SUN TZU'S ART OF WAR FIVE VIRTUES LEADERSHIP AND INNOVATION IN LEVERAGING THE EFFICIENCY OF CHINESE BRAND PASSENGER-VEHICLE INDUSTRY IN CHINA

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A dissertation submitted in partial fulfillment of the requirements for the degree of

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DECLARATION

I, Yu Yan, hereby certify that the work embodied in this dissertation entitled "Sun Tzu's Art of War Five Virtues Leadership and Innovation in Leveraging the efficiency of Chinese brand passenger-vehicle industry in China" is result of original research and has not been submitted for a higher degree to any other universities or institutions.

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ABSTRACT

Title : 'Sun Tzu's Art of War Five Virtues Leadership and Innovation in Leveraging the Efficiency of Chinese Brand Passenger-vehicle Industry in China

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This study investigates the influence of Sun Tzu's Art of War Five Virtues Leadership on innovation and operational efficiency in the Chinese brand passenger vehicle industry. The research analyzes the role of innovation in improving industry efficiency. The study proposes strategies to leverage Five Virtues Leadership to enhance competitiveness and performance. Implementing a mixed-methods approach, the study prioritized quantitative research through a questionnaire survey, gaining qualitative insights from in-depth interviews. 495 valid questionnaires were analyzed, alongside interviews with fifteen key informants. The findings revealed: 1) Sun Tzu's Art of War Five Virtues Leadership significantly impacts the efficiency of the Chinese brand passenger vehicle industry; 2) Five Virtues Leadership positively influences innovation; and 3) Innovation contributes significantly to enhancing industry efficiency.

Based on these results, the study offers practical recommendations for enterprises and policymakers to adopt the Five Virtues Leadership framework to strengthen the industry's operational performance. Future research directions are also proposed to explore further the interplay between leadership, innovation, and industry efficiency.

Keyword: five virtues leadership, innovation, efficiency, Chinese brand passenger-vehicle industry

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INTRODUCTION

1.1 Background of the Problem

The automobile was invented in Germany and France in the late 1800s, though Americans came to dominate the automotive industry in the first half of the twentieth century. It was not until 1931 that China produced the first car in Liaoning Minsheng Factory. After 1949, China's emphasis on industrialization promoted the growth of the automotive industry. However, what propelled the development of the industry was the economic reforms of the late 1970s and 1980s, as joint ventures with foreign automakers surged and domestic brands became prominent. Except for the obvious means of transportation, the automobile has impacted our lives in many unnoticed yet crucial ways. It has affected our everyday lives' physical, economic, and social aspects.

The United Nations Economic Commission for Europe (ECE) automotive regulations and the China Automotive Statistical Classification Standard (2005) classified automobiles into commercial and passenger vehicles. **Commercial vehicles** refer to vehicles with more than nine seats (including the driver's seat) or with the primary purpose of carrying goods, including commercial vehicles, heavy trucks, coaches, and buses. **Passenger vehicles** are a crucial segment of the automotive industry and refer to vehicles with fewer than or equal to nine seats (including the driver's seat), designed to carry passengers, including basic passenger cars (sedans), multi-purpose vehicles (MPV), sport utility vehicles (SUV), specialized passenger cars, and minibus.

1.1.1 Current Landscape of the Global Passenger Vehicle Industry

After more than a hundred years of development and evolution, the global passenger vehicle industry has entered a mature stage of development and become one of the largest industries. The passenger vehicle industry has a significant output value, a long industrial chain, and comprehensive coverage, connecting many upstream and downstream industries such as steel, machinery, chemicals, electronics, logistics, services, and finance. It plays a vital role in driving the upgrading of industrial structures and the development of related industries. It is an essential indicator of a country's industrialization level, economic strength, and technological innovation ability.

In 2022, the global production of automobiles was 85.02 million, with passenger vehicle production accounting for 61.6 million or 72.45%. While global automobile sales stood at 81.63 million, of which passenger vehicle sales comprised 57.49 million, or 70.43%. Affected by COVID-19, global passenger vehicle production and sales in 2020 were lower than the same period in 2019. In 2021, the global passenger vehicle industry gradually recovered, with production and sales of 57.05 million and 56.44 million (International Organization of Automobile Manufacturers (OICA), 2022).

China has become the country with the largest global automobile production since 2009. China's annual automobile production accounted for 32% of the global automobile production in 2022. Among the top ten countries in global passenger vehicles production in 2022, China was the world's largest passenger vehicles producer, with a total passenger vehicles production of 23.84 million (all brands of passenger vehicles produced in China), or approximately 38.7% of the global total passenger vehicles production as shown in Table 1.1.

Table 1.1

Top 10 of Global Passenger Vehicles Production in 2022

Country/Region	**Production of Passenger Vehicles**
China	23,836,083
Japan	6,566,356
India	4,439,039
Germany	3,480,357
South Korea	3,438,355
Brazil	1,824,833
Spain	1,785,432
USA	1,751,736
Czech Republic	1,217,787
Indonesia	1,214,250

Source: International Organization of Motor Vehicle Manufacturers (OICA) (2022)

1.1.2 Current Landscape of the Chinese Brand Passenger Vehicle Industry

Chinese Brand Passenger Vehicle refers to the passenger vehicles produced by Chinese-owned companies. Representative brands include Geely, Chang'an, Jianghuai, Chery, Hongqi, BYD, and Lifan. The designation "Chinese brand" distinguishes these vehicles from those produced by international brands or joint ventures with significant foreign ownership, even if manufactured in China.

The Chinese brand passenger vehicle industry started in the 1950s, after years of development, has formed a comprehensive and complete passenger vehicle industry system and has now become an important component of the global automotive industry system. China Association of Automobile Manufacturers stated that from 2010 to 2017, Chinese brand passenger vehicle sales increased from 6.27 million to 10.85 million, with a compound annual growth rate of 8.14%. Since 2018, Chinese brand passenger vehicle production and sales have declined, and the passenger vehicle industry has entered a period of adjustment.

In 2021, the Chinese brand passenger vehicle industry experienced rapid recovery, with sales reaching 9.54 million. In 2022, Chinese brand passenger vehicle sales reached 11.77 million, 49.9% of the domestic market share, maintaining a recovery growth trend and demonstrating strong development resilience, as shown in Table 1.2. Notably, in 2022, the Chinese passenger vehicle brand BYD overtook the joint venture brand Volkswagen with a sales volume of 1.8 million units. This achievement made BYD the annual sales leader in the Chinese passenger vehicle market, ending the long-standing dominance of joint venture brands at the top.

Table 1.2

Chinese Brand Passenger Vehicles Sales Volume

Year	Total	Domestic Share	Global Share
2010	6,273,000	45.6%	7.96%
2011	6,112,200	42.2%	7.24%
2012	6,485,000	41.9%	7.23%
2013	7,222,000	40.3%	8.03%
2014	7,518,000	38.1%	8.28%

Year	Total	Domestic Share	Global Share
2015	8,737,600	41.3%	9.27%
2016	10,529,000	43.2%	10.96%
2017	10,847,000	43.9%	11.15%
2018	9,890,000	42.1%	10.35%
2019	8,470,000	39.2%	9.17%
2020	7,749,000	38.4%	9.83%
2021	9,543,000	44.4%	12.06%
2022	11,766,000	49.9%	15.04%

Source: China Association of Automobile Manufacturers (CAAM) (2023)

1.1.3 The Importance of the Development of the Passenger Vehicle Industry

The passenger vehicle industry is regarded by many countries as a pillar of economic development, representing the overall level and scientific research and innovation capabilities of a country's manufacturing industry. From a production perspective, the passenger vehicle industry has a high degree of correlation and a strong driving force. Furthermore, it is closely related to raw materials such as steel, non-ferrous metals, rubber, plastics, glass, mechanical, and electronic industries and logistics, finance, insurance, and other service industries. Especially in recent years, with the advancement of technology, passenger vehicles have deeply integrated with emerging fields such as new materials, big data, new energy, and chips, driving the rapid development of high-tech industries.

According to data from the National Bureau of Statistics of China, in 2022, China's automotive retail sales accounted for approximately 10.4% of the total retail sales of consumer goods. The revenue and profits of the automotive manufacturing industry accounted for about 7% of the industrial economy, and the import and export trade of passenger vehicles accounted for about 3% of China's commodity trade. In 2022, passenger vehicles accounted for 88.23% of China's total automotive production and 87.71% of its sales, highlighting the dominant position of passenger vehicles in the Chinese automotive industry. The passenger vehicle industry has a huge job market,

including multiple fields such as manufacturing, research and development design, business management, and service guarantee. The development of the passenger vehicle industry can create many job opportunities and provide high-quality work and stable income for workers. In addition, the widespread application of passenger vehicles has expanded people's range of activities, improved their quality of life, and is conducive to promoting the process of urbanization, bringing more power and vitality to global economic development.

1.2 Significance of the problem

Since the reformation, China has introduced multinational automotive companies such as General Motors, Volkswagen, Peugeot, Honda, Toyota, and Nissan through joint ventures, which has led to the rapid rise of China's automotive manufacturing industry. However, joint ventures have long dominated the Chinese automobile manufacturing sector and still encounter several problems.

1.2.1 Main Problems Faced by Chinese Brand Passenger Vehicle Industry

1.2.1.1 Limited Innovation Capabilities

The development of the Chinese passenger vehicle industry has long relied on joint ventures, which only provide manufacturing technology without design technology. Tan and Wu (2023), Cai (2023), and Cai and Hu (2019) point out that Chinese brand passenger vehicles lack technological development, core technologies for high-end automotive manufacturing, research production efficiency, and innovation capabilities and can only engage in low-end limitation. Zhang et al. (2023) mention that Chinese new energy vehicles mainly face problems such as the unreasonable allocation of innovation resources and the need for breakthroughs in key core technologies. Improving technology innovation capabilities is the key to solving problems.

1.2.1.2 Management Issues

Some Chinese brand passenger vehicle companies lack long-term development strategies and clear market positioning, resulting in dispersed resources and the inability to concentrate on investment and innovation in key areas. Wu (2023) points out that some passenger vehicle companies' management teams lack digital strategic planning and data governance, and corporate departments operate independently, wasting resources. Liu and Zhang (2020) believe that Chinese brand passenger vehicle

companies have a short development time, weak car-making foundation, little technology and experience accumulation, weak management capabilities, and have not yet formed a relatively mature management concept. Xu (2017) points out that some passenger vehicle companies have problems with insufficient development team experience and poor information communication. Zhang (2015) points out that the structural lack of talent, weak management foundation, and inadequate innovation in technological reserves restrict the sustainable development of passenger car companies.

1.2.1.3 Talent Shortage

Most passenger vehicle companies face a talent shortage or brain drain problem, especially for highly skilled and key positions. Yu (2020) points out that some passenger vehicle companies have been facing a recruitment shortage, and it is difficult to recruit automobile sales talents that fully meet the requirements. At the same time, excellent sales consultants continue to leave. In 2023, Development Dimensions International (DDI) highlighted a transformative shift in the automotive sector as it enters the New Four Modernization phase: electrification, connectivity, intelligence, and sharing. This evolution is characterized by diverse stakeholders engaging in both competition and collaboration. A major challenge anticipated for China's passenger vehicle industry is the impending dearth of interdisciplinary talent. The Ministry of Industry and Information Technology of China has indicated that by 2025, while there will be a need for 1.2 million experts in energy-saving and new energy vehicles, a staggering talent gap of 1.03 million is expected. Specifically, the new energy vehicle maintenance sector will grapple with an acute 80% talent deficiency.

1.2.1.4 Unstable Quality

According to the National Automotive Consumer Complaint Handling Service Platform (China Automotive Quality Network), in August 2023, a total of 17,882 valid complaints from car owners were received, of which Chinese brand cars received over 9,000 complaints, ranking first. The main issues of complaints are quality issues and service issues. The main manifestations are unstable product quality, significant quality differences between different batches, and various assembly and process issues within the same batch; Sudden or strange faults, such as power outages, stalls, and black screens, have poor reliability; After several years of use, the quality of a new car rapidly decreases, making it difficult to maintain its stability and safety. There is still a certain

gap between the stability, consistency, reliability, and durability of Chinese brand passenger car products and the international mainstream level. Sun and Yang (2012) and Zhu (2018) point out that Chinese brand passenger vehicle companies have problems with unstable quality and lack of core technology. Some Chinese auto brands have faced issues regarding the consistency in the quality of their products, both in domestic and overseas markets.

1.2.1.5 Low Service Level

According to the National Automotive Consumer Complaint Handling Service Platform (2023), the main complaints issues are quality and service issues. Service issues mainly focus on after-sales service and service attitude. For example, some service personnel have low professional quality and cannot provide detailed, standardized introductions. From the perspective of workflow and service, it cannot be fully recognized by consumers. Some 4S store staff were unable to effectively solve the problem of the malfunction, resulting in consumers undergoing multiple repairs.

1.2.1.6 Poor Brand Image

There is a perception challenge for some Chinese brands in overseas markets, where consumers sometimes view them as producing lower quality compared to established brands from Japan, Europe, or the US. There is also the issue of brand characteristics. Chen (2022) points out that some new energy vehicle companies have problems such as poor brand image, weak key core technology capabilities, and insufficient intelligent networking technology. Li and Gao (2021) point out that there is still a certain gap between Chinese brand vehicles and developed countries regarding added value, core technology, and brand efficiency.

In summary, the Chinese brand passenger vehicle industry is confronting problems such as limited innovation ability, talent shortage, unstable product quality, and low service quality, all of which have damaged the brand reputation. Communication barriers, a lack of team experience, and insufficient training are also significant issues. Effective leadership helps drive technological advancement, stimulate innovation, expand market reach, and enhance brand value. Chinese brand passenger vehicle industry is at a critical stage of transformation, and the quality of management talents will determine the future development trajectory of the industry.

Essentially, developing top talent is crucial to meeting the current challenges in the passenger vehicle industry and ensuring the continued growth of the industry.

1.2.2 Efficiency's Important Impact on Automotive Industry

Due to several key factors, efficiency plays a crucial role in the automotive industry.

1.2.2.1 Cost Reduction and Increased Productivity

Oh and Hildreth (2014) said that the automotive manufacturing industry is one of the largest energy-consuming industries. Efficient operations can help automotive manufacturers reduce production costs and increase productivity in the highly competitive global market. By optimizing processes, reducing waste, and improving resource utilization, companies can effectively control costs, thereby maintaining competitiveness in markets with high price sensitivity. Measures such as simplifying assembly lines, automation, and lean manufacturing principles improve production efficiency and allow companies to produce more vehicles within the same timeframe, enhancing market competitiveness.

1.2.2.2 Enhanced Environmental Sustainability and Quality Assurance

In addition to cost reduction and increased productivity, Veres et al. (2018) mentioned that efficiency measures in the automotive industry also significantly impact environmental sustainability and product quality. By reducing emissions, improving fuel efficiency, and minimizing waste generation, automotive companies can improve their environmental performance and comply with regulations. Meanwhile, by reducing defects, errors, and rework, companies can ensure high product quality, meeting customer demands for reliability, safety, and performance, thus enhancing brand image and market competitiveness.

1.2.2.3 Innovation and Competitive Advantage

Halim (2018) stated that efficiency drives innovation and technological advancement in the automotive industry, providing companies with opportunities to differentiate themselves from competitors. By developing new technologies and solutions to improve vehicle performance, connectivity, and sustainability, companies can innovate continuously to meet market demands. Those companies with outstanding

efficiency can offer high-quality vehicles at competitive prices, effectively meet customer needs, and quickly adapt to changing market conditions, thereby gaining a competitive advantage.

1.2.3 From a unique perspective of Sun Tzu's Art of War Leadership

The knowledge system of Chinese management is mainly based on the construction, development, and improvement of Western developed countries' management theories and research paradigms. Over 40 years of reform and opening up, China has grown into the world's second-largest economy with a huge production and consumption market. For a long time, many scholars have followed and researched the Western management theory system. Still, managers in practice engage in management work based on their experience and actual conditions (such as national, public, and enterprise conditions). Disobedience to local conditions often occurs.

Sun Tzu's Art of War (an ancient Chinese military classic) emphasizes the principles of understanding and adapting to changing environments, using resources well, and choosing strategies and tactics wisely. These principles can help Chinese brand passenger vehicle companies better understand and solve their current challenges. By drawing on the knowledge of Sun Tzu's Art of War, businesses can learn to survive and thrive in an ever-changing and competitive environment.

Five Virtues Leadership (wisdom, faith, benevolence, courage, strictness) derived from Sun Tzu's Art of War provides a leadership model that centers on strategic thinking and balances execution and innovation. Wisdom emphasizes leaders' strategic vision and forward-thinking, helping companies anticipate market trends, adjust production and marketing strategies quickly, and improve market response speed and efficiency. This is particularly important for the fiercely competitive market and rapidly changing consumer demands in the automotive industry. The concepts of "faith" and "benevolence" emphasize the importance of leaders in building trust and maintaining team morale. Establishing trust relationships with suppliers and distributors can ensure more efficient collaboration among Chinese brand passenger vehicle companies and enhance brand competitiveness. "Courage" represents the spirit of leaders who dare to innovate and take risks.

Innovation is the key to maintaining a leading market position in the passenger vehicle industry. By encouraging innovation, companies can continuously optimize

product design and manufacturing processes and improve service levels. "Strict" emphasizes discipline and execution, which is the key to ensuring effective strategy implementation. Strict production management and quality control are the foundation for improving production efficiency and brand image. In short, applying the Five Virtues leadership for the Chinese passenger vehicle industry can help companies enhance their strategic adaptability, promote innovation, optimize resource allocation, and improve overall operational efficiency in complex market environments.

Applying the time-honored principles of Sun Tzu's Art of War in tandem with Western leadership indices offers a unique perspective into the leadership dynamics tailored for the modern Chinese brand passenger vehicle industry. The combination of ancient Chinese wisdom and modern Western management theory has the potential to propel the Chinese brand passenger vehicle industry forward, increase efficiency, enhance its global competitiveness, and consolidate its status as a major automotive country.

1.3 Research Question

The research will find possible answers to the following questions:

1) What is the relationship between Sun Tzu's Art of War Five Virtues Leadership, innovation, and the efficiency of the Chinese brand passenger vehicle industry?

2) How can the Chinese brand passenger vehicle industry improve its efficiency?

1.4 Objective

This study aims to improve the efficiency of the Chinese brand passenger vehicle industry. This goal is achieved by addressing the following research objectives.

1) To analyze how Sun Tzu's Art of War Five Virtues Leadership influences innovation and the efficiency of the Chinese brand passenger vehicle industry

2) To analyze how innovation influences the efficiency of the Chinese brand passenger vehicle industry

3) To propose how to use Sun Tzu's Art of War Five Virtues Leadership to promote the efficiency of the Chinese brand passenger vehicle industry

1.5 Scope of the Study

In this study, the scops would be classified as follows:

1) Scope of area

The passenger vehicle enterprises in China.

2) Scope of population

For quantitative research, questionnaires will be distributed to Chinese brand passenger vehicle company managers.

For qualitative research, will select personnel from enterprises and government departments for interviews.

3) Scope of content

This research will be based on the following theories and concepts:

- ✓ Sun Tzu's Art of War Five Virtues Leadership
- ✓ Resource-Based View
- ✓ Trait Theory Leadership
- ✓ Innovation Diffusion Theory
- ✓ Efficiency Theory

4) Scope of time

This research will begin in September 2023 and finish in October 2024.

1.6 Expected Results

1) To clarify the relationship between Sun Tzu's Art of War Five Virtues Leadership, innovation, and the efficiency of the Chinese brand passenger vehicle industry

2) To provide recommendations for the automotive industry to improve efficiency

1.7 Definition

Efficiency refers to the ability of a system, process, or organization to convert inputs (such as energy, time, and resources) into outputs and minimize waste. At the corporate level, efficiency is reflected in its ability to maximize resource utilization and enhance brand value within a specific time, the efficiency of resource use, and the enhancement of brand influence.

Leadership refers to the ability of an individual to influence and guide others toward achieving common goals, set a vision, motivate, and inspire others, make decisions, and foster collaboration and development within an organization.

Sun Tzu's Art of War, known as The Art of War, refers to the ancient Chinese military treatise written by Sun Tzu, a military strategist from the Spring and Autumn period. The book comprises around 6,000 Chinese characters and is divided into thirteen chapters. It is renowned for its strategic wisdom and principles, which have been widely studied and applied in various fields, including management and leadership.

Five Virtues represent a concept derived from Sun Tzu's Art of War that encompasses essential qualities for effective leadership and organizational success. These virtues are typically associated with strategic leadership and include Wisdom, Faith, Benevolence, Courage, and Strictness. While wisdom and benevolence lean towards understanding and compassion, faith, courage, and strictness demand responsibility, bravery, and order. By integrating these virtues, leaders can navigate organizational management challenges, ensuring their teams' well-being and competitiveness.

Passenger Vehicle Industry refers to the automotive industry segment that designs, manufactures, markets, and sells motor vehicles intended primarily for transporting passengers rather than goods. It encompasses a wide range of vehicles with fewer than or equal to nine seats (including the driver's seat), including basic passenger cars (sedans), multi-purpose vehicles (MPV), sport utility vehicles (SUV), specialized passenger cars, and minibus.

Innovation refers to the ability of a system, process, or organization to create and implement new ideas, products, services, or technologies to provide value and drive improvement. This process involves introducing novel solutions to meet emerging needs or enhance existing products and services. At the enterprise level, innovation is reflected in the ability to drive progress and maintain competitive advantage through product, service, and technology changes. Companies can adapt to market changes, optimize operations, and achieve long-term growth through continuous innovation.

CHAPTER 2
LITERATURE REVIEW

Theories and concepts related to this research were collected from textbooks, articles, journals, websites, and related dissertations. The outline of this chapter could be elaborated as follows:

2.1 Resource-Based View
2.2 Sun Tzu's Art of War Five Virtues Leadership
2.3 Innovation
2.4 Efficiency
2.5 Related Literature
2.6 Conceptual Framework, Operational Definition, Hypothesis and Explanation of Hypothesis

2.1 Resource-Based View

The publication of Wernerfelt's (1984) "A Resource-Based View of the Firm" marked the birth of the Resource-Based View (RBV). He defined firm resources as anything that can contribute to the organization's core competitive capabilities, emphasizing the significance of internal resources for the sustained development of the firm. However, he argued that firms are not just participants in market activities but rather unique combinations of various resources. Furthermore, organizations often overlook the impact of internal resources on competitive advantage, instead tending to seek success from industry, market, and product-related factors.

Wernerfelt (1984), Itami and Roehl (1991), and Hall (2009) have categorized resources into two main types: tangible resources and intangible resources. Tangible resources primarily include financial resources (profitability, capital-raising ability), physical resources (equipment, facilities, location), and organizational structural resources (comprehensive management systems). Intangible resources mainly include human resources (management talent, organizational culture), innovation resources (research and development capabilities, innovation capacity), and reputational resources (brand satisfaction, corporate reputation). To some extent, tangible resources can be imitated by competitors, but intangible resources are challenging to replicate and learn

from. They are the critical determinants of a firm's competitiveness. Due to reasons internal to the firm and external factors, each firm possesses different resources, leading to resource heterogeneity. This heterogeneity of resources results in differences in competitiveness among firms, affecting their profitability. Only heterogeneous resources can bring about above-average economic returns for some firms.

