# VEHICLE INDUSTRY OF JAPAN AND MARKET INTENSITY

**HIROYUKI MATSUOKA**

Department of Management and Information Sciences, Fukui University of Technology, Japan
E-mail: matsuh@fukui-ut.ac.jp

**Abstract** - The vehicle industry'smarket intensityof Japan depends on the type of automobiles made. The overall market situation is competitive. Almost all vehicles made in Japan are Japanese brand. In the case of other countries and areas, some countries are more competitive such as China, England, Italy, and so on. However, the situations are different. On the other hand, in monopolistic countries and areas, like Taiwan, India, and Pakistan, Japan's influence is very big. But in Korea and France, the marketsare largely occupied by their own companies' brand. By the way, we have to note the development of electric vehicle(EV)and other new technologies because they will give a great impact on the vehicle industry and market of Japan.Now Japan's vehicle industry is going to be divided into three groups, Honda, Toyota group, and Renault-Nissan-Mitsubishi group. Therefore, from now on I will check the worldwide development of EV and other new technologies and the reorganization of auto companies groups.

**Keywords** - Vehicle Industry, Market Share, Herfindahl-Hirschman Index, Electric Vehicle(EV), Reorganization of Industry.

## I. INTRODUCTION

Now we face the new situation for vehicle industry. The development of electric vehicle(EV) is going to change the present vehicle industries of each countries. It is partly reflected by worldwide environment regulations. Many countries declare they will prohibit new gasoline vehicle productions and new gasoline vehicle sales in the near future or around 2040. It will give a great impact on the present vehicle industries of each countries including Japan as a majorvehicle production country. Therefore now it is very important for us to understand the present situation of Japan and other countries' vehicle industries including vehicle companies and vehicle companies group. Furthermore I discuss the degree of market concentration using HHI (Herfindahl-Hirschman Index) .It is also helpful for understanding vehicle industries.

## II. PRESENT SITUATION

### 2.1 Japan

A vehicle has 30,000 parts. Many parts manufacturers support some finished auto manufacturers in Japan. The industry produces much employment. In many countries, the industry occupies the major part of manufacturing industries. By the way, to realize connected car, electric car, and automatic driving, the vehicle industry's developing costs are increasing. Therefore, we can see reorganization in the industry such as Toyota-Mazd(2015),Toyota-Suzuki(2016) Now Japan's vehicle companies are going to be consolidated into three groups, Toyota group, Renault-Nissan-Mitsubishi group, and Honda（see References[1]）.

### 2.2 Other countries

In 2017, Top three companies are VW (Volkswagen), Runault-Nissan-Mistubishi, Toyota concerning the share of global auto sales（see Table 1）. Regardless of an unlawful gas exhaust problem in 2015, VW sales more cars in the world. The driving force role of that is sale in China. In some countries, vehiclesale high rank countries, SUV(Sport Utility Vehicle) is very popular and the share competitionis high.In the future, we will see the newenvironmentalregulation andstrengtheningenvironmental regulation. Therefore, the reinforcement of product power concerning such as electric car, Plug-in Hybrid Vehicle, etc., is crucial.

**Table 1. Vehicle sales in the world (Top 5), 2017 10 thousand**

| maker | sales |
|---|---|
| Volkswagen (VW) | 1,074.2 |
| Renault-Nissan-Mitsubishi | 1,060.8 |
| Toyota | 1,038.6 |
| GM | 960.0 |
| Hyundai-Kia | 725.1 |

**Source: References[5].**

## III. HHI

When discussing the market intensity of industries, we generally use Herfindahl-Hirschman Index (HHI). This index is used by Japanese government when reviewingM＆A in Japan to protect appearance of monopolistic company in a market. The index is calculated to sum the market shares of each company in a market. For example, if there are three companies in a market and each share is 50%, 40%, 10%, the index is as flows（see References[2]）:

$HHI=50^2+40^2+10^2=4,200$

When it is generalized,

$$HHI = \sum_1^n Si \qquad i=1+\cdots n$$

Here, n is the number of companies in market and S is the

market share of each company. Moreover, when the minor share is unavailable, for example: share of company a is 40%, company b is 30%, C is 10% and "other"is 20%,

We can calculate HHI as follows （ see References[3]）:

