

COMPETITION ANALYSIS OF AUTOMOBILE INDUSTRY BETWEEN KOREA AND FRANCE

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Abstract

This research review competitiveness of automobile import-export structure between Korea and France through international trade reference index to analyze comparative business advantage under the time-series statistics data (2000, 2005, 2010, 2016) by the courtesy of using research tool, revealed comparative advantage index(RCA), trade specialization index(TSI) and international market share index. Specifically, in order to get analysis of export competitiveness, The RCA analysis shows that it is increase trend from 1.20 to 3.08 (2000, 2005). However, as they are located between 0 and 1, Korean's automobile industry is more export specialization industry whereas, France's automobile industry is import specialization. Per international market share, it shows that France is more competitiveness during 2000~2005 as 0.027(Korea), 0.066(France) in 2000 and 0.041(Korea), 0.065(France) in 2005. However, Korea is getting competitiveness during 2010~2016 as 0.049(Korea), 0.043(France) in 2010 and 0.050(Korea), 0.036(France) in 2016. Under the results of research analysis, Korea automobile industry is overwhelmingly dominating France automobile industry throughout whole research period as Korea is competitiveness against France in automobile industry.

Keywords: Automobile Industry, Revealed Comparative Advantage, Trade Specialization, Market share, Trade Structure

INTRODUCTION

Automobile industry is high value-added creative industry and knowledge-based industry combined by culture and technology, which is eventually future-oriented promising industry. It is also brain-intensive industry with applied technology as well as have a great ripple effect toward overall total industries. Additionally, it has promise of future greatness about growth potential

which satisfy humanbeing's desire sufficiently. Therefore, the developed country like France encourage automobile industry to nominate one of a national export strategy industry.

This paper is organized as: Chapter 2 conducts precedent research related to automobile industry as well as comparative analysis on current situation about Korea-France automobile industry, Chapter 3 conducts empirical-positive analysis on international competitiveness to take advantage of export-import data between Korea and France provided by UN COMTRADE materials and finally, Chapter 4 makes conclusion after summarize this paper.

Finally, this research conducts to analyze export-import competitiveness about Korea-France automobile industry, especially, to focus on international trade provided by UN COMTRADE statistical data.

The country of France has scene of the story such as a rose of Versailles, the Eiffel tower, the triumphal arch, the Three Musketeers. Additionally, France is the birthplace of automobile. Renault, the biggest automotive maker in Europe, has business start-up in France. As French automobile has refined and distinct individuality of image, furthermore, it has unexpected attraction. One of the characteristic of French automobile is high-powered capacity. As France has been agricultural business was prevalent, automobile needs practicality as a tool to transport the cargoes, which cause engine output power capacity has been also grown up. Additionally, the automotive engine in France is not only high-powered capacity, but also high output clean diesel power which stress environment function as a characteristics.

Like France is called the country of art and fashion, the automotive design in France is pretty much sophisticated. Even though some of them look like something wrong based on viewpoint in Korean, the French automotive design which put elaborated efforts into specific parts enjoy highly good reputations all over the world.

Renault SAS is automotive manufacturing company which has head office in Paris, France. As an affiliated company, there are Nissan and Renault Samsung, etc, it is the largest automotive company in European community based on unit of group company.

It is characteristic that French government holds 20% stocks of Renault SAS. Both Renault SAS and French government have been maintaining strong relationship till present from 1988 for a long time.

From long time ago, they have been endeavors to increase automotive safety. Renault SAS is the first case to put disk brake on 4 wheels in the vehicles on the market. Renault Twingo is a small vehicle which Renault has manufacture and sell. The first model was on sale from 1992 to 2007. Current model is the third generation which was on sale in 2014 and it started on sale in Japan from July 14, 2016. It is not on sale in Korea yet. The popular design of

which the theme is curve got a lovely sophisticated layout design as a French automobile. Even though it is small automotive, it has powerful turbo instrument as well.