Barney (1991) proposed that resources must meet the "valuable, rare, imperfectly imitable, and non-substitutable (VRIN)" criteria to provide a competitive advantage to the firm. A firm's internal resources are crucial sources that guide strategic development and profitability. Wernerfelt (1984), Grant (1991), Collis and Montgomery (2009) emphasized that resources enable firms to develop and maintain their competitive advantages, leveraging these resources and competitive advantages to achieve outstanding performance. These assets and capabilities determine how effectively and efficiently a company performs its functional activities.

Teece et al. (1997) and Eisenhardt and Martin (2000) highlighted that a firm's innovation capability, as a dynamic capability, assists firms in continuously adapting to changing environments. It serves as a source for firms to gain competitive advantages.

Assensoh-Kodua (2019) stated that RBV is important in helping organizations create, nurture, and maintain competitive advantage and understand the collective resources needed to compete favorably in a globalized and highly competitive market.

Chahal et al. (2020) took a meta-analytic approach to statistically combine and critically analyze the application of RBV in operations management from 2007–2020. They identify three primary operational functions/capabilities, namely flexibility, supply chain integration, and organizational capability, that positively impact business performance in general and competitive performance, financial performance, and operational performance in particular.

Collins (2021) said that strategic human resource management scholars have drawn on the resource-based view of the firm to argue that a high-commitment human resource strategy leads to a firm competitive advantage by creating greater firm-level employee-based resources that are rare and valuable.

Kero and Bogale (2023) synthesized empirical research on RBV and the Dynamic Capabilities of firms across various sectors, employing a systematic literature review methodology. Their analysis revealed five major themes related to RBV:

knowledge-based, human, physical, technological, and organizational resources. RBV emphasizes how a firm's resources contribute to its competitive advantage, while Dynamic Capabilities elucidate how firms can cultivate a competitive edge in fluctuating environments.

In summary, resources refer to all assets, capabilities, organizational processes, firm characteristics, information, and knowledge controlled by a firm that can be used to enhance its efficiency and performance and serve as the foundation for strategic implementation. The core of the Resource-Based Theory lies in the belief that different firms possess resources that exhibit heterogeneity, leading to competitive advantages and, consequently, value creation. This theory provides a fresh perspective for exploring the sources of firm competitive advantages. The Resource-Based View effectively explains the origins of firm competitive advantages and the reasons for sustained performance differences among firms within the same industry. It offers valuable insight into the differences in firm efficiency from the perspective of internal resource advantages and competitive strategies.

2.2 Sun Tzu's Art of War Five Virtues Leadership

Leadership has been at the epicenter of academic, business, and managerial research since the inception of organized human endeavors. Over the course of the past century, the definition and understanding of leadership have evolved considerably. Initially, the quest to understand leadership revolved around trait theories, aiming to identify inherent characteristics or qualities of leaders. However, as research progressed, attention shifted to encompass behaviors, styles, and contexts of leadership, probing how they impact the performance of teams and organizations. Moreover, factors such as culture, environment, technological advancements, and globalization have also been increasingly integrated into leadership studies, rendering it a multifaceted and multidimensional field.

2.2.1 Introduction to Sun Tzu's Art of War and Sun Tzu

Sun Tzu's Art of War, known as The Art of War, consists of approximate 6,000 Chinese characters. It is the earliest surviving military book in China and the earliest military work in the world, around 2,300 years before Clausewitz's On War. It is revered as the "Canon of Military Science". Yang (2010) and Huang (2017) mentioned that in

Chinese history, many military strategists and rulers such as Cao Cao (155-220, a powerful official of the Eastern Han Dynasty), Zhuge Liang (181-234, the Prime Minister of Shu Han), Li Shimin (599-649, the second emperor of the Tang Dynasty), Wang Anshi (1021-1086, a politician of the Northern Song Dynasty), and Mao Yuanyi (1594-1640, a powerful minister of Ming Dynasty), highly praised the enormous military value of Sun Tzu's Art of War.

Sun Tzu's Art of War is divided into thirteen chapters: Initial Estimates, Waging War, Strategic Attack, Formation, Momentum, Engagement, Conflict, Nine Variations, Moving the Army, Terrain, Nine Situations, Fire Attack, and Espionage. Xiong (2023) said the book elucidates the principles of achieving victory in warfare, strategic principles, tactical maneuvers on the battlefield, and logistical support for armies. Sun Tzu's Art of War is known for its rich content and concise language, earning it the reputation as a classic in ancient military strategy. The basic principles and ideological methods of Sun Tzu's Art of War have also penetrated social life beyond military affairs and have been widely valued and applied in commercial competitions, enterprise management, sports competitions, diplomatic negotiations, and other activities. Huang (2017) said Sun Tzu's Art of War had transcended the boundaries of time and space and possesses eternal charm.

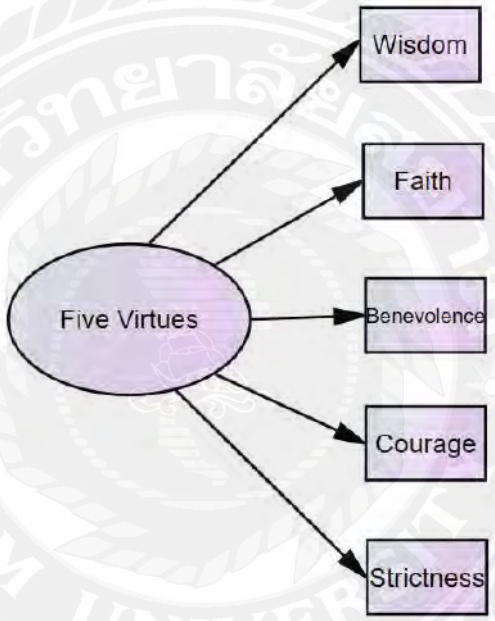
The author of Sun Tzu's Art of War is Sun Wu, whom the Chinese reverently call Sun Tzu. Sun Wu (approximately from 545 BC to 470 BC) was a renowned military strategist, politician, and philosopher during the Chinese Spring and Autumn period. Huang (2017) mentioned, according to historical records, Sun Wu was born into the nobility of the State of Qi (from 1046 BC to 221 BC, a vassal state in Chinese history from the Western Zhou Dynasty to the Spring and Autumn Warring States period) and grew up in a military family with deep roots, laying a solid foundation for his participation in war practice and writing books. Sun Wu is good at drawing on and absorbing past war experiences and is good at modifying and enriching his military theory according to new situations.

The application of Sun Tzu's Art of War to the field of business management has a long history in China. According to the records of Shiji (the first comprehensive historical work in the form of annals and biographies in Chinese history), Bai Gui (a renowned merchant, economic strategist, and financier during the Warring States period in China) applied Sun Tzu's Art of War to commercial competition and made great

achievements. Bai Gui believes that businessmen should have the four virtues of "wisdom, courage, benevolence, and strength", which is very close to Sun Tzu's "Five Virtues"(wisdom, faith, benevolence, courage, and strictness). With the development of the economy, more and more people are interested in the business management thought of Sun Tzu's Art of War. Scholars from China, Japan, South Korea, the United States, and other countries have joined Sun Tzu's Art of War and Business Management research team.

Figure 2.1

Sun Tzu's Art of War Five Virtues



2.2.2 Research Status of Sun Tzu's Art of War and Enterprise Management

After China's reformation, the economy has developed rapidly. Yao and Wu (2014) mentioned that people increasingly recognize the modern value of traditional Chinese classics. This comes as scholars reflect on Japan's economic miracle, which is closely related to the successful application of Sun Tzu's Art of War in Japanese business management. In 1982, Renmin University of China invited Japanese expert Fushi Murayama to make a report on how Japanese business circles applied Sun Tzu's Art of War for business management. The content of the report had a great impact on the Chinese management theory circle. Li et al. (1984) published Sun Tzu's Art of War and Enterprise Management, and there was an upsurge of research on Sun Tzu's Art of War and business management in the Chinese management circle. In terms of the

research of Sun Tzu’s Art of War and business management can be roughly divided into four categories: military, management, business management practice, and training and consulting.

Zhong (2014), Fu (2014), and Okano (2021) pointed out that Japan's research on Sun Tzu’s Art of War and Management was earlier than China's. In 1913, Harada Yuzo published Sun Tzu’s Art of War and a professional work on business management - Business Sun Tzu. In 1939, Miwa Zenhei wrote Sun Tzu and Commercial Warfare, which profoundly impacted the later Japanese research on Sun Tzu’s Art of War and business management. After Japan's defeat and surrender in 1945, it made every effort to develop its economy and achieved brilliant economic achievements. Murayama believes that Japan's economic take-off relies on the "two wheels" of modern American business management theory and Chinese classics represented by Sun Tzu’s Art of War. Ohashi Takeo successively published 55 monographs on Sun Tzu’s Art of War management, such as Management with Sun Tzu’s Art of War, which led the Japanese management circle to form a school of military management, which had a huge impact on the research community of Sun Tzu’s Art of War all over the world. Except for Japan, most of the research on Sun Tzu’s Art of War and business management in other countries began in the 1980s, such as South Korea, Thailand, Singapore, and other countries, which have achieved rich research results.

Zhong (2014) mentioned that the research and application of Sun Tzu’s Art of War in the United States was widespread and in-depth in the 1980s. Nearly a hundred societies, associations or clubs studied Sun Tzu’s Art of War. Vinayan (2012) noted that McNeilly adopted Sun Tzu's principles for business leadership, and in 1996, he encapsulated the concepts and ideas from Sun Tzu’s 'Art of War' into six strategic principles. Michaelson (2001) published Sun Tzu: Sun Tzu’s Art of War for Managers: 50 Strategic Rules, which combines military philosophy from Sun Tzu’s Art of War with corporate strategic management and marketing principles. The book outlines applying Sun Tzu's ideas to modern business strategies and practices, including competition, planning, leadership, communication, and negotiation. Due to its popularity and being translated into multiple languages, a revised version of Sun Tzu: Sun Tzu’s Art of War for Managers: 50 Strategic Rules Updated for Today's Business (2010) was published.

2.2.3 Meaning of Leadership

Leadership has been defined in numerous ways across various disciplines and times, often reflecting the social, cultural, and academic contexts of the era in which the definition was crafted. However, in this context, the leadership for this research will be based on the Five Virtues leadership in Sun Tzu's Art of War.

Stogdill (1974) said that leadership may be considered as the process (act) of influencing the activities of an organized group in its efforts toward goal setting and goal achievement. This definition includes three key parts: it is an interpersonal process between individuals and groups; there is no “leader” without “followers,” and the criterion for effective leadership is the achievement of goals.

Davis (1989) explained that leadership is the ability to persuade others to seek defined objectives enthusiastically. The human factor binds a group together and motivates it towards goals. Davis underscores the importance of leaders inspiring and energizing their followers. Leadership is not mere management or directive authority but a capacity to influence, inspire, and unify a group in pursuit of common objectives.

Bass and Stogdill (1990) pointed out that as many people attempt to define leadership, there will be as many different definitions of leadership. They believe that leadership occurs when one group member modifies the motivation or competencies of others in the group.

Kirkpatrick and Locke (1991) mentioned that leadership was the process of being perceived by others as a leader because of the individual's ability to influence and guide a group toward a meaningful objective.

Kouzes and Posner (2006) defined leadership as motivating others to transcend their boundaries to achieve a common vision. This definition clearly points out the concepts of motivation and achieving common goals.

Ganta and Manukonda (2014) explained that leadership is a kind of power where one person can influence or change another person's values, beliefs, behavior, and attitudes.

Kruse (2013) and Silva (2016) said that leadership is a process of interactive influence, where some people accept someone as their leader to achieve common goals.

Atenya and Nzulwa (2018) found that organizational leadership has the strongest correlation with successful strategy implementation. The sponsor role demonstrates executive leadership support by guiding the project teams responsible for building the strategic components of the strategy.

Santoso (2019) noted that the leadership process is voluntary, collectivity, and is in a traditional or informal social structure. The theory of Asian leadership is local and influenced by the cultural influences of Asian local communities.

Sun Tzu's Art of War records: "A general is wise, trustworthy, benevolent, brave, and strict." Later generations call it "the five virtues of generals." Five Virtues leadership refers to the five qualities that excellent generals should possess. These are the five dimensions of leadership summarized by Sun Tzu: wisdom, faith, benevolence, courage, and strictness. Dimovski et al. (2012), Chen (2020), Sengupta (2020), and Xie (2020) agreed that the Five Virtues of Sun Tzu are the quality requirements for generals and can be applicable to enterprise or government leaders.

Dimovski et al. (2012) explained that Sun Tzu's Art of War contains many descriptions of the attributes of an ideal leader. In describing a perfect general, Sun Tzu lists Five Virtues; wisdom appears to be the most important attribute of the strategic leader in Sun Tzu's Art of War leadership. Wisdom is a much broader concept than intelligence, as it refers to acquiring knowledge and skills through accumulation and the ability to fulfill one’s responsibility.

Sengupta (2020) said that the concept of leadership is diverse. In empirical studies, leadership is applied to varied roles, including a committee leader, business executive, politician, and head of state. The Chinese concept of wisdom emphasizes that wisdom can be acquired through continuous study and practice, unlike the Western notion of intelligence, which is primarily based on the idea of heredity and is a non-malleable concept.

Although there are a variety of leadership definitions, the majority focus on two components, which are the process of influencing a group of individuals to obtain a common goal and develop a vision.

In summary, leadership is a multifaceted and complex concept that involves motivation, influence, goal orientation, value guidance, and strategic implementation. Effective leadership is closely linked to the setting and achievement of goals and

represents an interactive process between individuals and groups. Leadership is about management or directive authority and the ability to inspire and unite a team toward common objectives. Additionally, leaders can change others' values, beliefs, behaviors, and attitudes. In Sun Tzu's Art of War, leadership is defined as combining the Five Virtues: Wisdom, Faith, Benevolence, Courage, and Strictness, which are vital dimensions that excellent leaders should possess.

2.2.4 Trait Theory Leadership

Leadership is motivating, influencing, and guiding others toward achieving common goals. Starting from the 1940s, classical leadership theories gradually emerged, including traits theories of leadership, also known as quality theory or personality theory, which focuses on studying the qualities and characteristics of leaders. Its theoretical foundation is rooted in Allport's personality trait theory.

Early 20th-century researchers in leadership theory believed that leadership traits are inherent, suggesting that only individuals born with these inherent traits could become leaders. This theory emphasizes the impact of a leader's certain quantity of distinctive qualities and traits, which set them apart from others, on their effectiveness in leadership.

Stogdill (1948) analyzed 124 leadership trait studies conducted between 1904 and 1948 and found that eight personality traits (intelligence, alertness, insight, responsibility, initiative, persistence, self-confidence, and sociability) were commonly present. Stogdill (1974) reviewed hundreds of research literature again, and a wealth of evidence reinforced the above conclusions.

Bass and Stogdill (1990) analyzed 163 leadership traits discovered in research conducted between 1948 and 1970, categorizing them into ten essential leadership traits: achievement, persistence, insight, initiative, self-confidence, responsibility, cooperation, tolerance, influence, and sociability. They concluded that personality factors play a role in differentiating leaders from non-leaders and believed that leadership personality traits include integrity, honesty, independence, and emotional stability. Intellectual traits include good cognitive ability, judgment ability, decision-making ability, and wisdom.

Hunt (1991) and Northouse (2007) stated that the trait approach of leadership has a century of research to back it up. No other theory can surpass the breadth and depth of its research. The strength and longevity of this line of research give the trait approach a measure of credibility that other approaches lack.

Kirkpatrick and Locke (1991) believed that effective leaders differ from others in certain key respects. Key leader traits include drive (a broad term that includes achievements, motivation, ambition, energy, tenacity, and initiative); leadership motivation (the desire to lead but not to seek power as an end in itself); honesty and integrity; self-confidence (which is associated with emotional stability); cognitive ability; and knowledge of the business.

Judge et al. (2002) and Peterson et al. (2003) linked personal attributes to leader effectiveness, providing a substantial empirical foundation for the argument that traits matter in predicting leader effectiveness. Germain (2012) believes that decades of research show that having certain personality traits is associated with being an effective leader. Northouse (2007) and Zaccaro et al. (2004) stated that intellectual ability positively relates to leadership. Leaders tend to have higher intelligence than non-leaders. Strong ability, perceptual ability, and reasoning appear to make a better leader.

Germain (2006) found that subordinates perceived leaders as having evidence-based and self-enhancement-based characteristics. Evidence-based items include knowledge, education, qualification, and training. Self-enhancement items include subjective attributes such as ambition, drive, the ability to improve, deduce, assess, intuition, judgment, self-assurance, self-confidence, extraversion, and charisma. Northouse (2007) summarized the leadership traits that are central to the trait approach theory as follows: intelligence, self-confidence, determination, integrity, and sociability.

Germain (2012) said that the trait approach focuses exclusively on the leader, not on the followers or the situation. This makes the trait approach theoretically more straightforward than other approaches, such as situational leadership. In essence, the trait approach concerns what traits exhibit and who has those traits. This approach emphasizes that having a leader with certain traits is crucial to effective leadership. The leader and his or her personality are central to the leadership process.

Northouse (2021) pointed out that although the traits of leaders may vary from person to person, intelligence, honesty, courage, and competence are fundamental traits that can help leaders succeed in different situations. Intelligence refers to the cognitive and cognitive abilities of a leader. High-intelligence leaders are more likely to understand complex problems, make effective decisions, and solve challenges. Honesty refers to a leader's honesty, integrity, and sincerity. An honest leader can build trust and respect because team members trust their promises and promises. Honest leaders are also more likely to establish good communication and cooperative relationships with team members. Courage refers to the firmness and bravery of a leader when facing challenges and difficulties. Courageous leaders can take risks, try new ideas and methods, challenge tradition, and drive organizational development and innovation. They can also remain calm and stable during difficult times, supporting and motivating team members. Competence refers to a leader's professional knowledge, skills, and experience. Capable leaders can demonstrate outstanding performance in specific fields, significantly impacting the organization's operation and development.

Funk (2022) said that the trait leadership theory is a benchmark for identifying suitable leaders. Successful leaders require many traits and skills. For instance, leaders need to be confident, empathetic, and possess a high level of self-esteem. They must also exhibit a sense of responsibility, adaptability, and strategic thinking, with foresight into the future success of the company or the projects at hand.

Germain (2012) stated that the trait theory lacks strong predictive power and may overlook situational specificity. Funk (2022) pointed out that one major issue with the trait leadership approach is the absence of a definitive list of leadership traits. Due to the extensive body of research, countless traits exist, making it challenging to discern which traits contribute most significantly to a leader's effectiveness. Despite these shortcomings, individuals at all levels and in all types of organizations can apply the trait theory. The trait theory suggests that organizations will operate more effectively if managerial personnel possess designated expertise profiles. Organizations can specify the characteristics or traits that are important for particular positions and then utilize personality assessment measures to determine if an individual fits their requirements. Therefore, trait assessments can aid managers in determining if they possess the qualities for lateral or vertical movement within the company. The trait theory provides us with benchmarks for what traits we should possess if we aspire to be leaders.

2.2.5 Concepts and Theories Relevant to Sun Tzu's Art of War Leadership

The leadership concepts of Sun Tzu's Art of War Five Virtues Leadership and Trait Theory Leadership are both significant in leadership studies. Although they stem from different cultural backgrounds and academic traditions, they share some connections and similarities. Sun Tzu posits that an outstanding leader needs to embody five virtues: wisdom, faith, benevolence, courage, and strictness. These virtues support each other and collectively form a complete leadership image. Trait Theory Leadership, on the other hand, is a prominent theory in modern leadership studies that focuses on leaders' personal traits and characteristics. According to this theory, an excellent leader possesses a set of specific attributes such as decisiveness, self-confidence, a sense of responsibility, and composure. These traits enable leaders to influence and inspire their teams, leading to success effectively.

According to Resource-Based View, the long-term competitive advantage of a company stems from its possession and effective utilization of resources and capabilities. Leadership is crucial in organizations as it influences the direction, culture, decision-making, and employee behavior. From the Resource-Based View perspective, leadership is considered an intangible resource due to its scarcity, inimitability, value, and sustainability. These characteristics make excellent leadership an essential factor in gaining a competitive advantage for a company.

Mok (2015) explained that the elements of flexibility, innovation, variation, contingencies, and leadership are incorporated in Sun Tzu’s principles and strategies. Sun Tzu proposed using innovation to solve unexpected situations. Through this approach, companies can create more profits, improve marketing and sales, and improve goals related to work efficiency, motivation, and increased corporate responsibility.

Law et al. (2016) explored how Sun Tzu's military strategy affects business leaders, particularly Chinese business leaders in Malaysia, regarding change, performance, and leadership. Through inductive analysis, the influence of Sun Tzu's Art of War Leadership philosophy on leadership has become apparent. Specifically, these influences are centered on dimensions such as strategic mindset, proper planning and execution, and leadership qualities.

Jin (2017) interpreted the Five Virtues with specific indicators of Western psychology and found that the Five Virtues leadership element system is similar to the six virtues of positive psychology. These six virtues are specifically wisdom and knowledge, courage, humanity, justice, temperance, and transcendence.

Liu and Zhang (2017) combined the full text of Sun Tzu's Art of War to analyze the five aspects of "wisdom, faith, benevolence, courage, and strictness". They believed that Sun Tzu's "way of being a general" is an important criterion for measuring general talent, and it is also an important criterion for enterprises to select talents.

Through an extensive literature review, Hughes et al. (2018) found that there is clear theoretical and empirical evidence demonstrating that leadership is an important variable that can enhance or hinder workplace creativity and innovation.

Sadeghi and Rad (2018) asserted that innovation is a key factor distinguishing organizations in highly competitive markets today. Through empirical analysis, they demonstrated a significant and positive relationship between knowledge-based leadership and innovation performance, with a coefficient of 0.73.

Xu (2018) compared the performance of business leaders' wisdom, benevolence, and courage with the company's competition-cooperation preferences and found that entrepreneurs' inherent capabilities and their preferences for different competition-cooperation options with upstream and downstream or peer companies have a significantly positive relationship.

Chaubey and Sahoo (2019) conducted a structured questionnaire survey and data analysis among engineers, managers, and R&D professionals from southern India's car manufacturing and R&D units. Empirical findings demonstrated that transformational leadership positively impacts employee creativity, mediated by intrinsic motivation, contributing to the enhancement of organizational innovation.

Santoso (2019) proposed that Western leadership theory is developed from an organizational perspective, emphasizing competition to acquire resources and sustain the organization's existence. The process of leadership in the West is described as mechanical, formal, and transactional. The methodological differences between Asian and Western leadership theories align with the concepts of low-context and high-context cultures. This implies that Western leadership theory focuses on specific, explicit

organizational goals and processes, whereas Asian leadership theory emphasizes the overall harmony of teams and relationships.

Huang (2020) agreed that the Five Virtues influence and complement each other, forming the complete image of a successful leader or decision-maker. The Five Virtues' essential qualities and sorting logic reflect the universal attributes that ordinary leaders should possess. "Courage" requires strategy, and the combination of "wisdom" and "courage" makes a good general and leader. Both "benevolence" and "strictness" complement each other and cannot be neglected. "Faith," "benevolence," and "courage" are requirements for the character, while "wisdom" and "strictness" are requirements for talent.

