
Impact of Ecological Factors on Nationwide Supply Chain Performance

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Abstract

Environmental responsibility is an integrated part of responsible supply chain management and involves several steps. The objective of this study is to investigate the role of ecological factors in the supply chain. Therefore, this study examined the role of GDP growth rate, the degree of openness, the rate of exchange and balance of payment effect on foreign direct investment (FDI) and FDI effect on the supply chain. Different national and international frameworks and tools guide companies in their work with sustainability and environmental supply chain management. UN's Global Compact is one of the main international frameworks. In this study, data were collected from Indonesian ecologists. Email addresses of Indonesian ecologists were collected and email was sent to them to get responses. Only one hundred email addresses were found of various ecologists. Therefore, the total sample size was one hundred. From total one hundred, sixty ecologists responded. Outcomes of the study show that increases in GDP growth rate, the degree of openness and balance of payment increases the nationwide supply chain performance. Decreases in GDP growth rate, the degree of openness and balance of payment decreases the nationwide supply chain performance. However, increases in the rate of exchange decrease the FDI growth rate which ultimately decreases the supply chain practices.

Keywords: supply chain, ecological factors, ecologists, the degree of openness, the rate of exchange, the balance of payment, FDI

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INTRODUCTION

Environmental supply chain management starts by mapping the supply chain and assessing the environmental impact of products and services with a life cycle approach. For companies with many suppliers and sub-suppliers in many different countries it may be a challenge to get an overview of the supply chains. Different steps are recommended to identify and prioritise key suppliers and sub-suppliers in the supply chain (see box). A complete overview of all suppliers and their environmental performances will seldom be possible. It has been broadly characterized in the literature that Foreign Direct Investment (FDI) frequently prompts numerous monetary points of interest to the beneficiary nation through its

arrangement of capital, foreign trade, innovation exchange, authoritative system, administrative abilities and chances to export through the enhancement of foreign markets (Crespo and Fontoura 2007, Javed et al. 2012, Salman and Feng 2010, Nas et al. 2016). FDI has a major role in economic growth and nation's wellbeings (Brooks et al. 2003a, 2003b, Görg and Greenaway 2004). Financial specialists guaranteed that FDI can likewise boost household investment through its linkages to empowering both with innovation and monetary development of the nation (Awan et al. 2011). However, it requires a certain level of supply chain activities. FDI increases business operation in a country which has a significant effect on the supply chain of goods and services.

Several environmental tools exist for companies to use when implementing environmental responsibility in their supply chains. Following is listed some of the key national and international environmental tools: UN's Global Compact Global Compact has developed several tools including A Practical Guide for Continuous Improvement to assist companies in implementing the Global Compact principles throughout the supply chains and integrate sustainability into procurement strategies. For more information on Global Compact; ISO 26000 ISO 26000 is an international guidance standard on social responsibility which covers the environment as one of six core subjects on social responsibility. ISO 26000 gives guidance on prevention of pollution, sustainable resource use, climate change mitigation and adaptation and protection and restoration of the natural environment. ISO 26000 may become a useful tool for companies to advance universal environmental principles in their supply chains integrated with other responsibility aspects such as labour rights; GSCP Environmental Module To get inspiration on environmental requirements and implementation guidelines for suppliers take a look at the Environmental Module of the Global Social Compliance Programme. The GSCP seeks to form a common understanding of what good environmental practice looks like and has defined environmental requirements at employment site level across geographies and sectors.; Life Cycle Assessment Life Cycle Assessment, LCA, is a generally accepted method for assessing environmental impact of different processes throughout the entire lifecycle of a given product and service - all the way from raw material to production, consumption and waste disposal. An LCA provides the basis for choosing the most attractive process from a number of alternative processes providing the same benefit. Companies can seek inspiration in the booklet An Introduction to Life-Cycle Thinking and Management. Two international standards, ISO 14040 and ISO 14044, are related to the framework for life cycle assessment.

A few examinations have inspected the job of FDI for the growth of the ecology and also the mix of FDI-attracting variables. Generally, studies about investigations have declared that FDI basically assumes a positive in the procedure of financial growth of developing nations. Here, the supply chain important role which facilitates economic growth through FDI. In this prospective, for example, (Lugemwa 2014, Paus and Gallagher 2006) have contended that foreign partners of TNCs (Transnational Corporations) do well in

growing new items and quicker selection of innovations than neighborhood firms.

