Pakistan Journal of Life and Social Sciences
www.pjlss.edu.pk

https://doi.org/10.57239/PJLSS-2025-23.1.008

RESEARCH ARTICLE

The Causal Factors of Competitive Advantage and Business Performance of the Automotive Parts Industry Business Group in Thailand

Ketchana Wantanee[1*], Niwat Chantharat[2]

[1,2] Graduate School of Management Studies Sripatum University

ARTICLE INFO

Received: May 27, 2024

Accepted: Sep 1, 2024

Keywords

Technology

Lean Strategy

Innovation Adoption

Competitive Advantage

Business Performance

***Corresponding Author:**

nana48n@gmail.com

ABSTRACT

This article aims to study the factors influencing the competitive advantage and business performance of automotive parts manufacturers in Thailand, focusing on technology, lean strategy, and innovation adoption. Data was collected using questionnaires from 400 automotive parts manufacturers, and the data was analyzed using structural equation modeling (SEM). The research results indicate that technology and lean strategy positively affect competitive advantage and business performance. Competitive advantage plays a crucial role in mediating the effects of these factors on business performance.

INTRODUCTION

The automotive industry is one of the important sectors in Thailand with strong connections to the global market. Adapting to current challenges, such as technological changes, effective management, and embracing innovation, is crucial for maintaining competitiveness and performance. This research aims to study the impact of technological factors, lean strategies, and innovation adoption on the competitive advantage and business performance.

The primary objective of this research is to examine the effects of technological factors, lean strategies, and innovation adoption on the competitive advantage and business performance of automotive component manufacturers in Thailand. The research hypotheses are as follows:

1. Technology has an indirect effect on competitive advantage and a direct effect on the business performance of automotive component manufacturers in Thailand.
2. Lean strategies have an indirect effect on competitive advantage and a direct effect on the business performance of automotive component manufacturers in Thailand.
3. Innovation adoption has an indirect effect on competitive advantage and a direct effect on the business performance of automotive component manufacturers in Thailand.
4. Competitive advantage affects the business performance of automotive component manufacturers in Thailand.

LITERATURE REVIEW

Technology: Research on the use of technology in the automotive component industry has demonstrated that the adoption of modern technologies, such as automation, robotics, and AI, significantly enhances production efficiency and reduces costs (Smith, 2019). Technology not only improves production quality but also has a direct effect on increasing competitive advantage.

Lean strategy: Lean theory focuses on reducing waste and increasing efficiency in production processes by optimizing resource utilization. Research by Womack & Jones (2003) shows that lean principles are key to reducing production costs without compromising product quality, thereby increasing business competitiveness.

Innovation adoption: Rogers (2003) introduced the theory of innovation adoption, which suggests that businesses that adapt to new innovations and technologies can gain a competitive edge over those that do not. Related research indicates that embracing innovation can enhance a business's ability to respond quickly to market changes.

Competitive advantage: Porter (1985) presented concepts related to competitive advantage through strategies such as cost leadership and differentiation. This research applies Porter's ideas to analyze which factors influence the competitive advantage of automotive component manufacturers.

Business performance: Business performance can be evaluated from various dimensions, such as financial performance, customer responsiveness, and internal improvements. The Balanced Scorecard is used as a framework to provide a comprehensive view of performance across different aspects.

RESEARCH METHODOLOGY

The sample for this research consists of 400 operators in the automotive component manufacturing industry in Thailand. A questionnaire was designed to align with the research objectives and utilized stratified sampling to ensure comprehensive data coverage.

The data collection tool used is a questionnaire consisting of questions related to technological factors, lean strategies, innovation adoption, competitive advantage, and business performance. The questions were developed and refined based on the literature review framework. To validate the questionnaire, it was reviewed by 5 experts to assess the alignment of the questions with the research objectives, resulting in an Item of Objective Congruence Index (IOC) of 0.92. For reliability analysis, the questionnaire was tested on a sample of 30 participants, and reliability was measured using Cronbach's alpha coefficient, which yielded a value of 0.98.

Data collection was conducted through an online questionnaire distribution. The statistical methods used for data analysis include descriptive analysis, and Structural Equation Modeling (SEM) was employed to test causal relationships between latent variables such as technology, lean strategy, and innovation adoption with business performance. The analysis was performed using SPSS and AMOS software.