Chen (2020) transformed the Five Virtues into indicators to measure the quality of entrepreneurs and established a research model on the relationship between entrepreneurial quality and business performance. The research results indicate that the entrepreneur quality model based on the Five Virtues leadership is theoretically reasonable and has practical operability.

Novitasari et al. (2020) measured the impact of authentic leadership style on innovative work behavior in a manufacturing company in Indonesia through empirical research. The research results indicate that authentic leadership can become a predictive factor for employees' innovative work behavior. Authentic leadership style has a positive and significant impact on innovative work behavior.

Wang (2020) believed that trait theory of leadership focuses on identifying and studying the inherent qualities and traits that make individuals effective leaders. The concept of leadership in Sun Tzu's Art of War aligns with trait theories because it acknowledges the importance of inherent characteristics and traits in effective leadership. For instance, wisdom as a leadership trait plays a significant role for leaders in addressing challenges, making wise decisions, and achieving success.

1st Virtue: Wisdom

Chen (2008) pointed out that according to Sun Tzu’s description of wisdom, wisdom contains three levels of meaning. 1) Profound knowledge: Effective leadership activities rely on applying knowledge. 2) Correct decision-making: Decision-making ability is the core ability of leading cadres. 3) Be resourceful and changeable: Leaders should be able to adapt to changing circumstances, analyze situations, predict

development trends, and adjust strategies in a timely manner according to changes in objective circumstances.

Duan (2017) and Liu and Zhang (2017) pointed out that Sun Tzu believed that the wisdom of generals is reflected in two aspects: one is the macro management art of strategy formulation, and the other is the micro command art of tactics. The leader's management wisdom is expressed in formulating and implementing strategies for the enterprise and guiding the team to realize the enterprise development strategy. Furthermore, a wise person should be knowledgeable and resourceful, able to understand things correctly, foresee changes in situations, and have the ability to overcome difficulties, solve problems, and defeat the enemy.

Dimovski et al. (2012) and Sengupta (2020) said that the Chinese people's concept of wisdom is multidimensional and requires continuous learning and practice to obtain it. Wisdom is the meta characteristic of leadership in Sun Tzu's thinking. More conceptual work is needed to refine and concretize wisdom and establish its effectiveness in leadership research.

Wisdom is often associated with strategic decision-making and long-term vision, which is essential for efficient resource allocation. According to Hlavatý and Ližbetin (2021), globalization of markets, intense competition, and rapid innovation require managers to make quick and correct strategic decisions. Five Virtues Leadership guides managers in making correct and quick strategic decisions. Wisdom enables leaders to foresee potential challenges and opportunities, making informed decisions that enhance efficiency. This aligns with Chan (2024), which emphasizes the importance of foresight in resource optimization. Sun Tzu believes that fixed costs increase over time, emphasizing resource optimization, similar to how to improve the efficiency of modern enterprises.

Wisdom involves deep understanding and insight, which are crucial for identifying opportunities and navigating complex challenges in innovation. According to Arokodare and Asikhia (2020), strategic foresight is essential for driving innovative processes and adapting to market changes. Wisdom enables leaders to balance short-term gains with long-term innovation goals, aligning with Katarzyna (2020), who underscores the crucial role of strategic vision in fostering innovation.

In summary, "wisdom," as mentioned in Sun Tzu's Art of War, refers to a leader's possession of comprehensive and rich knowledge, the ability to correctly understand things, make good use of various resources, and possess the skills to overcome difficulties and solve problems. It also implies adapting to change and making correct decisions based on the changing objective circumstances.

2nd Virtue: Faith

Chen (2008) and Huang (2020) pointed out that Sun Tzu believed that a general must be trustworthy, keep promises, and be careful not to go back on his words and change orders overnight. As for "faith", the rules set by leaders must be consistently implemented, as they vary from person to person.

Hao and Yazdanifard (2015) said that if employees trust their leaders, their performance and commitment will improve. If the situation is the opposite, it may lead to a high employee turnover rate in the organization.

Duan (2017) believed that "faith" is the basis for the survival of enterprises. The "faith" of corporate leaders has three meanings: 1) Be trustworthy in rewards and punishments, enabling employees to abide by various rules and regulations consciously; 2) Fully trust subordinates and mobilize employees' initiative and enthusiasm; 3) Actively fulfill social responsibilities and win the trust of society and the public.

Faith, understood as trust and reliability within the organization, can significantly impact team dynamics and cooperation. Zhang and Nasir (2022) noted that Faith and Benevolence help companies to actively fulfill their corporate social responsibilities and help corporate management shape a good brand image, thereby improving corporate efficiency. This is consistent with virtuous leadership discussed by Piper (2021), who argued that we should embrace the virtuous approach to leadership. Emphasizing the importance of virtue for leadership is entirely appropriate; moral virtue is crucial for strong leadership, and subordinates would greatly increase efficiency and productivity.

Faith plays a vital role in promoting a risk-taking culture necessary for innovation. Chen et al. (2021) suggest that team trust leads to greater openness to experimentation and creative problem-solving. Five Virtues Leadership, through the virtue of faith, builds a foundation of mutual trust that encourages employees to share ideas and take calculated risks, which are essential for innovative breakthroughs. This

complements the findings of Rulinawati et al. (2024), which link trust-based leadership to enhanced innovation outcomes.

In summary, in enterprise management, leaders must consistently implement established rules without individual differences. "Faith" includes a fair reward and punishment system, full trust in subordinates, and fulfilling social responsibilities.

3rd Virtue: Benevolence

Chen (2008) emphasized that "benevolence" is not doting but care and cherishing based on strict management. Duan (2017) pointed out that the "benevolence" of corporate managers is to not treat employees as subordinates and tools, but to be full of care for employees and to be people-oriented.

Huang (2020) pointed out that the "benevolence" mentioned by Sun Tzu has two levels of meaning for generals. 1) The shallow level of "benevolence" means that as a general, he should be kind and generous, have a compassionate heart, be able to care for ordinary soldiers, and love the general public. 2) The deep-seated "benevolence" refers to the leadership style of a general, the mind and capacity he should possess, and the ability to be open-minded and tolerant. Listening to other people's opinions with an open mind and brainstorming ideas.

Benevolence, or a leader's compassion and care for subordinates, can enhance employee motivation and loyalty. Kurdi et al. (2020) pointed out that benevolence can create a positive organizational climate, promote employee satisfaction and retention, and thus improve the efficiency of corporate operations.

Benevolence fosters an inclusive and supportive environment where creativity can thrive. Arghode et al. (2022) discussed how empathetic leadership can unlock employee potential and enhance creativity and innovation. Khairy et al. (2023) said benevolence encourages a collaborative atmosphere where diverse perspectives are valued, leading to more creative and innovative solutions. Yao and Hao (2023) mentioned that benevolent leadership positively impacts employee innovation behavior and new venture performance. This virtue contrasts with transactional leadership styles, which may stifle creativity by focusing solely on performance metrics.

In summary, Sun Tzu's thought emphasized the important role of "benevolence" in military leadership and business management. A general or decision-maker should be kind and care for subordinates and ordinary people, actively listen to different opinions

and suggestions, and show an open and tolerant attitude towards people and things. This helps them better understand and solve problems and enhances team cohesion and cooperation spirit.

4th Virtue: Courage

Chen (2008) and Duan (2017) believed that business leaders, first, should have a pioneering and innovative spirit and the courage to take risks; secondly, leaders should make decisive decisions instead of hesitating and missing opportunities. When encountering difficulties and criticism, leaders are not afraid of hardships and obstacles, always persisting in moving the right direction. "Courage" and "Wisdom" should be unified and gain the support of "Wisdom".

Wan (2017) assumed that courage is particularly important for leaders in the workplace, as they must address difficult issues and innovate. Courage leads to a virtuous cycle, positively impacting the individual, others who witness acts of courage, and the organization. On the other hand, a lack of courage may lead to a vicious cycle.

Huang (2020) pointed out that the "courage" mentioned by Sun Tzu has two meanings. First from a low level, "courage" means not being afraid of sacrifice or daring to fight. Second from a higher level, "courage" requires generals to have a resolute spirit of responsibility, dare to take responsibility, not complain to superiors, and not blame others.

Courage in leadership is essential for staying competitive in dynamic markets. Radomska et al. (2021) found a positive relationship between risky strategy and firm performance. In Five Virtues Leadership, courage enables leaders to make bold decisions, contributing to short-term efficiency and long-term sustainability. This aspect contrasts with risk-averse leadership models that may prioritize stability over efficiency.

Courage is the most directly linked virtue to innovation, as it involves the willingness to embrace uncertainty, challenge the status quo, and risk-taking. Chatterjee et al. (2020) argued that courageous leadership is critical in initiating and sustaining innovative projects, particularly in the face of resistance or failure. In Five Virtues Leadership, courage empowers leaders to make bold decisions and explore uncharted territories, driving innovation forward. This is supported by Giaccone and Magnusson (2022), which highlights the significant effect of risk-taking on innovation performance.

In summary, "courage" is not only fearlessness and strength in the face of dangers and difficulties but also includes decisiveness in daily decision-making and management. A good leader should be able to make wise and quick decisions in the face of uncertainty and risk without hesitating or procrastinating. This decisiveness comes from an in-depth understanding of things and evaluating various possible outcomes, which is "wisdom".

5th Virtue: Strictness

Chen (2008) pointed out that Sun Tzu's explanation of "strictness" contains three levels of meaning.1) The laws and regulations are strict. Discipline will inevitably be loose without strict rules and regulations; 2) Rewards and punishments are strict and interdependent. If you only punish but not reward, you will become ruthless and keep people away, and punishment will not achieve the expected effect. If you only reward but not punish, you will become unprincipled and doting; 3) Be strict with yourself. Leaders must be strict with themselves, be strict with themselves, and be lenient to others.

Duan (2017) mentioned that "strictness" refers to strict discipline, and only strict requirements can achieve strict military discipline. The same is true in business management. Create a strict environment in the team to ensure the team's execution ability.

As a virtue, strictness emphasizes discipline and adherence to procedures, which are critical for efficient operations. Juliana et al. (2021) highlighted the role of procedural rigor in minimizing errors and optimizing workflow. Similarly, Li et al. (2021) noted that strict management can promote the optimal allocation of manufacturing resources and improve resource utilization efficiency. Within the Five Virtues Leadership framework, strictness ensures effective resource utilization, meticulous process adherence, and the achievement of organizational goals efficiently. This aligns with Mairia et al. (2021), who emphasized the importance of disciplined leadership in achieving operational excellence.

Strictness ensures that innovative processes are disciplined and aligned with organizational goals. Wang et al. (2023) said that there should be a balancing act between kindness and strictness, and they believed strictness could help improve a firm innovation capability and performance. Gaspary et al. (2020) mentioned that

characteristics such as strictness, control, and a high level of execution discipline help promote innovation. In the Five Virtues framework, strictness ensures that innovation efforts are well-managed and resources are efficiently utilized, preventing waste and maximizing the impact of innovative activities.

In summary, a strict discipline system includes clear rules and regulations and must also be accompanied by a reasonable reward and punishment system. A good leader knows how to balance strictness and compassion and keep the team in order while stimulating the team's enthusiasm and fighting capacity. For any organization, a management system that is both fair and humane is the key to success.

2.3 Innovation

2.3.1 Meaning of Innovation

Greenacre et al. (2012) mentioned that Schumpeter pointed out in 1911 that innovation is establishing a new production function, realizing a previously nonexistent combination of production factors and conditions. Schumpeter emphasized that innovation was not just the invention or improvement of technology or processes but, more importantly, how they are integrated into actual production and market operations. Innovation is not a one-time event but a continuous process, requiring consistently incorporating new inventions and discoveries into production and market operations to achieve sustained economic and societal development.

De Vires et al. (2014) defined innovation as introducing new elements into a service—new knowledge, new organization, new management/skills. This definition focuses on the new within a service.

Kanagal (2015) explained that innovations are the creation and exploitation of value providing or value built in newness or differences in products, processes, technologies, methods, and business models. Innovation leads to a process of change in organizations and their market offerings. It is vital for winning customers and markets by developing sustainable competitive advantages.

According to the Oxford Dictionary (2016), innovation refers to innovating, introducing novelties, and altering what is established by introducing new elements or forms. Innovation is the act of using existing thinking patterns to propose insights that are different from conventional or ordinary thinking, utilizing existing knowledge and

materials to improve or create new things, including but not limited to various products, methods, elements, paths, environments, and achieving certain beneficial effects.

Taylor (2017) said that innovation can be considered as being a product or process that is new or existing but has been improved. Four types of innovation are identified, namely total innovation, expansionary innovation, evolutionary innovation, and developmental innovation.

Edwards Schachter (2018) pointed out that innovation is a complex socio-cultural process involving diverse actors and sources of knowledge. Its nature is evolving from innovation for economic productivity to innovation for sustainability, from risky innovation to socially responsible innovation, and from narrow conceptualizations to broadening the socio-techno-cultural perspectives of innovations.

Fagerberg (2018) explained that innovation describes a sense of purpose to the evolution of humanity, explained in terms of the creative capacity of invention as a source of technological, social, and cultural change.

Kahn (2018) mentioned innovation is an outcome, a process, and a mindset. As an outcome, it emphasizes the desired results, such as product, process, marketing, business model, supply chain, and organizational innovations. As a process, it defines how innovation should be organized, including the innovation process and new product development. As a mindset, it involves internalizing innovation by individuals and fostering a culture of innovation within the organization.

Varadarajan (2018) said innovation creates value by using relevant knowledge and resources to convert an idea into a new product, process, or practice or improve an existing product, process, or practice.

Kamalirad and Hashemi (2022) said that innovation is a key driver of sustainable competitive advantage, and in the current business environment, innovation is essential for organizations and plays an important role. Li et al. (2022) mentioned that innovation is successfully implementing creative ideas within an organization.

Pelenk (2023) found out that innovation refers to both a process and an outcome, it can happen in the company’s products or services. Innovation is the transformation of new ideas into output that creates value. Businesses can increase their productivity by gaining competence in innovation.

In summary, innovation is a multifaceted concept that involves transforming new ideas into valuable new products, services, or technological practices. It encompasses creating and exploiting novelty in these areas, serving as both an outcome and a process, and fostering a culture of innovation. Innovation is key for sustainable competitive advantage and involves not just entirely new creations but also improvements to existing products, services, and technologies.

2.3.2 Diffusion of Innovations Theory

Miller (2015) stated that the Diffusion of Innovations Theory was first introduced by Rogers in 1962, focusing primarily on how new ideas, products, and technologies spread within society or organizations. According to Rogers' theory, the diffusion process of innovation includes five stages: knowledge, persuasion, decision, implementation, and confirmation. He also categorizes adopters into five types: innovators, early adopters, early majority, late majority, and laggards, each adopting new products or ideas at different times. Additionally, Rogers pointed out four main elements (the innovation itself, communication channels, time, and social system) and several key factors (such as observability, compatibility, trialability, relative advantage, and complexity) that influence whether individuals or organizations decide to adopt or reject new technology.

Chursin et al. (2016) believed that the advanced competitiveness of high-tech enterprises in the global market can only be ensured through the continuous introduction of innovative technologies. They performed mathematical modeling of economies to show how introducing various innovative technologies changes the competitiveness of output.

Diffusion of Innovations Theory has deepened our understanding of the dissemination and acceptance of innovation. By identifying different types of adopters and understanding their characteristics and needs, organizations can more effectively disseminate innovation and encourage more people or organizations to adopt new technologies or ideas. Understanding the various factors affecting the diffusion of innovation, such as communication channels and social systems, can help organizations better position their innovation strategies, thereby achieving faster and more extensive diffusion of innovation.

Du Plessis and Smuts (2021) proposed the Diffusion of Innovation Experience Model, which focuses on the individual employee's experience and reaction to change when adopting new technologies. Organizations can refer to this model to encourage and facilitate employees' adoption and adaptation to technology within the organization. By applying the Diffusion of Innovation Experience Model, organizations can improve their change management practices regarding technological changes and increase the success rate of technology adoption within the organization.

Diffusion of Innovations Theory is intimately related to enterprise efficiency, guiding businesses to effectively promote and adopt new technologies, products, or methods. Companies can significantly enhance production efficiency and reduce costs by introducing new production technologies and processes. Additionally, by rapidly adopting and implementing innovations in the market, businesses can bolster their market competitiveness and meet the diverse needs of various consumers. With insights from the Diffusion of Innovations Theory, enterprises can make more informed and swift decisions about adopting specific innovations, thus reducing the risks and uncertainties associated with innovation adoption. Furthermore, this theory aids businesses in establishing and promoting an innovation culture within the organization, stimulating employees' enthusiasm and practices for innovation, ultimately realizing the company's sustainable development, and continuously strengthening its competitive advantage.

2.3.3 Concepts and Theories Relevant To Innovation

According to the Resource-Based View, innovation should be considered as an intangible resource. Innovation helps companies attract more consumers by continuously launching new products, services, or solutions. Innovation promotes the integration of human resources, funds, and technology in enterprises. The innovation process is not only the development of new products or services but also the process of organizational learning and adaptation. Through innovation, enterprises can accumulate experience and knowledge. Therefore, innovation helps to improve the efficiency and competitiveness of enterprises.

Morris (2013) explained that innovation is the only source of sustainable competitive advantage because companies adapt through innovation. The dimensions of innovation can be divided into incremental innovation, breakthrough innovation, and

Business model innovation. Business model innovation is often the most powerful among these three types of innovation.

Choudhary (2014) said an organization must innovate for long-term success. He studied four key traits of organizations that can sustain innovation. One of them is leadership committed to innovation. Wu and Chiu (2015) mentioned that innovation capability is a valuable resource for competitive performance.

Hiller and Beauchesne (2014) identified core self-evaluation, narcissism, need for achievement, and risk propensity as some notable leadership traits that better explain how leaders' characteristics predict organizational outcomes such as innovation and performance.

Xu (2015) investigated the relationships between the two knowledge dimensions (knowledge breadth and knowledge depth) and two types of innovations (radical innovation and incremental innovation). The results demonstrate that while knowledge breadth positively contributes to radical innovations and knowledge depth positively contributes to incremental innovations, both relationships are subject to diminishing returns.

Eisner (2016) studied ten signature traits among leaders who lead innovation, including intelligence and integrity, which closely align with the "Wisdom" and "Faith" principles of Sun Tzu's Five Virtues of Leadership.

Antunes et al. (2017) found through empirical research that companies that adopt process innovation strategies can improve performance in both operational and financial aspects. Product innovation can only enhance an organization's financial performance.

Latorre (2018) said that the Price Waterhouse Coopers (PwC) survey results indicate that newer vehicles will be distinguished primarily by their innovative technology involving assisted driving and global connectivity innovation-related challenges reshaping traditional auto industry structures and relationships.

Lin et al. (2019) studied the relationship between firm-level green innovation strategy and corporate financial performance. The empirical results indicated that the green innovation strategy positively affected the corporate financial performance.

Casidy et al. (2020) said that service innovation is essential, particularly for companies operating in highly competitive environments, as it can lead to innovation adoption behaviors, influencing overall business performance.

Bibi and Afsar (2020) stated that innovation often comes with risks and uncertainties, and courage plays an important role in taking risks. He examined the relationship between behavioral courage and innovative work behavior, and the results showed that behavioral courage was positively associated with innovative work behavior.

Kafetzopoulos et al. (2020) comprehensively considered environmental uncertainties and believed that in situations of high uncertainty, enterprises should focus on three dimensions of product, marketing, and process innovation. In situations of low uncertainty, focus should be on three dimensions process, organizational, and product innovation.

Xu and Chen (2020) used the stochastic frontier model to analyze the innovation efficiency and factors influencing China's new energy vehicles industry. They then concluded that the innovation level of China's new energy industry is low. They emphasized the critical role of innovation in China's new energy vehicles industry and suggested that the Chinese government should incentivize enterprises to improve their technical innovation level. Azeem et al. (2021) mentioned that innovation is widely recognized as a critical driver of organizational efficiency, enabling firms to optimize resources, improve processes, and enhance overall performance.

Product innovation involves the development of new or significantly improved products that meet evolving market demands. As Afum et al. (2021) highlighted, product innovation can streamline business operations, reduce waste, and improve production processes. By introducing innovative products, firms can achieve higher economies of scale and optimize their production lines, thereby reducing costs and enhancing efficiency. This view aligns with Qiu et al. (2020), who emphasized the pivotal role of product innovation in strengthening competitive advantage.

Guerola-Navarro et al. (2021) found that the dimensions of innovation include product, process, administrative, marketing, and service. Gupta (2021) divided innovation into product, marketing, and process innovation. Research has shown that product and marketing innovation significantly and positively impact corporate

performance. In contrast, process innovation exhibits indirect effects mediated by marketing innovation.

Technology innovation, encompassing the adoption of new technologies and the development of technological solutions, is a critical driver of efficiency in modern organizations. According to Li et al. (2021), low-carbon technological innovation significantly and positively impacts the performance of manufacturing enterprises. Technology innovation enhances efficiency by automating processes, improving data management, and reducing manual labor. Shao et al. (2020) emphasized that technological innovation reduces production costs and increases operational efficiency through continuous improvement and upgrades. This view aligns with Wang et al. (2021), who found that technology innovation plays a key role in driving efficiency improvements across various industries.

Boonsuwan and Siriwichai (2022) pointed out that most automobile manufacturers have encouraged new technology knowledge to improve their competitiveness, efficiency, and optimism in performance. Most multinational automobile companies enhance their value and revenue efficiency through innovation, such as developing new products and implementing high-tech technologies. Improve the efficiency of enterprise innovation by exploring new knowledge with radical innovation capabilities.

Mai et al. (2022) stated that leadership is one of the most important factors that plays a key role in firms' innovation. Leaders have positively influenced organizational innovation by fostering inspiration and intellectual stimulation and strengthening management practices, processes, and structures.

Service innovation creates new or improved services that enhance customer satisfaction and operational processes. Katragadda (2023) discussed how service innovation can improve efficiency by automating routine tasks, improving customer interaction, and reducing service delivery times. In the context of organizational efficiency, service innovation enables firms to optimize resource allocation, enhance service quality, and reduce operational costs. This is supported by Ravishankar and Christopher (2020), who introduce different approaches to service innovation and highlight the positive impact of service innovation on increasing efficiency and reducing costs.

2.4 Efficiency

2.4.1 Meaning of Efficiency

Alexander (2009) noted that efficiency became an important technological value during the nineteenth and twentieth centuries as part of the construction of modern industrial society. Efficiency remains an important post-industrial value, particularly in continuing concern about waste and wise resource management.

Heckmann et al. (2015) explained that while effectiveness means that achieving a predefined goal can be guaranteed even if conditions are adverse, efficiency refers to minimal spending of resources to reach this goal.

Gonzalez (2015) pointed out that economic efficiency is obtained by comparing the optimal revenue, cost, profit, or any other data that considers an appropriate quantity and price, and it is defined as the behavioral goal of the production unit.

Agrimonti (2016) said that evaluation of technical efficiency is intended to help public policy-makers efficiently allocate limited resources.

Lindholm and Searle (2016) mentioned that efficiency is an economic term that means increasing the output of constant resources.