In the 21st century and even over the most recent two decades, FDI has turned into the biggest wellspring of capital arrangement worldwide, particularly for the developing nations. FDI likewise assumes a vital job for the financial advancement of host nation economies mainly in the event that it is joined by sound monetary approaches and more prominent policies to exchange. There are many studies (Farahani et al. 2014, Naanaa and Sellaouti 2013) that show the advantages of FDI to the beneficiary nation with the help of innovations, export, skills etc. Literature revealed that FDI is one of the vital instrument to boost nation's economic growth (Musibah et al. 2014, Shahzad and Al-Swidi 2013).

The monetary system's joining through social as well as cultural aspects known as globalization which has changed the world into a little town. Globalization has presented open doors for progress, but the risk dangers have additionally been multiplied. With regards to the financial related framework, FDI is considered to be the centre of globalization (Alfaro 2014, Thorpe and Leitão 2014). The link between FDI and groblization has many of advantages for economic growth (Abidin et al. 2015b, Barros et al. 2013, Cho 2003). It can be described as, FDI is alluded to as the centre of globalization component in the worldwide ecology (Anyanwu 2012). It comprises of the stocks buys, profit reinvestment, and loaning of assets to a foreign backup or a foreign branch (Chaudhuri and Mukhopadhyay 2014, Duce 2003).

Apart from FDI, there are other ecological factors which effect on FDI. There factors include gross-domestic product (GDP) growth rate, the degree of openness, the rate of exchange, and balance of payment. All these factors have significant contribution to increases or decreases in FDI (Musibah 2015). Increases or decreases in FDI ultimately has an effect on the supply chain of goods and services.

Therefore, this study examined the role of GDP growth rate, the degree of openness, the rate of exchange and balance of payment effect on FDI and FDI effect on supply chain management. Thus, the objective of this study is to investigate the role of ecological factors in supply chain management in Indonesia.