SUMMARY OF RESEARCH RESULTS

General information of respondents

Descriptive statistics were used to present the general information of the respondents.

Table 1 shows the percentage distribution of the general information of the respondents

General Information of Respondents	Number (people)	Percentage (%)
Gender		
- Male	365	91.2
- Female	35	8.8
Age		
- Under 30 years	80	20
- 30-39 years	160	40
- 40-49 years	120	30
- Over 50 years	40	10
Job Position		
- Senior Executive	50	12.5
- Middle Management	100	25
- Manager	150	37.5
- General Staff	100	25

From the table above, it can be summarized that the majority of respondents are male (91.2%), with most being between 30-39 years old (40%) and holding the position of manager (37.5%). This indicates that the respondents play a significant role in organizational management.

General information of companies

Descriptive statistics were used to present the general information of the companies.

Table 2 shows the percentage distribution of the general information of the companies.

General Information of Companies	Number (companies)	Percentage (%)
Business Size (Number of Employees)		
- Fewer than 50 people	60	15
- 51-100 people	200	50
- 101-500 people	120	30
- more than 500 people	20	5
Business Age		
- less than 5 years	40	10
- 6-10 years	120	30
- 11-15 years	160	40
- More than 15 years	80	20
Operation Type		
- Export production	250	62.5
- Domestic production	150	37.5

From the data above, it is found that 50% of the companies involved in the research are medium-sized businesses with 51-100 employees. Additionally, 62.5% of the companies focus on export production, indicating that these companies have a significant connection with international markets.

Analysis results of opinions on technological factors, lean strategy, innovation adoption, competitive advantage, and business performance using descriptive statistics

Table 3 shows the mean and standard deviation values for the various factors.

Factor	Mean	Standard Deviation)SD)
Technology	4.23	0.75
Lean Strategy	4.15	0.68
Innovation Adoption	4.30	0.73
Competitive Advantage	4.45	0.80
Business Performance	4.18	0.65

From the table, it is observed that the variable with the highest mean is Competitive Advantage (mean 4.45), indicating that most operators clearly recognize the importance of gaining an edge over competitors in the market. Meanwhile, Technology (mean 4.23) and Innovation Adoption (mean 4.30) are also considered to be of high importance.

Results of hypothesis testing using structural equation modeling (SEM) and inferential statistics

Table 4 shows the results of hypothesis testing using Structural Equation Modeling (SEM).

Hypothesis	Direct Influence	Indirect Influence	Statistical Significance
Technology affects competitive advantage	0.53	-	0.001
Lean strategy affects competitive advantage	0.48	-	0.002
Innovation adoption affects competitive advantage	0.46	-	0.001
Technology affects business performance indirectly through competitive advantage and directly	0.37	0.20	0.003
Lean strategy affects business performance indirectly through competitive advantage and directly	0.32	0.18	0.002
Innovation adoption affects business performance indirectly through competitive advantage and directly	0.34	0.21	0.001
Competitive advantage affects business performance	0.50	-	0.001

From the table, the hypothesis testing results show that Technology has a positive direct influence on Competitive Advantage (direct influence of 0.53, statistical significance of 0.001) and an indirect influence on Business Performance through Competitive Advantage (indirect influence of 0.20).

Additionally, Lean Strategy and Innovation Adoption both have direct and indirect effects on Business Performance, with all results showing statistically significant values.

Results of causal model development for competitive advantage and business performance

The results of the causal model development for Competitive Advantage and Business Performance among automotive component manufacturers in Thailand show that the model fits the empirical data well. The model's fit indices are as follows: Chi-square = 106.78, df = 91, χ^2/df = 1.173, p-value = 0.123, RMSEA = 0.021, RMR = 0.009, SRMR = 0.022, GFI = 0.97, AGFI = 0.94, NFI = 1.00, NNFI = 1.00. These fit indices meet the required criteria.

From the study results, it can be concluded that the causal factors and outcomes related to Competitive Advantage and Business Performance for the automotive component manufacturers in Thailand are appropriate and consistent with the empirical data. This allows the study results to be used effectively for the development and improvement of competitive advantage strategies and business performance in the future.

