

Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export

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Abstract

The study aimed to analyze the obstacles hindering the development of the Thai auto parts manufacturing industry for export, focusing on the second confirmatory factor. Both quantitative and qualitative research methods were used, including in-depth interviews, group discussions, and surveys. The research revealed that the second confirmatory factor identified five main aspects that impede the development of the Thai automotive parts manufacturing industry for exports, with the highest average score. Quantitative research division survey data were collected from 500 executives in the auto parts industry using descriptive, reference, and multiple statistics. The research results revealed that the second confirmatory factor assessed five aspects that impede the development of the Thai automotive parts manufacturing industry for exports with the highest average. The priority of each aspect is as follows: 1) Political and economic stability ($\bar{X} = 4.63$). The most important in each item was the international trade war. As a result, global trade slowed down, causing the cost of goods to increase ($\bar{X} = 4.80$). 2) Insufficient resources ($\bar{X} = 4.56$). The most important in each item is the personnel's lack of readiness to learn (Growth Mindset) and are unable to adapt to the time frame, and fear of failure ($\bar{X} = 4.69$). 3) Technology impact ($\bar{X} = 4.52$) The most important items are changing cars from combustion engines to zero-emissions cars, causing entrepreneurs to invest more and prepare manpower to be ready with modern innovations ($\bar{X} = 4.71$). 4) Trade and legal barriers ($\bar{X} = 4.51$) The most important item is that the government section has not entered into a free trade agreement, resulting in having to pay customs duties such as VAT import taxes, customs fees, and fees for pre-audit procedures. ($\bar{X} = 4.64$). 5) Management failed ($\bar{X} = 4.43$). The most important items were no indicators suitable for the portfolio to assess the results of achieving the vision to develop and enhance the organization's potential following the same direction ($\bar{X} = 4.67$). The hypothesis testing results found that small, medium, and large

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businesses pay close attention to factors that impede the development of the Thai automotive parts manufacturing industry for export, differing significantly at the statistical level of 0.05. The second-order confirmatory factor assessment results passed the assessment criteria and were consistent with the empirical data. The chi-squared probability value was 0.263, the relative chi-squared value was 1.041, the concordance index was 0.944, and the root mean squared value of the error estimate was 0.009.

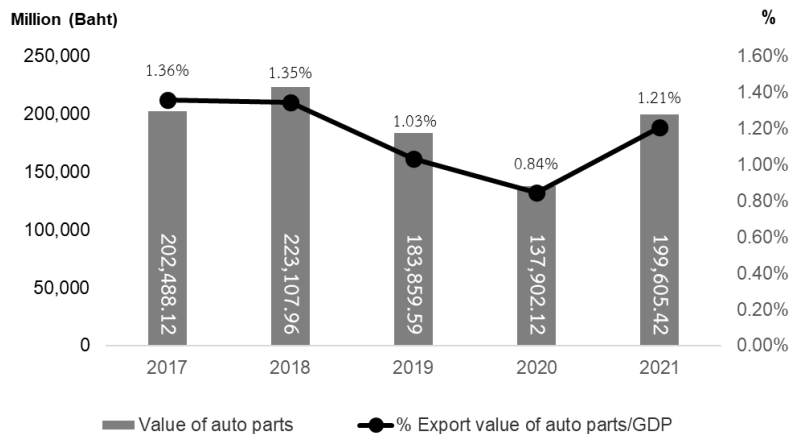
Keywords: Second Order Confirmatory Factors, Obstacles, Automotive Part Manufacturing, Export.

