Thailand Automotive Industry Trends

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Abstract

This research shows Thailand's high-value automotive export and manufacturing trends by keyword searching. Even in the faceted of the COVID-19 outbreak by showing statistical data and the origin of the change in Thailand from agro-industrial countries to the automotive industry because Thailand's manufacturing sector is increasing. It has become the core cause of these problems and the solutions needed to develop this remarkable industry sustainably. It is related to technology, management, and infrastructure related to human resources and Thailand 4.0 and the implementation of government policies. This article focuses on the case of Thailand, which is related to the mentioned topic.

Keywords: Thailand Automotive Industry Trend

Contents

i) Introduction

Previously, Thailand's economy was heavily reliant on exports, which accounted for approximately 60% of the country's gross domestic product (GDP) in 2019. Thailand is also a newly industrialized country, with an Economic output of 16.316 trillion (505 billion US dollars) in 2018, making it Asia's eighth-largest economy, according to World Bank data. The agriculture business is not the most important export.

In addition to being a significant automotive production base in the Association of Southeast Asian Nations (ASEAN), Thailand also has tremendous investment potential as a fast-developing location for automotive manufacturing. For the last 50 years, the nation has evolved from a component assembler to a leading automobile production and export centre. Having sent goods to more than 100 countries, Thailand ranks as the world's 13th biggest automotive components exporter and sixth-largest commercial vehicle producer, as well as the largest in the Association of Southeast Asian Nations (ASEAN). As shown in Figure1: Appendix 1 and Figure2: Appendix 1, Thailand aims to manufacture over 3500000 units of vehicles by 2020, making it one of the top performers in the global automotive market. This is one of the reasons why Thailand has excellent investment potential as a leading automotive production, as shown in Figure1: Appendix 1.

This paper will study the automotive industry trends in the country that clearly shows statistical data. And the fact that Thailand is growing very fast in the automotive industry because it is in line with the Thailand 4.0 policy from the past that it was a country focusing on exports in the agricultural sector. But to increase the value of the automotive export economy, which is a huge requirement in the modern world, both of these topics must be good comparative

indicators. Why does Thailand need to focus on industrial exports? Thailand, also known as the world's kitchen, should focus more on agriculture. It is also the policy from the Thai government which tries to provide the country images to global.

Four Factors of Thailand economy 4.0 Model.

1. Economic Prosperity: Economic Prosperity measured by the total. The gross product of exports represents a country's income across all industries; this is one of the most straightforward pieces of information.

2. Social Well-being: Social well-being inevitably comes from having an adequate income that corresponds to expenditure. It will help society more equality by reducing economic disparity.

3. Raising Human Values: Raising human values means increasing the equality of human rights. and the ability of people in the country to be qualitative workers both physically and academically.

4. Environmental Protection: Every industry must impact the environment, agriculture, or automobile. The adaptation of industries to the environment in each region is something that is happening in the developed world showed in Figure3: Appendix 1.

ii) Literature Reviews

This research focuses on the automotive industry in Thailand. There is much-related research, which categorized into main two categories;

1. Literature related to Thailand automotive manufacturing.

- Junyapornbunglua(2011) describes Thailand as being recognized as the Detroit of Southeast Asia. Car manufacturers in many countries Both Japan and the United States have invested heavily in Thailand. And they are bringing local companies to Thailand as part of the supply chain. Moreover, the Thai government has the opportunity to help these Thai companies become more innovative.
- Fartasch (2020), According to the findings of this study, the automobile sector is one of the world's largest employers. The significance of international trade in industrialized nations stems mainly from the ties between the home economy and the worldwide economy. There is a precise assembly procedure that takes place in the somewhat intricate supply chain that connects many new automobiles. In addition, the automobile sector employs more than 2 million people, accounting for around 5.5 percent of total employment in the EU 27 countries. The automobile sector employs approximately 8.4 million people (including manufacturers and suppliers) demonstrates that it is one of the essential economic values in many nations, including Thailand.
- Dietmar and Roland (2019) Industrialization lead to high export value. However, on the other hand, pollution and the environment are involved. This article provides an overview of the global production and sales of the

automotive industry. Moreover, the automotive sector confronts significant changes caused by new technologies that may affect production—the effect of digital transformations such as automated driving.