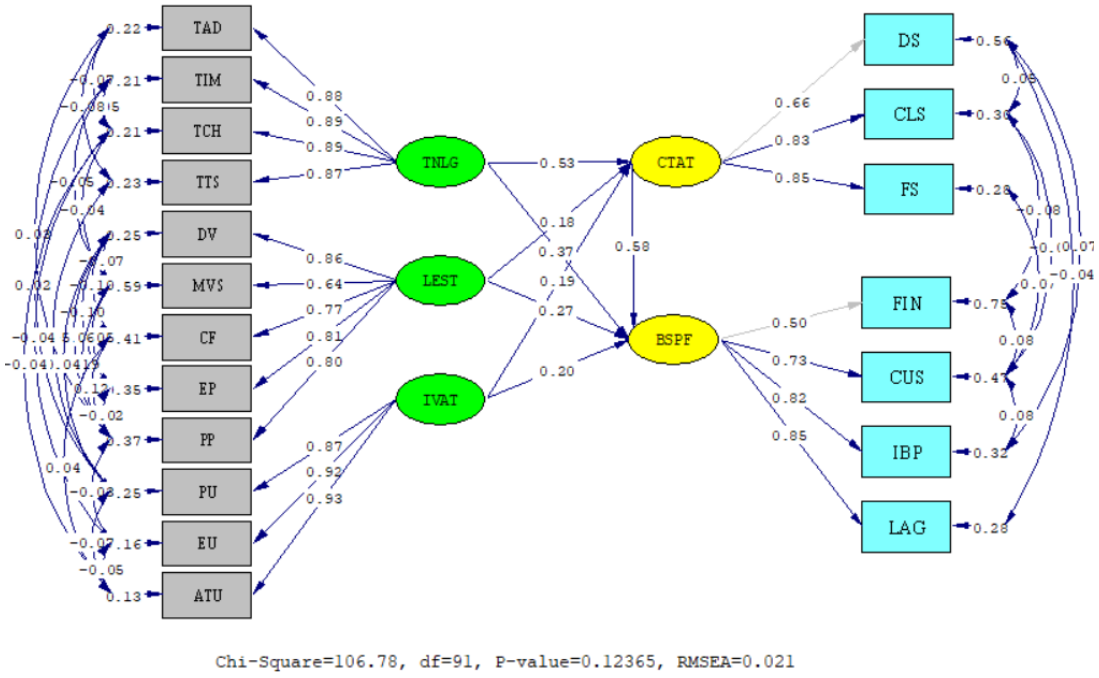

Figure 1: **Hypothesized structural equation model**

DISCUSSION OF RESEARCH FINDINGS

The research findings reveal that technology, lean strategy, and innovation adoption have a direct impact on competitive advantage and business performance for automotive parts manufacturers in Thailand. This is consistent with the theories and previous research discussed in Chapter 2.

1. Technology

The research shows that technology has a positive influence on both competitive advantage and business performance. This aligns with the study by Smith et al. (2019), which highlights that technology plays a crucial role in enhancing production efficiency and reducing operational costs. The adoption of modern technologies, such as robotics and automation, helps businesses gain a competitive edge by shortening production times and minimizing errors, which is reflected in the research results indicating a direct impact of technology on competitive advantage (0.53) and business performance (0.37).

2. Lean strategy

The research indicates that lean strategy affects both competitive advantage and business performance, aligning with the ideas of Womack & Jones (2003), who state that lean strategies reduce waste and enhance production efficiency without sacrificing quality. This supports the work of Ohno (1988), who points out that lean principles can lower production costs and increase business flexibility. The findings show that lean strategy has a direct influence on competitive advantage (0.48) and an indirect effect through competitive advantage on business performance (0.18).

3. Innovation adoption

The research finds that innovation adoption positively affects both competitive advantage and business performance. This is consistent with Rogers' (2003) innovation adoption theory, which suggests that organizations that embrace new technologies and innovations can achieve a competitive advantage. The study also supports Damanpour (1991), who argues that innovation adoption helps organizations adapt and respond effectively to market changes. Our findings show that innovation adoption positively influences competitive advantage (0.46) and business performance (0.34).

4. Competitive advantage

The research shows that competitive advantage is a critical variable linking technology, lean strategy, and innovation adoption with business performance. This result aligns with Porter's (1985) concept that competitive advantage arises from the ability to offer superior products or services compared to competitors, enabling businesses to maintain competitiveness over the long term.

