Comparative Analysis of SMEs Intensity in Ukraine and Indonesia Using FIS Approach

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ABSTRACT

The purpose of this study is to describe and examine the development of SMEs in Ukraine and Indonesia based on productivity factors of SMEs development measured SMEs contribution to the country's GDP. The study is based on data from 2000 to 2014, on number of SMEs, contribution of SMEs to GDP, labor in SMEs sectors, exports and import contributions to GDP of each country. Under complex data with uncertainty, Fuzzy Inference System (FIS) was applied to modelling process in estimating the differences between SMEs development in Ukraine and Indonesia. FIS models show the needs to improve policies on SMEs in each country of this study. We found that SMEs intensity development in Ukraine needs more SMEs to increase contribution to GDP and stipulate economic growth. While in Indonesia, growth in quantities of either labors or numbers of SMEs can be problematic, so it should focus on labors quality. Trade openness e.g., ratio export and import to GDP, shows that while Ukraine's SMEs contribution to GDP is lower, the ratio of Export and Import to GDP is increasing. Whereas Indonesia's ratio of export and import to GDP increases along with the SMEs contribution to GDP. The policies to increase the intensity development of SMEs in both countries should focus on increasing the quality of labors hired in SMEs, increasing the numbers of SMEs, reviewing and selecting the commodities that are prioritized to export and import in enhancing the ratio of export and import to GDP.

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1. Introduction

The entry and exit of firms that primarily happens in the small and medium firm ecosystem makes an economy dynamic and within-firm productivity improvement among SMEs as a major driver of productivity growth in the overall economy (Tewari et al., 2013; OECD, 2010). This assumption comes from the study of Khan (2004) that stated Small and Medium Enterprises (SME's) are the driving force for the promotion of an economy (Subhan et al., 2013). Economic growth is associated with real GDP growth, and SME development is considered as an important driver of economic growth as well (The Organisation for Economic Co-operation and Development [OECD], 2018). SMEs have significant impact for this by creating jobs, competing against big enterprise, and helping to reduce poverty in developing countries through their exports (Myslimi & Kacani, 2016). Trade openness affects economic growth not only in short run but also in the long run (Keho, 2017). But it can bring both positive and negative effects. The negative effect to economic growth will be in case when the country

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is not able to specialize in high-quality products and take low places in global value-added chains. Trade openness will positively influence economic development when country is specialized in production of high quality and value-added goods and services (Huchet-Bourdon et al., 2018). Many studies believe that the trade openness brings benefit to the development of developing countries' economies and positively related to economic growth (Hye & Lau, 2015). Thus, the developing countries, like Ukraine and Indonesia, consider SMEs sector as the main contributor to its growth although the attempts to prove the roles of SMEs in economic development are not clear enough (Hu, 2010). In 2017, the Strategy for SME development in Ukraine till 2020 was adopted by the Government, and one of its directions is SME export and internationalization. It aims at increasing SME contribution to GDP to 60.5% by 2020 (MEDT, 2017).

The reason for selecting Indonesia and Ukraine is the similarity of firm regulatory mode (both countries have the same ranks in the ease of doing business in 2019, whose positions was 71 for Ukraine and 73 for Indonesia; the CPI during December 2019 to February 2020 were also similar 2.4 % for Ukraine and 2.7% for Indonesia. Both countries experienced negative trade balance as well although the economic performance was different (countryeconomy.com). In addition, both countries have strengthened the intensive bilateral partnership in 2016 (Pakhil, 2016) that stipulated research interest in these countries. Fischer-Smith (2014) focused the research on policy issues and regulation of SME development in Ukraine during last two decades. Shutyak & Van Caillie (2015) revealed main trends in governmental support for small business and main challenges. Yermoshkina & Lobos (2017) conducted a comprehensive and comparative study of Ukraine and Poland as two post-soviet countries with different transition paths. Indonesian MSMEs contribute only 58-61% of national GDP and Tambunan (2019) suggested the government to provide low interest funding facilities, assistance in production and marketing along with the product quality. The other important thing for developing SMEs is improvement in corporate governance implementation (Jaswadi et al., 2015) to support the optimi-

zation of company's human resources potential.

While SME is quite popular topic, still there is a lack of studies focused on countries from different development paths and the usage of Fuzzy Inference System applied to SME development analysis.

Thus, in this paper we attempted to understand whether Indonesia and Ukraine have similarity in SMEs development patterns focusing on SME intensity in both countries and a number of economic indicators. We assume that differences in SME development patterns are associated with different economic performance, regulations, social and cultural backgrounds, demographics apart of some similarities in business and economy situations in recent years.

2. Theoretical Framework

2.1. Literature Review

SMEs development is very important for any country in the world. The performance of SMEs is the same as the company's success in the industry. The SMEs are very important for economic growth through the industrial development. SMEs become vital assets for emerging countries especially in its integration to the global market (Şentürk & Erdem, 2008). It is important to bring SMEs awareness of innovation processes and access to external resources and capabilities to overcome the global competition (Iivari, 2015). In the efforts of development, SMEs may face some problems related to the human resource management, business strategy and also finance. Thus, the government and its officials should help and interfere the process of development by setting up the policies that encourage the entrepreneurial spirit to improve the SMEs growth (Sanjo & Ibrahim, 2017).

Many countries are facing the challenges of low productivity and SMEs are considered as a major factor to deal with the challenge (OECD, 2018). So, the governments should think about SME development to increase or maintain the productivity level. Therefore, productivity as the ratio of output and input used in the production can be a measurement to indicate how well the SMEs run. The SMEs productivity as other business

sectors concern depends on the human resource management practices. The inadequacy and insufficiency of employee management in SMEs may result in low productivity (Gamage & Sadoi, 2008). So, it is important to take a look on labors hired by SMEs to measure how productive they are. The educational background and qualification of the entrepreneur and size of the enterprise are considered as the most important and significant factors, which influence SMEs growth. Thus, the quality of the human resources is very important in SMEs sectors (Yeboah, 2015).

To promote economy development, SMEs play the vital role as small companies are considered as the drivers of global growth (Myslimi & Kacani 2016; OECD, 2018). SMEs have noteworthy contribution to GDP (Qamruzzaman, 2015). SMEs will generate the eagerness to produce more products and services and thus increase GDP. The growth of developing countries' economy depends on the product quality and variety (Huchet-Bourdon et al., 2018). The economic growth is shown through effects of exposure to international markets (Mireku et al., 2017). Many other previous studies show positive and significant relationship between economic growth and trade openness and also increase the output and consumption in developing countries. In Indonesia, the SMEs can contribute to economy development and also soften a negative affect when many big companies experienced falling down (Prijadi & Desiana, 2017).

Trade openness in many cases is a proxy for economy openness and there are a lot of empirical evidences on relationship between trade openness and economic growth. The trade openness has positive effects on economic growth (Keho, 2017). It is not only characterized through the trade ratio but also export quality and variety (Huchet-Bourdon et al., 2018). The study showed that trade can lead to a negative impact on developing countries with low-quality export commodities, and the contrary for countries who export high-quality products. This situation brings different impact to the ratio of export and economic growth.