Lande (2017) mentioned that whereas allocative efficiency concerns the overall placement of resources in the economy, productive or technical efficiency refers to individual firms' use of resources most effectively. Productive efficiencies are crucial to any economy, whether in innovation, purchasing, manufacturing, marketing, distribution, or transportation.

Mykhailenko (2018) pointed out that representatives of the Classical School consider efficiency as a comparative ratio of production factors to their productivity and resource availability; the Neoclassical School considers efficiency from the point of view of social reproduction quality.

E. Burches and M. Burches (2020) said efficiency is doing things in the most economical way. Dabab (2020) defined efficiency as the ratio of actual output to effective capacity.

According to the Cambridge Dictionary (2023), efficiency refers to the quality of achieving the largest amount of useful work using as little energy, fuel, and effort. the quality of working well organized without wasting time or energy.

In summary, efficiency is a multifaceted concept broadly defined as achieving maximum productivity and desired outcomes with minimal waste of resources, time, and effort. It encompasses various dimensions, including economic cost-effectiveness, optimal use of capacity, and the effective allocation of resources across both individual firms and broader economic systems. Different schools of thought and experts emphasize distinct aspects of efficiency, ranging from its role in economic theory to its practical implications in business and public policy.

2.4.2 Concepts and Theories Relevant To Efficiency

Manolescu and Geamanu (2010) said that efficiency represents the relationship between effects and efforts in a system of inputs and outputs. Economic efficiency is linked to productivity, competitiveness, allocation, rationality, profit, cost, price, and market scale. At a company level, efficiency characterizes the overall relationship between inputs and outputs. Generally, business efficiency is based on preferences and choices, expressed in terms of restrictions such as time and income.

Andrews and Entwistle (2013) emphasized four types of efficiency: production, configuration, distribution, and dynamic. Production efficiency is related to the maximization of output exceeding input; Configuration efficiency refers to the matching between service demand and its supply; The efficiency of distribution is associated with the degree to which the government fairly distributes services among citizens within budget constraints; Dynamic efficiency refers to the balance between current and future consumption.

Yan et al. (2013) explained that electronics firms should be motivated to improve firm efficiency through various processes relative to performance outcomes when measuring inputs and outputs. According to a study on Taiwanese electronics firms, complex ownership structures and information asymmetry may cause agency conflicts that can negatively impact firm efficiency and performance.

Andrews and Entwistle (2013) explained that efficiency has become a core organizational value. Gkouskos et al. (2014) mentioned that efficiency is mostly related to time efficiency. The automation of the automotive industry is closely associated with time efficiency.

Gonzalez (2015) found out that in an organizational context, efficiency is related to utilizing inputs during the transformation process. Effectiveness is concerned with the correctness and enhancement of the output.

Murphy and Johnson (2016) said understanding the potential correlations between leadership practices and the efficiency and effectiveness of customer relationship management in this industry may enhance the success of future customer relationship management endeavors.

Berrett (2020) pointed out that technical efficiency measures the ratio of inputs to outputs. While efficiency is often associated with costs, the quality of human capital is one of the biggest determinants of efficiency.

Liu et al. (2021) and Jagtap et al. (2021) emphasized that resource optimization is a key aspect of enterprise efficiency because it enables organizations to maximize output while minimizing input, ensuring that every resource is used to its fullest potential without excess waste.

Gupta et al. (2020) argued that brand managers should actively pursue brand enhancement strategies. Effective branding strengthens customer loyalty and improves operational performance by creating value-added differentiation, allowing companies to achieve better results with fewer resources, thereby improving overall efficiency.

Pynatih et al. (2024) found that a strong brand can significantly contribute to a company's revenue, profit margins, and overall valuation. Brand enhancement reflects a company's ability to strategically optimize its market presence and reputation, leading to long-term growth and competitive advantage.

2.5 Relevant Literature

Vinayan (2012) studied the impact of Total Quality Management and Sun Tzu Art of War strategies on the sustainable competitive advantage of Malaysian manufacturing industries. The objectives of this study are 1) to determine the dimensions of Total Quality Management (TQM), Sun Tzu Art of War strategies (STAW) and Sustainable Competitive Advantage (SCA); 2) to examine if TQM has a significant effect on SCA in Malaysian manufacturing industries; 3) to examine if TQM has a significant effect on STAW strategies in Malaysian manufacturing industries; 4) to examine if STAW has a significant effect towards SCA in Malaysian manufacturing industries; 5) to investigate if STAW is a mediator in the relationship between TQM and SCA in Malaysian manufacturing industries. A conceptual model and four hypotheses concerning the relationship among the TQM constructs and STAW strategies constructs were proposed. The model was examined using data collected from 300 manufacturing organizations with quality management systems. The proposed relationships were tested using the Statistical Package for the Social Sciences (SPSS 18.0) and the Structural Equation Modelling technique, Analysis of Moment Structures (Amos 18.0). The statistical results indicate that STAW partially mediates between TQM and SCA, clarifying the ability of TQM and STAW to maintain a competitive advantage in Malaysia's manufacturing industry.

Vinayan and Hoe (2012) focused on manufacturing companies in Malaysia, including 167 Small and Medium Enterprises (SMEs) and 133 Multinational Corporations (MNCs). The aim was to apply Sun Tzu's Art of War strategies in business and to examine factors that may arise at different stages of an organization's lifecycle. A literature review established four dimensions of Sun Tzu's Art of War strategies: Employee Motivation, Situation Appraisal, Strategic Planning, and Leadership. These hypothesized dimensions were tested using Structural Equation Modelling techniques (SPSS and AMOS). The results showed that these four dimensions are significantly and positively correlated with the construction of Sun Tzu's Art of War strategies. This study contributes empirical and statistical evidence to the knowledge of Sun Tzu's Art of War strategies in business applications and prompts business operators to understand the role of these strategies in achieving business sustainability within organizations.

Chanon Chonwattana and Tipparat Laohavichien (2022) studied the relationship between Total Quality Management, innovation, competitive advantage, and organizational sustainability of manufacturing companies in Thailand. It was survey research that aims to study 1) the influence of total quality management on innovation, competitive advantage, and organizational sustainability and 2) the influence of innovation on competitive advantage and organizational sustainability. In the study, questionnaires were distributed to 744 executives of manufacturing companies in Thailand who had obtained the ISO 9001:2015 certification. A total of 290 complete responses were received, resulting in an overall response rate of 38.98%. The Analysis method used in the hypothesis was Structural Equation Modeling (SEM). The results indicated that total quality management has a positive direct influence on both innovation and organizational sustainability but has not shown a direct influence on competitive advantage. In contrast, innovation had a positive direct influence on competitive advantage and organizational sustainability. Therefore, total quality management positively affected the competitive advantage and organizational sustainability when mediated by innovation.

Kafetzopoulos and Psomas (2015) studied the impact of innovation on three dimensions of a firm's performance: product quality, operational performance, and financial performance. The study used a sample of 233 Greek manufacturing firms and employed research methods such as exploratory factor analysis, confirmatory factor analysis, and structural equation modeling. According to the study results, innovation capability directly contributed to product quality and operational performance. Although it did not directly impact the financial performance of manufacturing firms, it did have an indirect impact through the mediation of operational performance. The study suggested that managers should emphasize innovation more, as it was an essential element in achieving improved overall firm performance and sustainable competitive advantage.

Law et al. (2016) studied Sun Tzu's Art of War and its influence on Chinese corporate leadership. This research examined how Sun Tzu's Art of War affected corporate leaders in terms of change, performance, and leadership in general, specifically focusing on Chinese corporate leaders in Malaysia. The study provided valuable insights into the process of this influence. The analytical process and research methods employed to address the research questions were presented and organized into

four sections: (a) Participant sampling and selection, (b) Instrumentation, (c) Data collection, and (d) Data analysis. Through inductive analysis based on this study, it become evident that The Art of War philosophy had a notable impact on leadership. The findings of this study resonated with much of the existing research in the field of leadership literature, including works by Boal and Hooijberg (2000) and Eflin (2003).

Li et al. (2022) investigated the impact of leadership style on employees' deviant innovative behavior. Despite the risks associated with deviating from traditional innovation, it is anticipated to benefit the organization's long-term development. The study analyzed the relationship between coaching leadership, interactive justice, organizational identification, and employees' deviant innovation. The research surveyed employees from 26 companies across more than 10 regions in China. Questionnaires were distributed to 450 employees. The first round of the survey primarily collected demographic information about employees and the coaching leadership style of their superiors. The second round focused on employees' organizational identity, interactive justice, and deviation from conventional innovative behavior. After tracking and matching, 340 valid questionnaires were ultimately collected. SPSS 22.0 was used to describe the research variables, and Mplus 7.0 for confirmatory factor analysis and multi-path regression model analysis. The results indicated that coaching leadership can directly or indirectly promote employees' deviant innovation behavior through the dual-path and chain mediation of interactional fairness and organizational identification.

Latorre (2018) proposed an innovation framework based on a literature review and interviews. By examining the case study results of a specific automobile manufacturing company, he explored the impact of design thinking and innovation on the automotive industry. This study raised three main questions: (Q1) How can automotive companies implement agile systems engineering practices and leverage the advantages of design thinking and innovative principles to enhance business performance? (Q2) Can the proposed framework facilitate and simplify innovation in the product development process? (Q3) What obstacles and drivers might be encountered in integrating design thinking and agile systems engineering concepts into innovation practices? This innovation framework has been applied in a case study of a large automotive manufacturing company, providing insights into how design thinking and innovative technologies can be applied in automotive companies and beyond. This application demonstrates innovation frameworks' effectiveness in developing new

products and services. It laid the groundwork for integrating Design Thinking (DT) and agile systems engineering into existing innovation efforts.

Chen (2020) incorporated the five virtues of a leader proposed by Sun Tzu to measure entrepreneurial qualities, building an entrepreneurial quality model based on Sun Tzu's Art of War Leadership. This model could contribute new knowledge to the theoretical study of entrepreneurs and provide a theoretical reference for cultivating entrepreneurs. This study developed indicators for measuring entrepreneurial qualities based on the five virtues of an excellent leader discussed by Sun Tzu. Using a Likert Scale of seven points for questionnaire measurement, a survey on the qualities of general managers and the operational performance of 219 companies in Liaoning Province was conducted to establish a structural equation of entrepreneurial qualities and corporate innovation and operational performance. Using SPSS and AMOS software for analysis, an entrepreneurial quality model based on Sun Tzu's Art of War Leadership was established. The sample coefficient alpha was 0.814, indicating a high level of scale reliability; the model test results showed an RMSEA of 0.046 (less than 0.05), a GFI of 0.976, and an AGFI of 0.948, indicating excellent model fit; the study results show that the entrepreneurial quality model based on Sun Tzu's Art of War constructed in this study is theoretically sound and practically operable. It enriched the theoretical research of entrepreneurs and had reference value for the training and selection of entrepreneurs.

Li et al. (2021) took Chinese manufacturing companies as an example; this study explores the mediating role of green core competence in the relationship between low-carbon technological innovation and enterprise performance and assesses the moderating impact of firm size on this relationship. The study empirically analyzed 438 valid data points, revealing that low-carbon technological innovation significantly and positively affected the performance of manufacturing enterprises. Green core competence mediated the positive effect of low-carbon technological innovation on enterprise performance. Additionally, firm size positively moderated the relationship between low-carbon technological innovation and enterprise performance. Furthermore, firm size also moderated the relationship between low-carbon technological innovation and green core competence. The larger the scale of the enterprise, the more positive the improvement of low-carbon technology innovation on enterprise performance.

Zhang et al. (2020) explored the relationship between green transformational leadership and green product development performance. Using 23 new energy vehicle companies in China as samples, 298 valid questionnaires were collected and the hypothesis was validated through structural equation modeling. The results indicated that both green transformational leadership and green self-efficacy could promote the performance of green product development; Green self-efficacy played a mediating role in the positive relationship between green transformational leadership and green product development performance, while environmental regulations positively regulate the mediating effect of green self-efficacy. In addition, the interaction between environmental regulations and green self-efficacy promoted the performance of green product development.

Shahzad et al. (2022) targeted top management personnel of large Chinese automobile industries such as Shanghai Automotive Business Corporation (Group), China FAW Group Corporation, and Dongfeng Motor Co., Ltd. These companies hold the largest market share in China's automobile manufacturing industry. A total of 198 survey questionnaires from top management personnel in the Chinese automobile industry were collected. The data were analyzed using structural equation modeling (SEM) through Smart PLS 3.3.2 software. The study results showed that transformational leadership positively and significantly impacted firm performance. Corporate sustainability played a vital and positive mediating role in the relationship between transformational leadership and firm performance. Knowledge sharing also had a positive moderating role in the relationship between transformational leadership and firm performance. Leadership style significantly affected firm performance, and an internal knowledge-sharing culture is essential for better firm performance.

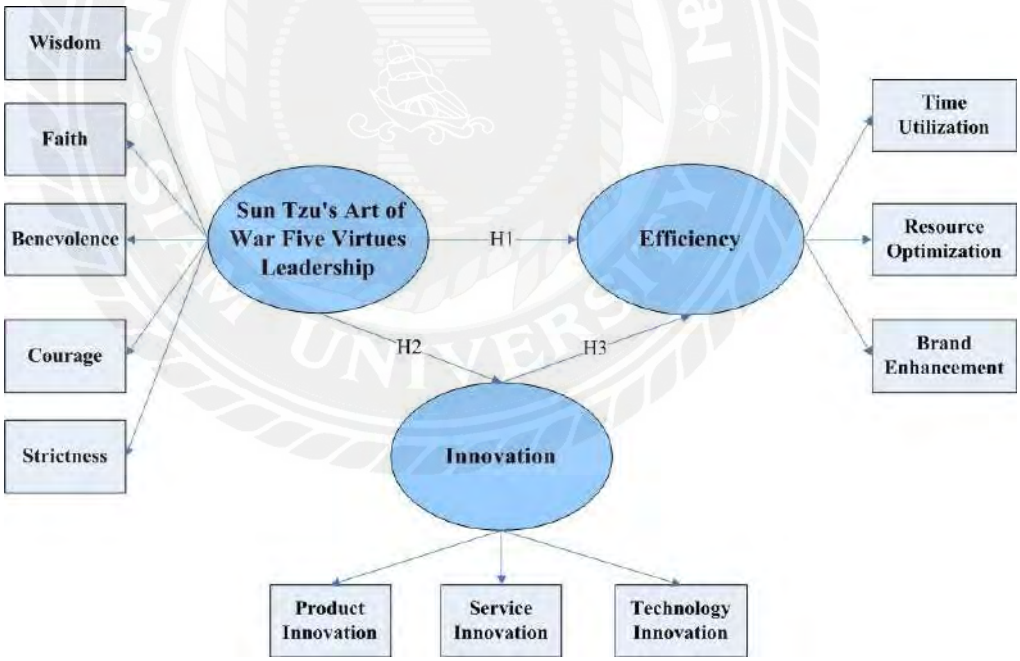
2.6 Conceptual Framework, Operational Definition, Hypothesis and Explanation of Hypothesis

2.6.1 Conceptual Framework

This study constructs a conceptual framework through a comprehensive literature review to explore the relationship between Sun Tzu's Art of War Five Virtues Leadership, innovation, and efficiency. The framework examines the concept and core characteristics of Five Virtues Leadership, therefore emphasizes the importance of innovation for enterprises, discussing how leaders can enhance organizational efficiency by fostering innovation. This conceptual framework consequently provides a theoretical foundation for a more in-depth exploration of the relationships between the Five Virtues Leadership, innovation, and efficiency in the Chinese brand passenger vehicle industry, offering practical guidance and recommendations for improving enterprise efficiency.

Figure 2.2

Conceptual Framework



From the above framework, hypotheses that show the relationship between independent variables and dependent variables can be elaborated as follows:

Hypothesis 1: Sun Tzu’s Art of War Five Virtues Leadership is positively related to the efficiency of the Chinese brand passenger vehicle industry in China.

Hypothesis 2: Sun Tzu's Art of War Five Virtues Leadership is positively related to innovation.

Hypothesis 3: Innovation is positively related to the efficiency of the Chinese brand passenger vehicle industry in China.

Two independent variables, which are Sun Tzu's Art of War Five Virtues Leadership (X1), and Innovation (X2), can be used to impact the efficiency of the Chinese brand passenger vehicle industry in China.

2.6.2 Operational Definition

Wisdom refers to possessing comprehensive and rich knowledge that can be broadly applied across different fields. It involves a deep understanding and insight into the world and life and the ability to make sound judgments and wise decisions in various situations. Wisdom is demonstrated in efficient problem-solving and effective utilization of resources, strategic macro planning, and displaying a comprehensive and long-term perspective in leadership.

Faith refers to the consistency, integrity, fairness, trust in subordinates, and active fulfillment of social responsibilities that leaders demonstrate in their leadership and management. Faith fosters employee loyalty and commitment to organizations and teams and creates a stable and harmonious work environment.

Benevolence refers to a leadership quality encompassing kindness, people-centered management, open-mindedness, and balanced and ethical management. It emphasizes the importance of how to treat individuals with respect and empathy while maintaining effective leadership and management practices.

Courage refers to the boldness and fearlessness to face challenges. It involves the willingness to take responsibility for decisions and actions and the ability to make decisive choices despite uncertainty. Additionally, courage entails persistence in maintaining direction and commitment during adversities. When coupled with wisdom, it ensures that actions are thoughtful, strategic, and aligned with the organization's or team's best interests.

Strictness refers to establishing and maintaining clear rules and regulations, implementing a fair system of rewards and punishments, and rewarding positive behavior while also applying appropriate penalties for infractions. Additionally,

strictness entails leaders holding themselves to high standards of personal discipline and ensuring consistency in enforcement.

Product Innovation refers to introducing new or significantly improved products in the market, encompassing novel features, innovative designs, expanded functionalities, or enhanced performance attributes. This process involves continuously exploring market insights, deeply understanding user needs, application of cutting-edge technologies, product development, market testing, and considerations for sustainability and environmental impact.

Service Innovation refers to the development of new services or enhance of existing ones with the aim to improve the overall service experience for customers. Organizations can meet evolving customer needs through innovative service delivery, customer interaction, and personalized services to drive business growth and competitiveness.

Technology Innovation refers to developing and applying new technologies or improving existing ones to enhance efficiency. This includes monitoring emerging technologies, integration advancements into products and services, adopting agile research and developing methods, optimizing production processes, nurturing talent, fostering teamwork, and implementing robust risk management.

Time utilization refers to efficiently planning and assigning tasks and utilizing process optimization and automation technologies to minimize task completion time. Additionally, it involves providing consistent time management training and integrating time management skills into daily work practices. Consistently, improvement of work speed can enable prompt responses to market demands while minimizing time wastage during task execution.

Resource optimization refers to the allocation of resources to maximize output. It involves optimizing energy usage in manufacturing processes or office environments to reduce waste and enhance resource efficiency. Additionally, it includes optimizing the allocation and layout of the workspace to minimize energy consumption, integrating technology to reduce reliance on physical servers and optimize resource utilization, recycling raw materials, and minimizing waste in manufacturing processes.

Brand enhancement refers to the maintenance of consistency in the brand image to enhance brand recognition, effective communication of the organization's core values and mission through the brand image, alignment of the brand image with the expectations and values of the target market, development of a crisis management plan to address potential negative events impacting the brand image, and providence of an outstanding customer experience that aligns with the brand image.

2.6.3 Explanation of Hypothesis

Hypothesis 1 Sun Tzu's Art of War Five Virtues Leadership is positively related to the efficiency of the Chinese brand passenger vehicle industry.

Meaning

Sun Tzu's Art of War Five Virtues Leadership affects the efficiency of the Chinese brand passenger vehicle industry in China and can be the factor that enforces the efficiency of the Chinese brand passenger vehicle industry in China.

Reason

Leaders who demonstrate Sun Tzu's Art of War Five Virtues Leadership are anticipated to inspire, guide, and foster a working environment that propels both individual and collective efficiency within the industry.

Theory or Supporting Research

Theories and research that support the relationship between Sun Tzu's Art of War Five Virtues Leadership and business efficiency are as follows:

Chen (2020, p. 28) transformed the Five Virtues into indicators to measure the quality of entrepreneurs and established a research model on the relationship between entrepreneurial quality and business performance. A questionnaire survey was conducted on the quality of general managers in 219 enterprises in Liaoning Province. The results indicate that there is a positive correlation between the five virtues of leadership and corporate performance.

Hlavatý and Ližbetin (2021, p. 1273), globalization of markets, intense competition, and rapid innovation require managers to make quick and correct strategic decisions. Five Virtues Leadership guides managers in making correct and quick strategic decisions. Wisdom enables leaders to foresee potential challenges and opportunities, making informed decisions that enhance efficiency.

Zhang and Nasir (2022, p. 12) noted that Faith and Benevolence help companies to actively fulfill their corporate social responsibilities and help corporate management to shape a good brand image, thereby improving corporate efficiency.

Hypothesis 2 Sun Tzu's Art of War Five Virtues Leadership is positively related to innovation.

Meaning

Leadership principles derived from Sun Tzu's Art of War positively influence the level of innovation within the Chinese brand passenger vehicle industry. Sun Tzu's Art of War Five Virtues Leadership affects the innovation of the Chinese brand passenger vehicle industry in China.

Reason

Sun Tzu's Art of War Five Virtues Leadership emphasizes strategic thinking and foresight, which are crucial for innovation. Leaders who adopt these principles might be more adept at recognizing market trends, foreseeing future demands, and guiding their organizations to develop pioneering technologies and solutions. Leaders might be encouraged to take calculated risks, promoting an environment where experimentation and novel approaches are valued.

Theory or Supporting Research

Theories and research that support the relationship between Sun Tzu's Art of War Five Virtues Leadership and innovation are as follows:

Vinayan and Khan (2013, p. 5) mentioned that the essence of Sun Tzu's Art of War is to maintain a strategically advantageous position through innovation, will, speed, flexibility, accuracy, precision, and a strong alliance against competitive forces. Organizations approaching maturity must actively pursue innovative strategies to maintain their competitive advantage. Five Virtues leadership helps motivate companies to engage in innovation actively.

Wisdom involves deep understanding and insight, which are crucial for identifying opportunities and navigating complex challenges in innovation. According to Arokodare and Asikhia (2020, p. 7), strategic foresight is essential for driving innovative processes and adapting to market changes. Wisdom enables leaders to

balance short-term gains with long-term innovation goals and enhance innovation levels.

Courage is perhaps the most directly linked virtue to innovation, as it involves the willingness to embrace uncertainty, challenge the status quo, and risk-taking. Chatterjee et al. (2020, p. 43) argue that courageous leadership is critical in initiating and sustaining innovative projects, particularly in the face of resistance or failure. In Five Virtues Leadership, courage empowers leaders to make bold decisions and explore uncharted territories, driving innovation forward. This is supported by Giaccone and Magnusson (2022, p. 93), highlighting the significant effect of risk-taking on innovation performance.

Hypothesis 3 Innovation is positively related to the efficiency of the Chinese brand passenger vehicle industry.

Meaning

Innovation within the Chinese brand passenger vehicle industry is a driving factor in enhancing efficiency. This implies that introducing new products, services, and technologies is instrumental in making the sector more productive and effective in its operations.

