globalization). The study found that though the Nigerian manufacturing sector benefited from the globalization process, the development level of the sector was found to be highly negligible – meaning that globalization exerts little impact on economic growth via the manufac-

turing sector of the economy.

Asuamah et al. (2016) investigated the stable long-run hypothesis between globalization and manufacturing sector productivity for Ghana for the period 1961-2013 by using annual time series data. The Augmented Dickey Fuller (ADF, for unit root analysis) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS, for unit root analysis), ordinary least square (OLS) regression, Johansen test (long run analysis), vector error correction model (VECM, short run analysis), and the Ganger causality test were used. The findings of the study indicated that though globalization has a positive influence on manufacturing sector productivity, the manufacturing factor has not benefited from globalization. There is no stable long run and short run influence of globalization on manufacturing sector productivity. The authors believed that policies to attain globalization are not achieving the intended target and the policies to improve the manufacturing sector productivity are not yielding positive results as expected.

Umaru et.al (2013) considered the impact of globalization on some key sectors of the Nigerian economy between 1962 and 2009. The study revealed that globalization has had a positive impact on some sectors of the economy such as agriculture, transportation and communication; while some sectors especially petroleum, manufacturing, and solid minerals were negatively affected by globalization.

Ayodele et al. (2017) investigated the impact of globalization on Nigeria's industrial growth. The study relied on collected time series data from 1981 to 2014 and the OLS regression analysis method. The result revealed that Nigeria did not benefit enough from globalization

even though trade openness tended to increase industrial growth. Based on the finding, trade openness, FDI and the exchange rate had significant impacts on industrial growth. Also, there was overdependence of the country on imported goods.

In contrast with the above empirical studies, several studies have shown that globalization through its indicators has had adverse effects on the industrial output of countries, most especially developing ones. Onyeonoru (2003) analyzed the impact of globalization of African economies on industrial performance in Nigeria. The study indicated that the economic performance of firms in the manufacturing sector during the globalization period was adversely affected by the process. The study showed that the adverse economic performance of the manufacturing sector in general and the food, beverage and tobacco sub-sector in particular was not substantially modified by the globalization structures introduced by the Structural Adjustment Programme in 1986. The study confirmed the position that the globalization project that aimed at the structural economic transformation of modern capitalist relations in Africa was associated with the de-industrialization process.

Aluko et al. (2004) examined the impact of globalization on the Nigerian manufacturing sector with focus on selected textile firms. The main finding of the study is that globalization had strong adverse effects on capacity utilization in the manufacturing sector and that the problems associated with globalization and trade liberalization hindered economic growth and sustainable development. The study concluded that Nigeria needs to have second

thoughts on globalization and her membership of the WTO (World Trade Organization) agreement if she does not intend to do away with the manufacturing sector of the economy.

Sonia and Kansal (2009) analyzed the impact of globalization on Indian small-scale industries in the period 1973-2007. The main finding of the study was that globalization had a negative impact on the growth of the small-scale sector in the period examined.

Wilson (2010) examined the impact of globalization on industrial growth in Nigeria using the period 1986 to 2008. The econometric method of data analysis and estimation adopted was the OLS technique. Variables in the study included: industrial output as a dependent variable, trade openness and exchange rate as explanatory variables. The relationship between globalization and Nigerian industrial growth was empirically tested and the results showed that globalization has a significant effect on industrial growth in Nigeria. Evidence from the study revealed that the more the Nigerian economy is open to trade with the outside world, the more the industrial sector suffers. Trade openness showed a negative relationship with the industrial sector growth. The exchange rate was positively related to industrial growth. Both variables were statistically significant in explaining the impact of globalization on industrial growth.

Essien (2012) studied the impact of globalization on industrial performance in Nigeria over the period 1975-2010 with plastic firms in focus. Evidence from the study indicated that the economic performance of industries in manufacturing sectors, especially the plastic industry, during the post- structural adjustment

programme period were adversely affected by the process of globalization.

Atta (2017) made an investigation into the impact of globalization on the manufacturing of Ghana between 1985 and 2013. The author used FDI as a proxy for globalization. The study employed simple OLS regression and indicated that there was a negative correlation between FDI and manufacturing in Ghana. The negative effect, which emanated from trade, the financial sector, and exchange rate liberalization, is materialized through stiffer competition, increased cost of production, and loss of confidence by indigenous investors.

