

Global Value Chain of Indonesia Furniture Industry

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Abstract – The exports of the furniture industry plays an important role for the Indonesia's economy. It is challenging, however, to measure the real benefits and added values of this industry due to the double counting problem. To address this issue, this study adopts a Global Value Chains (GVC) approach by using Input-Output (IO) tables developed by Organization for Economic Co-operation and Development as an alternative measurement of trades among countries. This study measures the value-added transactions of the Indonesian furniture industry from 1995 to 2011, including its position in GVC. Three key findings are concluded. First, in the case of the Indonesian furniture industry, local players contribute the majority of added values compared to foreign counterparts. Secondly, Indonesia plays a key role in the upstreaming process of the global furniture industry, which supplies inputs for other countries. Third, The Indonesian furniture industry is increasingly connected with the global value chain of world furniture industry.

Keywords – *Global Value Chain, Indonesia Furniture Industry, Input-Output Table, GVC Participation.*

I. INTRODUCTION

Indonesia is one of the world's largest exporters of furniture products (Kaplinsky et. al, 2003; Tambunan, 2006; KPM Asset, 2015). The furniture industry plays an important role for the Indonesian economy (Indrawan, 2012; Hierordl, 2010; SENADA-USAID, 2007). This industry provides about 146,000 employments; contributes to the state income over Rp193 billion and exports of \$1.09 billion; and produces total added values of Rp17,8 trillion (BPS, 2016). The development of this industry is supported by the availability of its key raw materials in Indonesia (KPM Asset, 2015) and growing global demand of of the Indonesian furniture products grew about 5% in 2003-2012 (CEPS, 2014).

The current export statistics is unable to decompose the added values by country. It only captures the total values of exports/import. This means that a large amount of exports

does not mean the country contribute to the majority of the added values. Alternative measures, therefore, are needed to capture the real benefits generated by each country in a given GVC, including at the Indonesian furniture industry (Barta and Covatz, 2015). In GVC concept, *value chains* illustrates the stages of value-added activities by a different companies/nations in producing goods or services, from the initial research and design process, production, marketing, distribution, and other supporting activities at the consumer level (Gereffi and Stark, 2011). Value chains also describe all activities to produce goods and services through the intermediate transactions prior to final consumer or disposal phase which involves a combination of physical changes and inputs from various production services (Kaplinsky, 2004).

The GVC concept involve different companies in different countries in the form of intermediate and/or final products (Hummels et al., 2001). The GVC of iPhone, for

instance, involves countries, including China, Germany, Japan, Korea, and the US (Xing and Detert, 2010; Dedrick et al., 2010). Each country plays a different role in the iPhone GVC. One country produces the intermediate inputs which are then sent to other countries and used to create the final products (Meng, 2011; Koopman et al., 2010). Other country can also focus on assembly process for the domestic markets, while other country plays a role in providing the capital for other countries, especially the third world countries which usually need foreign investment to support their economies (Johnson and Noguera, 2012).

Hummels et al. (2001) propose an alternative approach to study GVC. They use the ratio of import content of exports which is defined as *vertical specialization* (VS) by using the input-output (IO) table. This study decomposes the value of exports into the domestic added values and foreign added values. This study assumes that all the exports are fully absorbed by the global markets. Similarly, other studies (e.g. Johnson and Noguera, 2012; Koopman et al., 2010; Meng et al., 2012; Trefler and Zhu, 2010; or Johnson, 2018) use a multi-regional input-output model approach to analyse and measure GVC in each country. The analysis includes the measurement of added values of exports, which are produced in a particular country. These products are then exported to other countries as an intermediate input to produce other (higher value added) intermediate inputs or even final products, which would be sold to other countries (Serbanel, 2015).

The Indonesian furniture industry has actively participated in the GVC of this industry (Purnomo et al., 2011; Widodo et al., 2010; Parlinah et al., 2011). At the first stage (forestry/logging), the raw materials of the furniture industry in Indonesia are obtained from *Perum Perhutani's* (a *state-owned enterprise*) forests across the country (Purnomo et al., 2011; Widodo et al., 2010). At the second stage (wood brokers or retailers), the raw materials are sold to other industries. Some of the key raw materials include wood, fiber, glass, cardboard, processed wood, plywood, paper board, stamp, handle, glue, coating, MDF, chemicals, plastics, and paints (BPS, 2014). These raw materials are then transformed into higher value-added products, through sawmills and merchandized products to produce various goods/furniture for kitchen, office, bedroom, living room, and shop (Kaplinsky et al., 2003; Purnomo et al., 2011; Ministry of Trade, 2008). The next stage is followed by the distribution of the goods by global brokers, importers and domestic brokers (Purnomo et al., 2011; Parlinah et al., 2011). Finally, at the retail level, both international and domestic

retailers sell the final products directly to end consumers (Purnomo et al., 2011; Widodo et al., 2010).

Many studies in different countries (e.g. Malaysia (Zakaria et al., 2014), Hungary (Barta and Covatz, 2015), North Carolina-USA (Brun et al., 2013), and Philippines (Israel and Bunao, 2017), UNIDO, 2009;) reveal that the use of a descriptive statistics to analyse the GVC of furniture industry is unable to capture the value added activities in each stage. Further studies were carried out in. Nevertheless, there is still limited research on the role of Indonesia in the GVC of furniture industry. This study aims, therefore, to analyse the participation of Indonesia in the global furniture industry by using input-output approach and to determine its condition with its trading partners along with its position in the GVC of the furniture industry. Ma et al. (2019) state that a higher GVC position is able to encourage a greater demand for high skilled workers and help producers to be more competitive (Lutz and Matthias, 2017). This article is structured as follow. This chapter describes the background of the research. The second chapter elaborates the theoretical underpinning used in this research. Methodology is explained in detail at the third chapter. The fourth chapter is result and discussion, while the conclusion is provided at the last chapter.