$HHI=40^2+30^2+10^2+10^2+10^2=2,800$

Moreover, HHI means the number of company competes in a market. For example, Ifthere are two companies in a market and the share is 50% and 50% each other, the decimal point representation is as follows:

$0.5^2+0.5^2=0.5$

The reciprocal of 0.5 is 2, that is to say, 2 companies. It seems two companies compete in the market.In the case mentioned above, each share is 50%, 40%, and 10%in the market, it is considered that 2.4 companies （2.38） compete. This market intensity is more competitive compared to the case, the share is 50% and 50%.Here in reference to the Fair Trade Commission of Japan, weadopt the following market intensity criterion.

HHI ≦ 1,500:there is not the fear of competition restrictions in a market. (competitive）

1500 ＜ HHI ≦ 2500: the fear of competition restrictions is small in a market.
（not necessarilymonopolistic）

A company's share >35%or HHI>2500 : the fear of competition restrictions is big in a market. (monopolistic）

## IV. MARKET INTENSITY

### 4.1 Japan

When seeing the share of auto sales in Japan, in the case of vehicles excluding cars less than 660cc, the market is monopolistic （HHI=2,722,Table 2) .It excludes import cars.The top share is Toyota, 47.3%. About the market of cars less than 660cc（they are called Key-Jidousha, which means light car）, HHI=2,445 and it is not competitive. The top share is Daihatsu, 32.7%.In the case of motor truck, the market is monopolistic. The top share is Toyota, 38% and HHI=2,280. The market of buss is also monopolistic. The top share is Toyota, 36.6% and HHI is 2,588. We realize that the Japan vehicle market excluding imported cars is monopolistic as a whole. However, including imported cars, the market is more competitive. Toyota has top share, 28.4% and HHI is 1,395.

**Table 2. Vehicle sales in Japan (Top 5) excluding imported cars, Jan-June,2017**

| maker | sales | share (%) |
|---|---|---|
| Toyota | 1,391,759 | 47.3 |
| Honda | 381,835 | 13.0 |
| Nissan | 345,407 | 11.7 |
| Mazda | 155,616 | 5.3 |
| Subaru | 144,143 | 4.9 |

Source: References[5]. HHI=2,722

**Table 3. Vehicle sales in Japan (Top 5)including imported cars, Jan-June, 2017**

| maker | sales | share (%) |
|---|---|---|
| Toyota | 1,587,062 | 28.4 |
| Nissan | 751,559 | 13.5 |
| Suzuki | 665,871 | 11.9 |
| Daihatsu | 630,856 | 11.3 |
| Honda | 564,275 | 10.1 |

**Source: References[4].HHI=1,395**

### 4.2 Other Countries and Areas

In the competitive markets of Table 11, top share is occupied by foreign brand like China（Table 4）. On the other hand, the domestic brands have top share such as Germany（Table 5）. About some countries, such as Indonesia and Thailand, their markets are not monopolistic however the top share companies are Japanese ones （Table 6 and 7） .Concerning monopolistic markets（Table 11）, in India, Maruti-Suzuki has big share, more than 50% . Japan's influence is very big in India（Table 8） andalso in Taiwan. On the other hand, In France and Korea,their national brands have big share in the markets（Table 9 and 10）.

**Table 4. Vehicle sales in China (Top 5) Jan-May, 2018**

| maker | sales | share (%) |
|---|---|---|
| Volkswagen (VW) | 1,447,082 | 10.8 |
| Honda | 650,730 | 4.9 |
| Toyota | 572,433 | 4.3 |
| Buick | 552,222 | 4.1 |
| Changan | 532,593 | 4.0 |

**Source References[6].HHI=402**

**Table 5. Vehicles sales in Germany (Top 5) Jan-May, 2017**

| maker | sales | share (%) |
|---|---|---|
| Volkswagen (VW) | 295,270 | 19.7 |
| Mercedes-benz | 134,238 | 9.0 |
| Audi | 123,578 | 8.3 |
| Ford | 111,156 | 7.4 |
| BMW | 104,807 | 7.0 |