Reason

Innovation can lead to developing and implementing advanced technologies, processes, and strategies that optimize production, reduce costs, and enhance product quality and features. In the automotive industry, innovation means the development of more efficient manufacturing processes, using better materials, improving service, or introducing advanced automotive technologies (like electric vehicles and autonomous driving systems), all of which can enhance overall efficiency.

Theory or Supporting Research

Theories and research that support the relationship between innovation and business efficiency are as follows:

Afum et al. (2021, p. 1089) highlighted that product innovation can streamline business operations, reduce waste, and improve production processes. By introducing innovative products, firms can achieve higher economies of scale and optimize their production lines, thereby reducing costs and enhancing efficiency. This view aligns with

Qiu et al. (2020, p. 146), who emphasized the pivotal role of product innovation in strengthening competitive advantage.

Katragadda (2023, p. 600) discussed how service innovation can improve efficiency by automating routine tasks, improving customer interaction, and reducing service delivery times. In the context of organizational efficiency, service innovation enables firms to optimize resource allocation, enhance service quality, and reduce operational costs.

Li et al. (2021, p. 293) stated that low-carbon technological innovation significantly and positively impacts the performance of manufacturing enterprises. Technology innovation enhances efficiency by automating processes, improving data management, and reducing manual labor. Shao et al. (2020, p. 1465) emphasized that technological innovation lowers production costs and increases operational efficiency through continuous improvement and upgrades.

CHAPTER 3
RESEARCH METHODOLOGY

The details in this chapter will be separated into 7 parts as follows:

3.1 Research Design

3.2 Population and Sample

3.3 Research Tools

3.4 Data Collection Strategy and Procedure

3.5 Data Analysis

3.6 Research Ethics

3.7 Research Reporting

3.1 Research Design

In this research, a mixed-methods approach would be employed with both quantitative and qualitative research methodologies to comprehensively investigate the efficiency of the Chinese brand passenger vehicle industry. The detail to do the research would be as follows:

3.1.1 Literature Research

Through a review of the literature and the application of inductive analysis, this research provided a detailed description of the development history, current situation, and existing problems of the Chinese brand passenger vehicle industry. The main concepts involved in this study include Sun Tzu's Five Virtues leadership, innovation, and efficiency. The observed variables for Sun Tzu's Five Virtues Leadership included wisdom, faith, benevolence, courage, and strictness. The observed variables for innovation consisted of product, service, and technology. Efficiency's observed variables encompassed time, resources, and customer satisfaction.

3.1.2 Empirical Research

The following steps would be exercised.

The population and samples would be identified.

A questionnaire would be created, run through IOC (Item Objective Congruence Index), pretested, and distributed to the target group. The number of questionnaires would be regularly checked if it reached the minimum of questionnaires.

Statistical methods such as regression, correlation, and factor analysis, would be employed to test Research hypotheses and get data analysis.

In-depth interview would be organized to get results to support results from the questionnaire.

3.2 Population and Sample

3.2.1 Population

The population were people who worked in Chinese brand passenger vehicle companies in China . There were a total of 68 Chinese brand passenger vehicle enterprises in China sepated into 6 regions (North, Northeast, East, Central, South and Southwest) as shown in Table 3.1.

Table 3.1

The Total Number of Chinese Brand Passenger Vehicle enterprises in China separated by region

Region	Province	Number of Enterprises	Percentage (%)
North	Inner Mongolia	0	
	Beijing	2	
	Tianjin	1	
	Hebei	5	
	Shanxi	1	
	Total	**9**	13.24

Region	Province	Number of Enterprises	Percentage (%)
Northeast	Heilongjiang	0	
	Jilin	3	
	Liaoning	1	
	Total	**4**	5.88
East	Shandong	3	
	Jiangsu	6	
	Shanghai	1	
	Anhui	5	
	Zhejiang	6	
	Jiangxi	3	
	Fujian	4	
	Total	**28**	41.18
Central	Henan	2	
	Hubei	4	
	Hunan	1	
	Total	**7**	10.29
South	Guangxi	2	
	Guangdong	4	
	Hainan	1	
	Total	**7**	10.29
Southwest	Tibet	0	
	Sichuan	3	
	Chongqing	6	
	Guizhou	1	
	Yunnan	1	

Region	Province	Number of Enterprises	Percentage (%)
	Total	**11**	16.18
Northwest	Xinjiang	0	
	Gansu	1	
	Qinghai	0	
	Ningxia	0	
	Shaanxi	1	
	Total	**2**	2.94
	Grand Total	68	100

Source: China Association of Automobile Manufacturers (2023)

From Table 3.1, the population in this study consisted of 68 companies. The stratified sampling technique, therefore, would be applied to divide the population into seven regions (North, Northeast, East, Central, South, Southwest, and Northwest).

3.2.2 Sample for Quantitative (Qualitative) Research

1) Quantitative Research

Subsequently, the quote technique would be used to select the majority of the population living in the North, East, Central, South, and Southwest, accounting for 91.18% or 62 companies as the final sample. Eight questionnaires would be distributed using a proposed technique to managers and middle managers of each of these 62 companies. The Northeast and Northwest, the minority of 6 companies, would be reserved for the pretest.

2) Qualitative Research

For qualitative research, 15 key informants, ten from the business, two from government sectors, and three experts will be interviewed.

When selecting research participants from the business, government, and experts, it was typically necessary to consider certain eligibility criteria to ensure they possess sufficient expertise and experience related to the research topic.

"Ten from the business" should hold qualifications or degrees in the automotive field and had more than five years of working experience. They would be selected from the management team and ordinary employees.

"Two from government sectors" should be involved in formulating China's automotive industry policies and regulations and had been working in the government for more than five years.

"Three experts" should be renowned experts or scholars with outstanding automotive expertise and experience, enjoying a solid reputation in the field.

3.3 Research Tools

3.3.1 Questionnaire

The questionnaire was separated into five parts as follows:

Part 1: General information of the respondents

The information would include the gender, age, education level, length of service, and job position of the respondents. This information was essential for demographic analysis and understanding the respondents' background and could be valuable in interpreting the questionnaire results.

Part 2: The level of company managers in Sun Tzu’s Art of War Five Virtues Leadership

This section aimed to evaluate the level of Sun Tzu’s Art of War Five Virtues Leadership of Chinese brand passenger vehicle company managers.

The 5-point Likert scale would be used to evaluate the identification of respondents with Sun Tzu’s Art of War Five Virtues Leadership level of company middle and senior-level middle managers. Designed five questions would be asked for each five dimensions: wisdom, faith, benevolence, courage, and strictness.

The rating table for the opinions and attitudes of employees in the automotive industry towards Sun Tzu's Art of War Five Virtues Leadership was divided into five levels, as follows:

Level	Score
Strongly Agree	5
Agree	4
Neutral	3
Disagree	2
Strongly Disagree	1

The meaning of each score would be

Score 5 means respondents strongly agree with the statement

Score 4 means respondents agree with the statement

Score 3 means respondents are neutral with the statement

Score 2 means respondents disagree with the statement

Score 1 means respondents strongly disagree with the statement

The interpretation of the score would be Best (1981, p. 182)

Mean	Significance Level
1.00 - 1.80	Strongly Disagree
1.81 - 2.60	Disagree
2.61 - 3.40	Neutral
3.41 - 4.20	Agree
4.21 - 5.00	Strongly Agree

Part 3: The level of company in innovation

This section aimed to evaluate the level of innovation of the Chinese brand passenger vehicle company. Respondents would use a 5-point Likert scale to rate statements related to the three dimensions of innovation. The three dimensions were product innovation, service innovation, and technology innovation. Designed five questions for each dimension, with 15 questions in this section would be created.

Part 4: The level of company's efficiency

This section aimed to evaluate the efficiency of the Chinese brand passenger vehicle company. Respondents would use a 5-point Likert scale to rate statements related to the three dimensions of efficiency. The three dimensions were time utilization, resource optimization, and brand enhancement. Designed five questions for each dimension, with 15 questions in this section would be asked.

Part 5: Recommendation

It was an open-ended question for respondents to provide additional suggestions that would improve the efficiency of the Chinese brand passenger vehicle industry.

3.3.2 In-depth Interview

The semi-structured in-depth interview (SSI) method would be used to obtain comprehensive and multi-dimensional insights to interview 15 participants. These participants were selected purposively from related backgrounds in the Chinese brand passenger vehicle industry to ensure a multifaceted and comprehensive perspective.

3.3.2.1 Distribution of Interviewees

Company managers: A total of 10 managers who possessed extensive experience and knowledge in the Chinese brand passenger vehicle industry would be interviewed.

Government officers: Two officers from regulatory bodies or policy-making departments relevant to the automobile industry would be interviewed.

Experts: Three individuals, including industry analysts, academics, or experts from the automobile industry, would be interviewed.

This combination of interviews was designed to integrate professional opinions and analyses from various angles, providing a thorough and comprehensive understanding of the research topic. These interviews not only aided in gathering

qualitative data but also helped to reveal the industry's internal dynamics and evolving trends, therefore providing rich primary data for the research.

3.3.2.2 Interview Content and Methodology

Interview Form: An interview form would be developed, including open-ended questions focused on key topics as framed in the research conceptual framework.

Method of Interview: Interviews would be conducted according to the convenience and preference of the interviewees, using face-to-face interviews, phone calls, or video conferencing. Consent form would be signed prio to interview.

Data Recording: All interviews would be recorded and transcribed for detailed analysis and citation.

3.4 Data Collection Strategy and Procedure

3.4.1 Questionnaire

1) Review literature to define the conceptual framework.
2) Create a questionnaire to follow the research objectives.
3) Using IOC (Item Objective Congruence Index) to check content validity and seek comments from the following 5 specialists

    1. Dr. Karnjira Limsiritong
    2. Dr. Prachya Wongwaree
    3. Dr. Ling Feng
    4. Dr. Yuan Zhonghua
    5. Dr. Liang Feiwen

The formula for IOC calculation is

$$IOC = \frac{\Sigma R}{n}$$

Where IOC = Index of item-objective congruence value

R = Score from experts

ΣR = Total score from all experts

n = number of experts

The criteria to verify the score is

+1 means "the measurement item is congruent with the study's objective."

0 means "the measurement item is undecided with the study's objective."

-1 means "the measurement item is inconsistent with the study's objective."

IOC needs to be between 0.5-1.00 for every question.

4) Find the mean of the IOC and use the following judgment.

Means between 0.5-1.00 means "the measurement passes the criteria from experts."

Means below 0.5 means "the measurement needs change or correction."

Less than 0 means "the measurement is failed from experts."

5) Take a questionnaire to try out or pretest at 30 and check the reliability. The 30 questionnaires were distributed to 6 companies located in the Northeast and Northwest, five questionnaires for each company. The formula of Cronbach's alpha coefficient is

$$\alpha = \left[\frac{n}{(n-1)}\right]\left[1 - \frac{\sum_{i=0}^{n}/S_i^2}{S_t^2}\right]$$

where α = a coefficient of reliability

n = the number of informants

$\sum_{i=0}^{n}$ = the variance of the sum of informants

S_i^2 = the ratio of the variance of each informant

S_t^2 = the ratio of inter-informants' variance

The questionnaire form would be updated based on the try-out comments and distributed to the real case.

3.4.2 Data Collection

The researcher collected two types of data: quantitative and qualitative.

As for quantitative data, the following steps would be exercised.

1) Select target companies: 62 Chinese brand passenger vehicle companies were selected. 30 survey questionnaires would be distributed to six companies located in the northeast and northwest, with five questionnaires for each company. Conduct pretest and check its reliability.

2) Questionnaire distribution: Distributed eight questionnaires to each 62 companies to collect relevant data on Sun Tzu's Art of War Five Virtues Leadership, innovation, and the efficiency of Chinese brand passenger vehicle companies.

3) Collection method: To collect survey data, used the WJX Platform (https://www.wjx.cn/), a professional online questionnaire platform in China. Once respondents participate in the survey through the WJX Platform, researchers could view the submitted questionnaire data in the backend of the WJX Platform.

4) Data processing and analysis: Researchers would organize and analyze the collected questionnaires. Using computer programs to process data, statistical methods such as frequency, mean, standard deviation, and structural equation modeling (SEM) are used to analyze the data.

As for qualitative data, the following steps would be exercised.

1) Develop interview form: Create a semi-structured interview form with open-ended questions.

2) Participant selection: Select 15 participants to ensure diverse perspectives. This includes 10 experienced senior employees from Chinese brand automotive companies, two government officials related to the automotive industry, and three automotive industry experts.

3) Conduct interviews: Arrange interviewed at convenient times and locations for participants. An online interview could also be conducted. At the beginning of each interview, introduce and explain the research purpose. Use the interview form to guide the conversation, but be flexible in exploring new topics or insights that arise during the interview process. Consent form would be signed prio to interview.

4) Records and Documents: Obtain consent for the recording to ensure the accuracy of data collection. Take detailed notes during the interview.

3.5 Data Analysis

3.5.1 Quantitative Data Analysis

1) Analysis of General Information of Respondents

This step involved using frequency and percentage statistical methods to analyze the basic information of the respondents. This included but was not limited to, age, gender, years of work experience, and educational background. These statistics provided an overview of the study sample, helping to understand the representativeness and diversity of the sample.

2) Analysis of Characteristics of Variables

Use mean and standard deviation (SD) to analyze specific variables. These variables could be respondents' attitudes, opinions, or other metrics towards certain questions. The mean provided the average level of the variable, while the standard deviation revealed the extent to which data points are dispersed around the mean.

3) Descriptive Analysis of Variables

The first step was to perform a descriptive statistical analysis of the three variables: Sun Tzu's Five Virtues Leadership, Innovation, and Efficiency. A preliminary understanding of their central tendency and dispersion could be obtained by calculating these variables' arithmetic mean and standard deviation. The mean indicated the general level of each variable, while the standard deviation provided the range of data points around the mean.

4) Structural Equation Modeling (SEM) Analysis

Using AMOS 26 software for SEM analysis allowed for an exploration of the impact of Sun Tzu's Five Virtues Leadership and Innovation on Efficiency. In this model, Sun Tzu's Five Virtues Leadership and Innovation were independent variables, and Efficiency was the dependent variable. Path analysis used the Maximum Likelihood estimation method to assess the direct and indirect effects between these variables.

5) Interpretation and Application of Results

After analyzing the SEM results, the coefficients of each path in the model were interpreted. This helped to understand how Sun Tzu's Five Virtues Leadership and Innovation directly or indirectly affect Efficiency.

Overall, by integrating descriptive statistical analysis and SEM, the relationship between Sun Tzu's Five Virtues Leadership, Innovation, and Efficiency could be comprehensively assessed, providing valuable insights for Chinese brand passenger vehicle enterprises.

3.5.2 Qualitative Data Analysis

1) Content Analysis

Content analysis was employed to process interview data. This involved encoding the interview texts and identifying themes, patterns, and categories. The data were meticulously analyzed to uncover key themes and concepts, such as factors affecting efficiency, management challenges, and industry trends. Based on these insights, this paper analyzed how to apply the five leadership virtues (wisdom, trustworthiness, benevolence, courage, and strictness) to improve efficiency in the automotive industry.

2) Triangulation and Depth of Analysis

Triangulation combined the quantitative data results to enhance the research's credibility and depth. When analyzing qualitative data, the perspectives of different participants were considered, seeking points of consensus and divergence, and how these views support or refute the findings of the quantitative data.

3) Integration of Results and Application

The results of qualitative analysis were integrated with those of quantitative analysis to provide a more comprehensive perspective. The deep insights provided by qualitative data were used to interpret and supplement the results of quantitative analysis, offering specific recommendations to improve the efficiency of Chinese brand passenger vehicle companies.

3.6 Research Ethics

The researcher obtained formal consent from all participants involved in the study. This included ensuring that each participant was fully informed about the purpose of the research, the nature of their involvement, and their rights, including the right to withdraw from the study at any time without any negative consequences. The consent process also ensured confidentiality and anonymity for all participants, safeguarding their personal and sensitive information. Additionally, the researcher committed to using the data exclusively for the purposes outlined in the research and not for any other purpose.

The researcher already received a certificate for research ethics, Certification Number 2991230, from Protecting Human Research Participants Online Training Inc. Before conducting the research, the research ethics approved the questionnaire and interview outline (Certificate number: PIM-REC 027/2567).

3.7 Research Reporting

The reporting for this research is separated into 5 chapters as follows:

Chapter 1 Introduction

Chapter 2 Literature Review

Chapter 3 Methodology

Chapter 4 Research Result

Chapter 5 Research Conclusion, Discussion and Recommendation

CHAPTER 4
RESEARCH RESULT

This study utilizes SPSS 23 and AMOS 26 for quantitative data analysis, including descriptive statistical analysis, reliability and validity tests, and structural equation modeling. Additionally, in-depth interviews are used to supplement the questionnaire survey effectively. The details in this chapter will be separated into seven parts as follows:

4.1 Sample Selection and Data Description
4.2 Reliability Testing
4.3 Validity Testing
4.4 Hypothesis Verification
4.5 Final Model Evaluation
4.6 In-depth Interviews
4.7 Combination of the results from the Questionnaire and In-depth Interview

4.1 Sample Selection and Data Description

4.1.1 Sample Selection and Data Collection

This study selected 62 Chinese brand passenger vehicle enterprises located in northern, eastern, central, southern, and southwestern China. The survey was conducted using the "Wenjuanxing" platform (a professional online survey platform in China, https://www.wjx.cn/), accessible via mobile WeChat or computer link. Participants included employees from the production, research and development, human resources, and sales departments of these 62 enterprises. They work as middle-level management members, such as managers and supervisors. 530 questionnaires were collected, of which 495 were valid, with an effective response rate of 93.4%.

4.1.2 General Information of the Respondents

Overall, the sample selection for this study included 91.2% of Chinese brand passenger vehicle companies. The respondents cover employees from different genders, age groups, educational levels, years of work experience, and work departments.

Table 4.1

Percentage of all demographic variables (n=495)

Variables	Total of Respondents	Percentage
Gender		
Male	353	71.31
Female	142	28.69
Age		
18 - 30 years	69	13.94
31 - 40 years	216	43.64
41 - 50 years	157	31.72
Above 51 years	53	10.71
Education Level		
Under bachelor	114	23.03
Bachelor or equal	158	31.92
Postgraduate	223	45.05
Work Experience		
1 - 3 years	52	10.51
4 - 6 years	223	45.05
More than 6 years	220	44.44
Work Department		
Production	121	24.44
Research and Development	137	27.68
Human Resources	97	19.60
Sales	96	19.39
Others	44	8.89
Region		
North	76	15.35
East	214	43.23
Central	51	10.30
South	57	11.52
Southwest	97	19.60

The survey results indicated that most respondents are male, comprising 353 individuals or 71.31%, while females represented 142 individuals or 28.69%. Respondents aged 31-40 years account for over 40%, while those aged 41-50 comprised 31.72%. Together, these two age groups constituted the majority of the respondents. Regarding educational backgrounds, the highest proportion was 45.05% for those with

a postgraduate degree. Additionally, 31.92% of the respondents held a bachelor's degree or equivalent. Regarding work experience, most respondents felt into the "4-6 years" category, with 223 individuals accounting for 45.05%. Additionally, 44.44% of the respondents had over six years of work experience. As for work departments, the production, research and development, human resources, and sales departments account for 24.44%, 27.68%, 19.60%, and 19.39%, respectively. Other departments, including finance, marketing, and administration, account for 8.89%. Finally, most respondents were from the eastern region of China, totaling 214 individuals or 43.23%. This was because the eastern region hosted most Chinese brand passenger vehicle companies.

4.1.3 Percentage Distribution of Constructs

4.1.3.1 Sun Tzu's Art of War Five Virtues Leadership

This section presented the respondents' perceptions of Sun Tzu's Art of War Five Virtues Leadership in five dimensions with 25 questions.

The results for the wisdom dimension were displayed in Table 4.2.

Table 4.2

Analysis of the Wisdom Aspect

Statement		$\overline{X}$	**SD.**	**Level**	**Rank No**
1	Your manager has a thorough understanding of various fields in the automotive industry.	3.81	1.04	Agree	1
2	Your manager always performs well in setting long-term goals and developing successful strategies.	3.73	1.10	Agree	4
3	Your manager always makes wise decisions and choose the best course of action.	3.71	1.09	Agree	5
4	Your manager can always solve problems, even in complex situations.	3.79	1.10	Agree	2
5	Your manager always effectively utilizes resources such as human, material, and informational assets to achieve strategic objectives.	3.74	1.10	Agree	3
	Total	3.76	1.09	Agree	

From Table 4.2, the average score related to wisdom is 3.76, with scores ranging between 3.7 and 3.8, indicating a high overall rating. This suggests that respondents generally appreciate the wisdom demonstrated by their company managers.

The results for the faith dimension are presented in Table 4.3.

Table 4.3

Analysis of the Faith Aspect

Statement		$\overline{X}$	**SD.**	**Level**	**Rank No**
1	You feel stable and harmonious in your company and are less likely to feel stressed or anxious.	3.69	1.10	Agree	2
2	The rules set by your manager are consistently and fairly applicable to everyone.	3.70	1.11	Agree	1
3	Your manager trusts their subordinates and delegates power to them.	3.66	1.14	Agree	5
4	Your manager can establish trust. Therefore, he or she can improve employee's performance and employee's commitment to the organization.	3.67	1.12	Agree	4
5	Your company can actively fulfill social responsibilities and gain public trust.	3.69	1.13	Agree	2
	Total	3.68	1.12	Agree	

From Table 4.3, the average score related to faith is 3.68, with scores ranging between 3.6 and 3.7, indicating a high overall rating. This suggests that respondents generally appreciate the faith demonstrated by their company managers.

The results for the benevolence dimension are presented in Table 4.4.

Table 4.4

Analysis of the Benevolence Aspect

Statement		$\overline{X}$	**SD.**	**Level**	**Rank No**
1	Your manager demonstrates a compassionate and caring attitude towards others, especially towards employees.	3.81	1.01	Agree	1

Statement		$\overline{X}$	SD.	Level	Rank No
2	Your manager pays attention not only to the employees' career development but also their well-being.	3.68	1.08	Agree	4
3	Your manager always listens to others, encourages brainstorming and open dialogue, and respects different viewpoints.	3.72	1.12	Agree	2
4	Your manager guides and advises employees in a combination of firmness and empathy rather than indulging or slacking off.	3.68	1.09	Agree	4
5	Your manager exemplifies ethical behavior and moral integrity in leadership roles, setting a positive example for others to follow.	3.72	1.06	Agree	2
	Total	3.72	1.07	Agree	

From Table 4.4, the average score related to benevolence is 3.72, with scores ranging between 3.6 and 3.8, indicating a high overall rating. This suggests that respondents generally appreciate the benevolence demonstrated by their company managers.

The results for the courage dimension are presented in Table 4.5.

Table 4.5

Analysis of the Courage Aspect

Statement		$\overline{X}$	SD.	Level	Rank No
1	Your manager always takes responsibility.	3.31	1.09	Neutral	5
2	Your manager always pursues new ideas and takes risks for progress and improvement.	3.34	1.17	Neutral	4
3	Your manager always makes quick and firm decisions without hesitation, especially in critical situations.	3.37	1.16	Neutral	2

Statement		$\overline{X}$	SD.	Level	Rank No
4	Your manager persists in moving towards the right goals, even under pressure or unfavorable conditions.	3.46	1.10	Agree	1
5	Your manager always has backup plans (contingency plans) to deal with the unexpected situation.	3.37	1.12	Neutral	2
	Total	3.37	1.13	Neutral	

From Table 4.5, the average score related to courage is 3.37, with scores ranging between 3.3 and 3.4, indicating that the overall score is above average. This suggests that the majority of respondents are appreciative of the courage demonstrated by their company managers.