2.2. Methodology

The countries which are examined in this study are Ukraine and Indonesia. SMEs of those countries are developing rapidly and the governments concern on SMEs development as well. To measure the productivity factors in each country, the study needs to access data banks from both countries studied here. Official websites of each country were used together with the UN and World Bank data or other international statistical databases. Unlike national sources of data, international ones provide more reliable and comparable data.

In 2012, the Government of Ukraine brought its classification of SMEs into alignment with the European Union's definition for comparability of statistics, however using only two of three criteria, namely, annual number of employees and annual revenue (EU4Business, 2017). It caused changes in SME statistics and in order to use longer data series, in the paper we focus only on micro, small and medium enterprises with regard to number of employees. We exclude from the analysis single (private) entrepreneurs, who fall under SME definition for the statistical reasons and unavailability to construct long series. Despite there is also around 3.2 million of number of Single (private) entrepreneurs in Ukraine in 2014, their share in total sales was only around 13%. So, their impact on productivity and trade is quite limited. The numbers of SMEs in Ukraine is based only on number of people employed by enterprise. It is due to changes in criteria for SME identification, which were happened in 2008 and 2010, and in 2012. Ministry of Cooperation and SMEs of Indonesia in 2012 issued law (UU No. 20/2008) about the micro and SMEs in Indonesia, the criteria based on the Law are seen from assets and income criteria. The micro business has assets maximum 50 million Rupiahs and income maximum 300 million Rupiahs, while small business' assets is from 50-500 million Rupiahs with the revenue from 300 million to 2.5 billion rupiah. Medium businesses have assets 500-10 billion Rupiahs and the revenue 2.5-50 billion Rupiahs (Agus et al., 2015). Before 2014, the small businesses were including microbusinesses. The criteria are based on employees in various levels of business in Indonesia; a micro business has up to 4 employees, a small business has 5-19 employees, a medium business scale has 20-99

Figure 1
Research Framework
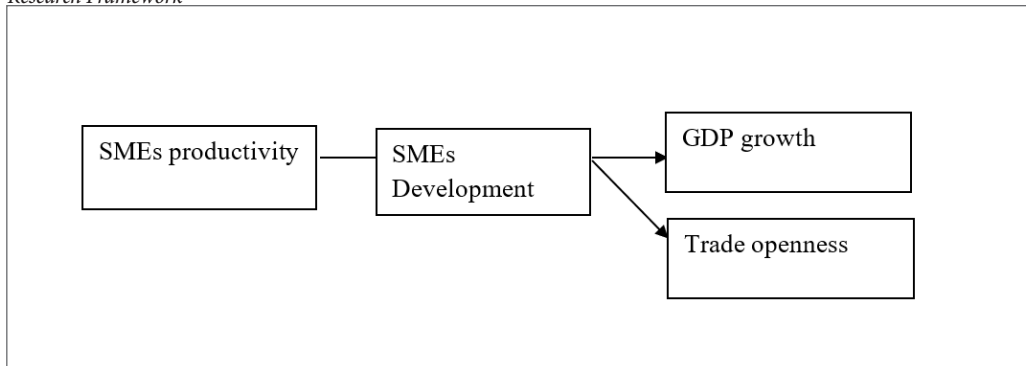
employees and a large one has more than 100 employees. By fact, microbusiness according to the Ukrainian definition covers all micro and small businesses according to the Indonesian approach. Medium enterprises in Ukraine should be split into medium and large businesses according to the Indonesian approach. Therefore, a big difference in SME definitions makes it impossible fully compare enterprises without access to microdata. Meanwhile, we still can focus on intensity and SMEs' performance from the national policy context.

The hypothesis of the study is as follows: the SME development pattern is determined by a set of SME indicators. To maximize SME performance each pattern requires a different SME policy focus. Roughly speaking, it stems from the concept of extensive and intensive economic growth (Irmen, 2005). SMEs number is considered as an extensive factor of SME development policy, while SME productivity and some other indicators related to SME quality as intensive ones. Given this, two types of policy approaches can be applied. The first is oriented on a simple increasing number of SME, in particular micro, in the economy; and the second one is focused on SME quality and its performance (number of employees per enterprise, the volume of foreign trade, value-added generation, etc.)

To test the hypothesis, we used a set of SME development indicators which were processed using Fuzzy Inference System. The indicators used are related to SME development, including their impact on the macroeconomic situation. They are described below.

SMEs productivity is measured through their contribution to GDP. Data for Indonesia is taken from: www.bps.go.id, www.depkop.go.id, www.bi.go.id and other sources. It worth to note that there was no statistical indicator like SMEs contribution to GDP in Ukraine, that leads us to use share of SME in total sales as a proxy. The reason for using SMEs contribution to GDP for measuring productivity is that value of total production shows the business activities in a country. Therefore, SMEs contribution will indicate their productivity, which is a very important indicator in SME research (OECD, 2017). However, to enhance the study the qualitative description will be used to provide better insight on the results of productivity measurement.

The analysis of SMEs development in each country is based on the official data sources either national or international. To indicate the SMEs development in this study we used available indicators for both countries, which reflect the SME performance and state of development: number of SMEs for the period of 2004-2014, number of labor

hired in SMEs, value of each sectors production, etc. All the data required is accessed from official government websites and other valid supporting sources.

To understand the impact of SMEs development on the macroeconomic situation, we analyzed a number of relevant macroeconomic indicators together with SMEs development data, namely: GDP growth and trade openness. GDP growth data will be gathered from the official website of each country's government and then trade openness will be measured from the ratio of export and import to GDP. Most of the data come from the national statistical offices of each country. The data on economic growth, that is GDP growth, was taken from the World Bank Indicators to ensure its compatibility. Ulaşan's (2012) study found that many openness variables are positively and significantly correlated with long-run economic growth. Thus, in our study, we use economic openness as the macroeconomics indicator as well. Trade openness is measured as a ratio of trade (export and import) in GDP. For SME, we assume more openness should be associated with higher intensity of SME development as openness (a result of trade liberalization) means better access for SMEs to import goods and better export opportunities. So, currently widespread and inclusive SME participation in international trade is state-of-art issue (World Trade Organization [WTO], 2016).

The steps of this study:

1. Measuring SMEs productivity through SMEs contribution to GDP

2. Measuring SMEs development by counting the numbers of SMEs each year from 2005-2014.

3. Measuring openness by calculating ratio of export and import to GDP.

4. Relating SMEs productivity and SMEs Development

5. Examine the SMEs Development to GDP growth

6. Examine the SMEs Development to trade openness

7. Apply Fuzzy Inference System to identify SME development patterns.

The limitations of previous research which were strictly studied the correlations of SMEs Productivity, SMEs Development, Openness, and GDP growth urge this study to examine the correlations using Simple correlation analysis. Statistical program software (SPSS V.21) is used. Table 1 shows there is no strong correlation between SMEs Productivity and SMEs development with the Sig. value 0.311 (more than 0.05). However, this weak significance indicates the negative value (-0.226) which means if SMEs development increases, the SMEs productivity will decrease.