II. THEORY

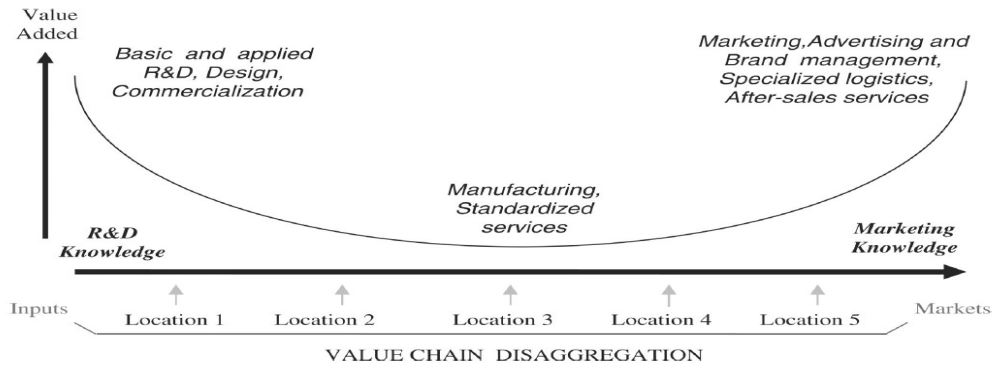
Timmer *et al.* (2014) explains the concept of the global value chain by distinguishing between the final product and the intermediate products. The final product is defined as the total values and works required to produce the goods bought by the end consumers. This GVC is identified by industry or company where the whole production processes are carried out in multiple countries. The price paid by the buyers is actually the incomes for the suppliers and its workers. It means that, in the age of GVC, companies are inter-connected one to another. The value added process depends on how much values that the company/worker contributes in the value chains. Thus, by adding up all the added values of labor and capital in a given location/country, the domestic added values of the product can be calculated.

In the context of globalization, value chains can be carried out between companies in a global scale. By considering the sequence of activities for the formation of value-added, both goods and services, the global value chain provides a comprehensive view of a global industry or commodity (Gereffi and Stark, 2011). The global production process with a value chain approach is illustrated by the "Smile Curve" (Figure 1). This curve describes that the value-added activities are usually generated in different locations. This concept is developed by Mudambi (2007, 2008). This

theory argues that high value-added processes are located at the both ends of the curve, upstream (R&D and design) and also marketing & other after-sales services.

In the case of Indonesia, Syafrian (2019) argue that most of the companies/industries experience struggle to upgrade themselves from the current condition due to some factors. From value capture perspective, Indonesian companies/industries are unable to optimize and get more

value-added processes in GVC. Many of them focus only on the right side of the smile curve (i.e. marketing and after-sales services). This is because Multinational companies view Indonesia mainly as a ‘market’ rather than center of ‘production’ or ‘R&D and design’. Consequently, Indonesia is unable to capture other high-value added processes, especially the activities shown at the left side of the smile curve.



Source : Ye et al. (2015)
Figure 1: Conceptual framework of smile curve

III. METHODOLOGY

This study uses Input-Output Tables initiated by Hummels et al. (2001) to measure the added values of the Indonesian furniture industry in GVC. This method allows to decompose the value added contributions by country. This technique, therefore, is able to address the double counting

problem in traditional trade statistics (UNCTAD, 2013). This study uses Koopman's et al. (2014) Inter-country Input-Output (ICIO) approach to calculate the domestic and foreign value-added contributions. Koopman et al. (2014) divid exports into nine value-added terms, as shown in equation 1 below.

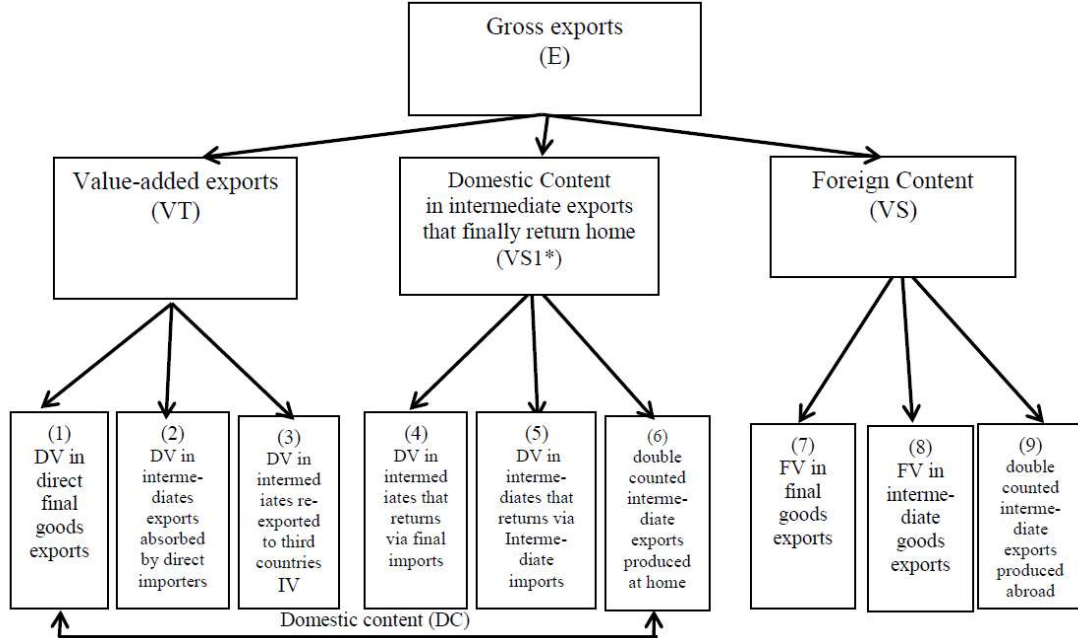
$$uE_{s*} = \{V_s \sum_{r \neq s}^G B_{ss} Y_{sr} + V_s \sum_{r \neq s}^G B_{sr} Y_{rr} + V_s \sum_{r \neq s}^G \sum_{t \neq s, r}^G B_{sr} Y_{rt}\} + \{V_s \sum_{r \neq s}^G B_{ss} Y_{sr} + V_s \sum_{r \neq s}^G B_{sr} A_{rs} (I - A_{ss})^{-1} Y_{ss}\} + V_s \sum_{r \neq s}^G B_{sr} A_{rs} (I - A_{ss})^{-1} E_{s*} + \{\sum_{t \neq s}^G \sum_{r \neq s}^G V_t B_{ts} Y_{sr} + \sum_{t \neq s}^G \sum_{r \neq s}^G V_t B_{ts} A_{sr} (I - A_{rr})^{-1} Y_{rr}\} + \sum_{r \neq s}^G B_{sr} A_{rs} (I - A_{rr})^{-1} E_{r*} \quad (1)$$

This model assumes a world consisting of the G (17) countries which are major trading partners of Indonesia furniture export, where each country produces goods in different (16) sectors (N=16) which uE_{s*} are gross exports, Y_{sr} are the final demand vector 16x1 which is the demand in country r. The final goods produced in country s, A_{sr} is the 16x16 Input Output (IO) matrix coefficient, which is the intermediate product used by r for goods produced in s. In addition, B_{sr} is a 16x16 inverse leontief matrix block, that provides the number of gross outputs produced by country s which is needed for an increase in one unit in the final demand to its destination r. It is a 16x1 vector which is globally used for the final product s. Next bV_s is the direct value-added coefficient vector 1x16.