The results for the strictness dimension are presented in Table 4.6.

Table 4.6

Analysis of the Strictness Aspect

Statement		$\overline{X}$	SD.	Level	Rank No
1	Your company's rules and regulations are precise and well-defined.	3.37	1.23	Neutral	5
2	Your company's rewards and punishments are fair.	3.67	1.08	Agree	1
3	Your company considers the reward and punishment based on a merit system more than on personal relationships.	3.62	1.18	Agree	3
4	Your company handles the violation properly.	3.53	1.07	Agree	4
5	Your manager always follows company rules and regulations and asks all employees to behave in the same way.	3.64	1.13	Agree	2
	Total	3.57	1.14	Agree	

From Table 4.6, the average score related to strictness is 3.57, with scores ranging between 3.3 and 3.6, indicating a high overall rating. This suggests that respondents generally appreciate the strictness demonstrated by their company managers.

4.1.3.2 Innovation

This section presents the respondents' perceptions of corporate innovation, which comprises three dimensions and 15 questions.

The results for the product innovation dimension are displayed in Table 4.7.

Table 4.7

Analysis of the Product Innovation Aspect

Statement		$\overline{X}$	**SD.**	**Level**	**Rank No**
1	Your company always launches new or improved products if there is a change in market demands and customers' needs.	3.63	1.29	Agree	3
2	Your company always utilizes the latest technology and design thinking to develop new products or functionalities.	3.64	1.27	Agree	2
3	Your company not only does product development but also marketing research before launching the new product.	3.63	1.29	Agree	3
4	Your company always considers using eco-friendly materials in product development to protect the environment.	3.65	1.3	Agree	1
5	Your company emphasizes the unique advantages of product innovation to improve brand communication.	3.63	1.29	Agree	3
	Total	3.64	1.29	Agree	

From Table 4.7, the average score for product innovation is 3.64, with scores being very close to each other. The overall rating is high, indicating that respondents generally appreciate the company's performance in product innovation.

The results for the service innovation dimension are displayed in Table 4.8.

Table 4.8

Analysis of the Service Innovation Aspect

Statement		$\overline{X}$	**SD.**	**Level**	**Rank No**
1	Your company always considers customers' needs and preferences.	3.88	1.21	Agree	1
2	Your company always utilize artificial intelligence, automation, and other technologies to simplify service processes.	3.80	1.2	Agree	4
3	Your company always collects feedback from customers and stakeholders regarding service quality.	3.81	1.17	Agree	3
4	Your company always provides customized services for customers.	3.77	1.22	Agree	5
5	Your company always collaborates with external partners and stakeholders to extend a wider range of customer needs.	3.83	1.18	Agree	2
	Total	3.82	1.20	Agree	

From Table 4.8, it can be seen that the average score for service innovation is 3.82, with scores ranging between 3.7 and 3.8. This indicates a high overall rating and suggests that respondents generally appreciate the company's performance in service innovation.

The results for the technology innovation dimension are displayed in Table 4.9.

Table 4.9

Analysis of the Technology Innovation Aspect

Statement		$\overline{X}$	**SD.**	**Level**	**Rank No**
1	Your company always monitors the development of emerging technologies.	3.33	1.35	Neutral	3
2	Your company encourages using automation equipment and intelligent systems to optimize production processes.	3.30	1.38	Neutral	5
3	Your company has a technology talent training program or development mechanism for employees.	3.35	1.36	Neutral	2
4	Your company encourages the sharing of technology innovation among employees.	3.32	1.39	Neutral	4
5	Your company develops clear policies and processes to ensure that the development and application of new technologies comply with rules and regulations.	3.40	1.38	Neutral	1
	Total	3.34	1.37	Neutral	

From Table 4.9, it can be seen that the average score for technology innovation is 3.34, with scores ranging between 3.3 and 3.4, indicating that the overall score is above average. This suggests that the majority of respondents appreciate the company's performance in service innovation.

4.1.3.3 Efficiency

This section presents the respondents' perceptions of corporate efficiency, which comprises three dimensions and 15 questions.

The results for the time utilization dimension are displayed in Table 4.10.

Table 4.10

Analysis of the Time Utilization Aspect

Statement		$\overline{X}$	**SD.**	**Level**	**Rank No**
1	Your company always plans and allocates tasks effectively.	3.74	1.16	Agree	1
2	Your company always utilizes process optimization and automation technology to minimize task completion time.	3.70	1.18	Agree	2
3	Your company provides training in time management.	3.58	1.26	Agree	5
4	Your company always encourages employees to integrate time management skills into their daily work practices.	3.65	1.18	Agree	3
5	Your company has a certain measure to help reduce the time wasted.	3.63	1.19	Agree	4
	Total	3.66	1.19	Agree	

From Table 4.10, it can be seen that the average score for time utilization is 3.66, with scores ranging between 3.5 and 3.7. This indicates a high overall rating and suggests that respondents generally appreciate the company's performance in time utilization.

The results for the resource optimization dimension are displayed in Table 4.11.

Table 4.11

Analysis of the Resource Optimization Aspect

Statement		$\overline{X}$	**SD.**	**Level**	**Rank No**
1	Your company always allocates inexpensive resources, including materials, manpower, and funds.	3.41	1.31	Agree	2
2	Your company always optimizes energy usage in manufacturing processes.	3.38	1.26	Neutral	4
3	Your company's workspace layout is well-designed and helps the company to reduce energy consumption.	3.32	1.27	Neutral	5
4	Your company's employees are skilled in utilizing cloud computing or other technologies, and therefore, it enhances the efficient use of resources.	3.47	1.26	Agree	1
5	Your company applies recycling to decrease manufacturing raw materials.	3.40	1.28	Neutral	3
	Total	3.40	1.28	Neutral	

From Table 4.11, it can be seen that the average score for resource optimization is 3.40, with scores ranging between 3.3 and 3.4, very close to the level of "agree." This suggests that the majority of respondents appreciate the company's performance in resource optimization.

The results for the brand enhancement dimension are displayed in Table 4.12.

Table 4.12

Analysis of the Brand Enhancement Aspect

Statement		$\overline{X}$	**SD.**	**Level**	**Rank No**
1	Your company provides media to proper channels to make the company gain more recognition.	3.21	1.26	Neutral	3
2	Your company's marketing and advertising convey the message effectively to give customers get a better understanding of the company's core concept.	3.23	1.27	Neutral	2
3	Your company provides a guarantee period of the product to make customers believe in your brand.	3.21	1.28	Neutral	3
4	Your company has a crisis management plan in place to deal with negative events that could impact your brand image.	3.20	1.19	Neutral	5
5	Your company monitors customer needs and expectations to provide a better experience to customers.	3.34	1.26	Neutral	1
	Total	3.24	1.25	Neutral	

From Table 4.12, it can be seen that the average score for brand enhancement is 3.24, with scores ranging between 3.2 and 3.3, indicating that the overall score is above average. This suggests that the majority of respondents appreciate the company's performance in brand enhancement.

4.2 Reliability Testing

Cronbach's alpha, Corrected Item-Total Correlation (CITC), and Cronbach's alpha after item deletion are used to assess the reliability of each variable. The criteria for evaluation are as follows: Cronbach's α coefficient greater than 0.7, CITC values greater than 0.50, and Cronbach's α after item deletion should not exceed the Cronbach's α of the overall scale. For the convenience of data analysis, the variable names have been abbreviated in this study, as shown in Table 4.13.

Table 4.13

Variable names and their codes

Variable Names	Codes	Measurement Items Code
Wisdom	WI	WI1-WI5
Faith	FA	FA1-FA5
Benevolence	BE	BE1-BE5
Courage	CO	CO1-CO5
Strictness	ST	ST1-ST5
Product Innovation	PI	PI1-PI5
Service Innovation	SI	SI1-SI5
Technology Innovation	TI	TI1-TI5
Time utilization	TU	TU1-TU5
Resource optimization	RO	RO1-RO5
Brand enhancement	BR	BR1-BR5
Sun Tzu's Art of War Five Virtues Leadership	X	WI1-WI5 FA1-FA5 BE1-BE5 CO1-CO5 ST1-ST5
Innovation	M	PI1-PI5 SI1-SI5 TI1-TI5
Efficiency	Y	TU1-TU5 RO1-RO5 BR1-BR5

Reliability testing is shown in Table 4.14. We can see that all the Cronbach's alpha are greater than 0.7, indicating the high reliability of the research data. Regarding "Cronbach's alpha after item deletion," the reliability coefficient shows no significant increase when any item is deleted. This suggests that none of the items should be removed. Concerning the "CITC," all the CITC values for the items are greater than 0.5, indicating good correlations. In summary, reliability testing results indicate high data reliability and suitability for further analysis.

Table 4.14

Reliability Test Results

	Items	CITC	Cronbach's alpha after item deletion	Cronbach's alpha
WI	WI1	0.737	0.861	0.887
	WI2	0.732	0.862	
	WI3	0.699	0.869	
	WI4	0.736	0.861	
	WI5	0.730	0.862	
FA	FA1	0.676	0.827	0.858
	FA2	0.663	0.830	
	FA3	0.714	0.817	
	FA4	0.647	0.834	
	FA5	0.662	0.831	
BE	BE1	0.612	0.818	0.841
	BE2	0.642	0.810	
	BE3	0.679	0.800	
	BE4	0.668	0.803	
	BE5	0.628	0.814	
CO	CO1	0.779	0.865	0.896
	CO2	0.734	0.875	
	CO3	0.731	0.876	
	CO4	0.712	0.880	
	CO5	0.761	0.869	
ST	ST1	0.767	0.833	0.875
	ST2	0.668	0.857	
	ST3	0.716	0.846	
	ST4	0.698	0.851	
	ST5	0.676	0.855	
PI	PI1	0.733	0.866	0.890
	PI2	0.736	0.866	
	PI3	0.708	0.872	
	PI4	0.743	0.864	

	Items	CITC	Cronbach's alpha after item deletion	Cronbach's alpha
	PI5	0.741	0.865	
SI	SI1	0.743	0.865	0.891
	SI2	0.743	0.865	
	SI3	0.713	0.872	
	SI4	0.711	0.873	
	SI5	0.760	0.861	
TI	TI1	0.793	0.898	0.918
	TI2	0.794	0.898	
	TI3	0.747	0.907	
	TI4	0.798	0.897	
	TI5	0.809	0.898	
TU	TU1	0.723	0.853	0.881
	TU2	0.715	0.855	
	TU3	0.635	0.875	
	TU4	0.749	0.847	
	TU5	0.755	0.845	
RO	RO1	0.798	0.879	0.907
	RO2	0.758	0.888	
	RO3	0.730	0.894	
	RO4	0.766	0.886	
	RO5	0.774	0.884	
BR	BR1	0.796	0.867	0.899
	BR2	0.771	0.873	
	BR3	0.670	0.895	
	BR4	0.734	0.881	
	BR5	0.785	0.870	

4.3 Confirmatory Factor Analysis

4.3.1 CFA for Sun Tzu's Art of War Five Virtues Leadership Model

Sun Tzu's Art of War Five Virtues Leadership model (hereinafter Model X) includes five dimensions. A confirmatory factor analysis is conducted on Model X, and the relevant results are detailed in Figure 4.1, Tables 4.15, 4.16, 4.17, and 4.18.

Figure 4.1

CFA Path Diagram for Model X (Standardized Estimates)

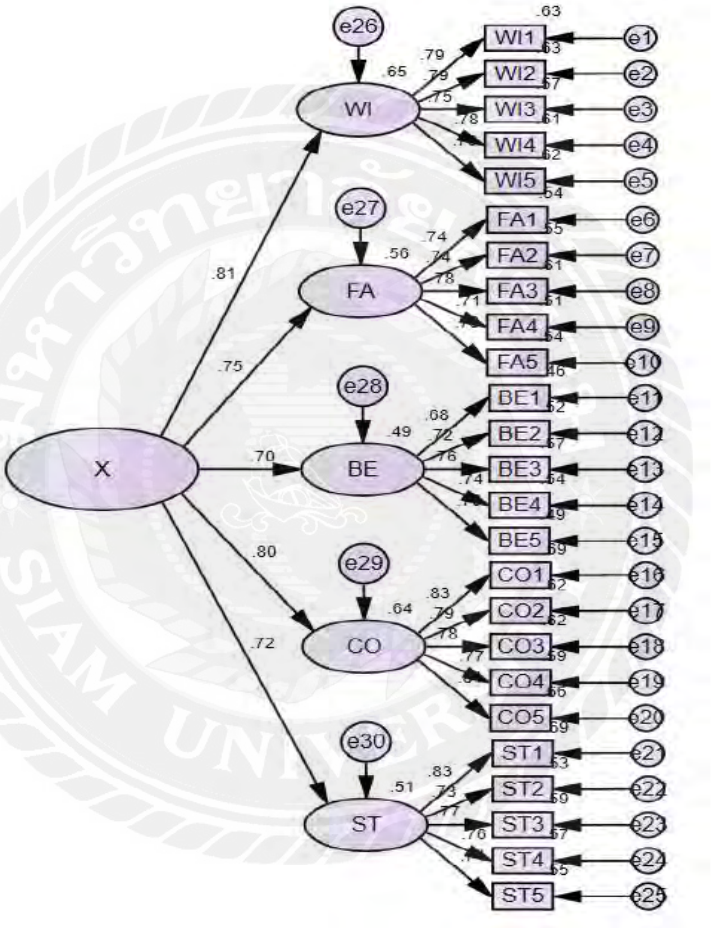


Table 4.15

Factor Loading Coefficients for Model X

Factor	Items	Std. Error	Critical Ratio	p	Standardized Factor loading	Squared Multiple Correlations
WI	WI1	-	-	-	0.793	0.630
WI	WI2	0.056	18.843	0.000	0.792	0.627
WI	WI3	0.056	17.754	0.000	0.754	0.569
WI	WI4	0.056	18.623	0.000	0.784	0.615
WI	WI5	0.056	18.772	0.000	0.789	0.623
FA	FA1	-	-	-	0.735	0.541
FA	FA2	0.065	15.538	0.000	0.738	0.545
FA	FA3	0.067	16.364	0.000	0.779	0.607
FA	FA4	0.066	14.994	0.000	0.712	0.508
FA	FA5	0.067	15.428	0.000	0.733	0.537
BE	BE1	-	-	-	0.677	0.458
BE	BE2	0.083	13.728	0.000	0.718	0.516
BE	BE3	0.087	14.335	0.000	0.758	0.574
BE	BE4	0.084	14.011	0.000	0.736	0.542
BE	BE5	0.081	13.421	0.000	0.699	0.489
CO	CO1	-	-	-	0.832	0.692
CO	CO2	0.051	20.016	0.000	0.787	0.620
CO	CO3	0.050	19.931	0.000	0.785	0.616
CO	CO4	0.048	19.322	0.000	0.767	0.589
CO	CO5	0.048	20.829	0.000	0.810	0.655
ST	ST1	-	-	-	0.829	0.688
ST	ST2	0.044	17.578	0.000	0.730	0.533
ST	ST3	0.047	18.818	0.000	0.769	0.592
ST	ST4	0.043	18.389	0.000	0.756	0.571
ST	ST5	0.046	17.956	0.000	0.742	0.551
X	WI	-	-	-	0.807	0.651
X	FA	0.080	11.433	0.000	0.751	0.564
X	BE	0.069	10.418	0.000	0.703	0.495
X	CO	0.085	12.822	0.000	0.797	0.636
X	ST	0.093	11.859	0.000	0.716	0.513

Factor loading values demonstrate the correlation between factors (latent variables) and items (observed variables/measurement items). If an item shows

significance and the standardized factor loading exceeds 0.7, it indicates a strong correlation. As shown in Table 4.15, the absolute values of the standardized loading for each measurement relationship are all greater than 0.6 and show significance, indicating a good measurement relationship.

Table 4.16

AVE and CR indicator results for Model X

Factor	Average Variance Extracted (AVE) value	Composite Reliability (CR) value
WI	0.613	0.888
FA	0.548	0.858
BE	0.516	0.842
CO	0.634	0.897
ST	0.587	0.876

AVE and CR are used to assess convergent validity in aggregate validity analysis. AVE values above 0.5 and CR values above 0.7 indicate high convergent validity. Table 4.16 shows that all five factors have AVE values exceeding 0.5 and CR values exceeding 0.8, suggesting good convergent validity of the data analyzed.

Table 4.17

Discriminative validity results for Model X

	WI	FA	BE	CO	ST
WI	0.783				
FA	0.551	0.740			
BE	0.492	0.441	0.718		
CO	0.59	0.514	0.473	0.796	
ST	0.475	0.475	0.476	0.524	0.766

Note: The numbers along the diagonal represent the square root of the Average Variance Extracted (AVE).

Table 4.17 shows that WI's square root of AVE is 0.783, greater than the maximum absolute value of the inter-factor correlation coefficient, 0.590, indicating good discriminative validity. FA's square root of AVE is 0.740, greater than the maximum absolute value of the inter-factor correlation coefficient, 0.551, indicating good discriminative validity. For BE, its square root of AVE is 0.718, greater than the maximum absolute value of the inter-factor correlation coefficient, 0.492, indicating

good discriminative validity. CO's square root of AVE is 0.796, greater than the maximum absolute value of the inter-factor correlation coefficient, 0.590, indicating good discriminative validity. For ST, its square root of AVE is 0.766, greater than the maximum absolute value of the inter-factor correlation coefficient, 0.524, indicating good discriminative validity.

Table 4.18

Model fit statistics for Model X

Common Indices	$\chi 2$	df	p	$\chi 2/df$	GFI	RMSEA	RMR	CFI	NFI	NNFI
Judging Criteria	-	-	>0.05	<3	>0.9	<0.10	<0.05	>0.9	>0.9	>0.9
Value	286.491	270	0.234	1.061	0.957	0.011	0.036	0.997	0.958	0.997
Other Indices	TLI	AGFI	IFI	PGFI	PNFI	PCFI	SRMR	RMSEA 90% CI		
Judging Criteria	>0.9	>0.9	>0.9	>0.5	>0.5	>0.5	<0.1	-		
Value	0.997	0.948	0.997	0.795	0.862	0.898	0.029	0.011~0.021		

Table 4.18 shows that the $\chi 2$ for Model X is 286.491, and the χ^2/df is 1.061, below 3, indicating an acceptable fit. The RMSEA is 0.011, below 0.1, indicating a minimal model error. The CFI and NFI are 0.997 and 0.958, respectively, above 0.90, suggesting a good fit for the model. Additionally, the AGFI was 0.948, further supporting the model's fit. All fit indices indicate that the model fits well with the observed data.

Based on the above, all indicators of Model X meet the standards, indicating that it fits the 495 sample data well. Therefore, this study will directly incorporate Model X into the hypothesis testing-related analysis.

4.3.2 CFA for Innovation Model

The innovation model (hereinafter Model M) includes three dimensions. A confirmatory factor analysis is conducted on Model M, and the relevant results are detailed in Figure 4.2, Tables 4.19, 4.20, 4.21, and 4.22.

Figure 4.2

CFA Path Diagram for Model M (Standardized Estimates)

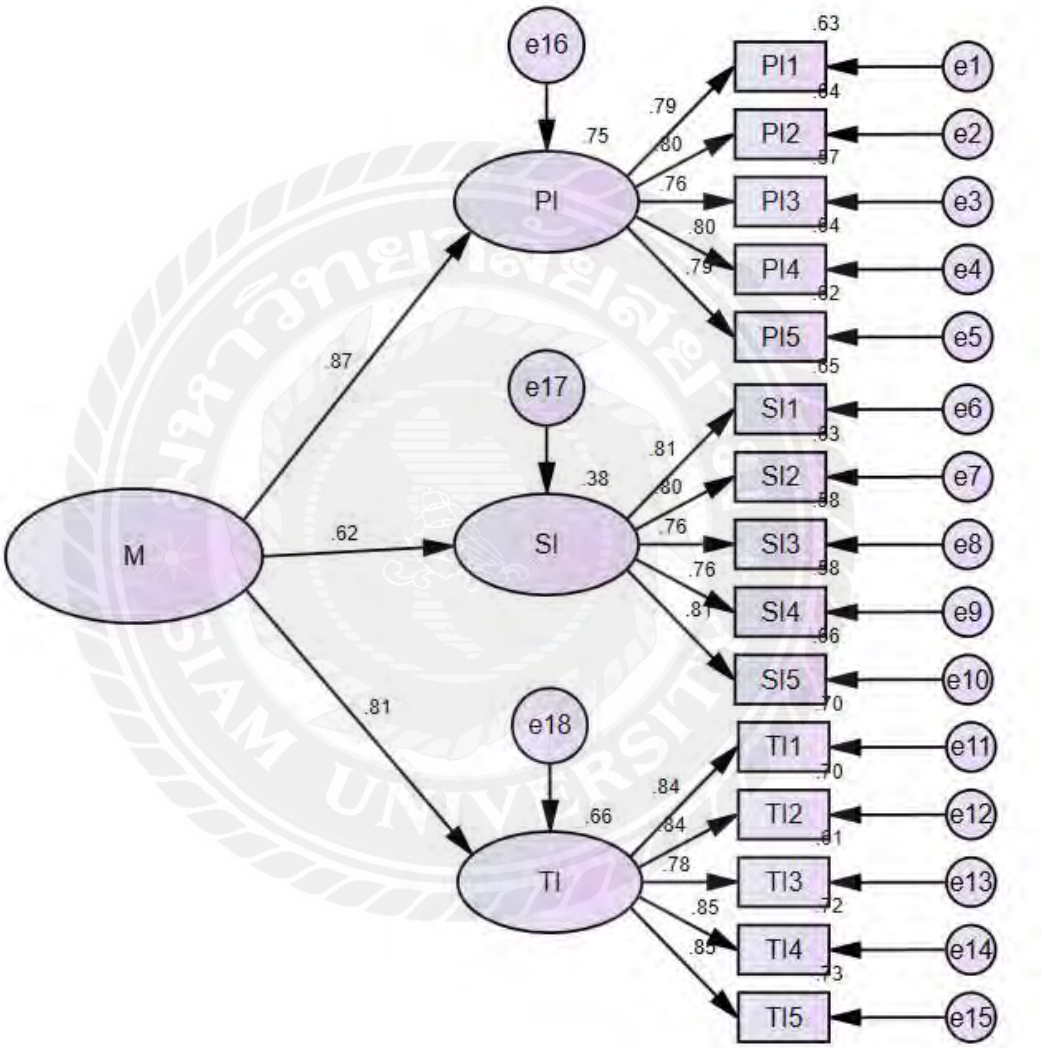


Table 4.19

Factor Loading Coefficients for Model M

Factor	Items	Std. Error	Critical Ratio	p	Standardized Factor loading	Squared Multiple Correlations
PI	PI1	-	-	-	0.794	0.630
PI	PI2	0.052	19.060	0.000	0.797	0.636
PI	PI3	0.053	17.871	0.000	0.757	0.573
PI	PI4	0.053	19.093	0.000	0.798	0.637
PI	PI5	0.053	18.755	0.000	0.787	0.619
SI	SI1	-	-	-	0.808	0.653
SI	SI2	0.051	19.328	0.000	0.796	0.634
SI	SI3	0.050	18.258	0.000	0.761	0.579
SI	SI4	0.052	18.232	0.000	0.760	0.578
SI	SI5	0.049	19.888	0.000	0.814	0.663
TI	TI1	-	-	-	0.840	0.705
TI	TI2	0.045	22.709	0.000	0.836	0.699
TI	TI3	0.046	20.440	0.000	0.781	0.609
TI	TI4	0.045	23.108	0.000	0.846	0.715
TI	TI5	0.044	23.394	0.000	0.852	0.726
M	PI	-	-	-	0.868	0.753
M	SI	0.069	9.914	0.000	0.619	0.383
M	TI	0.096	10.766	0.000	0.811	0.658

As shown in Table 4.19, the absolute values of the standardized loading for each measurement relationship are all greater than 0.6 and show significance, indicating a good measurement relationship.