- Komolavanij(2011) This research talks about the automotive industry starting in Thailand more than 50 years ago. This research attempts to track developments in the industry since then. Or we are speaking in terms of technology transfer Research and Development (R&D) and related innovations.
- Burchardt(2011)This research mentioned the general requirements for adhesives in automotive manufacturing. The main features of various structures and components for qualifying assessment This chapter serves as a guide for evaluating appropriate technology from an engineering perspective. And it will increase the use of this welding method in the manufacture of vehicles that will meet future challenges.

2. Other Literature related to automotive manufacturing.

- ManopSangchamnong (2021) A model for efficient and successful administration of various automobile parts manufacturing facilities in Thailand has been developed due to this investigation. However, there is another point of view in the automobile business in this era of increasing globalization, and that is It's less difficult to convey. However, as a result of this, there is more competition. It is essential to understand how some countries have succeeded in adopting the latest technology while others. left behind showed in Figure:4 Appendix 1

- Atkins(2003) This research summarizes the geography of manufacturing as part of the general process of globalization in the manufacturing sector. The current trend is that countries will open up markets for trade and investment, hoping that the global economy will grow and benefit everyone.
- Elangovan(2021) This paper focused on the role of information technology (IT) in the automotive industry's transformation during the 20th century. Actuator and the constraints made the sector one of the largest and most influential organizations in history. Use an IT perspective as an in-depth infrastructure to build on the critical data capabilities needed for change. Focusing on infrastructure involves considering several factors.
- Jaderná(2018) This research presents another perspective of the automotive industry. That need to be environmentally friendly which we cannot deny that Every factory establishment, no matter what type of industry There will always be consequences, whether it's air or water. That makes the environment toxic and affects people in that area. Therefore, the establishment of the automotive industry for sustainable production requires environmental considerations showed the emissions from manufacturing in Table:1 Appendix 2.
- (Annamária, Koncz;László Pokorádi, 2020) (2020)This research describes the automotive industry as one of the fastest-growing industries across all manufacturing areas, which has shown results on the importance of the automotive industry (as statistics) and the rules related to the analysis of risks and causes. The most crucial risk analysis method is Failure Mode and Effect

Analysis (FMEA). According to OEM standards and regulations, FMEA is mandatory in the automotive sector.

Research Gap

This research tries to study and find information on trends in the automotive manufacturing industry in Thailand, which has a lot of research that is a good reference that the exports of the automotive manufacturing industry in Thailand have a better trend every year COVID-19 outbreak. In this research, the range is limited. Due to the limited accessibility of data sources such as critical statistical data cannot be accessed publicly.

iii) Data & Methodology

This study will focus on the trends in the Automotive industry in Thailand regarding this interest the three countries such as the United States, Japan, and Thailand for comparison and shows network analysis for comparing the trends of Closeness centrality and Eigen-vector centrality indices of selected World Input-Output tables (2000 – 2014) are not obtaining from www.wiod.org.

Table 1: Source of data: Sector 20 related Automotive industry

18	C27	Manufacture of electrical equipment
19	C28	Manufacture of machinery and equipment n.e.c.
20	C29	Manufacture of motor vehicles, trailers and semi-trailers
21	C30	Manufacture of other transport equipment
22	C31_C32	Manufacture of furniture; other manufacturing
23	C33	Repair and installation of machinery and equipment
24	D35	Electricity, gas, steam and air conditioning supply

3.2) Methodology

In order to achieve the goal of this study, the methodology will be divided into two main parts: the first will use Google Trends to determine trends in the automotive industry in Thailand, Japan, and the United States, and the second will use network analysis to determine trends in the automotive industry worldwide. By applying the World IO table of 2000-2014 to Gephi and comparing Closeness centrality trends. Eigen-vector centrality indices of the United States and Japan there is no Thailand indicator because it focuses on looking at the directions of the two countries to compare.