Peugeot SA has head office in France, which it is the oldest automotive manufacturing company all over the world. At present, PSA Peugeot Citroen are organized together with the same French automotive manufacturing company, Citroen.

Inauguration as an automotive maker was earlier than Daimler-Benz AG in 1882 to produce steam automobile. After gasoline engine of Daimler-Benz AG were adopted as a type of licensing production, it has been grown up as a mass-production automotive maker. Furthermore, as Citroen was merged due to poor company management, currently, Peugeot-Citroen was created in 1974.

Peugeot 208 is a small automobile which has been selling on the market from 2012. This automobile was created next model to Peugeot 207, which has 1.6L Serial four-cylinder turbo and it has a maximum output of 256 horsepower. As Platform is assembled with newly developed aluminum components, the weight is over 100kg lighter than that of model 207. Outer appearance is designed refined and agile like French automobile.

Automobiles Citroen is French automobile manufacturing company. It belongs to, at present, PSA Peugeot Citroen. After World War 1st was concluded, Citroen was established to make goal as 'French Ford' in 1919, which adopted FR system and developed 'hydro new matic' of their suspension.

They enjoy good reputation as characteristic automobile company. However, too much characteristic is problem. It was merged and belongs to PSA Peugeot Citroen in 1970 under the name of poor business management environment. Therefore, now, platform and engine are shared with Peugeot automobile.

Citroen C3 is to start business on the market in 2002 and currently, present model is 2nd generation to start business on the market in 2009. Additionally, currently, the 3rd generation model is ready to sell on the market. Current model's design is influenced by helicopter which is created in 1950 and the largest character is "zenith front window" which is front glass up to the roof without ties.

Even though front window is broad in area which receives a lot of sun-shines, it is not afraid that special process is conducted into glass to protect heat and ultraviolet rays. A comfortable indoor space, instruments of anti-sound proof, anti-vibration proof are established to increase quietness and capacity of trunk space secured maximum 300L. Driving a car appeals refined emotional character with a practical and refined design French automobile.

French automobile market is famous for the most conservative market in the world because PSA Peugeot Citroen and Renault SAS, the top 2 French maker, dominate 53% market share. The rest half of quantity dominated by German automobile such as Volkswagen.

Under these circumstance, Korean Hyundai and Kia automobiles appear in the automobile market in 2012. Generally, automobile industry think that if a certain automobile maker's car is found friendly in the street, they think it should be at least 3% market share. In 2016, as Kia automobile is 1.3% market share and Hyundai automobile is 0.9% market share in the French automobile market, even though both 2 company's market share is put together, we know that it is not the level that we can easily find those automobiles in the street.

Nonetheless, such a low degree market share suddenly becomes hot potato in the French automobile market. Peugeot Citroen announce shocking restructuring plan with 8,000 workers tremendous job cut and factory closures after they got a huge loss over 810 million Euro (over 1,100 billion Korean won) in 2012. It is the rank 2nd automobile maker in Europe and among Peugeot, Citroen and Renault, the large top 3 automobile brand, it is typical French enterprise which is unique descendent from automobile legacy. In case of Citroen, the company owner are changed several times and it was merged into Peugeot in 1976 and now, become one of companies in. Peugeot Citroen group and Renault is nationalized because it had cooperated with Nazi during World War 2. Eventually, Citroen and Renault is survived automobile name as an automobile brand. In case of Peugeot, it is symbol of French automobile industry which Peugeot family had owned ever since business inauguration in 1885.

REVIEW FOR PRECEDENT RESEARCH DATA AND CURRENT SITUATION ON KOREA-FRANCE AUTOMOBILE INDUSTRY

Precedent research

There are several research way to analyze these trade structure and various trade determinant factors. However, realistically, it is pretty much difficult to identify and categorize whole trade factors in the international business. Therefore, this research paper provide 3 trade determinant analysis index such as revealed comparative advantage index, trade specialization index and market share index.