Introduction

Derivation and significance of the problem

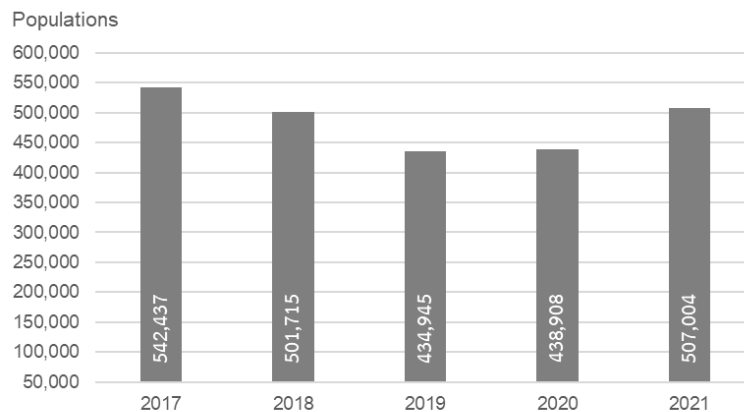
In the era of the industrial revolution, this was the fourth time that the process had changed both the production method and production system. Therefore, the government needs to focus on Industry 4.0. This includes adjusting and choosing to change, finding obstacles to solve, organizing, and rapidly changing opportunities and threats. The automotive parts manufacturing industry is one of the top 10 exported products and is one of the industries that has potential and is essential to the country's economy. The automotive parts industry is coherent with many industries. It is considered the central cogwheel that helps the domestic economy continuously drive the supply chain from upstream to downstream. The rate of export value of automotive parts per gross domestic product (GDP) has steadily decreased since the B.E. 2560. The export value of automotive parts per GDP was 1.36%, which slowed down continuously until the B.E. 2564. The export value of automotive parts per gross product was 1.21%, reflecting the loss of Thailand's automotive competitiveness, and may put pressure on the current account balance in the future, as shown in Figure 1.

Figure 1. Measuring the value of exports of automotive products as a percentage of GDP (The Federation of Thai Industries Automotive, B.E. 2565)



Meanwhile, with significant changes in the labor market, many workers want to develop and adapt their skill capabilities, especially with existing labor personnel having to adapt themselves according to technology. It was found that there was a tendency of increasing demand for competency development since B.E. 2562, increasing to 507,004 people by B.E. 2564, as shown in Figure 2.

Figure 2. The need to develop the capability of the automotive parts group (Statistical Office, B.E. 2565)



To obtain a skilled workforce that meets the needs and to solve the problem from essential skilled workers to skilled workers specializing in specific occupations, one must rely on training to increase the workforce's skills (Chitipat, B.E. 2561). As mentioned above, the various obstacles and impacts faced by automotive part manufacturers are challenging in developing their capabilities to

increase the value of domestic automotive part exports, especially in the future industry-driven. This will benefit Thai industries' development to enhance their capabilities and competitiveness at the international level. It is imperative to generate income in a country and create jobs for people. This includes the development of the society of Thailand to be stable, prosperous, and sustainable, achieving national development according to the national strategic framework. This is the source of research on the factors that hinder the development of the Thai automotive parts manufacturing industry for export.

Objectives of the research

1. To study the Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export.
2. To analyse the second confirmatory factor assessment of all the Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export.

Literature review

Based on past concepts and theories, the researcher can summarize the Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export, with five elements as follows:

- 1) Political and Economic instability means that political change is the starting point of political conflict in the country. Political instability has a negative impact on economic growth in the short term (including higher economic volatility) and long-term yield growth potential. When assessing the impact of uncertainty on the Thai economy, it was found that rising uncertainty had a negative effect on GDP, with private investment and exports being the hardest affected by Pongsak and Yuthana (2018).
- 2) Commercial and Legal Wall Elements (trade barriers and laws) are laws, rules, and regulations that hinder industrial business operations in the international trade system. It includes exercising dominance over market trade barriers, Unfair Trade practices (unfair trade), Tax Barriers (Re-Tariff Barrier), reduced non-tariff barriers (Re-non-Tariffs Barrier), and International Trade Laws in the country, affecting the business of exporting parts for the automotive industry. Each country has a social-basis economy and the policy well-being of its population. Different bargaining powers in negotiations cause countries to use trade protection measures and the laws of each country as a tool to prevent the loss of benefits from allowing free import-export in the future (Somchai et al. B.E. 2563).
- 3) Technology Disruption Components cause many things to drastically change from what they used to be. These changes will impact people's

careers, businesses, and livelihoods. It is technological development or innovation that has better potential at a lower price than the original product or service. However, it can also meet Mainstream Market demands under the volatility and uncertainty of the industrial environment (Chotika, B.E. 2561). This has resulted in changes or substitutions in existing technology standards. Therefore, the use of technology to create value for products and services that affects the original industry of products and services is severe. This may cause businesses to use traditional technology to abnegate their businesses (Sribovorn, B.E. 2561). According to Almgren and Skobelev (2020), technological innovations that help achieve better performance are encouraged by industry development organizations.