Ecological Factors

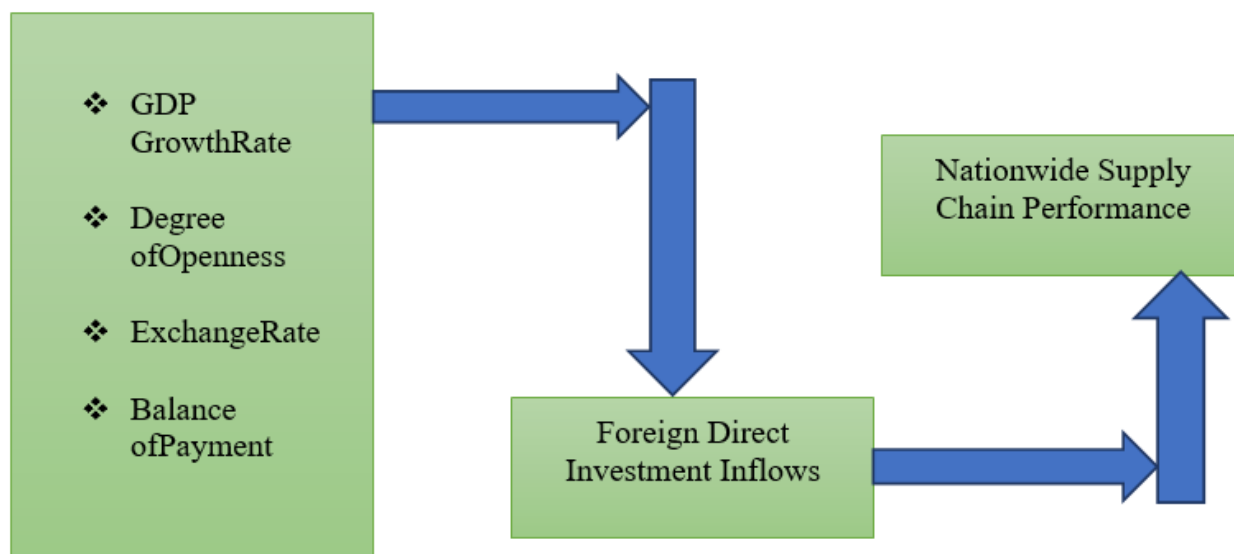


Fig. 1. Theoretical Framework

HYPOTHESES DEVELOPMENT

Foreign direct investment can be defined as the net inflow of capital to gain a long-term profit in a company functioning in an ecology other than an individual investor (UNCTAD 2014, World Bank 2014). GDP can be defined as the yearly rate of increment in market calculated by all services as well as goods in a definite frame that is created in one year in a nation (UNCTAD 2014). Moreover, the degree of openness can be described as the import and export ratio in the GDP. The price of one currency in terms of another currency is known as the exchange rate between these to specific currencies (UNCTAD 2014). Furthermore, the balance of payment is a contrast between cash net inflows within a country from abroad short outpourings of cash from the nation amid same day and age. It has two parts as a capital record as well as present record (UNCTAD 2014). All these factors influence on the supply chain of goods and services.

FDI has three segments. It comprises of value capital, intra-firm advances, and reinvestment of held income. Likewise, FDI can either be even or vertical. From the point of view of a specific nation, it tends to be separated into two kinds: FDI streams might be internal (a foreign nation puts resources into the nation being referred to), or outward (the nation of origin contributes abroad). FDI streams take a few structures, for example, the foundation of another undertaking, the development of a current either as a branch or as a backup, or the foundation of an abroad business endeavour or its advantages (Buckley et al. 1996). These investments inside or outside the country have a major

relationship with supply chain activities and performance.

It is guaranteed that FDI could directly impact economic growth and advancement as it drives better utilization of assets, advances exchange and administrative skills exchange. Beside this, foreign investments indirectly energize the growth rate of the host nations by means of assistance and preparing, assets, procurement and utilizing the novel system of organizations (Abidin and Haseeb 2015a, Abidin et al. 2018, Hunter and Saldana 2013, Mahmood 2013). Scarce number of studies have specified that FDI have to a great extent concentrated on the three arrangements of ecological elements that affect FDI in particular cost decreasing components, business task and modern condition enhancing factors, lastly, ecological strategies and formative technique variables of a nation (Dumludag 2009, Dumludağ and Şükrüoğlu 2007, Enu et al. 2013).

There elements have a contribution in the supply of goods and services. Increases in FDI increases the demand for goods and services which enhances the supply chain activities and expedites the process the functions of supply chain companies. As an option, there might be a direct advancement system which advances investment for exportable things to be producers by the foreign and other applicable local endeavours identified with the trading enterprises (Chakrabarti and Scholnick 2002, Hakro and Ghumro 2007, Hanson 2001). The above investigations endeavour to clarify why FDI is favourable to the host nations for their economic growth based on export-led growth technique. Moreover, various other factors

effect on FDI such as GDP growth rate, the degree of openness, exchange rate and balance of payment (Haseeb 2018, Haseeb and Azam 2015).

The focal point of analysts in economic has dependably been on the connection between the GDP and FDI. The Gravity Model was utilized by a few investigations where GDP is incorporated as an informative variable to decide the nations' financial size (Martínez-Zarzoso 2011, Martínez-Zarzoso and Nowak-Lehmann 2003). Particularly Martínez-Zarzoso and Nowak-Lehmann (2004) came to the outcomes that the more prominent the nation's income, the bigger is the assets to be put resources into organizations abroad. Both GDP and GDP growth rate demonstrates the national economic growth of the financial performance of the nation, which is appeared through generation, utilization and great conveyance provided by the country. The pattern of GDP likewise demonstrates the nation's dimension of financial advancement in connection to its growth rate and its opportunities in the residential market in the investors' perspective (Albasu and Nyameh 2017, Chielotam 2015, Kucukkocaoglu and Bozkurt 2018, Maldonado-Guzman et al. 2018, Maroofi et al. 2017, Maurice 2013, Mowlaei 2017, Purnama 2014, Suryanto et al. 2018).

A few investigations were done to inspect the impacts of DoP on FDI. DoP alludes to concerning the connection among FDI and exchange has been mostly restricted to export substituting of FDI. Nevertheless, the connection among FDI and DoP tends to be perplexing in the present period where a few countries have started to change their imports and go into exchanging courses of action (two-sided or multilateral) around the world. It has significant impact on exports which effect on FDI and supply chain management. A few investigations (Markusen and Maskus 2002a, 2002b, Navaretti et al. 2006, Ponce 2006) uncovered that the DoP effects on the FDI inflow in the ecology tends to vary for each expectation behind creating FDI attractiveness in business exercises. Accordingly, a more prominent dimension of openness can be connected with low FDI degree.