For the research whole period, it ranges from 2000 and 2009 to 2015. As newly provided statistic data from international research institutions or organizations are not available until now, 2015 data are the most up-to-date figures for your references.

Regarding to precedent research, Lee(2017) by revealed comparative advantage index reviews structural characteristic and competitiveness change in cosmetic industry among Korea,

China and Japan, Ding & Rhee(2016) by revealed comparative advantage index comparatively analyze international competitiveness about automobile industry between Korea and China, Hong & Son(2017) by revealed comparative advantage index study export competitiveness between Korea and Japan in the Asian market, Roger & David(2015) by revealed comparative advantage index analyze comparing advantages about US trade with the rest of the world during 1968~2008.

Per researches by trade specialization index, Chang(2016) by trade specialization index analyze trade competitiveness between Korea and Germany, Nam & Cho(2016) by trade specialization index analyze economic effectiveness of Korea-China FTA which focus on influence to import & export for manufacturing companies in Chungnam area, Choi & Li(2016) by trade specialization index analyze trade pattern among Myanmar and Korea-China-Japan, Ku, Park & Dou(2016) by trade specialization index explain how to set up specialization strategy and agricultural products trade status between Korea and China, Kim, Jun, Choi & Han(2016) by trade specialization index study marketing mix strategy how seasoned laver enters into Chinese market, Lee(2016) by trade specialization index study current status on Knowledge-based service industry and international comparison of export competitiveness.

Per research for market share, Lee & Byun(2016) by market share index study competition in product market and enterprise's risk chase, Kim(2016) by market share index study EU gas market liberalization and EU's energy strategy change against Russia, Ahn(2016) by market share index study economic union and development on low-cost aircraft industry network. Gabriele (2017) suggest the way that how to materialize the market building through regional integration agreements, especially, between the EU and the Asean way.

Current status on Korea-France automobile industry

Table 1 shows current status on automobile trade volume between Korea and France. From 2000, US\$15,265,527,149 to 2016, US\$62,651,437,860. The rate of export volume from 2000 to 2016 is over 310.4%. The gap of export volume from 2000 to 2016 is US\$ 47,385,910,711. On the contrary, France had been increased export volume until 2005 as US\$59,673,451,922 and started to decrease export volume from 2010 to 2016 consecutively, each US\$47,147,795,901 and US\$45,382,766,347 respectively. The rate of export volume from 2005 to 2016 is 23.9% which means 23.9% is diminished and the gap of export volume from 2005 to 2016 is US\$ 14,290,685,575. Therefore, we can easily know that Korea is export-oriented tendency in automobile industry based on Table 1 trade volume results. On the other hand, France is not export-oriented tendency in automobile industry.

However, when we review import volume, both 2 countries have been increasing import volume from 2000 to research end year 2016 continuously. Especially, the import volume from 2010 to 2016 consecutively, each US\$7,867,147,296 and US\$15,236,919,477 respectively. The gap of import volume from 2010 to 2016 is US\$7,369,772,181. The increasing rate of import volume from 2010 to 2016 is 93.7% in Korea automobile industry, whereas, per France, , the import volume from 2010 to 2016 consecutively, each US\$55,954,056,890 and US\$59,272,019,578 respectively. The gap of import volume from 2010 to 2016 is US\$3,317,962,688. The increasing rate of import volume from 2010 to 2016 is 5.9%. Regarding to balance of trade, Korea's trade surplus is US\$19,663,795,263 which is increased by 144.2% from initial year 2000 to 2005 and in case we review whole research period from 2000 to 2016, the trade balance(trade surplus) is US\$33,780,252,776 which surplus rate is increased by 247.8% in Korean automobile trade volume. Additionally, from 2000 to 2005, the surplus rate is sharply increased and after 2005, from 2010 to 2016, the surplus rate is increased gradually. In case of France, from 2000 to 2005, trade balance is trade surplus as 957,952,027 which trade surplus rate is increased by 14.1%. However, trade balance is trade deficit instead of trade surplus as of US\$-8,806,260,989 in 2010. During the whole research period from 2010 to 2016, the trade deficit volume is bigger than that of 2010. The rate of trade deficit from 2010 to 2016 is increased by 57.7%. The trade deficit gap amount between 2010 and 2016 is US\$-5,082,992,242.