Notwithstanding, existing empirical evidence shows mixed results about the relationship between globalization through its forces and industrial development. Mairesse et al. (2012) investigated the relationship among globalization, innovation, and manufacturing firms in China for four major manufacturing sectors: textiles, wearing apparel, transport equipment and electronic equipment. The authors used a large sample of firm level micro data from 2005 to 2006 and a structural model in the estimation. The effects of globalization variables on innovation in four manufacturing sectors were in exports and ownership. The results showed that globalization has various impacts on innovation, through exports. Globalization had a positive effect on both the decision to carry out research and development (R&D), and the intensity of R&D input in sectors with competitive advantage, such as textiles and transport equipment, but not in sectors with high levels of overseas capital control, such as electronic equipment and wearing apparel. Ownership revealed the same story in different sectors,

namely that foreign firms tended to do less in innovation in input and output, but they did have a higher level of productivity. In all sectors, exports improved new products' output.

Tamuno (2012) examined the impact of globalization on the Nigerian industrial sector, utilizing annual time series data covering the period 1970-2008. Under the framework of a cointegration test and error correction mechanism, the results showed that external debt, gross capital formation, nominal exchange rate, and degree of openness had a negative impact on the Nigerian industrial sector while FDI had a positive impact on industrial output in Nigeria.

Warburton (2012) investigated the impact of globalization on structural changes in the US manufacturing sector in the period 1987-2010. The author found that US productivity in the manufacturing sector increased, but that the performance of the sector was highly contingent on change in the US national income. Changes in manufacturing output responded adversely to shocks that were associated with the US national income and manufacturing imports, but the negative effect of income shock on US manufacturing dominated and outlasted that of the manufacturing import shock. Empirical evidence also indicated a dual-causal relationship between national income changes and employment changes in the US manufacturing sector. The empirical evidence suggested that manufacturing output may not be entirely dependent on globalization, but a combination of factors of which changes in national income and domestic and foreign absorption are paramount.

Ebong et al. (2014) examined the nature of

the influence globalization might have exerted on the industrial development of Nigeria over the past five decades (1960-2010). Based on the Engle-Ganger two-step and Johansen Cointegration tests, the vector auto regression technique was used within an error correction framework. Findings clearly showed that globalization had a significant impact on industrial development in Nigeria. Specifically, trade openness had a positive influence on industrial development. This suggested that increasing the level of trade with the rest of the world would increase opportunities to export local raw materials and import necessary inputs into the industrial process. In contrast, financial liberalization adversely impacted on industrial development.

In Vietnam, there also exist a number of studies on the effect of globalization on economic growth, poverty, employment and some aspects of human development such as education and healthcare, etc. For instance, Thoburn (2004) studied about globalization and poverty in Vietnam and found that Vietnam has seen a striking reduction in poverty since its opening to the outside world in the early 1990s, and evidence for this poverty reduction is not sensitive to where the poverty line is drawn. However, inequality has risen. Jenkins (2006) explored the ways in which globalization affected the labour market in Vietnam by analyzing the impact of FDI on employment. He concluded that the expansion of foreign firms to labour-intensive manufacturing has not had a substantial impact on employment because of the high productivity and low value-added of much of this investment. Not only have the direct employment effects of FDI in Vietnam not been very sub-

stantial, but the indirect effects have also been minimal and possibly even negative. Nguyen et al. (2004) studied globalization's effects on health care and occupational health in Vietnam. They concluded that the process of globalization has given rise to serious problems for the health of workers. The pollution of working environment in workplaces are at a high level and the situation of diseases related to occupations and occupational diseases of workers have been detected and have increased yearly. Besides that, Nguyen and Fraser (2007) analyzed the impact of globalization on higher education in Vietnam and showed that the merging of higher education institutions, abandonment of state monopolies in education, increasing diversity in education provision, re-orienting curricula to meet the market needs, and introducing competition into the educational sector in order to enhance the efficiency and effectiveness of the educational services are impacts of globalization on the education system in Vietnam. In addition, Pham (2013) analyzed the effects of globalization and the necessity of Vietnamese educational management for integration into the world, etc.

Notably, Tran and Nguyen (2018) studied the impact of globalization on economic growth in Vietnam for the period from 1995 to 2014. The results showed that globalization, measured by the KOF index, promoted economic growth and Vietnam has gained from integrating into the global economy. The overall index of globalization had positively and significantly impacted the economic growth in Vietnam. The results also indicated that economic globalization had a significantly positive effect on economic growth in the period examined.

The findings showed that foreign direct investment and the exchange rate affected economic growth positively whereas the balance of trade affected economic growth negatively.

From the brief review above, empirical studies that analyze the impact of globalization on industrial development are numerous. However, the findings on the influence of globalization through its indicators on industrial development of countries, most especially developing ones, are mixed as indicated by the above review of related literature. Moreover, these studies often evaluate the impact of globalization through various indicators such as foreign direct investment, trade openness, foreign labour, exports, technology, trade and financial liberalization etc., but each of which only reflects one aspect of globalization. Despite the numerous studies, knowledge of the effect of globalization on industrial development in Vietnam is still scarce. The present study is an attempt to fill this gap.