Table 4.20

AVE and CR indicator results for Model M

Factor	Average Variance Extracted (AVE) value	Composite Reliability (CR) value
PI	0.619	0.890
SI	0.621	0.891
TI	0.691	0.918

In this Confirmatory Factor Analysis conducted on three factors and 15 items, Table 4.20 shows that all three factors have AVE values exceeding 0.6 and CR values exceeding 0.8, indicating good convergent validity of the data analyzed.

Table 4.21

Discriminative validity results for Model M

	PI	SI	TI
PI	0.787		
SI	0.476	0.788	
TI	0.635	0.450	0.831

Note: The numbers along the diagonal represent the square root of the Average Variance Extracted (AVE).

Table 4.21 shows that PI's square root of AVE is 0.787, greater than the maximum absolute value of the inter-factor correlation coefficient, 0.635, indicating good discriminative validity. SI's square root of AVE is 0.788, greater than the maximum absolute value of the inter-factor correlation coefficient, 0.476, indicating good discriminative validity. TI's square root of AVE is 0.831, greater than the maximum absolute value of the inter-factor correlation coefficient, 0.635, indicating good discriminative validity.

Table 4.22

Model fit statistics for Model M

Common Indices	$\chi 2$	df	p	$\chi 2$/df	GFI	RMSEA	RMR	CFI	NFI	NNFI
Judging Criteria	-	-	>0.05	<3	>0.9	<0.10	<0.05	>0.9	>0.9	>0.9
Value	101.256	87	0.141	1.164	0.973	0.018	0.041	0.997	0.979	0.996
Other Indices	TLI	AGFI	IFI	PGFI	PNFI	PCFI	SRMR	RMSEA 90% CI		
Judging Criteria	>0.9	>0.9	>0.9	>0.5	>0.5	>0.5	<0.1	-		
Value	0.996	0.963	0.997	0.706	0.811	0.826	0.025	0.018 ~ 0.032		

Table 4.22 shows that the $\chi 2$ for Model M is 101.256, and the χ^2/df is 1.164, below 3, indicating an acceptable fit. The RMSEA is 0.018, below 0.1, indicating a minimal model error. The CFI and NFI are 0.997 and 0.979, respectively, above 0.90, suggesting a good fit for the model. Additionally, the AGFI was 0.963, further supporting the model's fit. All fit indices indicate that the model fits well with the observed data.

Based on the above, all indicators of Model M meet the standards, indicating that it fits the 495 sample data well. Therefore, this study will directly incorporate Model M into the hypothesis testing-related analysis.

4.3.3 CFA for Efficiency Model

Efficiency model (hereinafter Model Y) includes three dimensions. A confirmatory factor analysis is conducted on Model Y, and the relevant results are detailed in Figure 4.3, Table 4.23, 4.24, 4.25, and 4.26.

Figure 4.3

CFA Path Diagram for Model Y (Standardized Estimates)

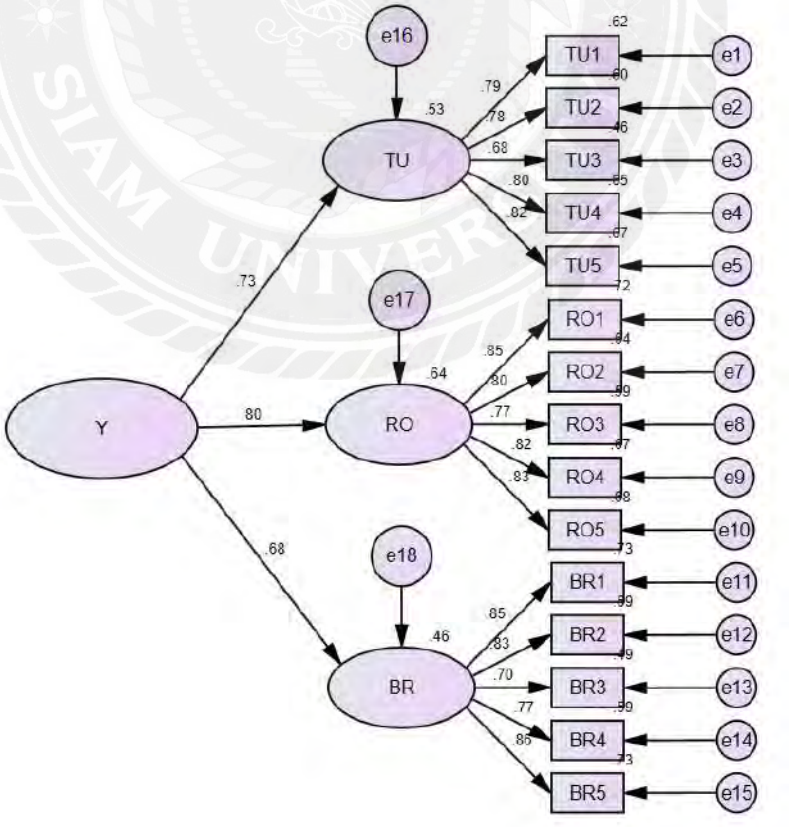


Table 4.23

Factor Loading Coefficients for Model Y

Factor	Items	Std. Error	Critical Ratio	p	Standardized Factor loading	Squared Multiple Correlations
TU	TU1	-	-	-	0.790	0.624
TU	TU2	0.055	18.191	0.000	0.777	0.604
TU	TU3	0.060	15.433	0.000	0.676	0.458
TU	TU4	0.055	18.936	0.000	0.804	0.646
TU	TU5	0.055	19.423	0.000	0.821	0.675
RO	RO1	-	-	-	0.850	0.723
RO	RO2	0.043	21.186	0.000	0.798	0.637
RO	RO3	0.044	20.101	0.000	0.770	0.594
RO	RO4	0.042	22.074	0.000	0.820	0.672
RO	RO5	0.042	22.320	0.000	0.826	0.682
BR	BR1	-	-	-	0.854	0.730
BR	BR2	0.043	22.548	0.000	0.829	0.687
BR	BR3	0.047	17.541	0.000	0.699	0.489
BR	BR4	0.042	19.966	0.000	0.765	0.585
BR	BR5	0.042	23.686	0.000	0.855	0.732
Y	TU	-	-	-	0.726	0.527
Y	RO	0.139	9.690	0.000	0.802	0.642
Y	BR	0.113	9.784	0.000	0.682	0.465

As shown in Table 4.23, the absolute values of the standardized loading for each measurement relationship are all greater than 0.6 and show significance, indicating a good measurement relationship.

Table 4.24

AVE and CR indicator results for Model Y

Factor	Average Variance Extracted (AVE) value	Composite Reliability (CR) value
TU	0.601	0.882
RO	0.661	0.907
BR	0.645	0.900

In this Confirmatory Factor Analysis conducted on three factors and 15 items, Table 4.24 shows that all three factors have AVE values exceeding 0.6 and CR values exceeding 0.8, indicating good convergent validity of the data analyzed.

Table 4.25

Discriminative validity results for Model Y

	TU	RO	BR
TU	0.775		
RO	0.518	0.813	
BR	0.429	0.485	0.803

Note: The numbers along the diagonal represent the square root of the Average Variance Extracted (AVE).

Table 4.25 shows that for TU, its square root of AVE is 0.775, which is greater than the maximum absolute value of the inter-factor correlation coefficient, 0.518, indicating good discriminative validity. RO's square root of AVE is 0.813, greater than the maximum absolute value of the inter-factor correlation coefficient, 0.518, indicating good discriminative validity. BR's square root of AVE is 0.803, which is greater than the maximum absolute value of the inter-factor correlation coefficient, 0.485, indicating good discriminative validity.

Table 4.26

Model fit statistics for Model Y

Common Indices	$\chi 2$	df	p	$\chi 2$/df	GFI	RMSEA	RMR	CFI	NFI	NNFI
Judging Criteria	-	-	>0.05	<3	>0.9	<0.10	<0.05	>0.9	>0.9	>0.9
Value	93.617	87	0.295	1.076	0.975	0.012	0.042	0.999	0.980	0.998
Other Indices	TLI	AGFI	IFI	PGFI	PNFI	PCFI	SRMR	RMSEA 90% CI		
Judging Criteria	>0.9	>0.9	>0.9	>0.5	>0.5	>0.5	<0.1	-		
Value	0.998	0.965	0.999	0.707	0.812	0.827	0.027	0.012 ~ 0.028		

Table 4.26 shows that the $\chi 2$ for Model Y is 93.617, and the χ^2/df is 1.076, which is below 3, indicating an acceptable fit. The RMSEA is 0.012, below 0.1, indicating a minimal model error. The CFI and NFI are 0.999 and 0.980, respectively, both above 0.90, suggesting a good fit for the model. Additionally, the AGFI was 0.965, further supporting the model's fit. All fit indices indicate that the model fits well with the observed data.

Based on the above, all indicators of Model Y meet the standards, indicating that it fits the 495 sample data well. Therefore, this study will directly incorporate Model Y into the hypothesis testing-related analysis.

4.4 Hypothesis Verification

From the analysis in the previous section, it can be seen that the measurement models for each latent variable have good reliability and validity, and the degree of fit to the sample data has also reached an ideal level, which can be used for structural equation modeling analysis. Based on the previous section, this section conducts a structural equation analysis of the model for various variables and measurement indicators and tests the hypotheses of this study.

4.4.1 Hypothesis 1 Testing

Hypothesis 1: Sun Tzu's Art of War Five Virtues Leadership is positively related to the efficiency of the Chinese brand passenger vehicle industry.

Using AMOS 26 to perform structural equation analysis on hypothesis 1, the results are shown in Figure 4.4 and Table 4.27.

Figure 4.4

SEM output results generated by Model X and Model Y (Standardized Estimates)

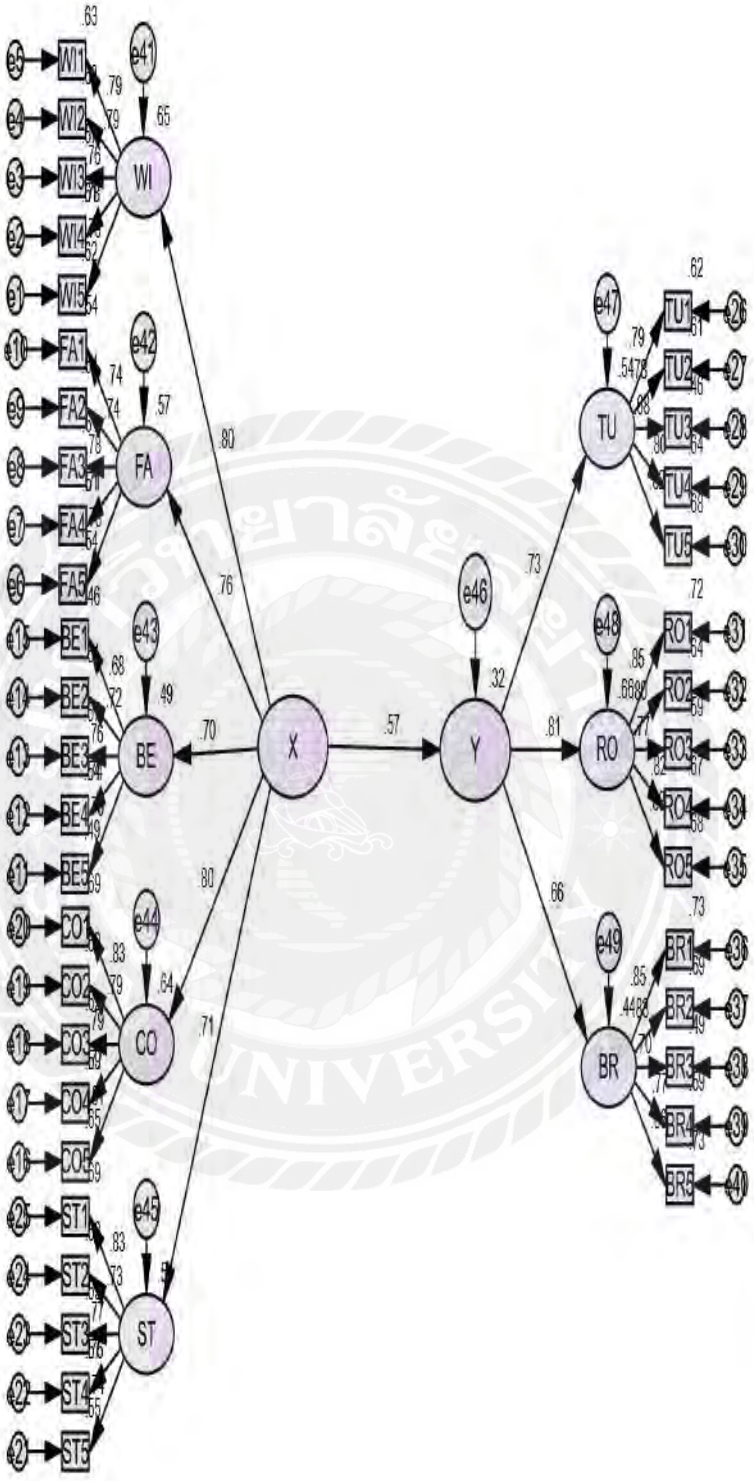


Table 4.27

The fit indices of SEM between Model X and Model Y

Common Indices	**χ2**	**df**	**χ2/df**	**GFI**	**RMSEA**	**CFI**	**NFI**
Judging Criteria	-	-	<3	>0.9	<0.10	>0.9	>0.9
Value	742.889	731	1.016	0.931	0.006	0.999	0.937
Other Indices	**TLI**	**AGFI**	**IFI**	**PGFI**	**PNFI**	**PCFI**	**SRMR**
Judging Criteria	>0.9	>0.9	>0.9	>0.5	>0.5	>0.5	<0.1
Value	0.999	0.923	0.999	0.830	0.879	0.936	0.0351

Table 4.27 shows that the χ2 is 742.889, and the χ^2/df is 1.016, which is below 3, indicating an acceptable fit. The RMSEA is 0.006, below 0.1, indicating a minimal model error. The CFI and NFI are 0.999 and 0.937, respectively, both above 0.90, suggesting a good fit for the model. Additionally, the AGFI was 0.923, further supporting the model's fit. All fit indices indicate that the model fits well with the observed data.

Based on the good overall fit of the measurement model, the researcher tested the significance of the regression paths. The specific impact relationship between Model X and Model Y is shown in Table 4.28.

Table 4.28

SEM output results generated by Model X and Model Y

Hypothesis	**Path Relationship**	**Non-standardized loading**	**Std. Error**	**P**	**Standardized loading**	**Supported**
H1	Y <--- X	0.546	0.066	<0.001	0.569	Yes

According to Table 4.28, the path coefficient between Model X and Model Y is 0.569, with a P-value less than 0.001, indicating statistical significance. This demonstrates that Sun Tzu's Art of War Five Virtues Leadership has a significant positive impact on the efficiency of the Chinese brand passenger vehicle industry, supporting the previously proposed hypothesis 1.

4.4.2 Hypothesis 2 Testing

Hypothesis 2: Sun Tzu's Art of War Five Virtues Leadership is positively related to innovation.

Using AMOS 26 to perform structural equation analysis on hypothesis 2, the results are shown in Figure 4.5 and Table 4.29.

Figure 4.5

SEM output results generated by Model X and Model M (Standardized Estimates)

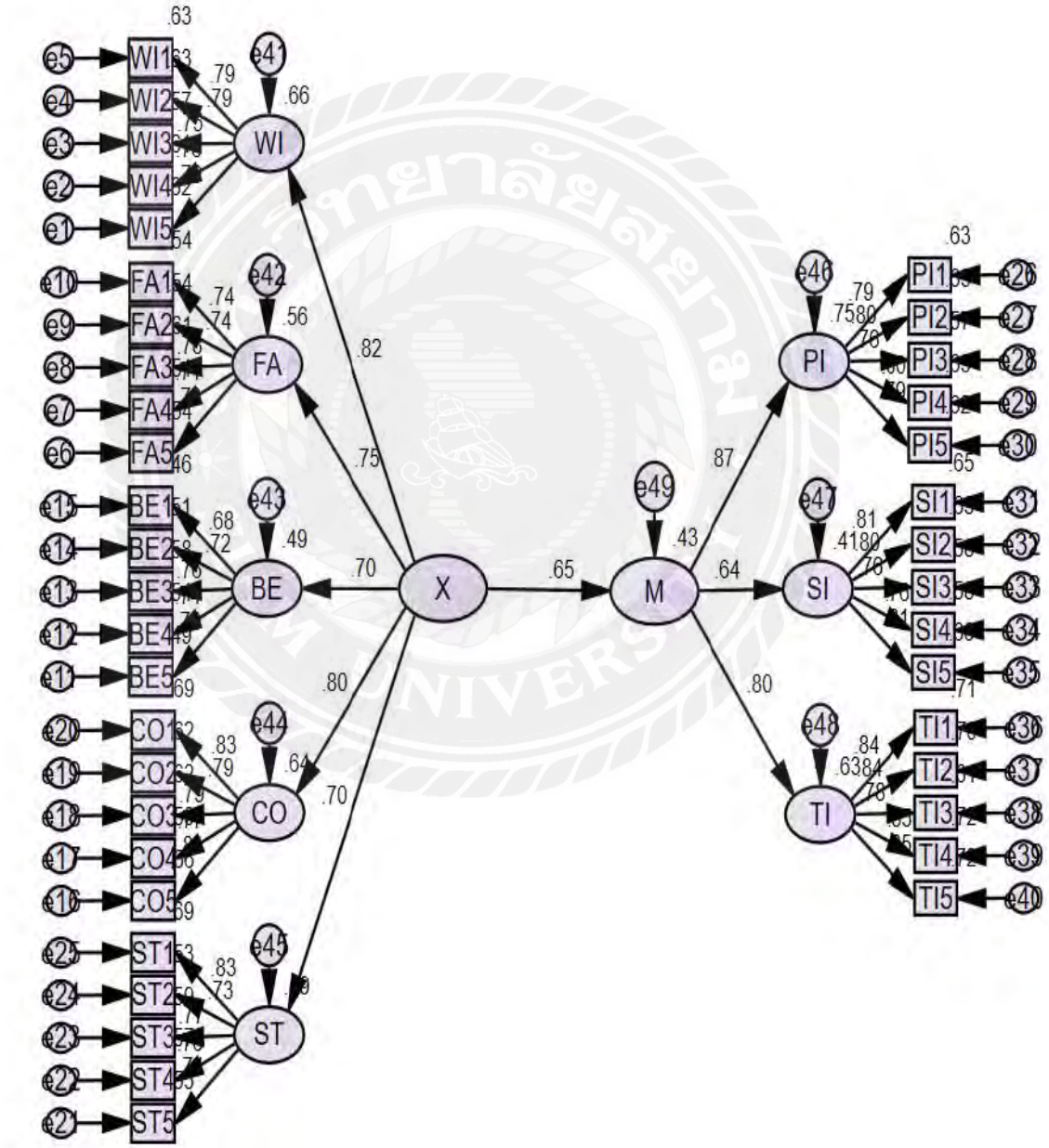


Table 4.29

The fit indices of SEM between Model X and Model M

Common Indices	**χ2**	**df**	**χ2/df**	**GFI**	**RMSEA**	**CFI**	**NFI**
Judging Criteria	-	-	<3	>0.9	<0.10	>0.9	>0.9
Value	827.715	731	1.132	0.926	0.016	0.992	0.932
Other Indices	**TLI**	**AGFI**	**IFI**	**PGFI**	**PNFI**	**PCFI**	**SRMR**
Judging Criteria	>0.9	>0.9	>0.9	>0.5	>0.5	>0.5	<0.1
Value	0.991	0.917	0.992	0.825	0.874	0.929	0.0356

Table 4.29 shows that the χ2 is 827.715, and the χ^2/df is 1.132, which is below 3, indicating an acceptable fit. The RMSEA is 0.016, below 0.1, indicating a minimal model error. The CFI and NFI are 0.992 and 0.932, respectively, both above 0.90, suggesting a good fit for the model. Additionally, the AGFI was 0.917, further supporting the model's fit. All fit indices indicate that the model fits well with the observed data.

Based on the good overall fit of the measurement model, the researcher tested the significance of the regression paths. The specific impact relationship between Model X and Model M is shown in Table 4.30.

Table 4.30

SEM output results generated by Model X and Model M

Hypothesis	**Path Relationship**	**Non-standardized loading**	**Std. Error**	**P**	**Standardized loading**	**Supported**
H2	M <--- X	0.821	0.081	<0.001	0.653	Yes

According to Table 4.30, the path coefficient between Model X and Model M is 0.653, with a P-value less than 0.001, indicating statistical significance. This demonstrates that Sun Tzu's Art of War Five Virtues Leadership has a significant positive impact on innovation, supporting the previously proposed hypothesis 2.

4.4.3 Hypothesis 3 Testing

Hypothesis 3: Innovation is positively related to the efficiency of the Chinese brand passenger vehicle industry.

Using AMOS 26 to perform structural equation analysis on hypothesis 3, the results are shown in Figure 4.6 and Table 4.31.