The correlation between SMEs development and GDP growth is also examined using SPSS V.21 which resulted a very weak correlation (Sig. value is 0.783). It means that the numbers of SMEs as the indicators of SMEs development used in this study cannot give any impact to GDP growth.

SMEs development after examination has no correlations to the Export contribution to GDP and import contribution to GDP. Both export and import contribution to GDP are the indicators of openness, but export contribution relates to import contribution to GDP.

Although the points of hypothesis are lack of correlation as assumed when being examined by SPSS V.21, the estimation of the data by which the countries comparison used needs the other method.

To compare both countries in terms of productivity factors comparison analysis is used in this study. We collected the data from many sources and coded them using Excel software. Then the coded data was processed by using the Fuzzy Inference System (FIS) to identify different patterns of SME development in Ukraine and Indonesia. Fuzzy is used to estimate the data under big uncertainty to get a better prediction and the reality (Munoz et al., 2016) and provides the logical tools to model the real complex and uncertainty data (Zarte et al., 2018). Fuzzy Inference System (FIS) is used to generate the model of input and output variables relationship by clustering data as it is a simple way to build system without a complex analytical equation required and effective to handle the imprecise input observations (Mehran, 2008). FIS approach has two types: Mamdani and Takagi-Sugeno. Mamdani FIS results in fuzzy sets

Table 1

The Correlation between SMEs Productivity and SMEs Development

Correlations			Prod	Devl
Prod	Pearson Correlation		1	-.226
	Sig. (2-tailed)			.311
	N		22	22
Devl	Pearson Correlation		-.226	1
	Sig. (2-tailed)		.311	
	N		22	22

Table 2

The Correlation between SMEs Productivity and GDP Growth

Correlations			Devl	GDPGr
Devl	Pearson Correlation		1	-.062
	Sig. (2-tailed)			.783
	N		22	22
GDPGr	Pearson Correlation		-.062	1
	Sig. (2-tailed)		.783	
	N		22	22

Table 3

The Correlation between SMEs Development and Openness (The Contributions of Export to GDP and Import to GDP)

Correlations		Devl	ExpGDP	ImpGDP
Devl	Pearson Correlation	1	.330	.207
	Sig. (2-tailed)		.133	.355
	N	22	22	22
ExpGDP	Pearson Correlation	.330	1	.952**
	Sig. (2-tailed)	.133		.000
	N	22	22	22
ImpGDP	Pearson Correlation	.207	.952**	1
	Sig. (2-tailed)	.355	.000	
	N	22	22	22

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

of output membership functions, whereas Takagi-Sugeno type results in either linear or constant outputs. This study used Mamdani type because the data used in this study is uncertain and has great noise that results in accuracies. Thus, to facilitate the rational interpretation and decision within such environment Mamdani type is used instead of Takagi-Sugeno. The study of Cavallaro (2015) is based on Takagi-Sugeno FIS to assess and examine the production sustainability and biomass for energy usage because of high uncertainty of its assessment process (Garcia-Diaz et al., 2013). The FIS will act as a model that will reflect the relationship between Total SMEs, Contribution's to GDP, Labors in SME and Intensity Development. Then the results for two countries will be compared to examine differences between SMEs' productivity, contribution to GDP and trade openness of Ukraine and Indonesia taking account difference in SMEs definitions.

3. Analysis and Discussion

Ukraine and Indonesia are very different countries in size, location, culture etc. For example, the population of Ukraine is about 44 million people and it has negative trend while Indonesia is experienced population growth, and it is more than 250 million. It affects the size of SMEs sector too. The total number of SMEs (small and medium enterprises and micro enterprises) in Ukraine was 73,350 units, while in Indonesia it was 706,328 units in 2013. Small and Medium Enterprises (excluding microenterprises) data also showed the difference between Ukraine and Indonesia. In 2013, for example, 60,917 units of Ukrainian SMEs employed 2,850,500 persons, while 706,328 units of Indonesian's gave jobs for 114,144,860 people. The average number of employed by one enterprise was 162 people for SMEs in Indonesia, while only 47 people in Ukraine's SME. Figure 1 shows the number of SMEs (units) per 10,000 persons.

Based on Figure 2, Ukraine (straight-line) and In-

Figure 2
Total SMEs (Unit/10000 persons)
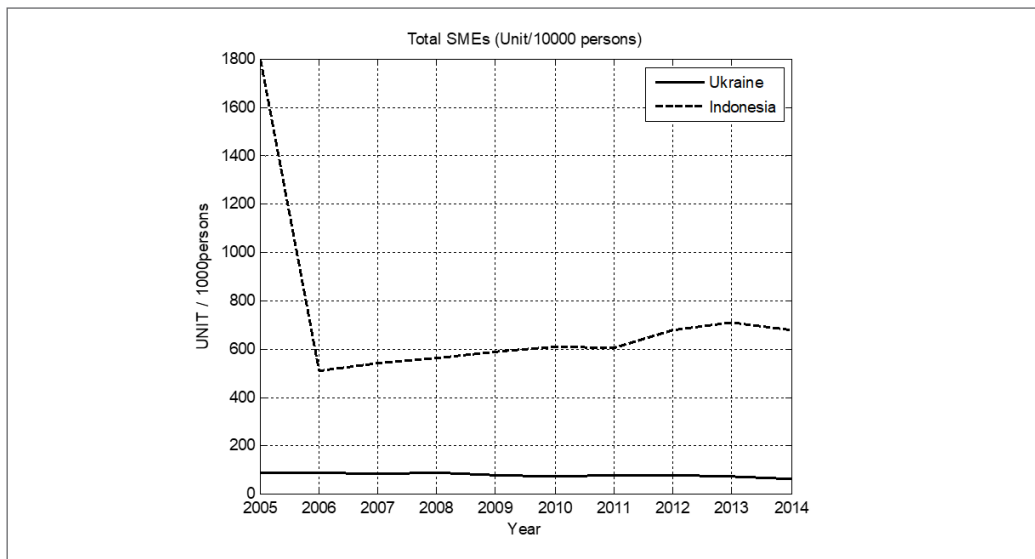
donesia (dashed-line) have a significant difference in SMEs intensity per 10,000 people. Indonesia has much more SMEs per 10,000 in comparison with Ukraine. The most interesting point derived from the graph is that SMEs intensity in Ukraine has an upward trend due to the increasing number of microenterprises. At the same time, the number of small and medium companies is declining. Such phenomenon reflects rather unfavourable conditions for the development of mature and highly productive SMEs in Ukraine that lead entrepreneurs to split up their businesses. Unlike Ukraine, the dynamic of Indonesian SMEs is positive and upward. In addition, patterns of micro-business dynamics are different too. Indonesia demonstrates permanent positive trends, while Ukrainian micro business is very vulnerable to external shocks. Nevertheless, we should note that we deal only with national definitions of SMEs. The SMEs productivity is measured by SMEs contribution to GDP and it is shown in Figure 3.