Unlike the above empirical studies, this study uses a new comprehensive index of globalization (KOF) that covers the economic, social and political dimensions of globalization to analyze impact of globalization on industrial development in Vietnam. The current study is expected to provide information and input in the policymaking of the effort to increase industrial growth in Vietnam. The author also expects this paper to provide contribution to references for further studies on globalization and industrial development.

3. Methodology and data

The equation designated to evaluate the impact of globalization on industrial development is specified as follows:

$$IND_t = \alpha_0 + \alpha_1 KOF_t + \alpha_2 FDI_t + \alpha_3 BOT_t +$$

$$\alpha_4 EXR_t + \alpha_5 \log(RES)_t + u_t \quad (1)$$

The dependent variable for simplicity of description and interpretation of results is industry value added. In the scope of the study, industry value added is considered as an index representing industrial development because it reflects the quantity aspect of industrial development.

The expected explanatory variables consist of:

KOF: This overall globalization index measures a nation's overall integration into the global economy. The KOF globalization index is built from each component and transformed into an index using a scale of 1 to 100, where bigger numbers demonstrate higher globalization, and it covers the economic, social and political dimensions of globalization (see the Appendix for details).

FDI: Foreign direct investment is measured as a percentage of GDP. Growth in FDI has been a major feature of globalization. FDI therefore is one of the most important indicators of financial globalization and a major component of international capital flows. FDI serves as an important engine for growth in developing countries through two modes of action: (i) expanding capital stocks in host countries and (ii) bringing employment, managerial skills, and technology. Dinda (2010) noted that FDI remains a significant force of globalization with its huge implications for industrial growth in countries around the world. Therefore FDI is believed to contribute to the growth of industry value added.

BOT: Balance of trade is measured as export minus import. Obadan (2008) affirmed that international trade is one of the driving forces of

Table 1: Description of variables used in analysis

Variable name	Description	Source (updated 2018)
IND	Industry value added	The global economy database
KOF	Overall globalization index	KOF index of globalization database
FDI	Foreign direct investment defined as the ratio of FDI to GDP	The global economy database
BOT	Balance of trade measured as export minus import	The global economy database
EXR	Foreign exchange rate	The global economy database
log(RES)	Log of reserves	The World Bank development indicators database

globalization. Trade is considered in this context because of its direct impact and relation to the Vietnamese industrial sector.

EXR: Foreign exchange rate, which is the value of the local currency units per US dollar. Global financial integration provides opportunity for countries, especially developing countries, to access a diversified investor base for bonds and equity issues and also access capital markets of the developed countries. Thus, it is important to examine the effect of the foreign exchange rate on industrial development.

RES: Reserves of Vietnam which include its holdings of foreign currencies and gold. It is expected that this independent variable will influence the industrial development of the country.

α_0 is constant; $\alpha_i (i = \overline{1, 5})$ are parameters.

u_t is error term.

The estimation of equation (1) by the ordinary least square technique may yield spurious regression if the variables are not stationary. In order to overcome this problem, all variables are subjected to a unit root test to determine the time series properties. The Augmented Dickey-Fuller (ADF) unit root test is employed on all variables to check the order of integration. In case all selected variables are integrated at

the same order, the Johansen cointegration test is then used to examine the long run relationship among the chosen variables. Otherwise, the auto regressive distributed lag model for cointegration can be considered. Once the variables are found to be cointegrated, meaning that long run equilibrium holds among them, they may still be in disequilibrium in the short run. Therefore, an error correction model is estimated to determine the short run dynamics of the system. In this study, the equation (1) is transformed into the following error correction model:

$$\Delta IND_t = \beta_0 + \beta_1 \Delta KOF_t + \beta_2 \Delta FDI_t + \beta_3 \Delta BOT_t + \beta_4 \Delta EXR_t + \beta_5 \Delta \text{Log}(RES)_t + \beta_6 u_{t-1} + \varepsilon_t \quad (2)$$

Where: Δ is the first difference; β_0 is constant; $\beta_i (i = \overline{1, 5})$ are parameters.

β_6 is the speed of adjustment that is linked with cointegration equation;

u_{t-1} is a one year period lag of error correction term derived from the randomness of the equations of the OLS model (1).

ε_t is the error term.

Data used for estimating these models is from various sources in Table 1.