4) Resource scarcity component (insufficient resources) refers to the inadequacy to meet the needs necessary to achieve goals or conduct business operations. Personnel must have the ability to drive industrial businesses with reasonable financial allocation. Procurement of raw materials. To proceed with practical, analytical, and prospective methods, organizations need to receive good, up-to-date information for decision-making. To reduce the risk of making incorrect decisions, computer technology has a large number of roles (Puchong, B.E. 2561). Sukartini et al. (2018) and Thanes and Polwat (B.E. 2557) found that human resource competence affects business operations and market access and business performance, which focuses on human resource competence as well as knowledge and expertise.

5) Management Failure refers to the management of the work process of a group of people in the organization, without strategic planning. It also includes a lack of work plans in advance, communication skills, teamwork skills, and paying little attention to the details of the work. It affects decision-making that lacks factual information (Make Decision Failure) for planning, marketing, finance, and production. Furthermore, it refers to the inability to operate to achieve the objectives of the organization effectively and inoperably according to the plan to achieve success. According to Netphanna, Nuttawut, and Pipat (B.E. 2560), entrepreneurs have the ability to manage businesses that can complete various activities. If personnel can perform their duties in accordance with their knowledge and abilities, they will inevitably produce good operational efficiency for the organization. Personnel recruitment must be consistent with business operations.

Research Methods

This is Inductive Research that uses mixed Methodology Research, consisting of three sections: Qualitative Research used in-depth interviews, quantitative research by collecting survey data, and

qualitative research uses Focus Group Discussion to confirm the validity of this research model:

1. Qualitative research using in-depth interview techniques: The population used in this research consisted of nine experts using a Purposive Sampling Method with the qualification criteria of experts (Qualifications of Experts). According to the Executive Committee of the Doctor of Business Administration Program Industrial Business Administration and Faculty of Business Administration King Mongkut's University of Technology North Bangkok, the research consisted of experts in 3 groups, namely, three business executives, three officials from government organizations and three experts from the field study (Leepaitoon, Lata, & Worawattanaparinya, 2020).
2. The sample included in this quantitative study consisted of 1,222 people who worked for financial firms that offered credit. The sample size was calculated using structural equation modelling or component analysis criteria. Using the multistage sampling procedure, the sample group size was very good (500 samples) (Silcharu, 2020). It consists of a Cluster Sampling procedure that is divided into two categories: small and medium-sized enterprises and large industrial enterprises. The lottery method and probability sampling were used to select samples and gather the data (Niratisayakul, Bua-In, & Shoommuangpak, 2021)
3. A Purposive Sampling method was used to certify the population model used in this research as 11 qualification experts.

Results

The Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export and the conclusions of the research results are as follows:

1. Results of the analysis of Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export classified by size of industrial business. Using qualitative research with in-depth interview techniques from experts, it was found that the components could be classified into five aspects: 1) political and economic instability, 2) trade barrier and legal, 3) technology disruption, 4) insufficient resources, and 5) management failure.
2. According to a classification of the importance of the Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export by size, it was discovered that small and medium-sized businesses place more emphasis on the factors preventing the growth of the Thai automotive parts manufacturing industry for exports than large businesses. Small and medium-sized businesses place the most significant emphasis on sustainability, scoring an average of 4.58. Small and medium industrial enterprises reported that when

examining each element, all aspects were at the highest level, including importance, which large businesses awarded a high level, with an average of 4.48:

- 1) The political and Economic instability components had an average of 4.68.
- 2) Lack of resources (insufficient resources), with an average of 4.61.
- 3) Trade and legal components had an average value of 4.56.
- 4) Technology disruption was the most important element, with an average of 4.55.
- 5) Management failure had the highest importance level, with an average of 4.50. Large businesses are important at a high level, with an average of 4.48 and when analysing the level of importance in each aspect, it was found that,

- 1) The component of political and economic instability (Political and Economic instability) was at the highest important level with an average of 4.58.
- 2) Lack of resources (insufficient resources) had the highest importance level, with an average of 4.51.
- 3) Technology disruption components have a high level of importance, with an average of 4.48.
- 4) Trade barriers and legal elements were important at a high level, with an average of 4.45.
- 5) The Management Failure aspect (management failure) was important at a high level with a mean of 4.36.

3. Comparing the differences in the level of the importance of the Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export classified by industrial business size. It was revealed that the overall perspective was different at a level of 0.05, for each of the five factors, and that all five differences were significant.