When we evaluate trade volume and trade balance itself both 2 countries, we know that Korea has pretty much competitiveness between 2 countries.

Table 1. Korea-France overall automobile trade volume against world market (Unit: 1 US\$)

automobile		2000	2005	2010	2016
Korea	Export	15,265,527,149	37,491,234,742	53,445,486,945	62,651,437,860
	Import	1,631,261,542	4,193,173,872	7,867,147,296	15,236,919,477
France	Export	37,173,377,437	59,673,451,922	47,147,795,901	45,382,766,347
	Import	30,397,528,045	51,939,650,503	55,954,056,890	59,272,019,578
Trade balance	Korea	13,634,265,607	33,298,060,870	45,578,339,649	47,414,518,383
	France	6,775,849,392	7,733,801,419	-8,806,260,989	-13,889,253,231

Source: calculated by author based on UN COMTRADE data

According to Table 2, automobile export volume between Korea and France is US\$549,614,671 in 2016 which is diminished compared to that of US\$910,095,290 in 2005. However, the export volume is slightly increased from US\$549,410,238 in 2010 to US\$549,614,671 in 2016 between 2 countries. Per automobile import volume between Korea and France, it sharply increased from

US\$220,575,743 in 2000 to US\$706,693,543 in 2005. However, the import volume diminished profoundly diminished to US\$584,014,220 in 2010 and the import volume falls down to US\$517,549,013 in last research year 2016 which is 26.8% decrease based year 2005. The import volume gap is US\$189,144,530.

When we review the balance of trade, between Korea and France, it is trade surplus in 2000 as of US\$-33,159,215. That means export volume is 17.7% smaller than that of import volume. In 2005, it is trade surplus instead of trade deficit as of US\$203,401,747 which means export volume is 22.4% bigger than that of import volume. Trade deficit is US\$-34,603,982 which means export volume is 6.3% smaller than that of import volume in 2010. Again, trade surplus is US\$32,065,658 and export volume is 5.8% bigger than that of import volume in 2016. Finally, during whole research period from 2000 to 2016, the gap of trade balance is US\$65,224,873 and the trade gap rate is increased by 196.7%.

Table 2. Automobile trade volume between Korea-France (Unit: 1 US\$)

automobile	2000	2005	2010	2016
Export	187,416,528	910,095,290	549,410,238	549,614,671
Import	220,575,743	706,693,543	584,014,220	517,549,013
Trade Balance	-33,159,215	203,401,747	-34,603,982	32,065,658
Variation rate	-17.7%	22.4% increase	-6.3%	5.8% increase

Source: calculated by author based on UN COMTRADE data

EMPIRICAL ANALYSIS METHOD

Regarding to methodology, selecting time series (2000, 2005, 2010, 2016) is no special the reason why select time series(2000, 2005, 2010, 2016). It is used simply to justify time series analysis for UNCOMTRADE data base like any other time series research analysis paper.

I should allocate research analysis period for 5-year unit calculation.

Money and resources are not obtained to everyone as much as they want. Therefore, in order to get the thing that people want, competition is inevitable. The power that goes a step ahead or win the competition means competitiveness. In case of enterprise, to get the competitiveness in the market, the enterprise should develop product that consumers can take choice. Therefore, they should have a fierce battle to make competition in order to develop superior product in terms of quality, price, design, service, function, etc. International competitiveness is product competitiveness in the international market. There are 2 kinds in the international competitiveness, the one is price competitiveness which is decided by export price and the other one is competitiveness which is decided by other factors such as quality, function, brand

new product development, delivery, market capacity, etc. The most important factor in the international competitiveness is export price. Export price is decided by labor productivity, the level of wage, foreign exchange rate, the price level, etc.