3.2.1) Methodology 1 (Keyword of Google Trends analysis)

- Choose the keyword automotive industry by searching in Thailand and display 2004 – 2021. The result showed in Table 2: Appendix2.
- Choose the keyword automotive industry by searching in Japan and display 2004 – 2021. The result showed in Table 3: Appendix2.
- Choose the keyword automotive industry by searching in the United States and display 2004 – 2021. The result showed in Table 4: Appendix2.

iv) Result Analysis of Google Trends analysis

The findings of this research are now being confirmed in terms of the direction of keyword trend data for the time under consideration. 2004 to 2021 shows that the values were in the same order in 2014 and then gradually declined in the following years until 2009 increases because there were problems with the global economy issue in 2009 and went in the same direction until the

Covid-19 outbreak. Until now, for the automotive industry, It's not new in Japan and the United States. However, Thailand gets more attention from keyword searches. Because as mentioned at the beginning about the transition of Thailand's economy to the automotive industry but the results of the trend It is different because the population of each country is not the same the results shown in Figure5(Thailand) Figure6(Japan) and Figure7(United States): Appendix1.

3.2.2) Methodology 2 (Comparison of centrality indices of automotive industry sector no.20 to Gephi)

- This methodology applies the World IO table of 2000-2014 to Gephi and compares the trends of Closeness centrality and Eigenvector centrality indices of Japan.
- This methodology applies the World IO table of 2000-2014 to Gephi and compares the trends of Closeness centrality and Eigenvector centrality indices of the United States.

3.2.3) Result Analysis of Network Analysis with Gephi

This result compares the centrality indices of the automotive industry (sector no.20), conclude the results, the US has the exact directions with Japan in approximation value of closeness centrality, but different in the Eigen centrality where the Eigen centrality of the United States is higher than that of Japan This is because the production capacity is more remarkable. And has more employment in the automotive industry, including the breadth of the country that has enough space to set up an automotive industry. The results showed in Figure8(Japan) and Figure9(United States): Appendix1.

v) Policy Recommendations

This study shows the automotive industry trend in Thailand compared to Japan and the United States. Making Thailand a leading export country is not difficult. Because from the analysis that Thai people are interested in the automotive industry every year more and more. And has good export value even in the Covid-19 outbreak.

1.) Step up Thailand to be the leader in the automotive industry with the government's Thailand 4.0 policy. Create value for the industry by exporting to primary production sources such as Japan and the United States.

2.) Determine public policies related to establishing automotive factories in the country. In order not to affect the way of life of the community and the environment, If the location of the factory has a suitable area The production will be of higher quality.

3.) Policy to support employment-related to workers in the automotive industry, whether physical labor. Make reasonable compensation and working hours and high-skilled labor Provides high balance, no boundaries, and has funding to do various research to develop the automotive industry in the country.

4.) Policies to support high competition for the best output for exporting automotive products to foreign countries. The competition in Thailand will get the best for country use and export.

5.) Finally, if Thailand has stepped up to become a leader in the automotive industry, Selling motor vehicles or related products to the country's people at reasonable and lower prices will allow the value of the domestic economy to flow better.

vi) Conclusion

I want to divide the main conclusion into two parts. The first part shows the Google Trends in keyword searches, automotive industry. To compare between 3 countries and part 2 analyze network analysis with Gephi to analyze and compare the Closeness centrality and Eigenvector centrality indices of the United States and Japan.

Point the results of the automotive industry trends in Thailand with Google Trends compared to Japan and the United States. It clearly shows that it is still far away if Thailand will one day be the leader in the automotive industry. But Trends indicates a higher search rate from 2019 until 2021 and not a drop compared to the United States and Japan. A number shows the trend is good and can develop soon. However, Thailand has recently transitioned from an agricultural, industrial country to automotive industry.

Finally, for network analysis and comparison. Of the United States and Japan from the results show the Closeness centrality and Eigenvector centrality indices in the same direction which is a good case study that Thailand can apply and make the domestic automotive industry more stable.

vii) Suggestions for further research

1. The research does not include other factors that affect it. Trends in the automotive industry in Thailand, both in the past and the future, whether it is government policies, raw materials for production, currency, and economic problems at that time, may be involved.