Presently, the exchange rate is viewed as one of the new and most basic issues in the literature of financial matters (Anigbogu and Nduka 2014, Anyanwu et al. 2016, Brixiova et al. 2014, Jones and Mwakipsile 2017, Le et al. 2018, Malarvizhi et al. 2018, Mohamed and Sidiropoulos 2010, Mosbah et al. 2017, Pan and Song 2014, Santhi and Gurunathan 2014). A relationship among FDI and exchange rate has contended. With the

degrading of the nation's money, a possibility emerges for foreign investors to put resources into the nation to buy reasonably assets. This is especially valid on account of foreign firms that have certain probability in their focused on business sectors (Boyi et al. 2018, Dölek and Günes 2016, Musibah 2015, Pérez-Luna et al. 2018, Tshepo et al. 2017). In this unique circumstance, Dumludag (2009) examined the FDI determinants in the setting of Turkey and demonstrated that exchange rate positively influence FDI. On the other hand, Kaya and Yilmaz (2003) utilized information for the period 1970 to 2000 trying to look at the exchange rate as FDI determinants in Turkey. The exchange rate and FDI inflows relationship were additionally inspected by Ngowani (2012) and he demonstrated that FDI inflows negatively related to the exchange rate. Negative and positive effect on FDI has a significant effect on supply chain practices.

Alluding to the past investigations, the balance of payment (BoP) position of the host nation is upgraded by monetary FDI inflows. In the investigation of Majeed and Ahmad (2009) dissected the host nation qualities that decide FDI in 72 developing nations. This investigation utilized board information for the time of 1970 to 2008. The consequences of the examination demonstrate that BoP shortage have a negative impact on FDI. The negative effect on BoP ultimately influence negatively on the supply chain.

The investigation of Shahzad and Al-Swidi (2013) utilized yearly information in Pakistan for the time of 1991 to 2011. The outcomes of the study demonstrate that BoP a positive noteworthy determinant of FDI inflows with political stability as moderating variable. As political influence has a significant effect on stock returns (Maqbool et al. 2018). Political instability disturbs the BoP, FDI and supply chain. Therefore, from the above discussion, the following hypotheses are proposed;

- H1:** GDP growth rate has a direct relationship with FDI.
- H2:** Degree of openness has a direct relationship with FDI.
- H3:** Exchange rate has a direct relationship with FDI.
- H4:** Balance of payment has a direct relationship with FDI.
- H5:** FDI has a direct relationship with the supply chain.