Among them, labor productivity and the level of wage are important.

This research's main goal is to explain comparative advantage based on export-import's comparative size in the automobile industry between Korea and France, which means trade specialization index as well as it is focused that comparative advantage is revealed through international trade activity, which is revealed comparative advantage index.

Revealed comparative advantage index

Revealed comparative advantage is the theory provided by Balassa which means that a certain product's export volume share towards world total export market/mentioned product's export dominating ratio towards a certain country's total export. It is the method to judge a certain product's comparative advantage. Formula of revealed comparative advantage is as follows;

$$\text{RCA}_i = \frac{EX_i / WEX_i}{TEX / TWEX} \times 100$$

EX_i : i industry's international export business volume from a special country.

WEX_i : i industry's international export business volume against world total market.

TEX : a certain country's total whole export volume amount.

$TWEX$: export amount of total whole products against world.

Generally, in case index of revealed comparative advantage is bigger than 1, it is called comparative advantage and if it is smaller than 1, it is called comparative disadvantage.

Table 3. Korean car export amount against France Unit: USD

Period	Trade Flow	Reporter	Partner	HS Code	Trade value
2000	Export	Rep. of Korea	France	87	187,416,528
2005	Export	Rep. of Korea	France	87	910,095,290
2010	Export	Rep. of Korea	France	87	549,410,238
2016	Export	Rep. of Korea	France	87	549,614,671

Source: calculated by author based on UN COMTRADE data

Table 4. Car export amount toward world market Unit: USD

Period	Trade Flow	Reporter	Partner	HS Code	Trade Value
2000	Export	world	world	87	559,262,243,589
2005	Export	world	world	87	911,730,908,503
2010	Export	world	world	87	1,086,582,689,075
2016	Export	world	world	87	1,339,381,730,027

Source: calculated by author based on UN COMTRADE data

Table 5. Korean total export amount against France Unit: USD

Period	Trade Flow	Reporter	Partner	HS Code	Trade Value
2000	Export	Rep. of Korea	France	Total	1,749,473,177
2005	Export	Rep. of Korea	France	Total	3,286,568,414
2010	Export	Rep. of Korea	France	Total	3,042,276,231
2016	Export	Rep. of Korea	France	Total	2,504,098,127

Source: calculated by author based on UN COMTRADE data

Table 6. All products export amount against world market Unit: USD

Period	Trade Flow	Reporter	Partner	Code	Trade Value
2000	Export	world	world	total	6,276,501,601,670
2005	Export	world	world	total	10,149,967,640,408
2010	Export	world	world	total	14,891,135,351,508
2016	Export	world	world	total	17,941,000,881,855

Source: calculated by UN Comtrade data

Table 7. RCA Index for Korea-France Automobile Industry Unit: USD

Year	①Korea auto export against France/world total auto export	②Korea total export against France/world total commodity export	①/② RCA value
2000	0.00033511385	0.0002787338	1.20
2005	0.00099820602	0.00032380087	3.08
2010	0.00050563131	0.00020430116	2.47
2016	0.00041034953	0.00013957404	2.94

Source: calculated by author based on UN COMTRADE data

When we review automobile industry's comparative advantage with revealed comparative advantage index, as you can see <Table 7>, In 2000, revealed comparative advantage index is 1.20. As its revealed comparative advantage index is over 1, it shows that Korean automobile industry is comparative advantage against French automobile industry. Especially, in 2005, revealed comparative advantage index is over 3, which means Korean automobile industry is pretty much comparative advantage against French automobile industry. In 2010, even though revealed comparative advantage index is gradually down compared to that of 2005, however, revealed comparative advantage index is 2.47 which means Korean automobile industry is still dominating French automobile industry. Additionally, in 2016, revealed comparative advantage index is recovered and improved inch by inch as revealed comparative advantage index is 2.94. Conclusively, revealed comparative advantage index is over 1 in the world market during whole research period from 2000 to 2016, which means Korean automobile industry is overwhelmingly comparative advantage against French automobile industry. Korean automobile industry has strong competitiveness against French automobile industry when we review comparative advantage about both 2 country's automobile industry with revealed comparative advantage index.