2. From the experimental method is divided into two parts, both of which have different indicators. There is Japan and the United States, and Thailand. Still, in using Gephi only Japan and the United States, both of these methods can only be summarized as the trend of the automotive industry network, formed by two sample countries using Thailand's trends as a comparison.

3. By showing trends in the automotive industry in Thailand, It would be clearer if enough data were available for the study. And in this study, the use of in-class resources is enough for readers to get an overview of future trends in the Thai automotive industry.

4. This study is not about networks analysis of the automotive industry of the sample countries. It’s just a benchmark that compares it to Thailand. Only to see a clearer picture that Thailand has changed from the agricultural industry to the automotive industry, and there is a better trend every year.

5. With time constraints, data limits, and limitations of tools, We can only analyze from limited data. And make the display not as straightforward as it should be This trend comparison should be tried in various formats and indicators. And adding essential data sources for more accurate analysis.

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Appendix1: Figures

Figure 1:Thailand Production, Sales, and Exports of Automobiles

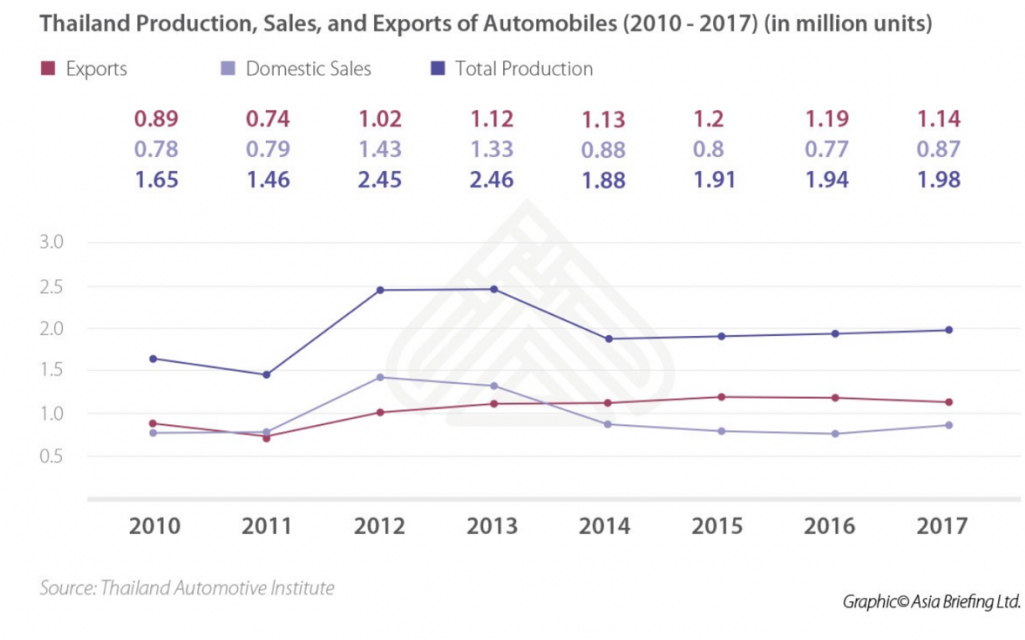


Figure 2:Thailand Leads Automobile Production in ASEAN

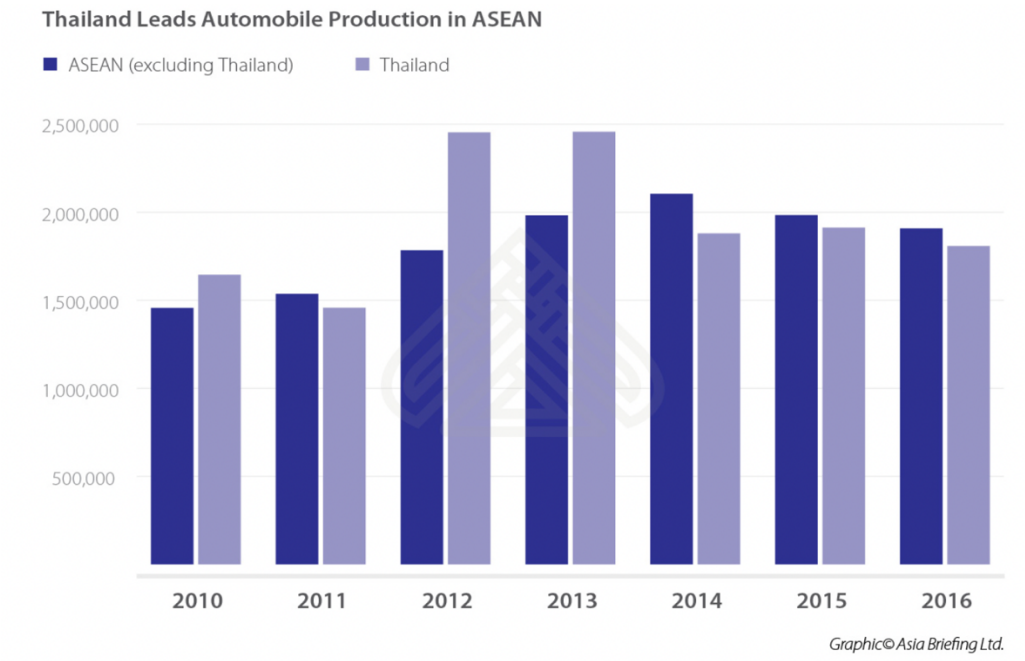


Figure 3:Thailand 4.0 economic model

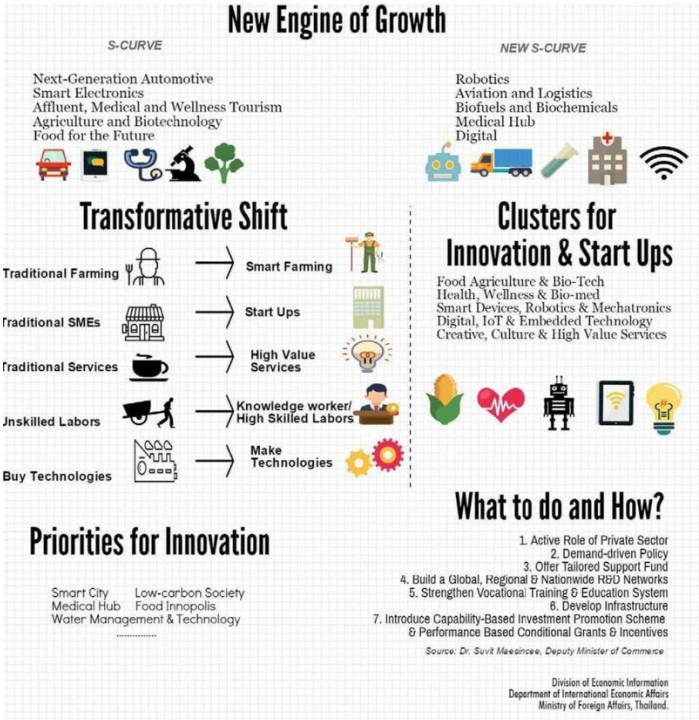


Figure 4:This research focuses on Thailand's highly valued automotive exports and manufacturing even in the face of the COVID-19 pandemic, showing statistical data and the origins of Thailand's dynamics. from agricultural industry country to automotive industry