The contribution of SMEs to GDP, the share of SME in total value-added, is an important indicator, which characterizes the scope of SME development. Unfortunately, data on Ukraine is available only since 2012. Ukrainian SMEs contributed about 55-56% of GDP. While in Indonesia this indicator is 58% with a positive trend. As mentioned above, on figure 3 the share of SME in total sales was used instead of the share of SME in GDP. An important point is that contribution of the Ukrainian SME sector to economic development is much more fluctuating and unstable. In turn, it is a strong indicator of the different nature and structure of the SME sector. The trend of SME contribution to GDP in Ukraine is vague, but for Indonesia, it is increasing slightly. The drastic increase of SME Contribution in Ukraine happened from 2011 to 2013. While SMEs in Indonesia slightly declined in 2013 to 2014. SMEs development is measured by the number of people employed in SME sector (see Figure 4).

Figure 3
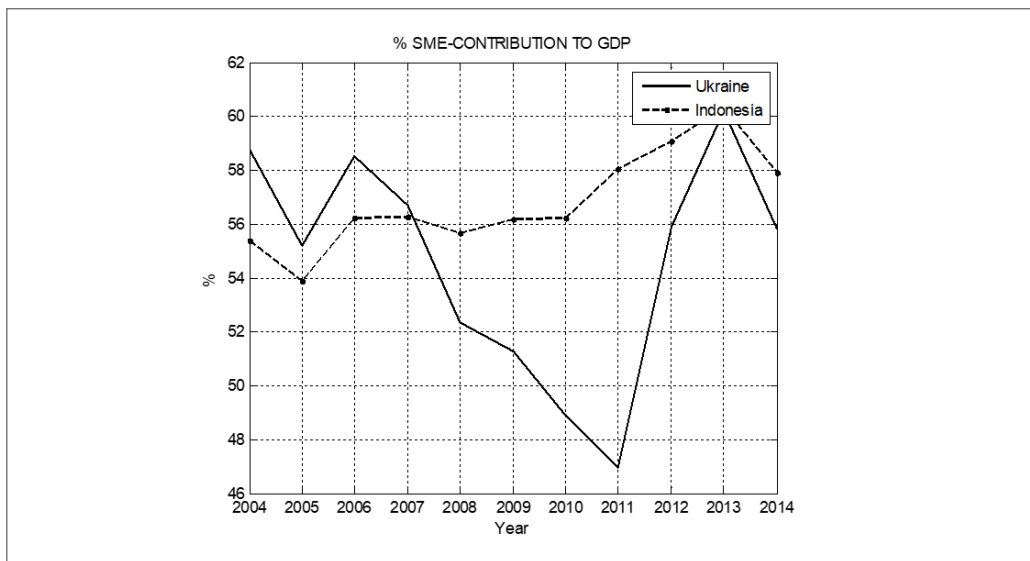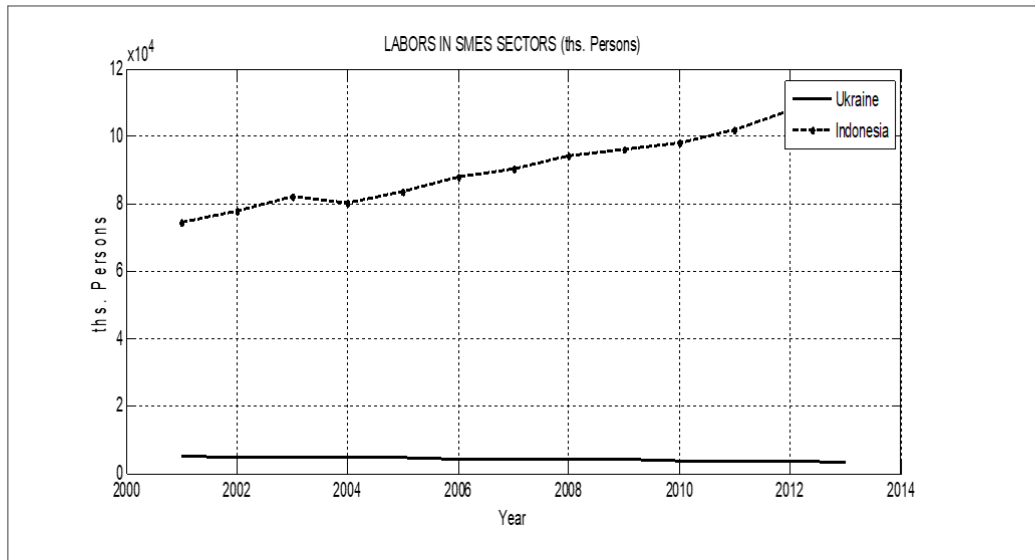*SMEs Contribution to GDP*

Figure 4

Labors in SMEs Sectors

Labors in SMEs indicators are different significantly because Indonesia's population is much larger than Ukraine's. However, the ratio between labors in SMEs and numbers of SMEs, averagely, in Indonesia is 1:98, it means that each SMEs will employ approximately 98 persons and in Ukraine, is 1:50, it means that each SMEs will employ approximately 50 persons. Given the definitions of SMEs, Indonesian business up to 100 employees are bigger than Ukrainian SMEs, which could employ up to 250 persons. To see the productivity of SMEs for both countries, the study uses SMEs contribution to GDP in USD/SMEs labours.

The different situation is shown on Figure 5 on the value per labor of SMEs Contribution to GDP. Ukraine data (straight-line) shows the increasing trend of value SMEs and the data of Indonesia shows the static SMEs value contribution to GDP (dashed-line). Although Indonesia has more population and labors work in SMEs sectors, their contribution to GDP seems much lower. This indicates a huge productivity gap between the countries. trade openness is measured from ratio of external trade (export plus import) to GDP. This indicator itself does not characterize SME development; however, while it is compared with SME contribution to GDP, it could shed some lights on relations between external trade and SME development (see Figure 6 and 7).

One can see that there is adverse dynamic. When openness indicator goes up, SMEs contribution falls down. The share of SME in export of Ukraine experienced high fluctuations: 7.8% in 2004, 5.2% in 2008, 8.6% in 2009 and 14.5% in 2012 (Krynitsyn et al., 2015). It can be assumed that contribution of Ukrainian SMEs to GDP and trade openness has long run relations. However, in short run period foreign trade of Ukraine is highly depended on large enterprises. It also corresponds with the data of IER (Krynitsyn et al., 2015). At the same time trade per se does not generate very much added value in comparison with other economic activities, while large enterprises utilize imported goods and services to produce and sell new ones. It results in increasing their contribution to GDP and respectively in declining of SME contribution to GDP. Since 2010 in Indonesia the creative industries started to grow rapidly and mostly available in SMEs schemes (Hidayat & Asmara, 2017). In our opinion, the differ-