In this study, data on variables is taken for the period from 1995 to 2015. This restriction

Table 2: ADF Unit root test results

Variables	Level		1 st Difference		Results
	t-statistic	Prob.	t-statistic	Prob.	
IND	-1.0233	0.7240	-0.0463	0.0064	I(1)
KOF	0.7987	0.9911	-7.2834	0.0000	I(1)
FDI	-1.9304	0.3127	-3.3189	0.0284	I(1)
BOT	-1.5547	0.4862	-3.5069	0.0195	I(1)
EXR	-0.1192	0.9331	-3.5916	0.0171	I(1)
Log(RES)	-1.2895	0.6133	-3.5595	0.0175	I(1)

ADF test type: Intercept without trend.

on the period of data is due to unavailability of data on globalization¹.

4. Results and discussion

In order to observe the impact of globalization on the industrial sector in Vietnam, firstly, the Augmented-Dickey Fuller unit root test is employed for levels of all variables of interest followed by the first difference. The results in Table 2 show that industrial value added (IND), overall globalization index (KOF), ratio of foreign direct investment to GDP (FDI), balance of trade (BOT), foreign exchange rate (EXR), and log(RES) are non-stationary at levels. The

results also indicate that all variables are stationary at the first difference and integrated order 1. This suggests a series of variables may reveal a logical long run relationship among them.

Since the variables in the model (1) are non-stationary and integrated of the same order, the Johansen cointegration test is used to determine the long run relationship among the variables in each model. Results in Table 3 confirm the existence of a long run relationship between IND and included variables in the model (1) as indicated by the Trace statistic and the

Table 3: Johansen cointegration test

Series: IND KOF FDI BOT EXR Log(RES)							
Unrestricted Cointegration Rank Test							
Hypothesized No. of CE(s)	Eigenvalue	Trace			Maximum Eigenvalue		
		Trace Statistic	0.05 Critical Value	Prob.	Max-Eigen Statistic	0.05 Critical Value	Prob.
None	0.994184	197.8799	95.75366	0.0000*	97.79695	40.07757	0.0000*
At most 1	0.847093	100.083	69.81889	0.0000*	35.68063	33.87687	0.0301*
At most 2	0.815233	64.40233	47.85613	0.0007*	32.08457	27.58434	0.0123*
At most 3	0.60039	32.31776	29.79707	0.0251*	17.42805	21.13162	0.1528
At most 4	0.501251	14.88972	15.49471	0.0615	13.21739	14.2646	0.0727
At most 5	0.084255	1.672333	3.841466	0.1959	1.672333	3.841466	0.1959

Note: * denotes rejection of the hypothesis at the 0.05 level.

Table 4: Normalized cointegrating coefficients

Variable	IND	KOF	FDI	BOT	EXR	Log(RES)
Coefficient	1.00000	-2.49592	-164.7609	-0.44898	-0.00132	3.87498
		(0.15595)	(11.1312)	(0.03986)	(0.00025)	(0.71122)
		[-16.0044]	[-14.8018]	[-11.2650]	[-5.31246]	[5.44834]

Note: Standard errors in () & *t*-statistics in [].

Max-eigen statistic values. The Trace-statistic result reveals that there are four cointegrating equations at a 5% level, while the Max-eigen statistic value also indicates three cointegrating equations among the variables in the model (1) at the 5% level. Thus, all the variables in the model (1) are cointegrated and have a long run equilibrium relationship with each other.

After confirming the existence of a long-run relationship among variables, we normalise on the IND equation because this is the equation of interest. The cointegrating equation shown in Table 4 captures the effect of overall globalization and macroeconomic variables on industrial development in Vietnam.

The results of the long-run IND equation can be summarised as follows:

First, the overall globalization index positively influenced the industry value added in Vietnam. The estimated results of the model (1) indicate that an increase of the overall globalization index level as big as 1 unit will enhance the industry value added by 2.49 units, *ceteris paribus*. Thus, globalization has generated greater value added for the industrial sector of Vietnam. It could be concluded that for Vietnam to achieve accelerated industrial growth and development, it is highly necessary to fully integrate the economy into the global economy.

Secondly, foreign direct investment was found to influence the industry value added positively with a coefficient score of 164.76. This implies that an increase in the ratio of foreign direct investment to GDP of 1 percent will lead to an increase in industry value added by 164.76 units, *ceteris paribus*. Globalization has implied much larger inflows of foreign direct investment for developing countries including Vietnam and the result implies that foreign direct investment has played an important role in the development of the Vietnamese economy in general and the industrial sector in particular. The positive influence of FDI on industrial development is in accordance with the theoretical expectation. This result is similar to the studies conducted by Sen (2008) who found foreign direct investment had a major positive effect on efficiency in Indian manufacturing from the early 1980s to the mid 1990s, Ullah (2012) who indicated that FDI positively affected Pakistan's industrial sector but the impact was statistically insignificant for the period 1979 to 2009. Tamuno (2012) also found that FDI had a positive impact on industrial output in Nigeria in the period 1970-2008. Alfaro and Charlton (2013) provided industry-level evidence by using data for 12 members of OECD (Organization for Economic Co-operation and Development) showing that the relation between FDI

and growth is stronger for industries more reliant on external finance. However, the result of the current study is different from Atta's (2017) findings that indicated a negative correlation between FDI and manufacturing in Ghana for the time span from 1985 to 2013.