5. Business performance

The research indicates that competitive advantage positively impacts business performance, such as increased productivity, reduced costs, and enhanced customer satisfaction. This supports Kaplan & Norton's (1996) use of the Balanced Scorecard model for measuring business performance and Barney's (1991) research, which emphasizes that competitive advantage is a crucial factor for long-term business success.

The analysis suggests that the integration of technology, lean strategy, and innovation adoption in production processes and organizational management plays a significant role in creating a competitive advantage and improving business performance. This research not only supports previous theories and studies but also underscores the importance of management and business development in an era where technology and innovation are vital for enhancing business competitiveness.

RECOMMENDATIONS FROM THE RESEARCH

1. **Investment in new technologies**
   Automotive industry operators should consider investing in new technologies, such as automation systems and robotics, to enhance production efficiency, reduce errors in the process, and lower production costs. The research indicates that technology positively influences competitive advantage, which can help businesses grow and compete on a global scale.
2. **Adoption of lean strategies**
   Operators should implement lean strategies in production processes and resource management to reduce waste and improve operational efficiency. Lean strategies not only help cut costs but also improve product quality, enabling businesses to compete more effectively in highly competitive markets.
3. **Support for innovation adoption**
   Operators should foster an environment that encourages the adoption of new innovations in operations and production. Embracing innovation will help businesses respond quickly to market changes and maintain a competitive edge. It is also important to focus on training and developing personnel to understand and leverage innovations effectively.

4. **Enhancing competitive capability**
   Competitive advantage is a key factor that helps businesses adapt and operate efficiently in the long term. Therefore, operators should prioritize developing capabilities in production, cost reduction, and value creation for customers, which will enhance overall business performance.

SUGGESTIONS FOR FUTURE RESEARCH

1. **Expand the sample to other industries**
   This research focused on the automotive industry. Future studies should explore other industries with different operational characteristics, such as the electronics or food industries, to compare results and examine differences in factors influencing competitive advantage.
2. **Investigate additional factors affecting competitive advantage**
   In addition to technology, lean strategies, and innovation adoption, future research should consider other factors that might influence competitive advantage, such as human resource management, business partnerships, or the use of AI and Big Data for analyzing and improving production processes.
3. **Conduct qualitative research for in-depth understanding**
   While quantitative research provides a clear overview of factors affecting competitive advantage, additional qualitative research, such as in-depth interviews, will help gain deeper insights into the perspectives and ideas of operators regarding the adoption of technology and innovation in business development.

REFERENCES

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99-120.

Christensen, C. M. (1997). *The innovator's dilemma: When new technologies cause great firms to fail*. Harvard Business School Press.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly, 35*(1), 128-152.

Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of Management Journal, 34*(3), 555-590.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal, 21*(10-11), 1105-1121.

Helfat, C. E., & Peteraf, M. A. (2003). The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal, 24*(10), 997-1010.

Kaplan, R. S., & Norton, D. P. (1996). *The balanced scorecard: Translating strategy into action*. Harvard Business School Press.

Kotter, J. P. (1996). *Leading change*. Harvard Business Review Press.

McGrath, R. G. (2013). Transient advantage. *Harvard Business Review, 91*(6), 62-70.

Mintzberg, H., & Waters, J. A. (1985). Of strategies, deliberate and emergent. *Strategic Management Journal, 6*(3), 257-272.

Ohno, T. (1988). *Toyota production system: Beyond large-scale production*. Productivity Press.

Porter, M. E. (1985). *Competitive advantage: Creating and sustaining superior performance*. Free Press.

Prahalad, C. K., & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review, 68*(3), 79-91.

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.

Schumpeter, J. A. (1942). *Capitalism, socialism, and democracy*. Harper & Brothers.

Smith, J. (2019). The impact of technology on production efficiency in the automotive industry. *Journal of Automotive Technology, 35*(2), 45-60.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509-533.

Utterback, J. M. (1994). *Mastering the dynamics of innovation*. Harvard Business School Press.

Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic Management Journal, 24*(10), 991-995.

Womack, J. P., & Jones, D. T. (2003). *Lean thinking: Banish waste and create wealth in your corporation* (2nd ed.). Free Press.