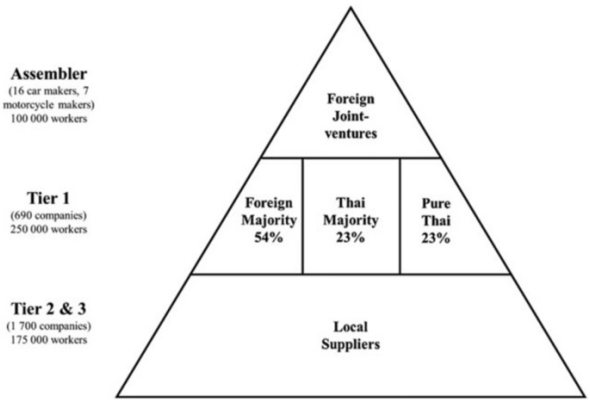


Figure 5:Result value of keyword: Thailand

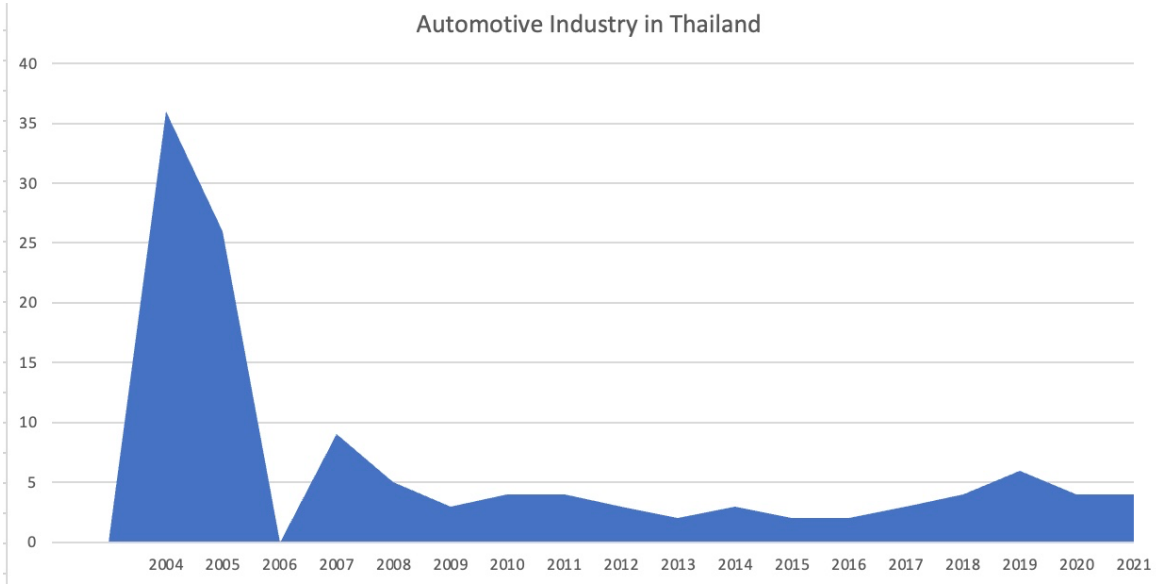


Figure 6:Result value of keyword: Japan

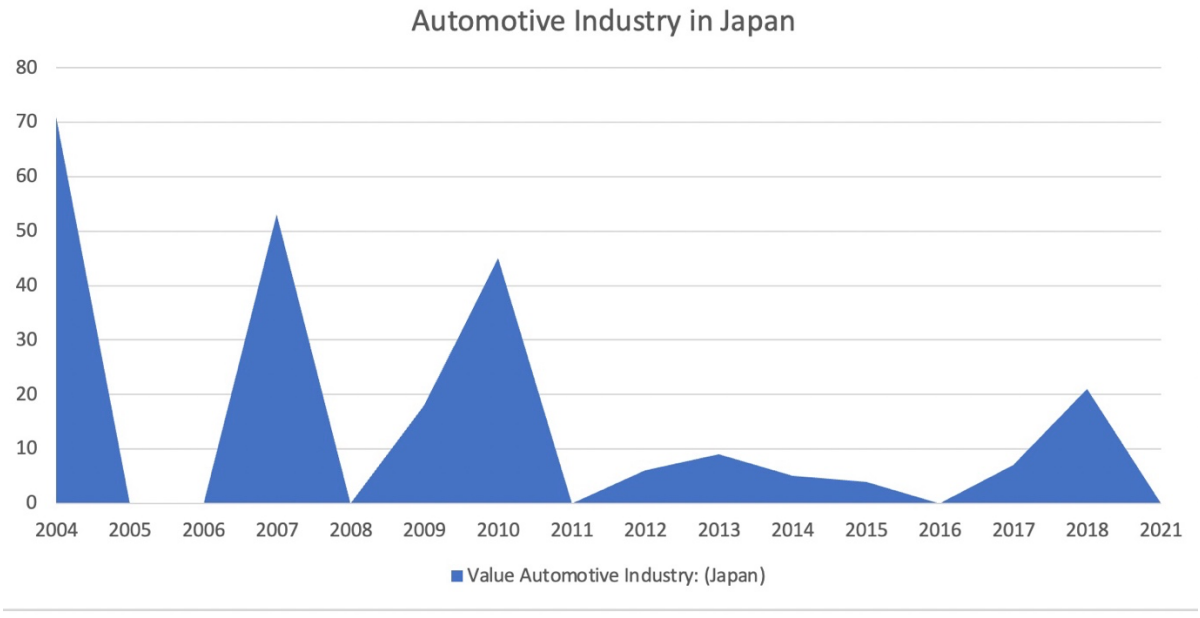


Figure 7:Result value of keyword: United States

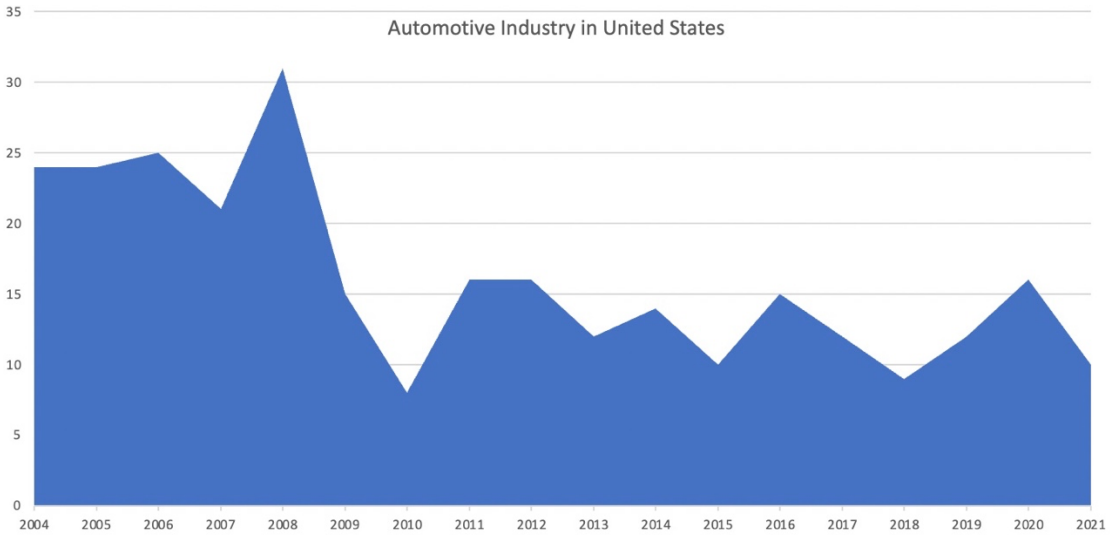


Figure 8:Gephi result: Japan

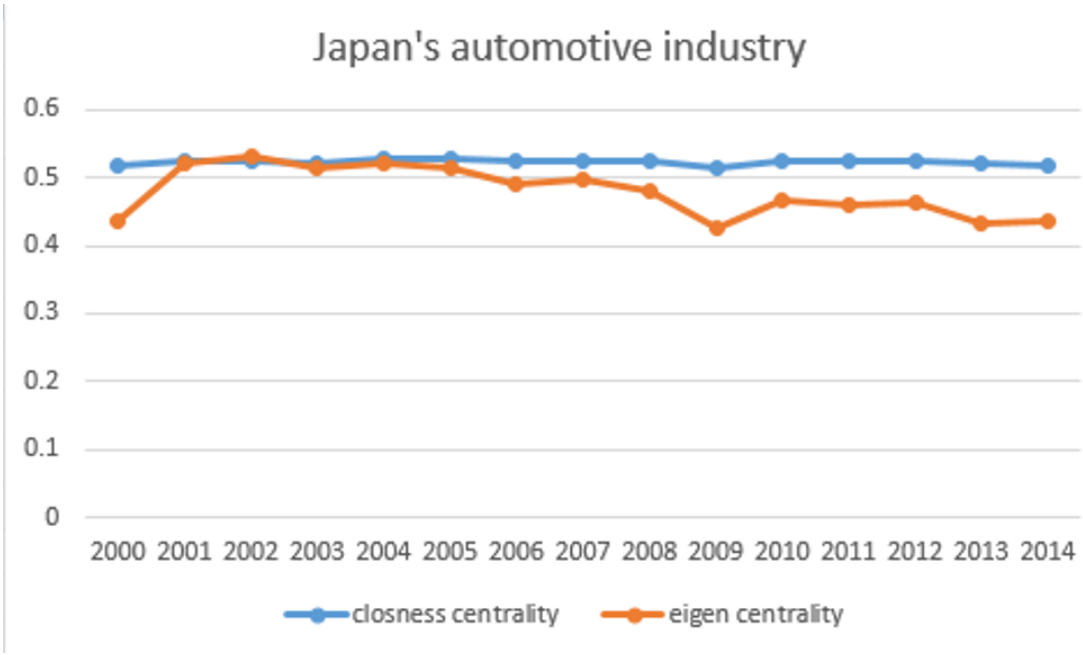
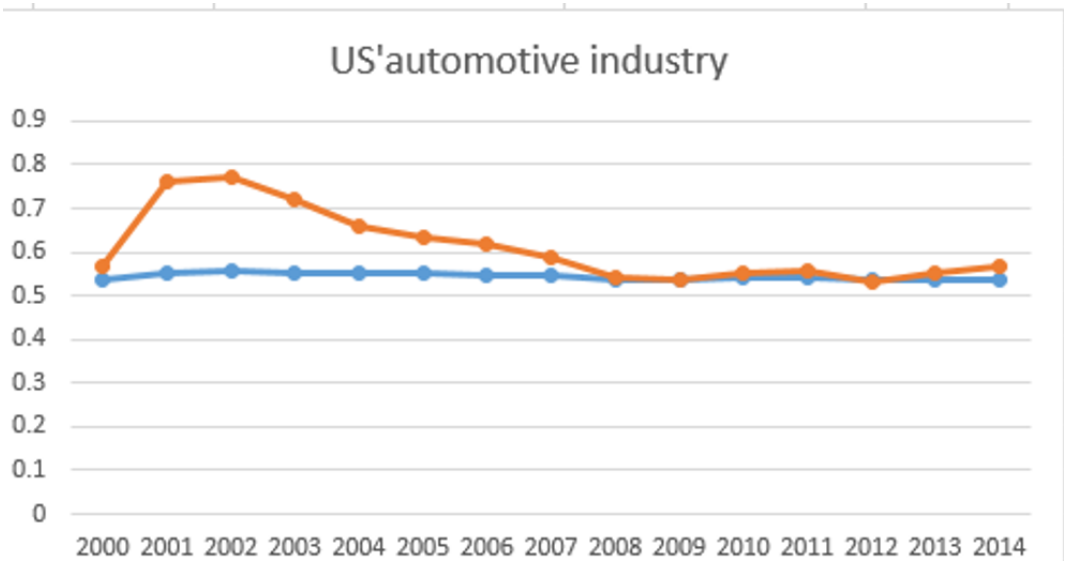


Figure 9:Gephi result: United States



Appendix2: Tables

Table 1: Source of data : Sector 20 related Automotive industry

18	C27	Manufacture of electrical equipment
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21	C30	Manufacture of other transport equipment
22	C31_C32	Manufacture of furniture; other manufacturing
23	C33	Repair and installation of machinery and equipment
24	D35	Electricity, gas, steam and air conditioning supply

Table 2: Automotive industry: Thailand

Year	Value
2004	36
2005	26
2006	0
2007	9
2008	5
2009	3
2010	4
2011	4
2012	3
2013	2
2014	3
2015	2
2016	2
2017	3
2018	4
2019	6
2020	4
2021	4

Table 3: Automotive industry: Japan

Year	Value
2004	71
2005	0
2006	0
2007	53
2008	0
2009	18
2010	45
2011	0
2012	6
2013	9
2014	5
2015	4
2016	0
2017	7
2018	21
2021	0

Table 4: Automotive industry: United States

Year	Value
2004	24
2005	24
2006	25
2007	21
2008	31
2009	15
2010	8
2011	16
2012	16
2013	12
2014	14
2015	10
2016	15
2017	12
2018	9
2019	12
2020	16
2021	10