Figure 5
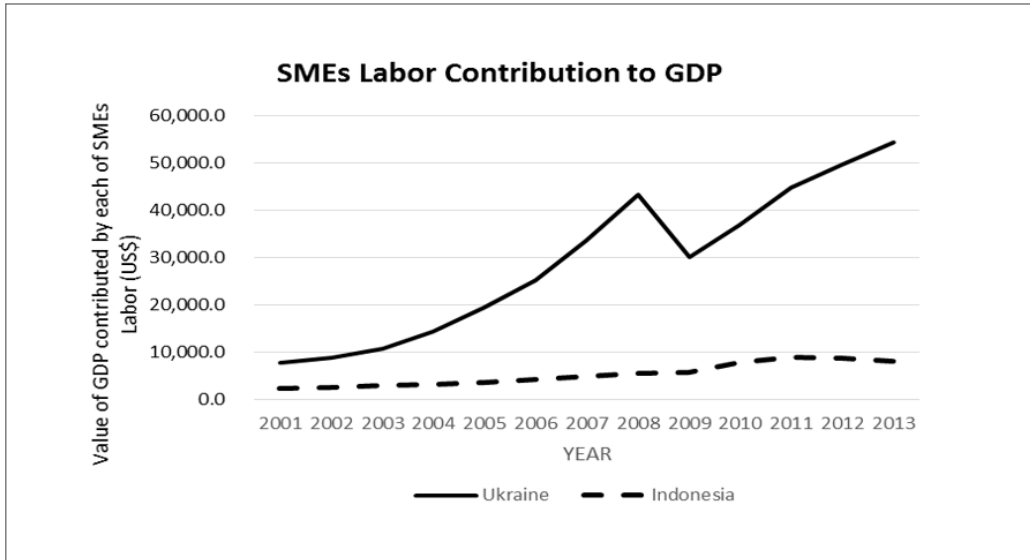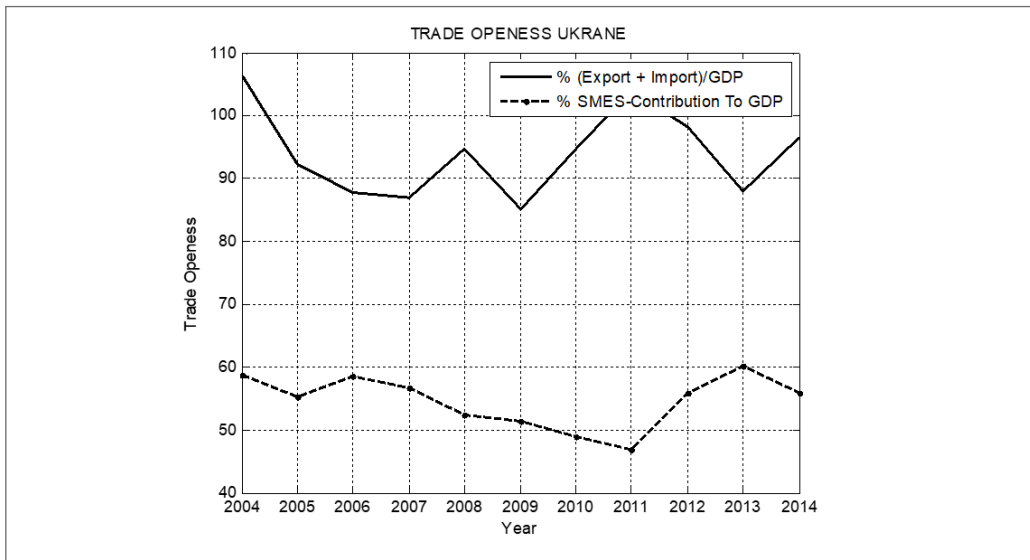*Value per Labor of SMEs Contribution to GDP*

Figure 6
Trade Openness (Ukraine)

ent trends of SME contribution (slightly positive) and trade openness (steep decline) tell us about difference in nature of economic development in general. Unlike Ukraine (World Bank, 2010), it seems that steady growth of Indonesia is not heavily depends on import and it is rather driven by internal consumption and investments, or at least SME sector does not depend on export and import goods and services. It is important for development not to rely heavily on foreign countries, but to explore own capabilities. From other hand, we can suggest that it also linked to productivity issue: import of capital goods are likely to boost productivity.

For the purpose of this paper, macroeconomic performance was analyzed using following indicators: inflation (CPI), GDP (market prices) and population rate. Those indicators reflect economic processes and factors which are important for SME development. Inflation may influence the business substantially (Sitharam & Hoque, 2016). High and volatile inflation hampers SME development and increases uncertainty, so small

businesses tend to reduce size and quality of products and increase production cost efficiency (Supriyadi & Kausar, 2017). The macroeconomic indicator of GDP is contributed by the SMEs by reducing the unemployment rate and poverty level (Sitharam & Hoque, 2016) Population as a source of human capital leads the economic growth either in the short and long run (Hye & Lau, 2015). However, Gričar et al. (2019) in their study indicated that the total of population was not the only factor to the number of SMEs but the supporting policies such as simplified procedures to open new ventures.

GDP at Market Prices is also significantly different that reflecting the size of countries. The GDP value of Indonesia is 7 times higher than that of Ukraine (see Figure 8). Given the difference in population is less than 6 times; it means that the productivity level (GDP per capita) in Indonesia is higher than in Ukraine. In turn, it could be associated with expanding role of the SME sector, the development of which relies mainly on domestic productions and services.
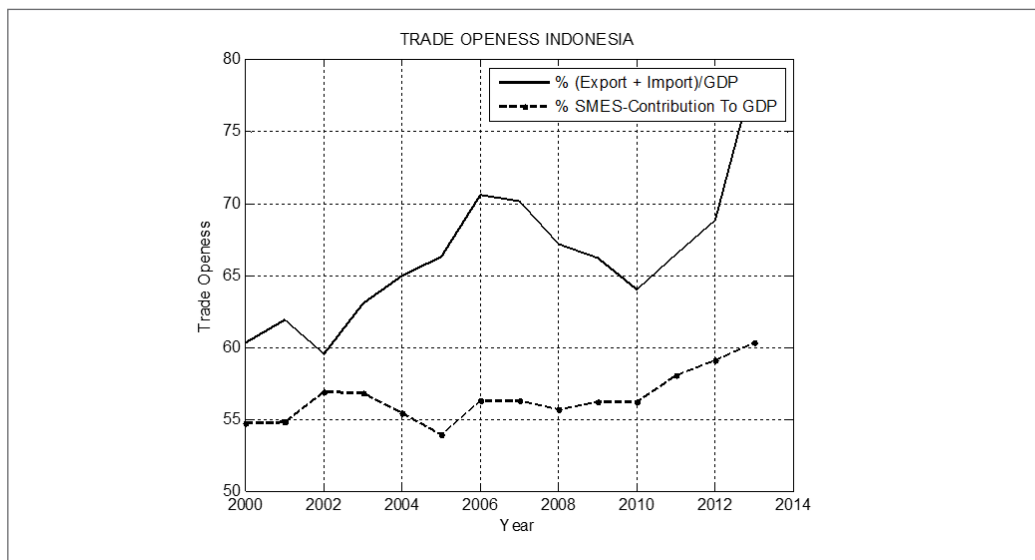
Figure 7

Trade Openness (Ukraine)