Trade specialization index

Trade specialization index is located between maximum value 1 and minimum value -1 and in case this index is getting bigger, it means that industry has international competitiveness whereas in case trade specialization index is 0, it means export amount and import amount is equal. In case the value is getting close to -1, the degree of import specialization is higher and if the value is getting close to +1, it means that the degree of export specialization is higher. Trade

specialization index is indicator of relative comparative advantage in the export market. It is also indicator to analyze competitiveness between 2 countries or world market in a certain market.

$$TSI = \frac{X_i - M_i}{X_i + M_i}$$

<Formula>

(Xi : Export of certain industry, Mi : Import of certain industry)

Therefore, mentioned research analysis is conducted by time serial method from 2000, 2005, 2010 and 2016. Korea automobile export against France is US\$187,416,528 whereas France automobile export against Korea is US\$7,924,329. French export volume to Korea is 4.2% only. Compared to that of Korea automobile export against France. Throughout whole research period from 2000 to 2016, in 2005, it is the largest automobile export volume against France as US\$910,095,290.

After export volume to France is sharply down to US\$549,410,238 in 2010, it is still gradually rising and recovered in 2016 as US\$549,614,671. On the contrary, France automobile export amount against Korea is very small from the first analysis year in 2000 and it is improved as US\$44,010,093 in 2005. French export volume to Korea is dramatically jumped into US\$159,679,697 in 2010 which is 362% increase compared to that of 2005 value amount. And in 2016, French export volume to Korea is also almost double increase from US\$159,679,697 to US\$333,051,353 which is approximately 108.6% increase. When we review trade specialization index from 2000 to 2016, the value of trade specialization index is 0.92, 0.91, 0.55 and 0.25 respectively. Even though the TSI values are coming down gradually from 2000 to 2005 and the values of TSI are sharply downward from 2010 to 2016, all of the TSI values from 2000 to 2016 are still between over '0' and +1. Therefore, Korea automobile industry is export specialization and on the contrary, France automobile industry is import specialization even if the degree of export specialization is coming down from 2000 to 2016.

Table 8. Korea's car export against France Unit: US\$

Period	Trade flow	Reporter	Partner	Code	Trade value
2000	Export	Korea	France	87	187,416,528
2005	Export	Korea	France	87	910,095,290
2010	Export	Korea	France	87	549,410,238
2016	Export	Korea	France	87	549,614,671

Source: calculated by author based on UN COMTRADE data

Table 9. France car export amount against Korea Unit : US\$

Period	Trade flow	Reporter	Partner	Code	Trade value
2000	Export	France	Korea	87	7,924,329
2005	Export	France	Korea	87	44,010,093
2010	Export	France	Korea	87	159,679,697
2016	Export	France	Korea	87	333,051,353

Source: calculated by author based on UN COMTRADE data

Table 10. Korea Trade Specialization Index against USA Unit: USD

Year	①Korea Auto export against France – France auto export against Korea	②Korea Auto export against France + France auto export against Korea	①/② TSI value
2000	179,492,199	195,340,857	0.92
2005	866,085,197	954,105,383	0.91
2010	389,730,541	709,089,935	0.55
2016	216,563,318	882,666,024	0.25

Source: calculated by author based on UN COMTRADE data

Market share index

By reviewing market share, we can suppose next example case to explain market share in the world market. Suppose there 4 companies as A, B, C and D. Mentioned countries whole sales amount for each month are as follows: U\$2000, U\$3000, U\$4000 and U\$5000 respectively and we assume there are market share as follows;

Company A is supposed to be $U\$2000/(U\$2000 + U\$3000 + U\$4000 + U\$5000) = 0.14$

Company B is supposed to be $U\$3000/(U\$2000 + U\$3000 + U\$4000 + U\$5000) = 0.21$

Company C is supposed to be $U\$4000/(U\$2000 + U\$3000 + U\$4000 + U\$5000) = 0.29$

Company D is supposed to be $U\$5000/(U\$2000 + U\$3000 + U\$4000 + U\$5000) = 0.36$

According to above supposed market share, we can figure out that the rate of market share for each 4 companies(A,B,C,D) have 14%, 21%, 29% and 36% respectively.