Among the nine terms put forward by Koopman et al. (2014), the first term is $V_1 = V_s \sum_{r \neq s}^G B_{ss} Y_{sr}$ which represents domestic value-added in direct final product exports, the second one is $V_2 = V_s \sum_{r \neq s}^G B_{sr} Y_{rr}$ which represents exports value-added of intermediate products directly absorbed, while the third term is $V_3 = V_s \sum_{r \neq s}^G \sum_{t \neq s, r}^G B_{sr} Y_{rt}$ which represents exports value-added of intermediate products re-exported to third world countries (other). Furthermore, the fourth term is $V_4 = V_s \sum_{r \neq s}^G B_{ss} Y_{sr}$ which represents domestic value-added in intermediate products returned to the country of origin (Indonesia) through import of intermediate products, the fifth term is $V_5 = V_s \sum_{r \neq s}^G B_{sr} A_{rs} (I - A_{ss})^{-1} Y_{ss}$ which represents domestic value-added in intermediate products returned to origin country through intermediate product

imports, and the sixth term is $V_6 = V_s \sum_{r \neq s}^G B_{sr} A_{rs} (I - A_{ss})^{-1} E_{s*}$ which represents a double calculation of exports intermediate products produced domestically. The seventh term is $V_7 = \sum_{t \neq s}^G \sum_{r \neq s}^G V_t B_{ts} Y_{sr}$ which represents foreign value-added in export of final products, the eighth term is

$V_8 = \sum_{t \neq s}^G \sum_{r \neq s}^G V_t B_{ts} A_{sr} (I - A_{rr})^{-1} Y_{rr}$ which represents foreign value-added in the intermediate products export, and the last one is $V_9 = \sum_{r \neq s}^G B_{sr} A_{rs} (I - A_{rr})^{-1} E_{r*}$ which represents a double calculation of intermediate products produced abroad, (figure 2).



Source: Koopman et al. (2014)
Figure 2: Global Value Chain Decomposition

This study also adopts a model developed by Koopman et al. (2010) to determine the GVC relationship in Indonesia with its trading partner countries formulated in the participation position and index as follows;

$$GVC_{position_{sn}} = \ln \left(1 + \frac{VS_{*sn}}{E_{s*sn}} \right) - \ln \left(1 + \frac{VS_{sn}}{E_{s*sn}} \right) \quad (2)$$

$$GVC_{participation_{sn}} = \frac{VS1_{*sn}}{E_{s*sn}} + \frac{VS_{sn}}{E_{s*sn}} \quad (3)$$

Where $GVC_{position_{sn}}$ represent the position of country s in GVC, $GVC_{participation_{sn}}$ represents its participation and E_{s*sn} represent gross export. The VS_{sn} represent vector

$$VS_s = \sum_{t \neq s}^G \sum_{r \neq s}^G V_t B_{ts} Y_{sr} + \sum_{t \neq s}^G \sum_{r \neq s}^G V_t B_{ts} A_{sr} (I - A_{rr})^{-1} Y_{rr} + \sum_{t \neq s}^G V_t B_{ts} A_{sr} \sum_{r \neq s}^G (I - A_{rr})^{-1} E_{r*} = \sum_{r \neq s}^G V_r B_{rs} E_{s*} = \sum_{t \neq s}^G \sum_{r \neq s}^G V_t B_{ts} Y_{sr} + \sum_{t \neq s}^G \sum_{r \neq s}^G V_t B_{ts} A_{sr} X_r \quad (4)$$

Where V_s is an element of the vector obtained from the sum of VS1 matrix rows (without domestic industry) relating

$$VS1_{*s} = \sum_{t \neq s} V_s B_{sr} E_{rs} = V_s \sum_{r \neq s}^G B_{sr} Y_{rs} + V_s \sum_{r \neq s}^G B_{sr} A_{rs} X_s \quad (5)$$

Besides viewing it from "upstream" and "downstream" sides through GVC position, it is also necessary to determine the country's participation and major trading partners in the overall value-added chain. As a result of this, the Koopman formula changes are as follows;

elements achieved from summing the matrix columns VS without domestic industry which is related to import charges (*foreign*) using the formula as follows;

to the export of domestic intermediate goods in other countries with its formulation as follows;

Basic data for the construction of *inter-country input output* (ICIO) of furniture industry was obtained from the Organization for Economic Co-operation and Development (OECD) data with base from 1995 to 2011 (OECD, 2015). It is also used for data aggregation and disaggregation using the Eora multi-region input-output table (MRIO) database (2017) in the same period using segregation in ICIO. There is aggregation from 43 countries to 17 countries and from 34 sectors to 16 with the disaggregates furniture industry from wood conducted. In this process, a "balancing" method using RAS is also performed with two different years used to determine the development of furniture industry GVC during the log export ban policy in 2001. The aggregation and disaggregation choice of the above countries and sectors is based on the export structure of the forestry and wood industry (Ye et al., 2015; FAO, 2014).

IV. RESULTS AND DISCUSSION

The GVC analysis in this study adopts Koopman et al. (2014). The contribution of this study to the literature is mainly from the methodological side. This study addresses the double counting problem of the domestic and foreign added values by decomposing it into 9 sub-values, as

explained in the third chapter. The results of data processing show (table 1) the composition of the domestic value added (V1-V6) of the Indonesian furniture industry is still at 98.6% while the remaining percentage is the foreign value-added (V7-V9).

This result is another calculation conducted by Koopman et al. (2012) using Hummels et al. (2001) method. The high domestic value-added shows that there has been limited involvement of foreign parties from Indonesia's gross furniture exports. This is understandable considering the fact that it is dominated by small and medium enterprises with investments generally coming from domestic circles such as the center for furniture exports in Jepara, Central Java, which is almost entirely owned domestically by using local resources (Purnomo et al., 2011). One of the reasons is the raw material, where BPS was used for calculation in 1995 which imported raw material components at 2.6% of the total inputs needed for its production (BPS, 1996). In addition to raw materials caused by natural resource wealth, another factor that causes dominant domestic value-added is economic measure which allows the supply of internal value-added to be greater (UNCTAD, 2013).