**Source:References[5]. HHI=793**

**Table 6. Vehicles sales in Indonesia (Top 5) Jan-April, 2017**

| maker | sales | share (%) |
|---|---|---|
| Toyota | 113,854 | 28.9 |
| Daihatsu | 70,476 | 17.9 |
| Mitsubishi | 53,899 | 13.7 |
| Honda | 53,274 | 13.5 |
| Suzuki | 40,860 | 10.4 |

**Source:References[5]. HHI=1,677**

**Table 7. Vehicles sales in Thailand (Top 5)Jan-April, 2018**

| maker | sales | share (%) |
|---|---|---|
| Toyota | 87,317 | 27.6 |
| Isuzu | 59,080 | 18.7 |
| Honda | 38,869 | 12.3 |
| Mitsubishi | 27,047 | 8.6 |
| Ford | 22,416 | 7.1 |

**Source:References[5]. HHI=1,497**

**Table 8. Vehicles sales in India (Top 5) May, 2018**

| maker | sales | share (%) |
|---|---|---|
| Maruti-Suzuki | 163,200 | 50.7 |
| Tata | 54,295 | 16.9 |
| Hyundai | 45,008 | 14.0 |
| Mahindra | 37,478 | 11.6 |
| Toyota | 13,113 | 4.1 |

**Source:References[5]. HHI=3,205**

**Table 9. Vehicles sales in France (Top 4) Jan-May, 2018**

| maker | sales | share (%) |
|---|---|---|
| Group PSA | 504,647 | 32.3 |
| Group Renault | 424,961 | 25.4 |
| Group VW | 277,249 | 11.6 |
| Group FCA | 85,998 | 4.7 |

**Source:References[5]. HHI=2,894**

**Table 10. Vehicles sales in Korea (Top 5) May, 2018**

| maker | sales | share (%) |
|---|---|---|
| Hyundai | 61,896 | 39.4 |
| Kia | 47,046 | 29.9 |
| SsangYong | 9.709 | 6.2 |
| Korea GM | 7,670 | 4.9 |
| Renault-Samsung | 7,342 | 4.7 |

**Source:References[5]. HHI=2,562**

**Table 11 HHI of Other Countries and Areas**

| | |
|---|---|
| HHI≦1500 (competitive) | China(402), England(544), Italy(690), Australia(728), Germany(793), Russia(897), Sweden(918), U.S.A.(1,096) Japan(1,395), Thailand(1494) |
| 1500＜HHI≦2500 (not necessarilymonopolistic) | Indonesia(1,677) |
| Share >35% or HHI>2500 (monopolistic) | Taiwan(2,550), Korea(2,562), France(2,894), India(3,205), Pakistan(4,281) |

**Source: References[4] , [5] . [6]**

## CONCLUSIONS

The competitive situation of vehicle industry in Japan depends on the type of vehicles made. Generally the situation is competitive. Almost all vehicles made in Japan are Japanese brand. In the case of other countries and areas, some countries are more competitive such as China, Italy, Germany, and so on. However, the situations are different. On the other hand, in monopolistic countries and areas, like India, Taiwan, and Pakistan, Japan's influence is very big. But in Korea, the market is largely occupied by Korean's vehicle companies. By the way, we have to note the development of electric vehicle (EV) and other new technologies because they will give a great impact on the vehicle industry and market of Japan. Now the vehicle industry in japan is going to be divided into three groups. Honda, Toyota group, and Renault-Nissan-Mitsubishi group. Therefore, from now on I will check the worldwide development of EV and new other technologies and the reorganization of vehicle companies groups.Finally, I would like to thank one of my laboratory undergraduate students, Tohrukashima, who helped me with calculating HHI.

## REFERENCES

[1] Nikkey Inc., Industrial Map 2018, Nikkey Inc., 2017.
[2] Yukiya Uemura, "Herfindahl-Hirschman Index, HHI",http://kyu-go-go.cocolog-nifty.com/blog/2009/10/post-bad0.html.
[3] Yukiya Uemura, "HHI calculation when miner share is unavailable",http://kyu-go-go.cocolog-nifty.com/blog/2013/01/post-860a.html
[4] "Ranking of vehicle sales of Japanese companies", http://car-moby.jp/48416#c4.
[5] "Vehicle Industry Portal MARKLINES", https://www.marklines.com/ja/.
[6] ZUU online, https://zuuonline.com/archives/164998.

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