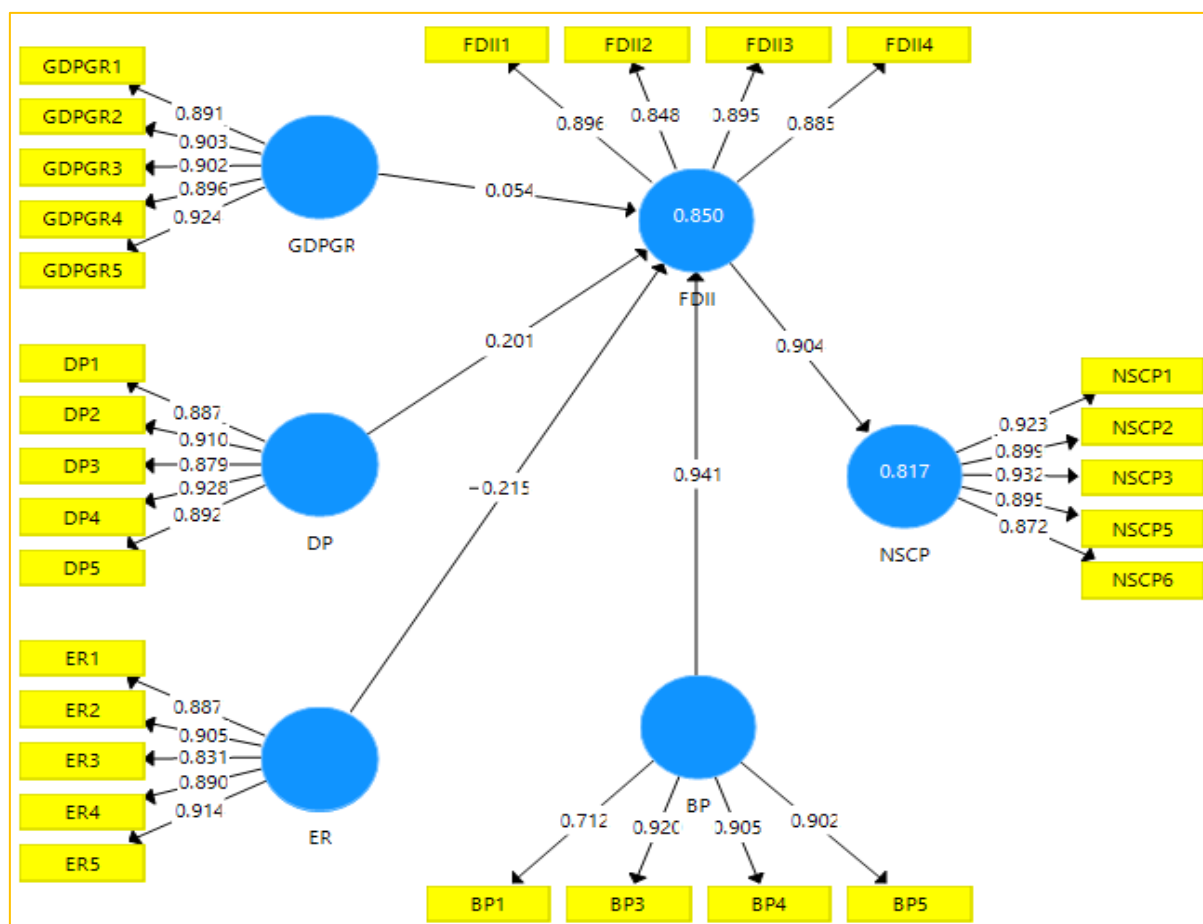


Fig. 2. Measurement Model

METHOD

In this study, data were collected from Indonesian ecologists. Email addresses of Indonesian ecologists were collected and email was sent to them to get a response. Thus, the respondents of this study are Indonesian ecologists. Only one hundred email addresses were found of various ecologists. Therefore, the total sample size was one hundred. From total one hundred, sixty ecologists responded. Therefore, the sample size was very low. To overcome this issues, Smart PLS was utilized to analyze the data. As this software is most suitable while analyzing data with small sample size. As it is also recommended by different studies such as Henseler, Ringle, and Sinkovics (2009), Reinartz, Haenlein, and Henseler (2009) and Hair Jr, Hult, Ringle, and Sarstedt (2016). These studies suggested that Smart PLS has the ability to cover the issue of small sample size. Therefore, the current study utilized Smart PLS version 3 to analyze the data.

Moreover, the data was gathered with the help of a questionnaire. A questionnaire survey method was used to collect the data from Indonesian ecologists. The questionnaire was based on 2 major sections. The first

section covered the profile of respondents. The second section covered the items related to the key variables, namely; FDI, the degree of openness, BoP, exchange rate, GDP growth rate, and supply chain. However, the Likert scale was used to collect the data.

RESULTS

As it is mentioned earlier, due to the small sample size, Smart PLS was utilized to analyze the data because of its suitability to handle small sample size. Basically, it consists of two major parts which are described by Hameed, Basheer, Iqbal, Anwar, and Ahmad (2018). In one part of PLS-SEM, the outer model was analysed with the help of factor loadings, reliability, and validity. According to various studies F. Hair Jr, Sarstedt, Hopkins, and G. Kuppelwieser (2014) and Henseler et al. (2009), the value of factor loading should be 0.5 or above, reliability should be 0.7 or above and AVE should be above 0.5. All the values are meeting the minimum criteria. **Table 1** shows the composite reliability, Cronbach Alpha and AVE. Finally, **Table 2** shows the discriminant validity and **Table 3** shows the cross-loadings. **Fig. 2** shows the outer model assessment.