Table 1. Decomposition of Global Value Chain Export of Indonesian and Indonesian Wood Industry Furniture Trade Partners 1995 (%)

No	Country	in Billions of US dollars	Value-added exports			Domestic VA return home		Pure double counting in int. exports produced in home	Foreign VA return foreign countries		Pure double counting in int. Exports produced abroad	Total
			in direct final exports	in int. absorb by direct importers	in int. reexports to third countries	in final exports	in int. Exports		in final exports	in int. Exports		
		(0)	(V1)	(V2)	(V3)	(V4)	(V5)	(V6)	(V7)	(V8)	(V9)	(10)
1	Indonesia	820,6	27,69	62,87	7,59	0,16	0,21	0,04	1,34	0,10	0,01	100,00
2	Australia	126,9	23,53	48,05	6,84	0,13	0,20	0,06	6,64	14,44	0,12	100,00
3	Belgium	235,5	21,79	33,41	5,69	0,22	0,33	0,38	15,45	22,06	0,68	100,00
4	France	446,8	25,91	39,69	6,17	0,61	2,78	1,27	9,96	11,17	2,43	100,00
5	Germany	1253,6	33,46	48,11	6,37	1,41	3,59	1,63	3,19	1,22	1,01	100,00
6	Japan	32,5	32,33	37,73	6,41	0,71	2,79	0,40	9,28	8,69	1,66	100,00
7	Korea	21,6	24,69	31,19	6,96	0,10	0,53	0,24	16,01	19,48	0,79	100,00
8	Netherlands	268,0	25,07	39,52	9,45	0,39	0,73	0,57	11,98	11,57	0,71	100,00
9	United Kingdom	153,4	29,07	34,96	5,55	0,41	3,01	1,42	10,89	11,37	3,33	100,00
10	United States	778,1	21,79	31,86	3,49	0,88	19,30	3,64	5,56	5,35	8,12	100,00
11	China	1536,9	16,61	72,55	7,00	0,14	0,30	0,09	1,87	1,42	0,02	100,00
12	India	5,9	18,21	21,15	26,73	0,02	1,09	0,16	17,83	13,35	1,47	100,00
13	Malaysia	596,5	19,11	62,92	9,00	0,25	0,22	0,20	4,26	3,94	0,09	100,00

14	Singapore	39,6	6,98	19,50	1,99	0,02	0,10	0,21	27,4 4	41,82	1,93	100,00
15	Taiwan	414,6	6,61	59,80	6,21	0,11	0,27	0,23	10,6 2	15,81	0,34	100,00
16	Vietnam	11,5	29,71	25,26	5,52	0,02	0,03	0,01	19,6 6	19,74	0,04	100,00
17	Rest of The World	6015,6	22,60	57,31	6,53	3,39	3,34	0,83	2,45	3,09	0,46	100,00

When intensively viewed using Koopman et al. (2014) framework with nine terms value-added, in the form of exports for intermediate products, the production and consumption of goods by importing countries is still around 62.87% (V2). This value compared to Indonesia's trading partners is much higher where the average for all countries is 50%, except for China which is 72.55% (V2). The value is due to the incomplete exportation of furniture at the assembly stage, which is generally adjusted to the tastes of consumers, in the form of color, shape and paint. The trend was driven by many exhibitions of wood products in these countries and the economic development of Indonesia's trading partners (ITCP-Osaka, 2012). However, the value-added in exports of final products is quite high, reaching 27.69% (V1) compared to some of Indonesia's trading partner countries, such as America, Singapore and the Netherlands. This amount also shows that their final products are quite competitive with these countries even though they are still below Germany, Japan, the United Kingdom and Vietnam.

Table 1 also shows that the exports value-added in intermediate products re-exported to third world countries is quite large compared to others at 7.59% (V3). This indicates that importation, utilizes products exported to other countries. This tends to have implications for increasing Indonesia's participation in the global value chains. Another case is with India which has an extreme V3 share of 26.73% or the biggest compared to other countries. This indicates that it specializes in intermediate products which are re-exported by third world countries even though in the aggregate the value of gross exports is far from Indonesia. Other forms of value-added are relatively smaller, both domestic returning to

Indonesia in the form of intermediate (V5) and final products (V4), double calculations on exports of domestically produced (V6) abroad (V9), and foreign value-added in the form of intermediate products (V8) and final products (V7). The relatively small value-added of some components above indicates that the relationship is still relatively small. This is in line with the calculation of shares in vertical trading described in Koopman et al. (2014) by adding component V3 where foreign involvement as well as third countries largely determine the level of GVC participation.

During its development in 2011, the Indonesian furniture industry GVC showed a different pattern where the value-added owned by foreign countries (V7-V9) increased from 1.4% to 8.16% (see table 2). This is also reflected on the deepening of BPS data from 1995 to 2011, which showed that the composition of imported raw materials for the furniture industry increased from 2.6% to 12.4% using wood, plywood, synthetic fibers, cartons, stamps, chemicals, paints (BPS, 2012). These developments indicate that the furniture industry began to face scarcity of key raw materials despite a ban on log exports in 2001. This happened because some of the timber from Indonesia's natural forests were illegally sent abroad especially to China (Cohen, 2005). Natural forest is the main source of the furniture industry, in addition to production it is planted by state-owned companies (Perhutani) and communities (Purnomo et al., 2001; Parlinah et al., 2011). It provides quality teak wood (teak wood) as the main raw material and takes up to 15 years to harvest. These two things cause the scarcity of raw materials for the furniture industry in Indonesia.