Compared to other regional economies, Vietnam is regarded as a late-comer to industrial development in relation to both the first and second generation of Asian newly industrialized countries. For many developing countries that have been late-comers to industrialization, foreign direct investment has played a crucial role in the industrial development of these countries by bringing in technology, market know-how and modern management practices to domestic firms in these countries. FDI has been a key factor behind the successful transformation of many countries in East and South Asia from costly and technologically backward import substitution to a more dynamic export oriented industrialization. Vietnam's location in the Asian region has played a major role for the development of foreign direct investment. Foreign direct investment in Vietnam jumped from only US \$1.78 billion in 1995 to US \$35.88 billion in 2017. This has created opportunities to exploit the country's comparative advantages and integrate it into the region's production systems. Nearly half of this foreign direct investment went into manufacturing and most of that manufacturing was destined for exports. Data from the World Bank shows that manufactures exports have grown quickly, making up more than 76 percent of merchandise exported. However, the majority of the growth has been made by foreign manufacturers based in Vietnam (Do, 2016). Electronics

and computers, which have become increasingly attractive to foreign investors, are the fastest areas of growth for Vietnam's manufacturing sector in recent years. Most of these products have been produced with imported inputs, with local content only a small part of the overall production (Do, 2016).

Thirdly, the estimated results from model (1) showed a positive coefficient (0.44898) between the balance of trade and industry value added. Thus, international trade has had a positive effect on industry development in Vietnam. Globalization has implied tremendous opportunities for trade for developing countries and trade is one of the most developed areas of Vietnam foreign economic relations. During the period 1995-2015, both exports and imports were increasing year by year except in 2009 due to the global crisis. Exports of goods and services of Vietnam have grown quickly from US \$6.8 billion in 1995 to US \$192.19 billion in 2016 with the annual average growth rate more than 15 percent over the period. Imports of goods and services of Vietnam also expanded rapidly from US \$8.69 billion in 1997 to US \$186.93 billion in 2016. For many years, import volume was higher than export volume, resulting in a trade balance deficit. Vietnam had a trade deficit because of a high demand for material, machinery, and modern techniques for the country that is in the first stages of industrialization. This has made a trade deficit unavoidable. However, Vietnam has had a trade balance surplus since 2012. Manufacturing is the most important industrial sub-sector that contributes to trade. Manufacture exports increased from about 41 percent in 1997 to more than 82 percent of merchandise exports in 2016

and manufacture imports accounted for nearly 70 percent in 1997 to 79 percent of merchandise imports in 2014. High-technology exports accounted for less than 29 percent of manufacture exports. Electronics became the country's leading export in 2013 and accounted for nearly one-third of total merchandise exports in 2016. Moreover, electronics are not only a big contributor to total exports but also play the lead role in the electronics' manufacturing of countries included in ASEAN (Association of South-East Asian Nations). The export of telephones and spare parts has become one of the largest contributors to the growth of the country's total exports. The second largest manufacturing sector is the garment and textile industry. The third ranking sector is the leather goods and shoe industry. The fourth most competitive sector is food processing, which has been well developed to meet both local and foreign market requirements. These show that Vietnam has identified its most competitive manufacturing sectors with intensive low-cost-labor and assembly industries.

Fourthly, the foreign exchange rate positively affected industrial development with a coefficient of 0.0013. This means that an increase in the foreign exchange rate of 1 unit will increase industry value added as much as 0.0013 unit, *ceteris paribus*. Thus, the exchange rate was found to exert a positive impact on industrial development in Vietnam. This implies that an increase in the exchange rate causes a move towards higher industrial value added. In the economic literature, there are controversies over the relationship between the exchange rate and industrial development. Wilson (2010) used the exchange rate as a proxy of globalization to determine the impact of globalization on industrial growth in Nigeria in the period 1986-2008. The result in his study showed that the exchange rate was positively related to industrial output in Nigeria. This suggests that the exchange rate is an important determinant of the level of industrial output. Ehinomen et al. (2012) also stated that the exchange rate plays an important role in the ability of the economy to attain a realistic growth in the manufacturing

Table 5: Error correction representation of the model (2)