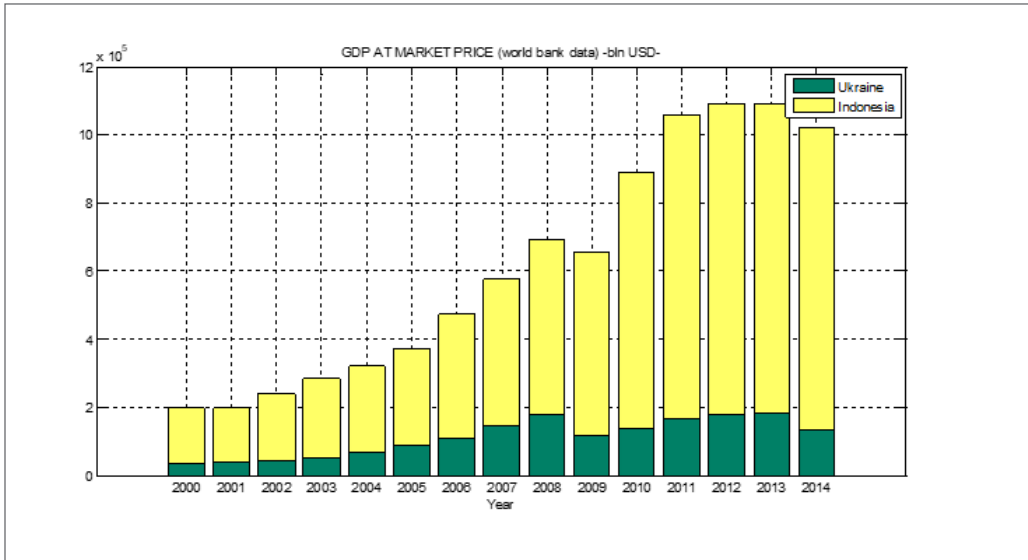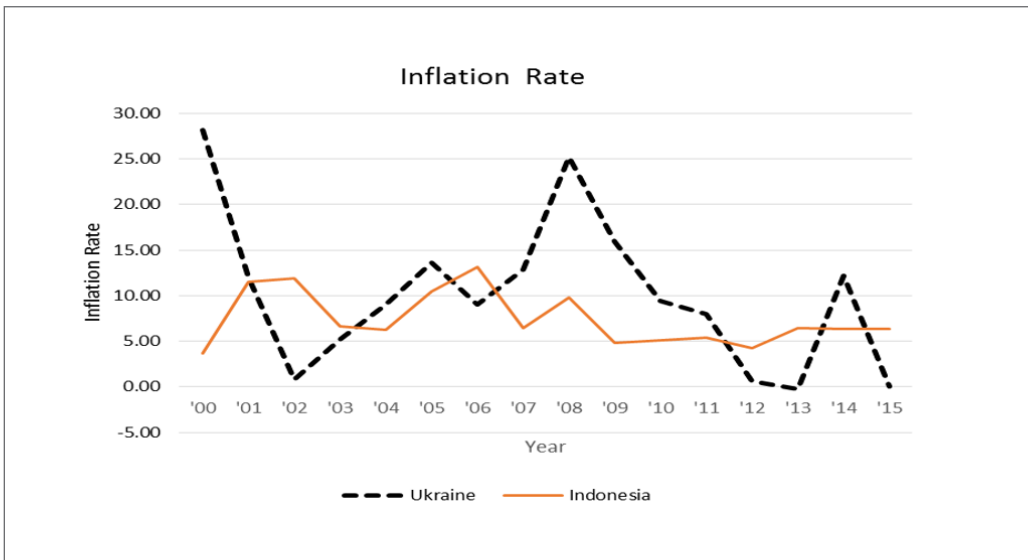**Figure 8**

*GDP at Market Price*

Figure 9

Inflation

The next macroeconomic indicator, which is very popular in economic research, is inflation. Year on the figure 9 stands for 2000-2015. Inflation rates for both countries were fluctuating. Ukraine experienced -0.2 in 2013 and 6.4 in Indonesia (see Figure 9).

Indonesia is 4th populated country in the world with more than 250 million people live in the country, while Ukraine's population is almost 45 million people (see Figure 10). SMEs Intensity Development in both countries is analyzed using total of people employed in SMEs sectors, numbers of SMEs, and the contribution of SMEs value to GDP at market prices. In this research, we also made an attempt to understand the relationship between total SMEs, and Labors in SME generated from Ukraine's and Indonesia's statistical sources. All of the data were collected from Internet, which is mostly from the websites of World Bank, Ukrainian Statistical Service and Indonesian statistical bureau. Here on, the intensity development factors will be addressed as inputs and the intensity development generated will be addressed as output. Hence our model has three input variables (three intensity development factors) and one output variable (intensity development). We modelled the relationship between the input variables and the output variable (intensity development) by grouping the data. The cluster centers was used as a basis to define a Fuzzy Inference System (FIS) which could then be used to explore and understand intensity development patterns. In our study, the fuzzy logic would be employed to capture the broad categories identified during clustering into a Fuzzy Inference System (FIS). The FIS will then act as a model that will reflect the relationship between Total SMEs, Contribution's to GDP, Labors in SME and Intensity Development. Clustering and fuzzy logic together provide a simple yet powerful tools to model the intensity development that in the focus of our study. This study deployed three membership functions to indicate

Figure 10

Total Population
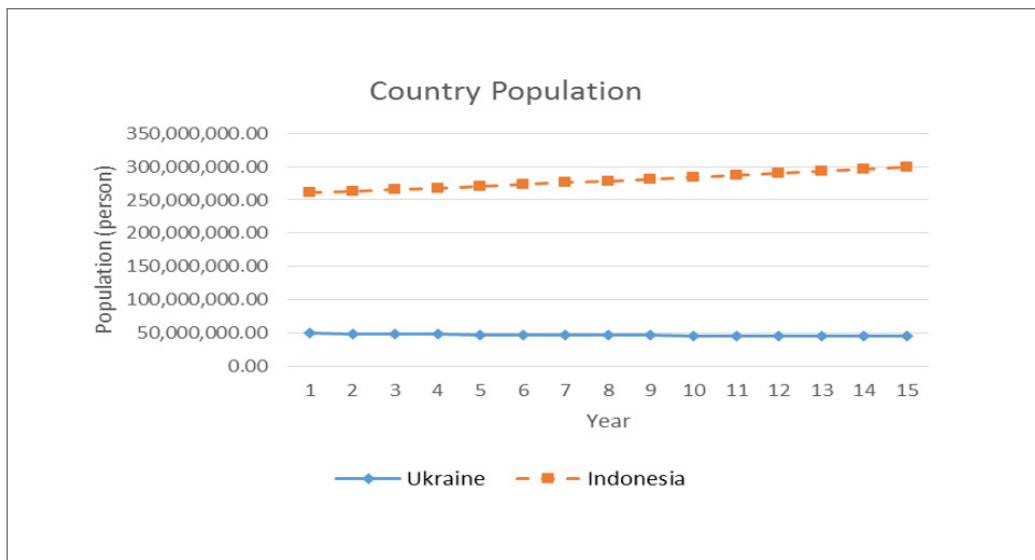
three input variables: Number of SMEs, SMEs contributions to GDP, labors in SME, and a variable output (intensity development). The membership function used Trapezium function in MATLAB with low, medium and high areas. The input and output variables of each country were put in range from lowest, medium and highest values. Since there are three membership functions used in this study, the "If-Then" rule is connected to logic as "IF input variable 1 is Low (L) = Input variable 2 is Low (L) = Input variable 3 is Low (L) THEN output variable is Low (L)" and this rule produces 27 permutations.