Table 2. Decomposition of Global Value Chain Export of Wood Furniture Industry in Indonesia and Trading Partner Countries in 2011 (%)

No	Country	in Billions of US dollars	Value-added exports			Domestic VA return home		Pure double counting in int. exports produced in home	Foreign VA return foreign countries		Pure double counting in int. Exports produced abroad	Total
			in direct final exports	in int. absorb by direct importers	in int. reexports to third countries	in final exports	in int. Exports		in final exports	in int. Exports		
		(0)	(V1)	(V2)	(V3)	(V4)	(V5)	(V6)	(V7)	(V8)	(V9)	(10)
1	Indonesia	1529,0	17,07	62,82	11,11	0,19	0,54	0,11	4,22	3,87	0,07	100,00
2	Australia	327,2	23,06	46,29	9,95	0,28	0,37	0,11	7,90	11,75	0,30	100,00

3	Belgium	382,1	16,56	30,96	5,53	0,13	0,19	0,17	13,50	32,48	0,47	100,00
4	France	805,2	19,72	30,44	4,70	0,40	1,24	0,71	16,17	24,14	2,48	100,00
5	Germany	2975,5	19,71	39,20	5,13	0,72	2,81	2,54	11,22	14,72	3,96	100,00
6	Japan	51,6	17,22	25,81	5,71	0,37	1,86	0,54	24,15	20,21	4,12	100,00
7	Korea	22,0	5,00	8,10	2,06	0,03	0,35	0,35	42,29	36,43	5,38	100,00
8	Netherlands	236,1	28,14	35,98	7,78	0,11	0,32	0,19	11,27	15,86	0,33	100,00
9	United Kingdom	285,0	16,00	25,19	3,92	0,28	1,16	0,68	23,99	25,11	3,68	100,00
10	United States	1404,1	8,62	18,09	2,37	0,48	9,95	2,58	16,84	16,57	24,50	100,00
11	China	15858,8	31,94	57,04	6,81	0,67	1,54	0,81	0,87	0,26	0,08	100,00
12	India	21,9	4,49	7,15	4,58	0,03	0,75	0,22	65,31	6,80	10,67	100,00
13	Malaysia	618,6	7,90	34,67	9,32	0,08	0,19	0,31	27,05	19,56	0,93	100,00
14	Singapore	43,6	3,25	8,33	0,79	0,01	0,03	0,07	40,39	45,92	1,22	100,00
15	Taiwan	266,5	6,17	22,13	4,01	0,05	0,16	0,25	23,32	42,08	1,83	100,00
16	Vietnam	292,8	16,57	21,83	4,13	0,03	0,02	0,03	24,86	32,41	0,11	100,00
17	Rest of The World	9496,4	22,35	46,18	5,58	3,95	4,42	1,18	5,18	8,73	2,44	100,00

Conversely, the composition of export value-added in the final form (V1) decreased from 27.69% to 17.07% and the domestic value increased from 7.59% to 11.11%, while the exportation value of products among those absorbed directly by the importing country (V2) remained at 62.82%. This development shows that the greater foreign value-added also affected the domestic pattern of intermediate products re-exported by importers. Export demand accompanied by involvement of foreign countries also aims to be re-exported.

There is an average significant difference when compared with Indonesia's trading partners, which

experienced an increase in foreign value-added from 25.1% to 48, 1% as shown in figure 3. This means that each has a tendency to involve others in the process of their furniture industry value chain, in the form of final and intermediate products. This is seen from the increase in shares V7, V8 and V9 followed by a reduction in shares V1, V2 and V3. These developments indicate that the trend of foreign value-added partner countries as "demand" is not in line with the trend of increasing export value-added in Indonesia's final product (V1).

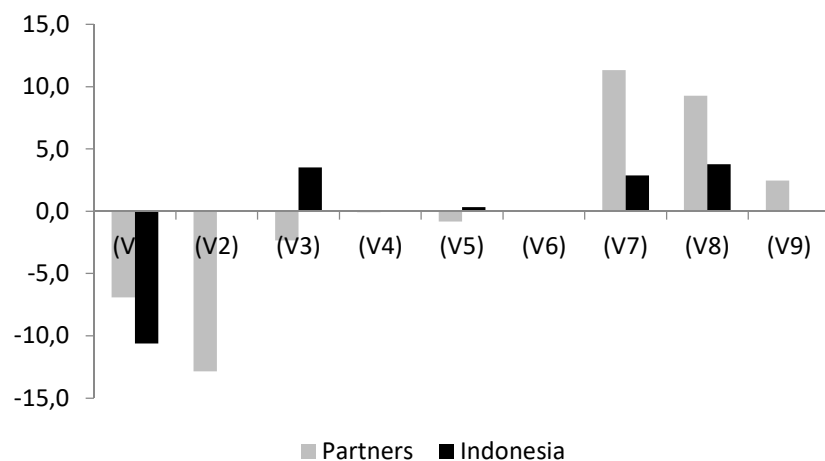


Figure 3. Changes in Global Value Chain Decomposition of Indonesian Furniture Industry Exports and Trade Partner Countries in 1995 and 2011 (%)

Among its trading partner countries, China still dominated world gross exports, both in 1995 and 2011 with a 93.1% development. This country remained consistent with a domestic value-added (V1-V7) above 97% for the two periods. China actually strengthens the value-added of exports in the form of final export products (V1) and reduces the share in the form of intermediate products absorbed by importing countries (V2). The large gross export value and progress achieved in the furniture industry are due to cheap wood raw materials, productive labor, economic banking interest rates, low taxes, low product costs due to small and simple businesses, easy licensing process, and dumping policy (Gunawan in Tambunan, 2006). In addition, the high domestic value-added in China for the manufacturing industry where furniture is located is due to the expansion of export volumes which uses domestic products rather than imports (Lianliang and Cuihong, 2017). Specifically, the high domestic value is due to the increasingly global procurement of raw materials, including illegal logging from Indonesia, Vietnam, Papua New Guinea, Myanmar and other countries (Cohen, 2005). This explains why domestic value-added is large while foreign charges is low given that illegal logging is not recorded as foreign cargo.

Beside China, Vietnam has the second gross export growth of 2,447.5% all over the *world*. Its changes are also same as the phenomenon in general partner countries, as earlier explained. Vietnam reduced V1, V2 and V3 but quickly increased V7 and V8 or in other words foreign value-added in intermediate products and final products in the gross exports of the furniture industry grew bigger. According to Hoang (2014), it is understood that few decades ago, Vietnam opened up large foreign investment opportunities, with the principle of overseas subsidiaries in the furniture industry. Decomposition dynamics of GVC in each country during these two periods show their various choices. This starts from the availability of main raw materials, the ability of human resources to innovate, openness to foreign investment and growth (Sampath et al., 2018). Although this determines the trade policies of each country in various ways, including options for developing "up grading" on final products, intermediate products or expanding overseas roles in the development of furniture industry exports.