Independent Variables	Model (2)			
	Coefficient	Std.error	t-Statistic	Prob.
C	2.5902	0.4257	6.0849	0.0000
D(KOF)	1.0896	0.2026	5.3766	0.0001
D(FDI)	-25.4715	20.3715	-1.2503	0.2332
D(BOT)	0.0972	0.0737	1.3252	0.2097
D(EXR)	-0.0023	0.0004	-5.1510	0.0002
D(log(RES))	1.1069	0.9179	1.2059	0.2494
ECT(-1)	-0.9239	0.0868	-10.6380	0.0000
R-squared	0.9316	Ramsey test (Prob.)		0.6210
Adjusted R-squared	0.8999	Breusch-Pagan-Godfrey test (Prob.)		0.4080
F-Statistic	29.4986	Breusch-Godfrey Serial correlation LM test (Prob.)		0.3246
Prob (F-statistic)	0.0000	Jarque-Bera probability		0.7961
Durbin-Watson stat	2.6838			

Dependent Variable: D(IND); Sample: 1995 2015.

sector. However, his empirical result in examining the impact of the exchange rate on the growth of the manufacturing sector indicated that in Nigeria, there was an inherent inverse relationship between the exchange rate and the manufacturing gross domestic product in the period 1986-2010. Thus, the result of this study is similar to the finding of Wilson (2010) that a positive correlation exists between the exchange rate and industrial development.

Finally, the estimated coefficient of reserves is negatively signed, suggesting that a one percentage point rise in reserves' growth would reduce industrial value added by approximately 3.87 units annually.

In econometric analysis, a cointegrated set of time series variables must have an error correction representation that reflects the short run adjustment mechanism. The short run model (2) is estimated in first difference form and the results are reported in Table 5. The value of $ECM(-1)$ represents the error correction term u_{t-1} .

The results in Table 5 clearly show that the coefficient of the error correction term (ECT) significant validating the error correction model specification. The coefficient of the error correction term has a negative sign (-0.9239) as expected and it is significant at a 1% level. The error correction term shows how fast the model returns to stability at any disturbance or shock. The speed of adjustment between short run dynamics and long run equilibrium value is 92% meaning about 92% of the discrepancy between the long term and short term IND is corrected within a year (yearly data). The significance of the coefficient of ECT connotes the existence of a long run equilibrium relationship

between industrial development and the explanatory variables.

In the short run, the overall globalization index has positive effects on industrial development. The variable is statistically significant at 1%. The foreign exchange rate variable shows a negative effect on industrial development and it is statistically significant at 1 percent. In addition, foreign direct investment is negatively related to industrial development but it is statistically significant. Balance of trade and reserve negatively influenced industrial development but they contributed no significant impact on industry value added in the short run.

Furthermore, the coefficient of determination of the model (2), represented by an R^2 value of 0.93, implies that 93 percent of the changes in the dependent variable are explained by the included explanatory variables. The model passes the Ramsey test for functional form misspecification (p-value is 0.6210). The model is free of autocorrelation in the specification because the p-value of the Breusch-Godfrey serial correlation LM test is 0.3246. The model is also free from any heteroskedasticity problem. The Breusch-Pagan-Godfrey test shows the variance of unobserved error is constant (p-values is 0.4080). The normality test indicates the score of Jarque-Bera probability (0.7961) is larger from $\alpha = 5\%$.

5. Conclusion

The role of the industrial sector in the growth of developing countries is very significant because sustained economic growth and development of developing countries, including Vietnam relies so much on the growth of the industrial sector. The purpose of this study is to examine the impact of globalization on in-

dustrial development in Vietnam. The cointegration technique was used to examine the long-term relationship existing among variables while an error correction model was also applied in order to determine the short-term dynamics around the equilibrium relationship.

The Vietnamese industrial sector has witnessed significant growth over the period studied. Based on the findings we conclude that there is a significant relationship between globalization and industrial development. The empirical results showed that globalization has a positive and significant impact on industrial development in the short term as well as in the long term. Thus, globalization is an important factor that should be considered in determining the development of the industrial sector in Vietnam. The findings of the results revealed that the Vietnamese economy is gaining from globalization and the presence of globalization could enhance economic development in Vietnam in general and industrial development in particular.

Owing to the empirical evidence of the study, foreign direct investment can be said to have a massive effect on the development of the Vietnamese industrial sector in the long term. Thus, globalization has helped increase foreign direct investment and the Vietnamese industry sector can harness the benefits of globalization and achieve a better growth. Moreover, globalization has also helped increase foreign trade. The trade balance has contributed positively to the industrial development in the long term. In addition, the exchange rate was found to be positively influential toward industrial development in the long term but it has had a negative effect on the industrial sector in the short

term. The study further showed that reserves negatively affect industrial performance in the long term but have an insignificant impact in the short term.