However, small- and medium-sized businesses prioritize factors that impede the development of the Thai auto parts industry for exports rather than large businesses.

Table 1 Comparison the level of the importance of Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export in the small and medium industrial sectors and large industrial.

Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export	Small and Medium Size			Large Size			t-Value	P-Value
	$\bar{X}$	S.D.	Significant Level	$\bar{X}$	S.D.	Significant Level		
Significant level of overall components	4.58	0.32	highest	4.48	0.32	high	3.60	0.00*
1. Political and Economic instability Aspect	4.68	0.27	highest	4.58	0.30	highest	3.68	0.00*
2. Trade Barrier and Legal Aspect	4.56	0.38	highest	4.45	0.38	high	3.30	0.00*
3. Technology disruption aspect	4.55	0.37	highest	4.48	0.40	highest	2.22	0.03*
4. Insufficient Resource Aspect	4.61	0.36	highest	4.51	0.39	high	2.88	0.00*
5. Management Failure Aspect	4.50	0.46	highest	4.36	0.39	high	3.54	0.00*

4. The structural equation model of Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export and the second confirmatory factor conformity assessment criteria (S-CFA) were used to analyze and refine the model by considering Modification Indices according to Arbuckle's recommendation, as shown in Table 2.

The definitions of the second confirmatory factor assessment (S-CFA) coherence statistical variable are presented in Table 3 and Figure 4.

The second confirmatory factor assessment (S-CFA) is a Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export in the Standardized Estimate mode after model improvement.

Table 2. Statistical values that evaluated the second confirmatory factor assessment (S-CFA) concordance of the factors. It is the Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export, compare before and after modifying the model.

Statistical	Consideration Criteria	Before Modify	After Modified
1. CMIN-p (Chi-square probability level value)	Have a value more than 0.05	0.000	0.263

2. CMIN/DF (Relative chi-square)	Have a value less than 2.00	5.744	1.041
3. GFI (Goodness of Fit Index)	Have a value more than 0.90	0.455	0.944
4. RMSEA (The root mean square index of the error estimation)	Have a value less than 0.08	0.098	0.009

5. Hypothesis testing results of the second confirmatory factor assessment (S-CFA) of Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export found that it was in line with five research hypotheses as follows:

H1: According to the research hypothesis Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export have a direct impact on the components of political and economic instability at the statistical significance level of 0.001, with standardized regression weight =.94.

H2: Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export directly influence the components (Trade Barrier and Legal) statistical significance at the 0.001 level with Standardized Regression Weight = .92, which is in accordance with the research hypothesis set.

H3: According to the stated research hypothesis, Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export have a direct impact on the components (Technology Disruption), with a statistical significance at the level of 0.001 and a standardized regression weight =.97.

H4: The Insufficient Resources aspect component was directly impacted by Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export at a statistical significance level of 0.001 with a standardized regression weight of .99.

H5: According to the established research hypothesis, Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export had a direct impact on the Management Failure aspect component's statistical significance at the 0.001 level, with standardized regression weight =.89.

Figure 4 The second confirmatory factor assessment (S-CFA), Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export in Standardized Estimate mode after model improvement.