Another dimension of GVC is the position and participation of each country in the GVC. Koopman et al. (2010) introduces its participation and position which shows

the vertical relationship of an industry/sector. A country in a "downstream" position tends to have a high share of its vertical specialization in terms of importations with foreign charges (VS) in its exportations. Conversely, the upstream position tends to have a share which is vertically high in terms of exports (VS1) or high share of exports through third world countries using intermediate input. This analysis has the tendency of being deepened with a description of the role of each country in the formation of the total demand and input between the Indonesian pulp and paper industry with major trading partner countries (BPS, 2010). This method is used to complete the impasse of the Koopman et al. (2010) in tracing the role of each country and each sector in the formation of GVC of a sector in a particular country.

This analysis begins by looking at the position and participation of the furniture industry and partner countries in 1995 with a GVC position value of 1.30 which places Indonesia as the country with the highest "upstream" position compared to its trading partner countries, see figure 4. Besides Indonesia, Germany, America, China and Malaysia are also in an "upstream" position in the GVC furniture industry. CEPS (2014) suggests that there are several factors that determine a country's furniture industry in the "Upstream" position in the GVC, namely the level of profit, the availability of raw materials. components, labor costs and the trained labor, investment in machine technology, research and development and innovation and design, policy support and furniture price development. Indonesia already has one or two of the above factors namely the availability of raw materials, components, cost of labor and trained labor, especially in some furniture industry centers in Jepara, Central Java Province (Purnomo et al., 2011; Widodo et al., 2010).

Singapore, India and several other countries have a "downstream" position which means they have a large proportion with the exportation of intermediate products from other countries. CEPS (2014) also revealed a number of things that led to a country's furniture industry in "downstream" position, namely the level of product demand, due to income spent, investment in housing construction, and changes in population demography. It was also caused by the form and level of ease of contracting furniture products as well as distribution and retail channels of furniture industry products.

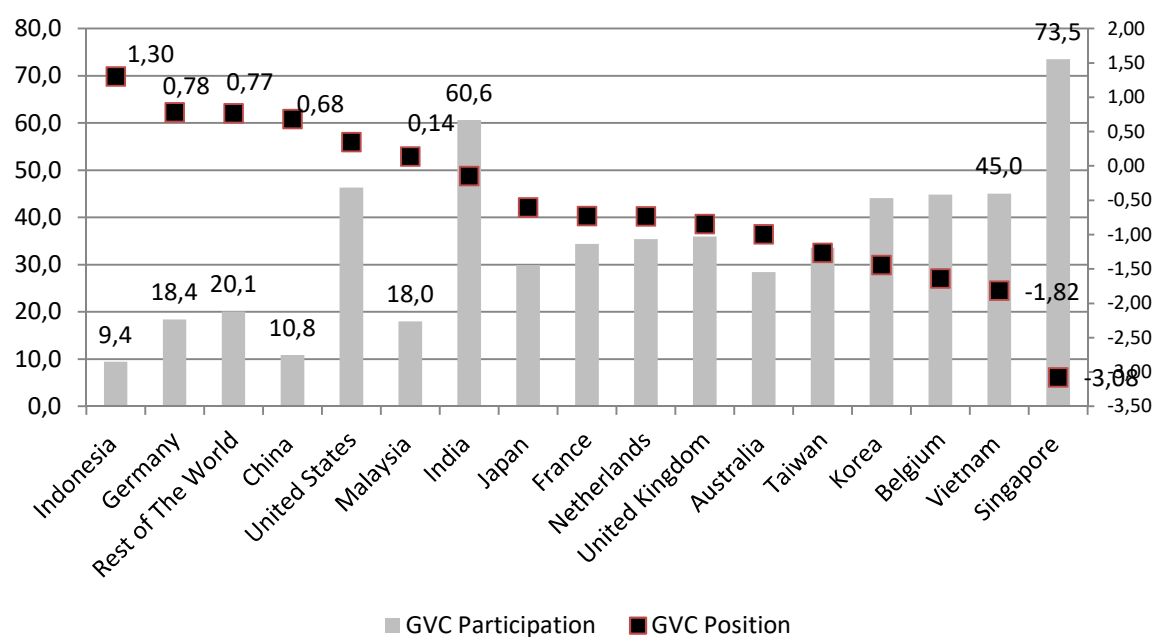


Figure 4: Position and Index of Participation in Participation in Indonesia and Major Trade Partner Countries in the Global Value Chain of the Wood Furniture Industry in 1995

Conversely, Indonesian furniture industry also has a low GVC participation index with a value of 9.45 compared to its main trading partner countries, which means that its exports processed and integrated in third countries are low. This is due to the fact that Indonesian exports are more dominant in the form of final and intermediate products which are absorbed directly by importers without being exported back to third countries or domestic. In other words, it's exports does not exceed the second world countries as already it increase productivity, peculiarities and diversification of the exported product (Kowalski et al., 2015). This means that Indonesian furniture industry products have not gone far in increasing productivity or diversifying exported products.

Singapore is in an extreme position where its GVC participation index is 73.52, which indicates a high level of participation because of its high "downstream" linkage processed and integrated in third country exports (UNCTAD, 2013). It is seen that the value-added overseas returns to their countries in Singapore's industrial exports are quite high compared to other countries, both in the form of inputs between 41.82%, and final products at 27.44%. The high level of participation of a country in the GVC, according to Marrel (2015) are labor market efficiency, climate of innovation, spending on R&D, low barriers to investment and trade between national borders, logistics performance to human capital. In plain view Singapore has several factors above that are far above Indonesia and other Asian countries.

The development of Indonesia's own furniture industry in 2011 experienced a slight change in which the value of the position of the GVC decreased from 1.3 to 0.35, thereby, indicating a balanced "upstream" or downstream position in producing raw materials for other countries, see figure 5. In terms of domestic raw materials, there is also a scarcity of teak wood as the main material for the Indonesian furniture industry, due to the decline in natural forest production and the slow production of teak forests by state and community plantations (Widodo et al., 2010; Purnomo et al., 2011). The decline is closely related to obstacles faced by this industry in foreign export markets, including illegal logging to other countries, which are not designed domestically but by foreign buyers or by the term original equipment manufacturer (OEM). The product quality is lacking because standardization and passive marketing system are not optimal (ITCP Osaka, 2012).