Vietnam like some other emerging economies has been highly integrated in the world economically, politically and socially and this has been attributed to the development of an industry sector through globalization. Globalization has come to play a major role in the recent pattern of industrialization of the country in recent years. Based on both the development and the position of the globalization level of Vietnam that is still relatively low, an increase in the globalization level can promote industrial development.

According to the results of the analysis, the following recommendations are made. First and foremost, there is a need for the Vietnamese government to support the development of the globalization level of the country to catch a higher level of industrial development. Secondly, there is a need for the Vietnamese government to continue with proactive and sound policies aimed at encouraging foreign direct investment, facilitating international trade, and ensuring foreign exchange rate stability to maximize the benefits of globalization and reduce its harmful effects on industrial development at the most. Lastly, reserves should be utilized in investment in the industrial sector rather than being kept as reserves. These measures could greatly promote the development of the Vietnamese industrial sector.

APPENDIX

Table 6: Components of overall globalization index

Components	Weights
Economic globalization	36%
<i>Actual Flow</i>	50%
Trade (percentage of GDP)	22%
Foreign direct investment, stocks (percentage of GDP)	27%
Portfolio investment (percentage of GDP)	24%
Income payments to foreign nationals (percentage of GDP)	27%
<i>Obstacles</i>	50%
Hidden import barriers	24%
Mean tariff rates	28%
Taxes on international trade	26%
Capital account restrictions	23%
Social globalization	38%
<i>Data on personal contacts</i>	33%
Telephone traffic	25%
Transfers	3%
International tourism	26%
The foreign population according to the total population	21%
International letters per capita	25%
<i>Data on information flows</i>	35%
Internet usage per 1000 people	36%
Television per 1000 people	38%
Trade in newspapers	26%
<i>Data on cultural proximity</i>	32%
Number of McDonald's restaurants per capita	44%
Number of IKEA per capita	44%
Trade in books	11%
Political globalization	26%
Number of embassies in country	25%
Membership in international organisations	27%
Participation in United Nation Security Council mission	22%
International treaties	26%

Source: Suci (2015).

Notes:

1. In 2018, KOF released the data on globalization up to 2015.

References

- Alfaro, L. and Charlton, A. (2013), 'Growth and the quality of foreign direct investment: Is all FDI Equal?', *CEP Discussion Papers* dp0830, Centre for Economic Performance.
- Aluko, M.A.O., Akinola, G.O. and Sola, F. (2004), 'Globalization and the manufacturing sector: A study of selected textile firms in Nigeria', *Journal of Social Sciences*, 9(2), 119-130.
- Asuamah, Y., Pinkrah, B. and Abbey, Q. (2016), 'What is the Effect of economic globalization on the productivity of the manufacturing sector of Ghana?', *MPRA Paper No. 71379*, MPRA.