Table 11. Korea Automobile Export Amount to World Unit: USD

Period	Trade direction	Main	Partner	HS Code	Trade volume
2000	Export	Korea	world	87	15,265,527,149
2005	Export	Korea	world	87	37,491,234,742
2010	Export	Korea	world	87	53,445,486,945
2016	Export	Korea	world	87	62,651,437,860

Source: calculated by author based on UN COMTRADE data

Table 12. France Automobile Export Amount to World Unit: USD

Period	Trade direction	Main	Partner	HS Code	Trade volume
2000	Export	France	world	87	37,173,377,437
2005	Export	France	world	87	59,673,451,922
2010	Export	France	world	87	47,147,795,901
2016	Export	France	world	87	45,382,766,347

Source: calculated by author based on UN COMTRADE data

Table 13. World Total Automobile Export Amount Unit: USD

Period	Trade direction	Main	Partner	HS Code	Trade volume
2000	Export	world	world	87	559,206,323,665
2005	Export	world	world	87	911,803,736,625
2010	Export	world	world	87	1,087,278,839,147
2016	Export	world	world	87	1,247,561,062,174

Source: calculated by UN Comtrade data

Table 14. Market Share for 2 country's Automobile Industry (%)

Period	Trade direction	Korea	France	Competitiveness based on international market share
		(Korea Automobile Export Amount to World/World Total Automobile Export Amount)	(France Automobile Export Amount to World/World Total Automobile Export Amount)	
2000	Export	0.027	0.066	France
2005	Export	0.041	0.065	France
2010	Export	0.049	0.043	Korea
2016	Export	0.050	0.036	Korea

Source: calculated by author based on UN COMTRADE data

The analysis results in <Table 14> shows that France is more competitiveness rather than that of Korea according to the degree of market share, 0.066 and 0.027 respectively in 2000. In 2005, French international market share is a little bit slow down rather than that of 2000 as 0.065. However, when we compare degree of market share between Korea and France, France is dominating Korean market share in the world market as 0.041 and 0.065 each, which means France is still competitiveness compared to Korean automobile industry in 2005. In 2010, French market share in international market is sharply decreased from 0.065 to 0.043, on the contrary, Korea's market share rebound to increase from 0.041 to 0.049. Now, we can figure out that Korea is dominating market share of French automobile industry in the world market based on <Table 14>. In a last research year, 2016, Korea's market share is a little bit increased, whereas France's market share is coming down severely as 0.050 and 0.036 respectively.

Finally, we can easily understand based on <Table 14> that The degree of Korean market shares are steadily and constantly increased from 2000 to 2016(0.027, 0.041, 0.049 and 0.050) on the contrary, the degree of French market shares are consistently coming down throughout whole research period, especially decline gap in 2010 is the biggest one compared to whole research period from 2000 to 2016. That means France is losing competitiveness from beginning year 2000 to end year 2016, whereas Korea is getting competitiveness during whole research period from 200 to 2016. Conclusively, according to <Table 14> research data, The automobile industry in Korea is more competitiveness rather than that of France.

Export similarity index

Export similarity index is export competitiveness index to evaluate export commodity's competitive relationship among 2~3 countries as a quantifying method to quantify degree of similarity in export commodity structure between 2 countries in a certain market.

Under the hypothesis if export commodity structure between 2 countries is as similar as possible, competitive possibility is higher. It is indicator to measure degree of bilateral similarity between 2 countries in the foreign market. What if export similarity index is closer to 1 between 2 countries, export commodities between 2 countries are competitive relationship each other as export commodity structure is similar bilaterally, on the other hand, if export similarity index is closer to 0, it means similarity relationship is not large as export commodity structures between 2 countries are different.