In terms of GVC participation, despite being at a lower level compared to other countries, its participation index also increased from 9.45 to 20.11. This indicates an increase in the role of this industry in the global value chain, which indicates that Indonesia is increasingly connected with other countries. As earlier explained, this is owing to its gross exports which increased its foreign value-added in raw materials which is reflected in V7 and V8. Increased participation is also supported by investment openness through foreign direct investment (FDI) in the manufacturing industry in Indonesia,

one of which came from China amounting to US \$ 30 billion (BKPM, 2016).

Some countries show different patterns such as China which has increasingly established itself with low GVC participation. In addition, cheap labor costs and high domestic availability are some contributing factors responsible for the availability of raw materials. Conversely, India is considered a "downstream" country with high participation due to its driving factors which has led to the development of hybrid model, disposable income growth, changes in consumer preferences, energy technology efficiency, segment and industrial product premiumization (KPMG, 2013).

The biggest changes were experienced by Korea, Malaysia and Taiwan in the increasing level of GVC participation. This shows that these countries are the fastest to make changes in their furniture industry. The most dominant is bringing in foreign value-added through input raw materials between other countries, because of the scarcity and trend of the use of intermediate input types in accordance with market demand. Furthermore, in Malaysia, due to manufacturing efficiency of the Original Equipment Manufacturer (OEM) model from Taiwan an initial investor in the industry (ASM, 2015) is required. With the OEM model, export volumes increase faster following investors' needs. This model is also applied by Vietnam as one of its competitors with the availability of raw materials and low labor costs.

Participation of partner countries in Indonesian GVC is seen in terms of intermediate and final demand in the Input-Output table structure (BPS, 2010). The countries associated with the largest are Japan and Australia, while others are relatively smaller when compared to 1995 and 2011, with an increase in relationship. This development shows that in terms of demand side, the country depends on Japan and Australia to keep the global value chain going forward for years. Meanwhile, in terms of intermediate inputs, countries that were closely related in 1995 were Japan, America, Singapore, Germany and Australia. While in 2011, there was a slight change in the sequence of China, Korea, Japan, Singapore and America. This change shows that there is a different relationship between periods where the dominance of the main trading partner differ. Japan plays an important input role in Indonesian furniture industries which is replaced by China. This shows that the increase of its participation in GVC also changes the structure of trade relations between countries, both as exporters and importers as seen from the structure of demand and intermediate inputs.

V. CONCLUSION

This study aims to understand the role of Indonesia in the global furniture industry. Input-Output (IO) tables are used to measure the contribution of Indonesia in value-added activities in the global furniture Industry. This study adopts Koopman (2014) method to analyze and decompose the value-added activities generated in Indonesia. This study finds that in 1995 and 2011, the Indonesia's furniture industry is still dominated by domestic value-added contents, although foreign contributions also increase gradually. In regard to its position in the GVC, the inter-connection of Indonesian furniture industry with other main trading partners between 1995 and 2011, is still well-connected and remains in the upstream level. Indonesia produces raw materials as well as intermediate inputs for other countries, especially for China and Australia. There is also a quite significant increase in the GVC participation with major trading countries.

REFERENCES

- [1] Academy of Sciences Malaysia (ASM). (2015). Furniture industry sector. Download from www.akademisains.gov.my/download/ms3.0/Furniture_Industry_Sector.pdf
- [2] Barta, B., and Kovats, J. (2015). Short note added value among the furniture manufactures SMES. *Wood Research*, 60 (6), 1017-1024.
- [3] BPS. (2016). Medium and large industries statistic 1992-2015. National Bureau Statistic of Indonesia (un-publish).
- [4] _____. (2016). Indonesia Export of Non Oil 2015.
- [5] National Coordinating Board of Indonesia (BPKM). (2016). BKPM Siap Fasilitasi Relokasi Investor Furniture Tiongkok. Siaran Pers 25 Maret 2016.
- [6] Brun, L., Giolio, B., Stacey, F., Gary, G., Yanyun, X. (2013). The furniture value chain in North Caroline. Duke-Centre on Globalization, Governance & Competitiveness.
- [7] Center for European Policy Studies. (2014). The EU furniture market situation and possible furniture products initiative. Final Report Submitted to European Commission DG Enterprise and Industry Within Framework Contract /ENTR/008/006.

- [8] Cohen, D. (2005). Impact of China on the global value (supply) chain : the wood sector. University of British Columbia. Download from *forest-trends.org/documents/files/doc_1120.pdf*.
- [9] Dedrick, J., Kraemer, K. L., and Linden, G. (2010). Who profits from innovation in global value chains?: A Study of the iPod and Notebook PCs'. *Industrial and Corporate Change*, 19(1), 81–116.
- [10] Eora multi-region input-output table (MRIO). (2017). Available at <https://worldmrio.com/>
- [11] Effendi, R., dan Priyanto, D. (2007). Kajian pengembangan industri furniture kayu melalui pendekatan kluster industri di Jawa Tengah. *Jurnal Penelitian Sosial dan Ekonomi Kehutanan*, 4(3), 233-255.
- [12] Food and Agriculture Organization of the United Nations (FAO). (2014). Forest product statistic. 2014 Global Forest Products Facts and Figures.
- [13] Gereffi, G., and Stark, K. F. (2011). Center on Globalization, Governance and Competitiveness (CGGC) Duke University Durham, North Carolina, USA.
- [14] Hierord, J. (2010). Value addition in the wood processing sector : options for production waste minimaxatio along the wood value chain. UNIDO.
- [15] Himawan, P. A., dan Triwilaswandio, W. P. (2014). Analisa Teknis dan Ekonomis Pengembangan Industri Pendukung Kapal. *Jurnal Teknik Pomits*, 2 (1), 98-104.
- [16] Hoang, N. (2014). Foreign subsidiary development of furniture industry in the context of global recession : case of Vietnam. Thesis summited for S M.Sc. Degree on Forest Sciences and Business University of Helsinki, Departement of Forest Science.
- [17] Hummels, D., Ishii, J., and Yi, K.M. (2001). The Nature And Growth Of Vertical Specialization In World Trade. *Journal Of International Economics*, 54 (1):75-96.
- [18] Indrawan. (2012). Strategi implementasi sistem verifikasi legalitas kayu (svlk) pada industri furniture di Indonesia. Thesis tidak dipublikasikan. Program Studi Magister Manajemen dan Bisnis Sekolah Pascasarjana. Institut Pertanian Bogor. 2012.
- [19] Israel, D. C., and Bunao, D. F. M. (2017). Value chain analysis of the wood processing industry in The Philippines. Discussion Paper Series No. 2017-05. Philippine Institute for Development Studies.
- [20] ITPC-Osaka. (2012). Market Brief : HS 9403.40 Kitchen Wooden Furniture. ITPC Osaka Japan.
- [21] Johnson, R., and Noguera, G. (2012). Accounting For Intermediates : Production Sharing And Trade In Value-Added, *Journal Of International Economics*, 86 (2), 224-236.
- [22] Johnson, R. C. (2018). Measuring Global Value Chain. *Annual Review of Economics*, 10 (1), 207-236.
- [23] Kaplinsky, R. (2004). Spreading the gains from globalization : what can be learned from value chain analysis ?. *Problem of Economic Transition*, 47 (2), 74-115.
- [24] Kaplinsky, R., Memedovic, O., Morris, M., and Readmen, J. (2003). The global wood furniture value chain : what prospects for upgrading by developing countries the case of South Africa. United Nations Industrial Development Organization.
- [25] Koopman, R., Powers, W., Wang, Z., and Wei, S. J. (2010). Give credit to where credit is due: tracing value-added in global production chains. NBER Working Paper 16426.
- [26] _____. (2014) Tracing value-added and double counting in gross exports. *American Economic Review*, 104 (2), 459-94.
- [27] KPM ASSET. (2015). Indonesia furniture industry. B3-Globe.
- [28] KPMG. (2013). Human resource and skill requirements in the furniture and furnishing sector 2013-2017, 2017-22. Government of India Ministry of Skill Development & Entrepreneurship.
- [29] Lianliang, Y., and Cuihong, Y. (2017). Change in domestic value added in china's exports: a structural decomposition analysis approach. *Journal of Economic Structures. The Official Journal of the Pan-Pacific Association of Input-Output Studies (PAPAIOS)*, 6 (18), 1-12.