Table 1. Alpha, Composite Reliability and AVE

	α	rho_A	CR	(AVE)
BP	0.884	0.908	0.921	0.746
DP	0.941	0.944	0.955	0.809
ER	0.931	0.935	0.948	0.785
FDII	0.904	0.905	0.933	0.776
GDPGR	0.944	0.946	0.957	0.816
NSCP	0.944	0.948	0.957	0.818

Table 2. Validity

	BP	DP	ER	FDII	GDPGR	NSCP
BP	0.864					
DP	0.720	0.899				
ER	0.747	0.817	0.886			
FDII	0.817	0.625	0.685	0.881		
GDPGR	0.738	0.909	0.804	0.653	0.903	
NSCP	0.812	0.691	0.730	0.804	0.678	0.905

Table 3. Cross-Loadings

	BP	DP	ER	FDII	GDPGR	NSCP
BP1	0.912	0.854	0.837	0.578	0.826	0.635
BP3	0.920	0.569	0.593	0.855	0.619	0.833
BP4	0.905	0.594	0.622	0.873	0.598	0.832
BP5	0.902	0.567	0.613	0.823	0.593	0.832
DP1	0.643	0.987	0.81	0.587	0.847	0.61
DP2	0.69	0.910	0.85	0.578	0.839	0.644
DP3	0.577	0.979	0.768	0.492	0.762	0.547
DP4	0.673	0.928	0.851	0.596	0.815	0.659
DP5	0.644	0.992	0.842	0.545	0.819	0.639
ER1	0.674	0.875	0.887	0.592	0.802	0.677
ER2	0.656	0.826	0.905	0.612	0.795	0.642
ER3	0.592	0.755	0.831	0.538	0.785	0.611
ER4	0.669	0.795	0.890	0.635	0.795	0.646
ER5	0.71	0.815	0.914	0.648	0.829	0.661
FDII1	0.84	0.596	0.642	0.896	0.617	0.827
FDII2	0.767	0.514	0.552	0.848	0.564	0.754
FDII3	0.817	0.575	0.628	0.895	0.567	0.809
FDII4	0.806	0.515	0.588	0.885	0.551	0.794
GDPGR1	0.653	0.84	0.822	0.556	0.891	0.614
GDPGR2	0.676	0.797	0.787	0.598	0.903	0.592
GDPGR3	0.64	0.825	0.817	0.551	0.902	0.58
GDPGR4	0.652	0.806	0.801	0.596	0.896	0.594
GDPGR5	0.709	0.838	0.855	0.639	0.924	0.677
NSCP1	0.824	0.643	0.677	0.838	0.645	0.923
NSCP2	0.842	0.608	0.698	0.868	0.603	0.899
NSCP3	0.854	0.642	0.694	0.863	0.645	0.932
NSCP5	0.809	0.605	0.623	0.769	0.588	0.895
NSCP6	0.793	0.629	0.603	0.738	0.582	0.872

The first section related to the measurement model was based on reliability and validity. Now the structural model was examined to analyze the hypothesis. First of all, the direct hypotheses were tested. Additionally, the mediation effect of the FDII was assessed. T-value 1.96 was considered for the acceptance and rejection of hypotheses. The relationship having t-value above 1.96 was accepted and relationship having t-value below 1.96 was rejected. Direct effect hypotheses are shown in **Table 4** and Indirect effect through the FDII is shown in **Table 5**. All the hypotheses have t-value above 1.96 therefore, all the hypotheses (H1, H2, H3, H4, H5) are accepted. **Fig. 3** shows the structural model process.

Additionally, it was found that FDII is a mediating variable. FDII is a mediating variable between the balance of payment and NSCP. It is also a mediating variable between the degree of openness and NSCP, exchange rate and NSCP.

CONCLUSION

The objective of this study is to investigate the role of ecological factors in the supply chain in Indonesia. This study examined the role of GDP growth rate, the degree of openness, the rate of exchange and balance of payment effect on FDII and FDII effect on the supply chain. It was found that GDP growth rate, the degree of