Table 15. Korea Total Export Amount to World Unit: USD

Period	Trade direction	Main	Partner	HS Code	Trade volume
2000	Export	Korea	world	total	172,267,495,379
2005	Export	Korea	world	total	284,418,167,174
2010	Export	Korea	world	total	466,380,619,660
2016	Export	Korea	world	total	495,417,715,559

Source: calculated by author based on UN COMTRADE data

Table 16. France Total Export Amount to World Unit: USD

Period	Trade direction	Main	Partner	HS Code	Trade volume
2000	Export	France	world	total	295,345,419,474
2005	Export	France	world	total	434,354,245,109
2010	Export	France	world	total	511,651,042,741
2016	Export	France	world	total	488,885,072,443

Source: calculated by author based on UN COMTRADE data

Table 17. Comparative analysis

Period	Trade type	Korea	France	Minimum value
2000	export	0.08861524987	0.125864073	0.08861524987
2005	export	0.13181729955	0.1373842954	0.13181729955
2010	export	0.11459628614	0.09214834323	0.09214834323
2016	export	0.126461844	0.09282911036	0.09282911036

Source: calculated by author based on UN COMTRADE data

CONCLUSION

This research empirically analyze competitiveness in international trade between Korea and France focusing on automobile industry. This research also conducted by time serial analysis during 2000~2016 to quantify all research values. Overall empirical research methods are 4 analysis tools such as 'revealed comparative advantage index', 'trade specialization index', 'international market share index' and 'export similarity index'. By taking advantage of above various trade competitiveness index, this paper analyze competitiveness in automobile industry between Korea and France.

First, from the RCA index, we can figure out that all of research values are over 1 which means Korea is comparative advantage against French automobile industry during 2000~2016,

especially, in 2005, the RCA index is 3.08 which means Korea's automobile industry is overwhelmingly dominating French automobile industry.

Second, according to TSI value, we can understand that all of TSI index values are located between 0 and 1 such as 0.92(2000), 0.91(2005), 0.55(2010) and 0.25(2016) even though all values are downward, especially, in 2000 and 2005, mentioned values are approaching 1. Therefore, generally, Korea's automobile industry is export specialization based on all of TSI values, on the contrary, France automobile industry is import specialization.

Third, by reviewing values of international market share, France is competitiveness during 2000~2005 such as 0.027(Korea) and 0.066(France) in 2000 and 0.041(Korea) and 0.065(France) in 2005 whereas Korea is more competitiveness in 2010~2016 such as 0.049(Korea) and 0.043(France) in 2010 while 0.050(Korea) and 0.036(France) in 2016,

By taking advantage of mentioned above research results, we need efforts of government, enterprises and consumer in order to improve competitiveness in automobile industry as follows;

Automobile industry is high value-added, technology intensive, up-to-date high-technology required industry and this is one of major industry in Korea as it is always top 10 export item in Korea ever since 1970s. In order to strengthen competitiveness in automobile industry in Korea, government based supports are inevitably required such as ease financial cost, support of oversea marketing strategy, R & D cost, etc. Automobile company also do their best to improve production technology and quality improvement as well as professional manpower training, distribution channel including new market frontier. The automobile industry should also refrain from over-competition in domestic market to get the sound competitiveness which is eventually to save whole Korean automobile industry.

Per further studies, this paper needs additional research analysis about both Korean and French automobile industry overall- total production amounts. Korean automobile industries do not release exact information for whole production amounts not only domestic output but also overseas output. At the same time, French industries are also reluctantly provide both domestic and foreign affiliated companies' whole production amounts. That's why author mainly should rely on database of UNCOMTRADE and this paper is made by author's calculation based on UNCOMTRADE data base. Therefore, the future research should be focused on real data provided by practical current automobile companies instead of UNCOMTRADE data.

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