- [30] Lutz, C., and Matthias, O. (2017). Global value chains and smallholders in sub-saharan africa. *Review of Social Econom*, 75 (3), 251-254.
- [31] Ma, S., Yinfeng, L., and Hongsheng, Z. (2019). The employment effects of global value chains. *Emerging Market and Finance and Trade*, 55 (10), 2230-2253.
- [32] Marrel, Er. V. D. (2015). Positioning on the global value chain map : where do you want to be ?. Ecipe Occasional Paper. No.01/2015.
- [33] Meng, B. (2011). Trade pattern and global value chain in east asia: from trade in goods to trade in tasks. World Trade Organizations-IDE JETRO.
- [34] Meng, B., Fang, Y., and Yamano, N. (2012). Measuring global value chain and regional integration : an international input-output approach. IDE Discussion Papers 362. Institute of Developing Economics, Japan External Trade Organization (JETRO).
- [35] Ministry of Trade of the Republic of Indonesia (Kemendag). (2008). Indonesia furniture creativity in woods. Hand book of commodity profile. Balitbangdag-Kementrian Perdagangan Republik Indonesia.
- [36] Mudambi, R. (2007). Offshoring: Economic geography and the multinational firm. *J. Int. Bus. Stud.* 38: 206-206.
- [37] Mudambi, R. (2008). "Location, control and innovation in knowledgeintensive industries." *Journal of Economic Geography* 8(5): 699-725.
- [38] Organization for Economic Co-operation and Development (OECD). (2015). Inter-Country Input Output Table, 2015 OECD, WTO, and World Bank Group. (2014). Global value chains : challenges, opportunities, and implications for policy. Report Prepared For Submission To The G20 Trade Ministers Meeting.
- [39] Parlinah, N., Herry, P., dan Bramasto, N. (2011). Distribusi nilai tambah pada rantai nilai mebel mahoni Jepara. *Jurnal Penelitian Sosial dan Ekonomi Kehutanan*, 8(2), 93-109.
- [40] Purnomo, H., Irawati, R. H., Fauzan, A. U., and Melati, M. (2011). Scenario-based actions to upgrade small scale furniture producers and their impacts on women in Central Java, Indonesia. *Journal of International Forestry Review*, 13(2), 152-162.
- [41] Sampath, P. G., and Vallejo, B. (2018). Trade, Global Value Chains and Upgrading: What, When and How? *The European Journal of Development Research*, 30 (3) : 481–50.
- [42] SENADA-USAID. (2007). Studi hambatan kebijakan bagi industri furniture : hasil studi di Jawa Timur dan Jawa Tengah. Laporan Regional Economic Development Indonesia.
- [43] Serbanel, C. L. (2015). Romania and its position on the global value chain : an introductive analysis. *Procedia Economics and Finance*, 27, 136-143.
- [44] Syafrian, D. (2019, September). Upgrading Challenges in Global Value Chains. In International Conference on Trade 2019 (ICOT 2019). Atlantis Press.
- [45] Tambunan, T. (2006). The growth and competitiveness of indonesia's wood furniture export. Kadin Indonesia-Jetro. August 2006.
- [46] Tanger, S. M. (2014). The economic contribution of forestry and the forest products industry on louisiana's congressional districts. Research Information Sheet 112. Department of Agricultural Economics and Agribusiness. Louisiana State University Agricultural Center.
- [47] Timmer, M. P., Erumban, A. A., Los, B., Stehrer, R., and de Vries, G. J. (2014). Slicing up global value chains. *Journal Of Economics Perspectives*, 28 (2), 99-118.
- [48] Treffer, D., and Zhu, S. C. (2010). The structure of factor content predictions. *Journal of International Economics* 82 (2), 195-207.
- [49] UNCTAD. (2013). Global value chain and development : investment value added trade in the global economy. A Priliminary Analysis, United Nations Conference on Trade and Development.
- [50] Widodo, K. H., Arbita, K. P. D., dan Abdullah, A. (2010). Sistem dinamis industri furniture indonesia dari perspektif supply chain management yang berkelanjutan. *Agritech*, 30 (2), 107-115.

- [51] Xing, Y., and Detert, N. (2010). How iphone widens the US trade deficits with PRC. Discussion Paper : 10-21. GRIPS Policy Reserach Center.
- [52] Ye, M., Bo, M., dan Shang, J. W. (2015). Measuring smile curves in global value chain. IDE Discussion Paper No.530. IDE-JETRO.
- [53] Zakaria, N. A., Merous, N. H., and Ahmad, I. (2014). Assesment of rubberwood of value added in malaysia's wooden furniture industry. *International Journal of Economic and Managemen*, 8(1), 1-9.