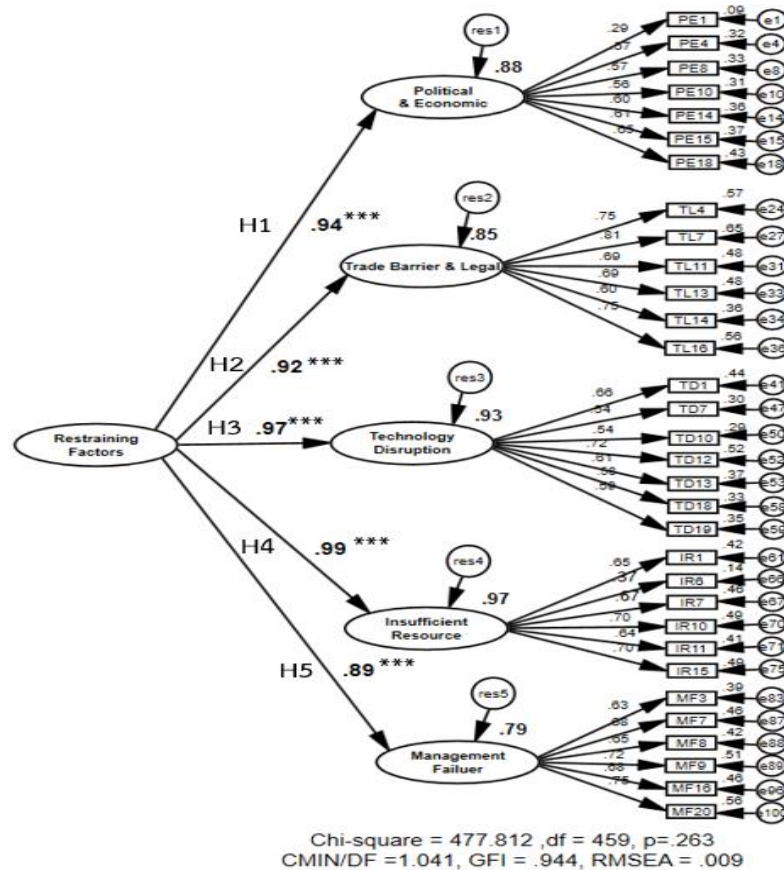


Table 3 Variable Definition

Variables	Meaning	Variables	Meaning
PE1	As a result of the international trade war, global trade slowed down, increasing product costs.	TD12	It is important for car manufacturers and auto parts to develop new products, in order to maintain a stable market share, when environmentally management is developed for zero pollution.
PE4	As a result of the US-China trade war, export sales slumped because the business is global in nature.	TD13	Entrepreneurs are turning to vehicle development to meet the needs of new customers as society develops into a smart city, a

			living environment focused on preserving the environment and saving energy.
PE8	There is uncertainty or unsafe in an investment section because there may be a change in the new government.	TD18	Smart car with innovative glass antenna supports 5G networks and has low transmission loss, causing entrepreneurs to add such innovations to the production process, increasing the cost and affecting the selling price of vehicles.
PE10	Lockdowns both domestically and internationally resulting from emerging disease situations affect the entire supply chain.	TD19	The use of quantum technologies has been radically changed by advances in physics and computational engineering. Control systems in vehicles will be developed more efficiently and accurately in a short period of time.
PE14	Aiming for environmental friendliness, this reflects consumer demand towards new energy vehicles, causing operators to have higher operating cost.	IR1	Lack of systematic transfer of knowledge between experienced employees and those who want to replace them.
PE15	Investors move their investment base to neighboring countries due to high GDP growth.	IR6	Failure to take action (Active learning) and utilize knowledge gained from experience to improve performance.
PE18	Importing or exporting certain auto parts may be prohibited in some countries to reduce air pollution.	IR7	Increased costs from replacing steel with aluminum to make electric vehicles lighter and reduce energy consumption.
TL4	The opportunity to sell products is limited on the grounds of lack of technology and production experience for entrepreneurs of their nationality before including inaccessibility to raw material sources.	IR10	Lack of funding to support the development of new projects and use a large budget.
Variables	Meaning	Variables	Meaning
TL7	Many countries claim to inspect all imported vehicles and are required to present a certificate of quality inspection for new imported vehicles. This causes additional costs and delays in exports.	IR11	There is no investment in buying machines with automation technology to be used in the production line instead of human beings to make it worthwhile.
TL11	The government has not entered into a free trade agreement, resulting in paying customs duties such as VAT import taxes, customs fees and fees for the pre-audit process.	IR15	Lack of research and testing center for automotive parts making it difficult to develop standardized automotive part.

TL13	Determining product prices, entrepreneurs cannot adjust product prices, if the order quantity decreases or does not meet the specified conditions affecting production costs (Quantity Forcing) and income from product sales.	MF3	Lack of short-term, medium-term and long-term planning according to the time dimension to determine the guideline (Indicative Plan) which will be useful for creating a vision of management.
Variables	Meaning	Variables	Meaning
TL14	Some countries have imposed measures to impose temporary protection duties (Safeguard) to collect additional taxes on many types of Thai goods, including automobiles.	MF7	No involvement with stakeholders in business strategy formulation.
TL16	Tariffs on electric vehicle imports from some countries have zero tariffs. As a result, entrepreneurs stopped developing automotive parts, because the cost of importing the whole car is lower than the development of such parts in the country.	MF8	Lack of coordination and not monitoring every problem closely.
TD1	Changing cars from combustion engines to zero-emissions cars. Entrepreneurs need to invest more and prepare manpower to be ready with modern innovations.	MF9	There are no indicators suitable for the portfolio. To assess the results of achieving the vision to develop and enhance the organization's potential in accordance with the same direction.
TD7	Industrial policy guides the market mechanism to promote the modern automotive industry, leaving combustion engine parts manufacturers behind.	MF16	Do not listen to opinions or suggestions from all stakeholders.
TD10	Development of intelligent systems operational control, command, intelligent public system including access to information, entrepreneurs must always develop products.	MF20	Inability to manage conflicts appropriately to solve problems and remove obstacles to work the system more smoothly with the utmost care and agility.