The models constructed by FIS are shown in figures below based on collected data. SMEs Intensity Development of Ukraine models are shown below on Figures 11-12.

Figure 11 shows that up-right corner area is the best area to gain more benefits in case of policy intervention in it. Using Contribution to GDP and Total SMEs as the indicators, the intensity development of SMEs in Ukraine could be improved if the numbers of SMEs grow and is followed by the high contribution of SMEs values to GDP. Other study found that the scientists have role in Principal investigator within micro level entrepreneurial ecosystem and this is expected to increase either economic or non-economic value not only for micro entrepreneurial but also the SMEs scales as well (Cunningham, Menter, & Wirsching, 2019).

Figure 12 shows labors in SMEs and Total SMEs as indicators for modelling SMEs intensity development. The current numbers of labor in SMEs and Total SMEs should be balanced. If the government wants to increase numbers of SMEs, the number of employees in SMEs should be increased as well. Otherwise, adding more entities will not lead to better performance. Given Ukrainian realities, the SME and other polices (e.g., fiscal) should not lead to split enterprises into smaller ones. The results of FIS modelling of SMEs Intensity Development of Indonesia are presented on figures 13-14. Figure 13 shows the SMEs intensity development of Indonesia using contribution to GDP and total SMEs as input indicators. The result shows that intensity development will be higher, if the total number of SMEs is not too high, but the contribution to GDP should be increased. Implication of this result into applied policy is that the current quality of SMEs in Indonesia needs

to be improved. Thus, it is important for the government to keep more attention and take more measures on improvement programs for SMEs development and increase of their productivity.

Based on the results of FIS modelling, there is a difference between SMEs intensity development in Ukraine and Indonesia. The number of SME in Ukraine should be increased to generate more contribution to GDP and more intense in development of SMEs, while in Indonesia, the more SMEs numbers will reduce the development of SMEs itself (See Figure 13). However, the development of SMEs can be supported by R&D strategy either internal or external to make the export productivity which indicates openness higher (Ito & Tanaka, 2016). The partnership which is arranged locally to enhance the SMEs potential in both countries can be supported by the host government to add the value of existing business infrastructure although the operation, business scales and coverage areas are different (Üztel & Martin, 1998).

Figure 14 indicates that intensity development, which is resulted from total labor hired in SMEs and numbers of SMEs, tends to focus on productivity. Indonesia has a huge population, there are a big share of youth people and people in the most productive age. However, the Indonesian Government should focus its efforts on human resources quality, especially for those who work in the SME sector. Following the results of FIS modelling, the numbers of SMEs must be controlled together with SMEs workers' quality, but not quantity. The comparison of Ukraine's and Indonesia's SME intensity development is based using SMEs quantity, and numbers of employed persons in SMEs (Country Economy, 2020). While Ukraine has less population and respectively fewer SME laborers than those of Indonesia, but seemingly, the increasing number of SMEs in Ukraine's will create better intensity development. This situation will be different for Indonesia, unless the increasing number of SMEs in Indonesia is followed by the increasing quality of labors hired in this sector, the intensity of development will become better. Hu (2010) in his study concluded that reaching the economic growth in the less developed economies requires more job-creation in SMEs. Thus, the results shown in Figures 13 and 14 might have a similar reason to explain them. Ukraine and Indonesia are developing countries (and less developed

Figure 11

SMEs Intensity Development of Ukraine based on Contribution to GDP and total of SMEs Numbers
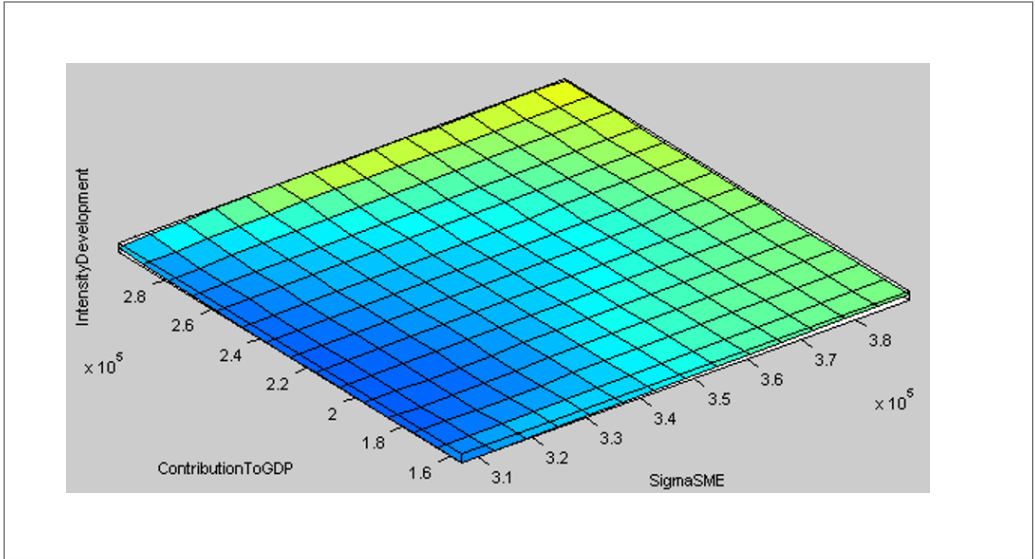

Figure 12

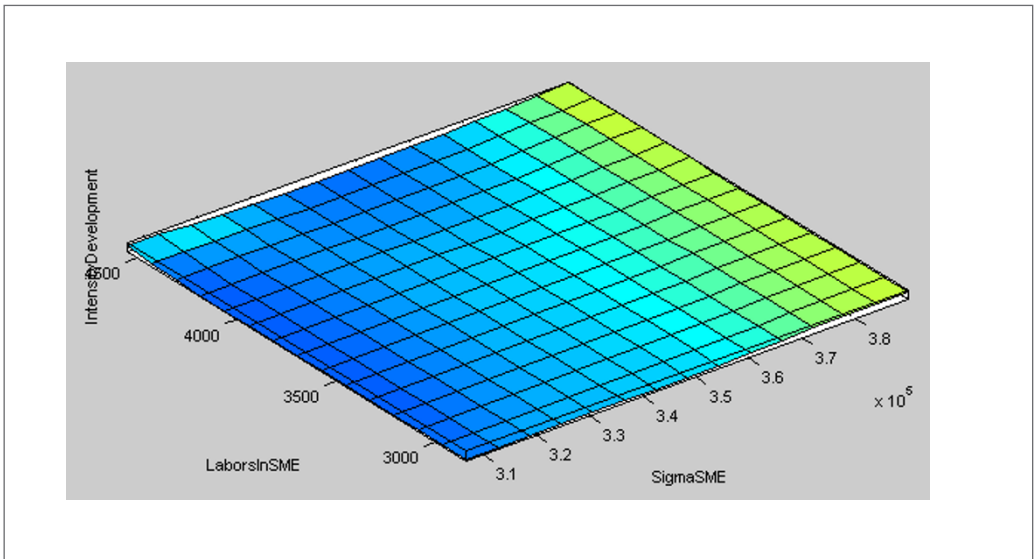*SMEs Intensity Development of Ukraine based on Labors in SMEs and total of SMEs Numbers*