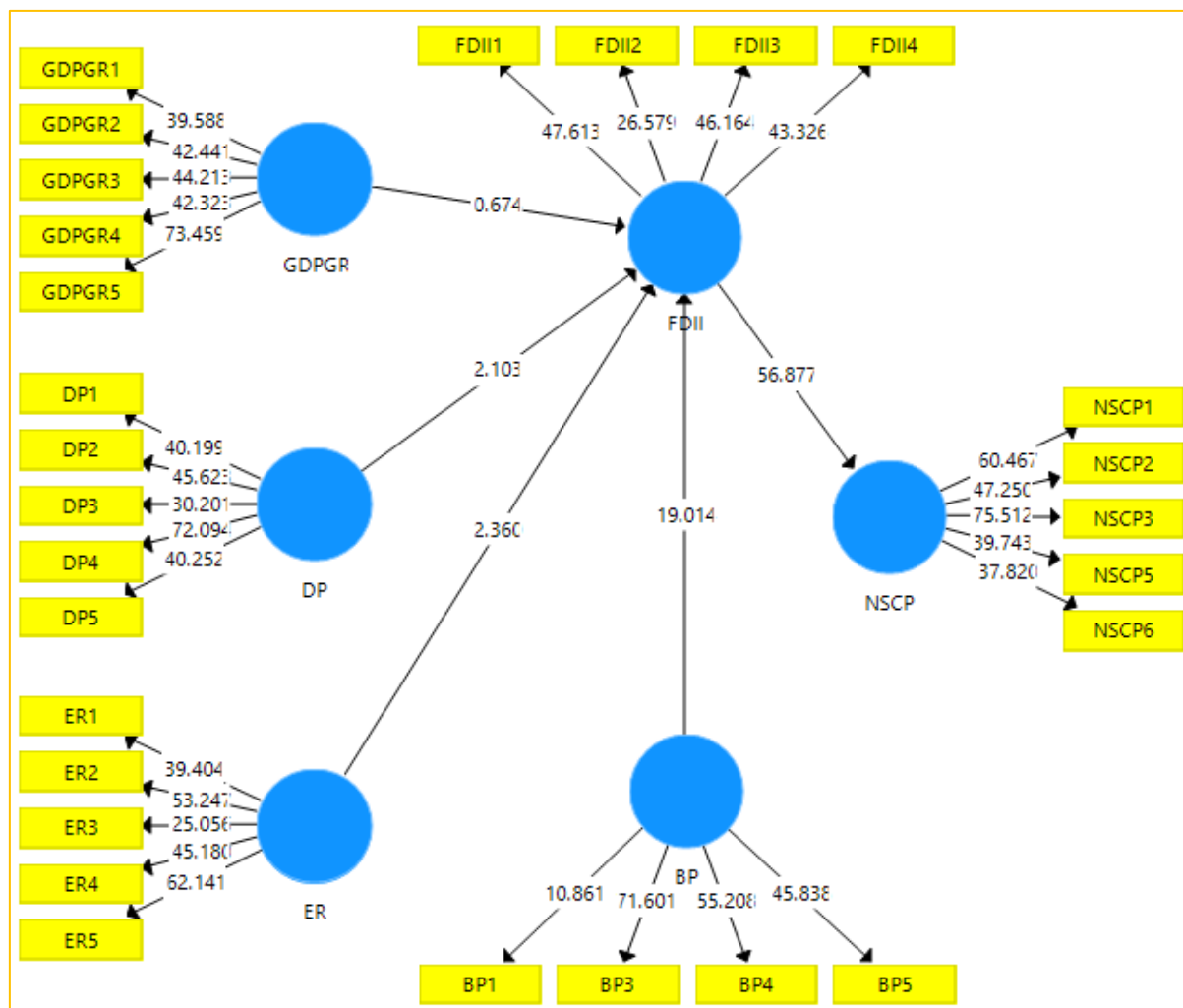


Fig. 3. Structural Model

Table 4. Hypotheses Testing Results

	(O)	(M)	(STDEV)	T Statistics	P Values
BP -> FDI	0.941	0.934	0.049	19.014	0.000
DP -> FDI	0.201	0.199	0.096	2.103	0.036
ER -> FDI	-0.215	-0.221	0.091	2.36	0.019
FDI -> NSCP	0.904	0.904	0.016	56.877	0.000
GDPGR -> FDI	0.054	0.053	0.021	2.674	0.009

Table 5. Mediation Effect

	(O)	(M)	(STDEV)	T Statistics	P Values
BP -> FDI -> NSCP	0.851	0.845	0.051	16.709	0
DP -> FDI -> NSCP	0.182	0.18	0.087	2.091	0.037
ER -> FDI -> NSCP	0.195	0.2	0.083	2.359	0.019
GDPGR -> FDI -> NSCP	0.049	0.048	0.072	0.673	0.501

openness, the rate of exchange and balance of payment has a significant relationship with nationwide supply chain performance. Increases in GDP growth rate, the degree of openness and balance of payment increases the nationwide supply chain performance. Decreases in GDP growth rate, the degree of openness and balance of payment decreases the nationwide supply chain performance. However, increases in the rate of

exchange decrease the FDI which ultimately decreases the supply chain practices.

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