Research Discussion

The main issues found from the research on Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export. Various issues that arise are analysed and compared to find the causes and prevent various risks of the organization as follows:

1. According to the research results, when comparing the Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export in the category of small and medium businesses with large businesses as a whole. It was found that there were significant

differences. There was statistical significance at 0.05. Moreover, the development of the Thai automotive parts industry in the category of small and medium businesses, since most of them are production subcontractors, depends mainly on the work experience and skills of doing business (Dumrong, B.E. 2564). It differs from the large businesses of the Thai auto parts industry that have systematic management. This includes management of business resources, technology, team relations, communication, and human capital development.

2. From the results of the hypothesis test, it was found that Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export directly influence the components of insufficient resources, which have a weight (Standardized Regression Weight) of 0.99. This indicates that the Thai auto parts manufacturing industry needs more raw materials for domestic production. Some raw materials must be imported from abroad, including technological innovations used in low-level production, which use less automation. Thus, it relies on technology and machinery from abroad (Thai Automotive Engineering Association, BE. 2560). However, the automotive parts industry still needs more upstream industries for electronic components used in assembling cars, which must be imported from abroad (Chitipat, B.E. 2561). Human resource competence affects operations business; it affects the market reach and efficiency of the business, which focuses on human resource competence, as well as knowledge and expertise (Sukartini et al. 2018).

3. Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export in terms of Political and Economic instability demonstrated an average of 4.63. It indicates the highest average and highest level of importance. Political participation is vital for the economic, social, and technological development of the nation and world society. Political participation plays a significant role in development, which, if understood in the process of political participation, is becoming more active in political participation. It will contribute to progressive and sustainable democratic development that, when good political and administrative stability, inevitably affects economic development. The social stability of the country permanently, Boonruen and Suwan (B.E. 2562). The trade policy of the United States towards China, from learning the right lessons, found that trade policy and trade barriers could lead to the failure of the government and market failures, including policy errors (2021)

4. Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export include an international trade war. As a result, global trade slowed, causing the product cost to increase by an average of 4.80, which is the highest importance level.

The impact of the US-China trade war policy caused the economy to affect the world trade economy widely. The United States uses its influence through political organizations and economic institutions to pressure countries in the region to open up more markets for American products (Krisana and Rangsan; B.E. 2564). It has also created a catastrophic humanitarian crisis and threatened the stability of geopolitical relations. The trade war raised concerns about a sharp slowdown in global growth, rising inflation and debt, and increasing poverty, and the economic impact of the conflict spreads through channels around the world, Orhan (2022)

5. Factors Affecting the Development of Thai Auto Parts Manufacturing Industry for Export demonstrated a limited likelihood of selling the product by citing the need for more technology. The production experience for entrepreneurs of their nationality includes a need for access to raw materials with variables in many countries. It claims to inspect all imported cars and has to present a certificate of quality inspection of new imported cars, causing additional costs and delays in exports with the highest value of 0.601, which is the highest pair. Savitri, Piyachat, and Surasit (B.E. 2565) found that the automobile manufacturing industry in Thailand, facing the problem of purchasing power, has yet to recover, and the production process has been paused. This results in a need for continuous export growth, and enterprises should pay more attention to technology and big data. However, reducing international trade barriers cannot be easily negotiated, and trade barriers must be applied (Somchai et al. B.E. 2563). The impact of digital transformation comes from market pressure, regulations, and flexibility. Therefore, risk management in business operations efficiently and effectively implements 4.0 technology to increase operational productivity (Rodríguez-Espindola et al. 2022).