Figure 13

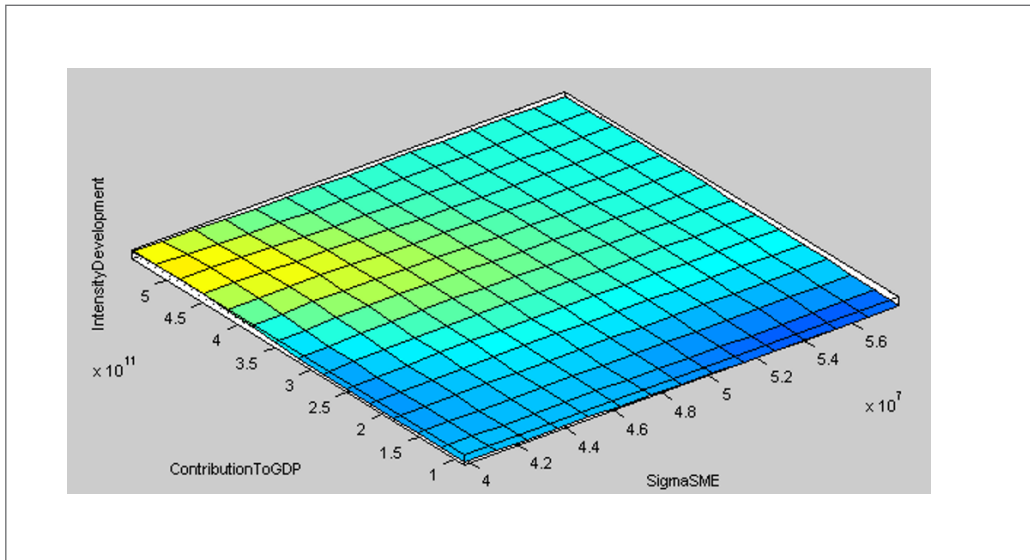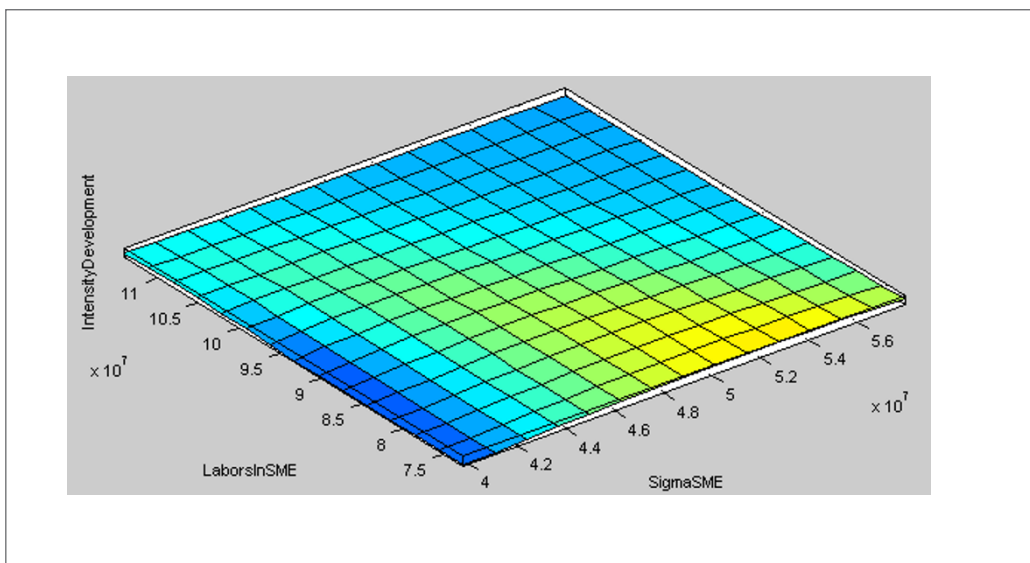*SMEs Intensity Development of Indonesia based on Contribution to GDP and Total SMEs Numbers*

Figure 14

SMEs Intensity Development of Indonesia based on Labor in SMEs and Total SMEs Numbers

countries) which are still fighting against the high rate of unemployment, so increasing numbers of SMEs is needed to involve more labor to work, although the quality of labor force SMEs might be ignored. This brings new circumstances that the government should overcome the low labor quality problem to maintain high level of SMEs development and its contribution to GDP. However, the government may solve the labor quality problem by increasing younger people, especially who are working in SMEs scales, promoting education and openness to influence the self-employment duration to bring benefit to country's GDP (Startienė & Remeikienė, 2013). Labor shortages in growing markets may cause SMEs operation problems, thus the government of respected country is able to provide the technical assistance to increase the labors' quality especially who work in SMEs (Lyon-Hill et al., 2019).

4. Conclusions

The paper presented a novel approach to SME development analysis using the Fuzzy Inference System model. The FIS model using a few variables on SME development demonstrated satisfactory results and policy implications. It helped to check the hypothesis on SME development patterns in the cases of Ukraine and Indonesia. Meantime, further studies with an increased number of input variables and countries in FIS models could shed more light on complicated links between different economic indicators.

The first finding is that increase of SMEs number in Ukraine should be set as a primary policy goal. It will lead to an increase in the contribution of SMEs to GDP. Unlike, in Indonesia, the policy focus should be shifted towards the quality of SMEs. The number of SMEs can be increased, while the quality of employees in the SMEs sector should be improved as its quantity looks sufficient. Having less population, Ukraine has a bigger possibility to increase the intensity of SMEs, and Indonesia should focus policy on improving the quality of labor hired in SMEs. The other finding is the difference between Ukraine and Indonesia on trade openness. In Ukraine, the SMEs contribute to GDP less than Indonesia, while ratio of Export and Import to GDP is increasing. Indonesia's situation differs from Ukraine's one. While the ratio of export of

import to GDP in Indonesia is increasing, the SMEs contribution to GDP becomes higher.

In addition, the ease of doing business in both countries should be improved by eliminating some useless and non-productive regulations and costs. The other policy recommendation is to review the issue of trade openness through export and import regulations. The government of the respected countries can prioritize the potential commodities to export and restrict import in order to increase the contribution of its export and import to the GDPs.

Following the results obtained during the study using FIS modelling, we can resume that FIS models allow to know the difference between SMEs intensity development in Ukraine and Indonesia. In turn, the results of such modelling contribute in improvement of policy making in SMEs domain. Unlike, widely used approach to increase SMEs number, our results also shows that high number could be misleading policy goal. Therefore, our results contribute to making a right choice between quantity and quality focus of entrepreneurial activity in Ukraine and Indonesia

The main limitation of the study is tracking of causality, which is better using rather other analysis techniques such as regression, factor analysis and structured equation models than FIS approach, especially when the variables are specific, and the data is less complicated.

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