-
- Atta, O. (2017), 'Effect of globalization on the manufacturing sector of Ghana', *International Journal of Current Research*, 9(5), 51592-51596.
- Ayodele, A., Ayoninuoluwa, O., Binuyo, B. and Olanrewaju, G.O.R. (2017), 'Impact of globalisation on the industrial growth in Nigeria (1981-2014): Implication to psychologist and economist', *European Journal of Business, Economics and Accountancy*, 5(5), 52-60.
- Dinda, S. (2010), 'Factors attracting FDI to Nigeria: An empirical investigation', *MPRA Paper 28097*, MPRA.
- Do, D.D. (2016), 'Manufacturing and industry in Vietnam three decades of reform', *Brenthurst Discussion Paper 6/2016*, The Brenthurst Foundation.
- Ebong, F., Udoh, E. and Obafemi, F. (2014), 'Globalization and industrial development of Nigeria: Evidence from time series analysis', *International Review of Social Sciences and Humanities*, 6(2), 12-24.
- Ehinomen, C. and Oladipo, T.I. (2012), 'Exchange Rate management and the manufacturing sector performance in the Nigerian economy', *Journal Of Humanities And Social Science*, 5(5), 1-12.
- Essien, A. and Mozie, I. (2012), *Globalization and industrial performance in Nigeria: A case study of the plastic industry 1975-2010*, retrieved on October 21st 2018, from <<http://dx.doi.org/10.2139/ssrn.2167266>>.
- Jenkins, R. (2006), 'Globalization, FDI and employment in Vietnam', *Transnational Corporations*, 15 (1), 115-142.
- Lee, J., Kim, J. and Lim, J. (2016), 'Globalization and divergent paths of industrial development: Mobile phone Manufacturing in China, Japan, South Korea and Taiwan', *Journal of Contemporary Asia*, 46(2), 222-246.
- Mairesse, J., Mohnen, P., Zhao, Y. and Zhen, F. (2012), 'Globalization, innovation and productivity in manufacturing firms: A study of four sectors of China', *Working Papers DP-2012-10*, Economic Research Institute for ASEAN and East Asia.
- Nguyen, T.H. and Fraser, S. (2007), *The impact of globalisation on higher education in China and Vietnam. Policies and practices*, retrieved on September 19th 2018, from <https://www.researchgate.net/publication/242369915_The_Impact_of_Globalisation_on_Higher_Education_in_China_and_Vietnam_Policies_and_Practices>.
- Nguyen, T.H.T, Nguyen, T.L.H and Nguyen, B.D. (2004), 'Globalization and its effects on health care and occupational in Vietnam', *Draft paper prepared for the RUIG/UNRISD project on Globalization, Inequality and Health, a collaborative international project forming part of RUIG research programme on the Social challenge of development*, United Nations Research Institute for Social Development, Geneva.
- Nguyen, T.T.A., Luu, M.D. and Trinh. D.C. (2016). 'The Evolution of Vietnamese Industry', in *Manufacturing Transformation: Comparative Studies of Industrial Development in Africa and Emerging Asia*, Newman, C., Page, J., Rand, J., Shimeles, A., Söderbom, M. and Tarp, F. (eds), Oxford: Oxford University Press, 235-256.
- Obadan, M.I. (2008), *Economic globalization, market and national development: How sensibly do the poor countries stand?: Inaugural lecture series 98*, University of Benin 2008, retrieved on September 19th 2018, from <<https://core.ac.uk/download/pdf/14520679.pdf>>.
- Ojo, A.S. and Ololade, O.F. (2013), 'An assessment of the Nigerian manufacturing sector in the area of globalization', *American Journal of Social and Management Sciences*, 5(1), 27-32.
- Onyeonoru, I. (2003), 'Globalization and industrial performance in Nigeria', *Africa Development*, 28 (3,4), 36-66.
- Pham, L.H. (2013), *Effects of Globalization and Necessity of Vietnamese Educational Management for Integration into the World. Innovative Management in Information and Production*. Springer, New York.

-
- Sen, K. (2008), 'Trade, FDI and industrial transformation in India', *Paper prepared for research workshop Emerging Trends and Patterns of Trade and Investment in Asia*, Brisbane, Australia.
- Sonia and Kansal, R. (2009), 'Globalization and its impact on small scale industries in India', *PCMA Journal of Business*, 1(2), 135-146.
- Suci (2015), 'The impact of globalization on economic growth in ASEAN', *International Journal of Administrative Science and Organization*, 22(2), 79-87.
- Sulaiman, N., Ismail, R. and Abidin, S.H.T.Z. (2012), 'The impact of globalization on total factor productivity of the manufacturing sector in Malaysia', *Prosiding Perkem*, 7(1), 409-422.
- Tamuno, S.O. and Edoumiekumo, S.G. (2012), 'Industrialization and trade globalization: What hope for Nigeria?', *International Journal of Academic Research in Business and Social Sciences*, 2(6), 157-170.
- Thoburn, J. (2004), 'Globalization and poverty in Vietnam', *Journal of the Asia Pacific Economy*, 9(2), 127-144.
- Tran, T.D. and Nguyen, T.C.V (2018), 'Impact of globalization on economic growth in Vietnam: An empirical analysis', *Journal of Economics & Development*, 20(1), 32-47.
- Ullah, A., Khan, M.U., Ali, S. and Hussain, S.W. (2012), 'Foreign direct investment and sectorial growth of Pakistan economy: Evidence from agricultural and industrial sector from 1979 to 2009', *African Journal of Business Management*, 6(26), 7816-7822.
- Umaru, A., Hamidu, A. and Musa, S. (2013), 'Globalization and its impact on the performance of the Nigerian Economy', *Interdisciplinary Journal of Research in Business*, 2(8), 1-16.
- UNIDO (2016), *Industrial development report 2016: The role of technology and innovation in inclusive and sustainable industrial development*, Vienna.
- Warburton, C.E.S. (2012), 'Globalization and structural change in the US manufacturing sector, 1987–2010', *Applied Econometrics and International Development*, 12(1), 73-92.
- Wilson, E.R. (2010), *The impact of globalization on industrial growth in Nigeria*, retrieved on October 22nd 2018, from <<http://www.researchgate.net/publication/256009500>>.
- Zhang, K.H. (2014), 'Globalization and regional industrial performance: Evidence from China', *Regional Science*, 93(2), 269-280.