Thailand's automotive parts manufacturing industry faces several challenges that hinder its competitiveness in the global market. Several studies have identified some of the primary obstacles, such as limited technological capabilities, high cost of production, and shortage of skilled workers. To address these challenges, the Thai government and industry leaders must take a proactive approach, and investment in R&D is essential to enhance technological capabilities. The government can offer tax breaks and grants to facilitate the innovation and development of new technologies. On the other hand, industry leaders can collaborate with academic and research institutions to tap into the full potential of Thailand's skilled workforce. Another way to improve the competitiveness of the automotive parts manufacturing industry is to streamline its regulatory framework. The Thai government could reduce bureaucratic procedures and improve policy transparency to foster a

conducive business environment. Lowering the cost of production by reducing the burden of taxes and regulations would improve industry competitiveness. The industry should work towards creating a more skilled labor force in the country. This can be accomplished through partnerships with technical institutes and vocational schools, providing apprenticeship opportunities, and promoting STEM education programs in schools. The Thai government and industry leaders must collaborate to overcome the challenges identified in this study. The automotive parts manufacturing industry can enhance its competitiveness in the global market by improving its technological capabilities, streamlining regulations, and investing in human resource development.

Stakeholders involved in the Thai auto parts manufacturing industry for exports need practical guidance to take action based on research findings. Several factors, including technological advancements, government policies, and market trends, affect the development of this industry. To leverage these findings for practical action, stakeholders must first identify the specific factors affecting their roles and business activities. They should then create a detailed plan that outlines the necessary steps to capitalize on the identified factors. The plan should include short- and long-term goals, timelines, and key performance indicators to track progress. In addition, stakeholders must monitor emerging trends and developments in the market to stay ahead of the competition. This requires regular research and analysis of industry data as well as the ability to adapt quickly to changing circumstances. Collaborating with other stakeholders and building strong partnerships can also help businesses remain competitive and enhance their chances of success.

Measures are being taken to address the obstacles to the development of the Thai auto parts manufacturing industry for export. The Thai auto parts manufacturing industry has significant potential for growth in the global market, but it has faced several challenges. The main obstacles include inadequate infrastructure, lack of innovation, and limited access to technology. To address these challenges, the Thai government has taken several steps to encourage its industrial growth. This includes investments in infrastructure development, such as new highways, expansion of seaports and airports, and improvement of logistics networks. Innovation has been the focus of the Thai government, providing incentives for research and development in the industry. This includes tax breaks for companies investing in research, modifications, and innovations in the auto parts industry. The Thai government has encouraged the development of human resources to support the growth of the auto parts manufacturing industry. This includes training and development programs for workers and scholarships and grants for students.

pursuing engineering degrees. These steps encouraged the development of the Thai auto parts manufacturing industry, making it more competitive in the global market. Continued investment and innovation will foster growth and ensure the industry remains strong.

Research Suggestion

Recommendations obtained from this research will be a guideline for setting strategies for adaptation to create competitive advantages in the free trade market to support Thailand 4.0 policy in this research. The researcher has suggested principles, concepts, and factors that impeding the development of Thai auto parts manufacturing industry for export to the government, private and educational sectors, the details are as follows:

1. Government policy level

(1) The Federation of Thai Industries should propose effective policy measures for the government in the context of emerging diseases and assists according to the business size. People who are most affected receive significant help. The criteria for what will help, what will not help, and how long the help will last must be clear, and action must be taken immediately to increase the types of auto parts covered by Free Trade Agreements.

(2) The Office of Industrial Economics (OIE) established a framework for cooperation. Further, it established the standards for managing economic data to lead to utilizing Big Data. The OIE includes the development of cooperation in sharing and exchanging information that must be implemented with a security system to create a network of financial information in the region. It emphasizes upgrading skills in technology and innovation through a network of collaborative capacity-building projects.

(3) The Ministry of Labor should expand cooperation in creating a personnel database with the private sector regarding Re-skill, Upskill, and New-skill training in short courses. The ministry is accelerating the creation of short-term training courses and becoming leaders. It emphasizes coordinating industry sectors to connect education and training to increase workforce skills and coordinating the committee with industry and educational institutions.

(4) The Ministry of Education implemented the established guidelines of the Vocational Education Center of Excellence to develop specific student skills. These guidelines assist graduates to work immediately and build a network with the potential private sector. In addition, it provides advice on continuing education according to the learners' abilities regarding the real commercial use of the private sector.

(5) To support the country's economic and social development in a sustainable manner, the Ministry of Higher Education, Science, Research, and Innovation (MHESI) should examine policies and strategic frameworks for manpower development in higher education and research institutes. With the development of specialized high-performance manpower, the learning center (Hub of Knowledge) will meet the needs of the industry and be ready to learn and adapt to changing environments.

2. Operational level

(1) Focusing on reducing production capacity and the need to reduce costs, increase productivity, and improve product quality will benefit the relevant supply chain, as well as the service and social sectors of the political component. The Thai automotive parts manufacturing industry for exports should pay attention to the issue of trade wars between countries and the situation of emerging diseases.

(2) The Thai automotive parts manufacturing industry should be allocated export budgets to support the research and development of the modern automotive parts industry. Emphasis should be placed on improving the quality of automotive parts. Meanwhile, reducing production costs by exchanging technology with foreign countries that specialize in modern vehicles will lead to the sustainable development of the automotive parts industry.

(3) In the Thai automotive parts manufacturing industry, export emphasis should be placed on converting combustion engine cars to pollution-free cars. By concentrating on learning to receive technology transfer from technology owners who are network companies or have a relationship to produce parts for the best one from manufacturers. It will aid in entering the automotive industry production chain for modern vehicles that emit fewer emissions or may have to move to produce parts for other markets, such as agricultural machinery and automation, coupled with the growing trend of replacement parts manufacturing.

(4) The Thai automotive parts manufacturing industry for exports should concentrate on personnel in learning (Growth Mindset) to create growth. This will assist with the understanding that anything can be made with effort, determination, enthusiasm, and indomitable to the problems and obstacles that arise complete the challenge, not afraid of mistakes and failures.

(5) The Thai automotive parts manufacturing industry for export should emphasize having appropriate indicators for performance. It should be carefully performed to assess the results of achieving the vision to develop and enhance the organization's potential in accordance with the same direction. Further, it should concentrate on the ability to measure and evaluate concretely throughout the

business cycle, enabling the continuous development of failed administrative elements.

Recommendation for future research

1. The automotive parts manufacturing industry for export should be analyzed to determine the negatives and weaknesses of the business in order to set guidelines or strategies for improvement and development following the framework and goals set. Therefore, the researcher aims to research factors that impede the development of the Thai automotive parts manufacturing industry for export in electronic and electrical systems, autopilots, and batteries. The research further focused on formulating strategies and building competitiveness in the automotive parts industry to match the factors that hinder specific groups.
2. In addition, the automotive parts industry for exports should study ways to manage the organizational structure to operate more efficiently. This study focuses on innovation in the automotive industry at the SMEs level, which is a holistic development in various fields for advancing and creating a competitive difference.
3. The economic recession continues owing to the COVID-19 pandemic, but the reality is still volatile, especially the problem of geopolitical conflicts. However, a supply chain still exists, especially in automotive parts, and there is an ongoing microchip shortage. Emphasis should be placed on the integration of management and the study of the management of international supply chains in the automotive parts industry under global economic volatility.

Conclusion

The findings of this study on factors affecting the development of the Thai auto parts manufacturing industry for export are crucial in shaping the overall economy of Thailand. This study highlights the significance of several factors, including technological advancements, cost efficiency, government policies, and transportation infrastructure. These factors collectively impact the competitiveness of the Thai auto parts industry in the global market. The study highlights that technological advancements play a critical role in enhancing the efficiency of the Thai auto parts industry. Advanced production technologies, such as automated systems, can significantly reduce lead times, improve product quality, and enhance cost-effectiveness. Moreover, the study indicates that government policies targeted at promoting the auto parts industry are critical for creating the necessary infrastructure and attracting investment. This study finds that enhancing cost-effectiveness is a crucial factor in

maintaining the competitiveness of the Thai auto parts industry. Factors such as labor costs, energy costs, and raw material prices play a vital role in determining the overall costs of production. Therefore, adopting optimal cost strategies can help manufacturers achieve cost savings, which can be passed on to customers at competitive prices. The findings of this study provide critical insights into the factors affecting the export development of the Thai auto parts manufacturing industry. The recommendations based on the findings of this study can serve as a guide to policymakers, manufacturers, and investors in the industry, enabling them to take necessary steps to enhance the industry's competitiveness and contribute to the overall development of the Thai economy.

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