Figure 4.6

SEM output results generated by Model M and Model Y (Standardized Estimates)

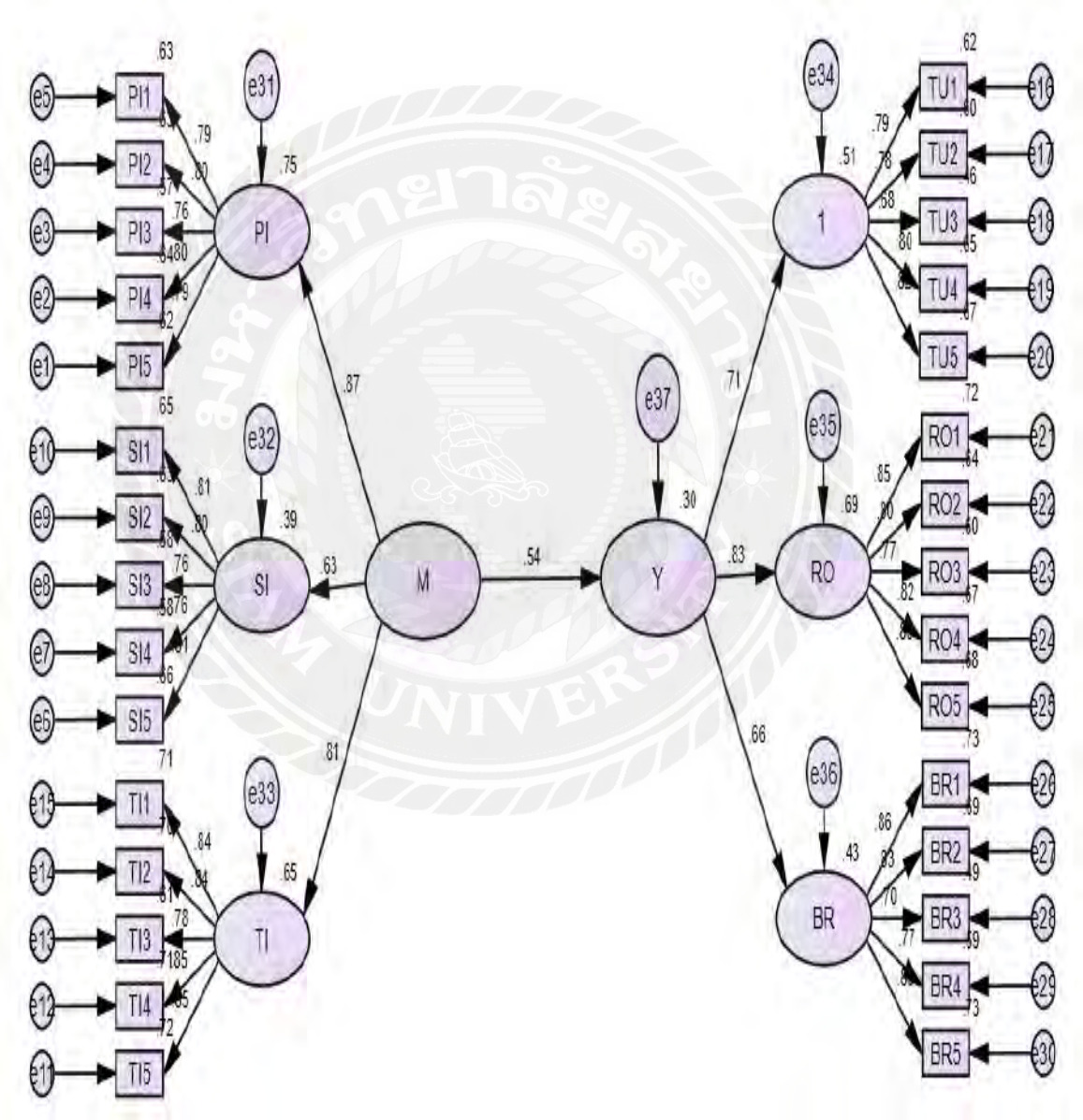


Table 4.31

The fit indices of SEM between Model M and Model Y

Common Indices	**χ2**	**df**	**χ2/df**	**GFI**	**RMSEA**	**CFI**	**NFI**
Judging Criteria	-	-	<3	>0.9	<0.10	>0.9	>0.9
Value	388.214	398	0.975	0.950	0.000	1.000	0.960
Other Indices	**TLI**	**AGFI**	**IFI**	**PGFI**	**PNFI**	**PCFI**	**SRMR**
Judging Criteria	>0.9	>0.9	>0.9	>0.5	>0.5	>0.5	<0.1
Value	1.001	0.942	1.001	0.813	0.878	0.915	0.0332

Table 4.31 shows that the χ2 is 388.214, and the χ^2/df is 0.975, which is below 3, indicating an acceptable fit. The RMSEA is 0.000, below 0.1, indicating a minimal model error. The CFI and NFI are 1.000 and 0.960, respectively, both above 0.90, suggesting a good fit for the model. Additionally, the AGFI was 0.942, further supporting the model's fit. All fit indices indicate that the model fits well with the observed data.

Based on the good overall fit of the measurement model, the researcher tested the significance of the regression paths. The specific impact relationship between Model M and Model Y is shown in Table 4.32.

Table 4.32

SEM output results generated by Model M and Model Y

Hypothesis	**Path Relationship**	**Non-standardized loading**	**Std. Error**	**P**	**Standardized loading**	**Supported**
H3	Y <--- M	0.403	0.052	<0.001	0.544	Yes

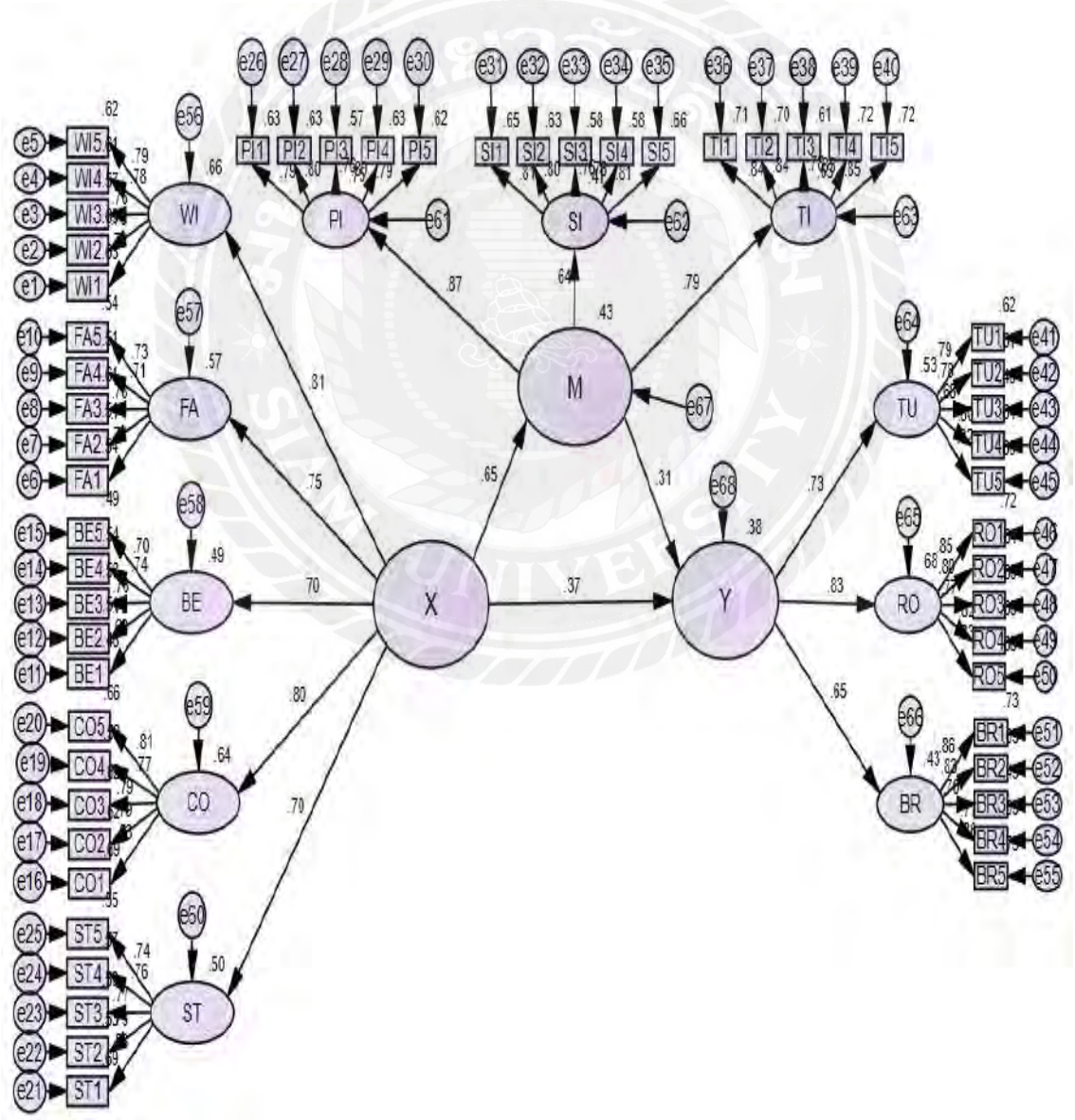
According to Table 4.32, the path coefficient between M and Y is 0.544, with a P-value less than 0.001, indicating statistical significance. This demonstrates that innovation has a significant positive impact on the efficiency of the Chinese brand passenger vehicle industry, supporting the previously proposed hypothesis 3.

4.5 Final Model Evaluation

In this study, the researcher constructed and tested a Structural Equation Model to explore the complex relationships among various variables. The structural Equation Model is a multivariate statistical analysis method that can simultaneously handle multiple causal relationships and measurement errors, thus providing a comprehensive understanding of the theoretical model. Figure 4.7 illustrates the Structural Equation Model of this study, visually presenting the research hypotheses and theoretical framework.

Figure 4.7

Final Structural Equation Model (Standardized Estimates)



The Structural Equation Model presented in Figure 4.7 demonstrates the intricate relationships among the studied variables. The model provides significant insights into how latent variables and their respective observed variables influence each other. The path coefficients and fit indices indicate that the model fits the data well, supporting the proposed theoretical framework. The specific model fitting data is detailed in Table 4.33.

Table 4.33

The fit indices of Final Structural Equation Model

Common Indices	**χ2**	**df**	**χ2/df**	**GFI**	**RMSEA**	**CFI**	**NFI**
Judging Criteria	-	-	<3	>0.9	<0.10	>0.9	>0.9
Value	1494.203	1416	1.055	0.905	0.011	0.995	0.915
Other Indices	**TLI**	**AGFI**	**IFI**	**PGFI**	**PNFI**	**PCFI**	**SRMR**
Judging Criteria	>0.9	>0.9	>0.9	>0.5	>0.5	>0.5	<0.1
Value	0.995	0.897	0.995	0.832	0.872	0.949	0.0368

Table 4.33 shows that the χ^2 is 1494.203, and the χ^2/df is 1.055, which is below 3, indicating an acceptable fit. The RMSEA is 0.011, well below the threshold of 0.1, indicating a minimal model error. The CFI and NFI are 0.995 and 0.915, respectively, both above 0.90, suggesting a good fit for the model. Although the AGFI is slightly below the conventional threshold, it is still close to the acceptable range, indicating that the model's fit is generally reasonable. In summary, most fit indices suggest that the model fits well with the observed data.

These fit indices collectively suggested that the proposed model adequately represented the underlying data structure. The strong model fit reinforced the validity of the theoretical framework and supports the hypothesized relationships among the variables. The following sections would further interpret these results, exploring their theoretical implications and practical significance.

4.6 In-depth Interviews

This study uses interviews to supplement the questionnaire survey, providing further explanation and in-depth analysis of the questionnaire data. By comparing interview and questionnaire data, the study examines whether there are any inconsistencies or conflicts in the results, which helps researchers identify issues and

make adjustments based on the actual situation, leading to more accurate and reliable research conclusions.

4.6.1 Interview Data Collection

This study interviewed a total of 15 individuals: 10 managers from Chinese brand passenger vehicle companies (including department heads, deputy heads, and other middle or higher-level administrative staff), two government officers (government employees with relevant experience in the industry), and three experts (industry experts and academic researchers with expertise in appropriate fields.). A total of 15 interview transcripts were collected. The basic information of the participants is shown in Table 4.34.

Table 4.34

Basic statistics of interviewees

Characteristic	Category	Sample Size	Percentage %
Gender	Male	12	80%
	Female	3	20%
Age	30-40 years old	7	46.67%
	41-50 years old	7	46.67%
	51-60 years old	1	6.67%
Educational level	Undergraduate	1	6.67%
	Master	11	73.33%
	Doctor	3	20%
Years of work experience	1-3 years	1	6.67%
	4-6 years	2	13.33%
	6 years or more	12	80%

After selecting the interview subjects, the interview outline was provided to them in advance, allowing them time to think. This study used face-to-face and WeChat Videos to complete the in-depth interviews.

4.6.2 Results from In-depth Interview

4.6.2.1 Opinion on Sun Tzu's Art of War Five Virtues Leadership

The interview results indicate that all interviewees believe that wisdom, faith, benevolence, courage, and strictness are closely related to leadership, which confirmed the questionnaire survey results.

Wisdom

All interviewees agreed that wisdom is closely related to leadership. For example, Interviewee No. 2 said, “Wisdom isn't just about gathering knowledge; it's about knowing how to use that knowledge to solve problems and push the business forward.” Interviewee No. 11 said, “Wisdom is key in leadership—it’s about having a sharp sense of market trends, understanding what consumers need, and staying on top of tech developments. This helps businesses make smart decisions”.

Faith

All interviewees agreed that faith is closely related to leadership. For example, interviewee No. 8 said, "Faith is the foundation of leadership and helps establish good cooperative or superior-subordinate relationships.” Interviewee No. 10 said, "Leaders need to have faith to earn the trust of their team members and stakeholders, which strengthens team cohesion.”

Benevolence

All interviewees agreed that benevolence is closely related to leadership. For example, interviewee No. 8 stated that “benevolence helps leaders gain more support from their subordinates and fosters a more humane work environment”.

Courage

All interviewees agreed that courage is closely related to leadership. For example, interviewee No. 3 stated, "Courage is a quality that leaders should possess.” Interviewee No. 15 said, "Courage is the spiritual pillar for leaders when facing risks and challenges.”

Strictness

All interviewees agreed that strictness is closely related to leadership. For example, interviewee No. 11 said, "Strictness is important for leaders to ensure the strict implementation of company policies.” Interviewee No 12 mentioned that “strictness helps leaders ensure product quality”.

4.6.2.2 Opinion on Innovation

The interview results show that all interviewees believe that product, service, and technology innovation are important manifestations of corporate innovation, which is consistent with the questionnaire survey results.

Product Innovation

All interviewees agreed that product innovation is closely related to innovation. For example, interviewee No. 5 said, "Product innovation is an important aspect of corporate innovation; it is crucial for a company to maintain its market competitiveness. The market demand changes rapidly, and only continuous product innovation can maintain a company's competitiveness".

Service Innovation

All interviewees agreed that service innovation is closely related to innovation. For example, interviewee No. 8 said, "Service innovation has a direct impact on customer satisfaction and loyalty, which are essential for a company's long-term success." Interviewee No. 13 said, "Service innovation is an important part of enterprise innovation. It helps improve operational efficiency and better use of resources".

Technology Innovation

All interviewees agreed that technology innovation is closely related to innovation. For example, interviewee No. 7 said, "Technological innovation is the core driver of a company's development. By leveraging new technologies, companies can enhance product performance and quality, cut production costs, and boost efficiency". Interviewee No. 11 said, "Technological innovation is very important in the fast-changing automotive industry."

4.6.2.3 Opinion on Efficiency

The interview results show that all interviewees believe that time utilization, resource optimization, and brand enhancement are important manifestations of corporate efficiency, which is consistent with the questionnaire survey results.

Time Utilization

All interviewees agreed that time utilization is closely related to efficiency. For example, interviewee No. 2 said, "Companies that manage their time well usually get

more out of their resources and staff". Interviewee No. 14 said, "Good time management shows how efficiently a company operates and manages itself. With proper planning and effective time use, a company can boost work efficiency, cut down on wasted resources, and speed up project progress".

Resource Optimization

All interviewees agreed that resource optimization is closely related to efficiency. For example, interviewee No. 2 said, "Effective resource management maximizes the use of a company's physical, human, and financial resources, leading to improved production efficiency". Interviewee No. 14 said, "Proper allocation and efficient use of resources can maximize value creation, reduce operating costs, and enhance both production efficiency and service quality".

Brand Enhancement

All interviewees agreed that brand enhancement is closely related to efficiency. For example, interviewee No. 11 said, "Brand enhancement reflects the company's high efficiency in product quality, service levels, and customer relationship management." Interviewee No. 13 said, "By implementing effective branding strategies and management, a company can build a strong brand image in the market, which in turn boosts operational efficiency and profitability".

4.6.2.4 Opinion on the relationship among Sun Tzu's Art of War Five Virtues Leadership, Innovation and Efficiency

The interview results reveal that all interviewees believe there is a positive correlation between Five Virtues leadership and the efficiency of the Chinese brand passenger vehicle industry. Interviewee No.5 said, "Leadership can enhance the execution ability of managers, improve the company's overall efficiency, and help teams achieve their goals."

Additionally, all interviewees agree that there is a positive correlation between Five Virtues leadership and innovation and between innovation and the efficiency of the Chinese brand passenger vehicle industry. Interviewee No.14 said, "Wisdom, courage, and innovative ability are closely related. If leaders possess these qualities, they can lead companies in developing new products, technologies, and markets." Interviewee No.14 said, "Innovation can help companies allocate resources more reasonably and improve production efficiency."

These findings are consistent with the statistical results from the questionnaire survey, further supporting the positive impact of Five Virtues leadership on corporate efficiency, the positive impact of Five Virtues leadership on innovation, and the positive impact of innovation on industry efficiency.

4.6.3 Other information obtained from interviews

During the interviews, some interviewees raised several new perspectives as follows:

Impact of Cultural Differences: Interviewee No. 15 pointed out that applying Five Virtues Leadership might vary across different regions and cultural backgrounds. This is particularly relevant for international companies, where balancing traditional leadership with modern management concepts is worth exploring.

Constraints on Innovation Resources: Interviewees No. 3, No. 4, No. 6, and No. 7 noted that while they acknowledge the role of innovation in enhancing efficiency, limited resources (such as funding, technology, and talent) often constrain their ability to innovate. This highlights that innovation depends not only on leadership but also on adequate resource support.

Impact of Government Policies: Interviewees No. 11 and No. 12 emphasized that government policies significantly drive enterprise innovation and efficiency. They pointed out that policy-making should focus more on creating a conducive environment for innovation and supporting businesses.

4.7 Combination of the results from Questionnaire and In-depth Interview

This section integrates the findings from the questionnaire survey and in-depth interviews to provide a comprehensive understanding of the relationships between the Five Virtues Leadership, innovation, and efficiency in the Chinese brand passenger vehicle industry. Combining these two methods ensures a more nuanced understanding of the research problem, allowing for both breadth and depth in the analysis.

The questionnaire survey was the primary quantitative method to measure and analyze the associations between the three constructs. It provided statistically significant evidence supporting the positive effects of the Five Virtues Leadership on innovation and efficiency, and innovation on efficiency. For example, the dimensions of Wisdom

and Courage showed a strong influence on innovation, these results suggest that leaders who demonstrate wisdom and courage are more likely to promote innovative behaviors within their organizations. The analysis also found that innovation plays a significant role in enhancing operational efficiency. The path coefficient between innovation and efficiency was 0.544 ($p < 0.001$), indicating that companies with higher levels of innovation tend to experience improvements in time utilization, resource optimization, and brand enhancement. The survey also identified four dimensions with low scores: "Courage," "Technology Innovation," "Resource Optimization," and "Brand Enhancement." For instance, the average score for the courage dimension was 3.25, falling below the neutral threshold of 3.41. This suggests that many industry leaders exhibit a cautious, risk-averse attitude, potentially limiting their willingness to take bold actions or embrace uncertainty.

Meanwhile, the in-depth interviews were conducted further to investigate the underlying reasons behind the survey results. They offered valuable qualitative insights into the mechanisms by which the Five Virtues Leadership influence organizational outcomes, such as team collaboration, decision-making, and operational optimization. These qualitative insights validated the survey results and provided nuanced explanations that numbers alone could not convey. The interviews revealed that the comprehensive application of Five Virtues Leadership significantly contributes to enhancing both innovation and efficiency in organizations. Interviewees emphasized the following points. Wisdom and Courage were identified as crucial in driving innovation. Wisdom helps leaders make informed, strategic decisions, while Courage enables them to act boldly and take risks when needed. Faith and Benevolence foster trust and collaboration within teams, which in turn creates a supportive environment for creative thinking and problem-solving. Strictness ensures that innovation initiatives are well-managed and aligned with organizational goals, preventing chaos and inefficiency. The interviews also revealed the reasons why the scores on the four dimensions were below 3.41. For example, the courage dimension scored low for the following three reasons. First, a risk-averse organizational culture prioritizes stability and incremental improvements over bold, innovative decisions. Second, rigid hierarchical structures discourage both employees and leaders from challenging authority or disrupting established norms. Finally, external economic and market uncertainties further dissuade managers from taking risks or making high-stakes decisions.

The integration of questionnaire and interview results highlights a strong synergy between quantitative and qualitative data. The survey offers broad, statistically significant evidence of the relationships among Five Virtues Leadership, innovation, and efficiency. Meanwhile, the interviews provide nuanced insights into the underlying mechanisms, explaining the "how" and "why" behind these relationships. Together, the findings confirm the positive influence of Five Virtues Leadership on innovation and efficiency in Chinese brand passenger vehicle companies and elucidate the processes driving these effects.

4.8 Utilizing the Five Virtues Leadership to Enhance Corporate Efficiency

4.8.1 Leveraging Five Virtues Leadership to Drive Innovation and Operational Efficiency

Create specialized innovation teams led by managers trained in the Five Virtues leadership to focus on discovering new market opportunities, promoting a culture of calculated risk-taking, and encouraging cross-functional collaboration.

Prioritize resources for Research and Development (R&D) projects that align with long-term strategic goals and encourage leaders to support innovation despite short-term uncertainties.

Reward behaviors that improve time utilization, resource optimization, and brand enhancement and foster an operational efficiency-oriented environment through recognition programs and performance incentives.

4.8.2 Enhancing Brand Positioning and Adapting to Economic Challenges

Invest in brand enhancement initiatives that align with Benevolence and Faith, such as customer-centric marketing campaigns to strengthen brand loyalty and market impact.

Develop long-term strategies that embody Courage and Wisdom, including market expansion or rebranding, supported by thorough market research and risk assessment.

Create crisis management frameworks incorporating the Five Virtues to guide organizations through economic challenges with Wisdom, Courage, and Strictness.

Adopt practices balancing short-term survival with long-term goals, ensuring resilience during economic downturns while continuing to invest in innovation and brand development.

4.8.3 Upgrading the Five Virtues Leadership Model

Nowadays, technology is developing rapidly, market competition is becoming increasingly fierce, and the social environment is becoming more complex and diverse. The traditional leadership model faces many challenges and needs to be constantly upgraded to adapt to new situations. Although the Five Virtues in Sun Tzu's Art of War have profound wisdom, they also need to be upgraded in conjunction with modern management theory and the needs of the times to better play their role in leadership practice.

1) Lifelong learning and innovative thinking

Leaders should constantly learn new knowledge and skills, maintain an open mindset, and encourage innovation and experimentation. Establish a learning organization and cultivate the team's innovative ability to adapt to the constantly changing market environment.

2) Social Responsibility and Sustainable Development

Extending Integrity to the Field of Social Responsibility, Focusing on the Sustainable Development of Enterprises. Leaders should take responsibility in three aspects: economy, environment, and society, establish a good corporate image, and win recognition and support from society.

3) Diversity and Inclusion

Creating a diverse and inclusive work environment that respects different cultures, backgrounds, and perspectives. Encourage collaboration and communication among team members to promote innovation and problem-solving.

4) Risk assessment and management

Leaders should possess the ability to assess and manage risks. Before making decisions, fully consider various risk factors and develop corresponding response strategies to ensure the stable development of the enterprise.

5) Flexible systems and norms

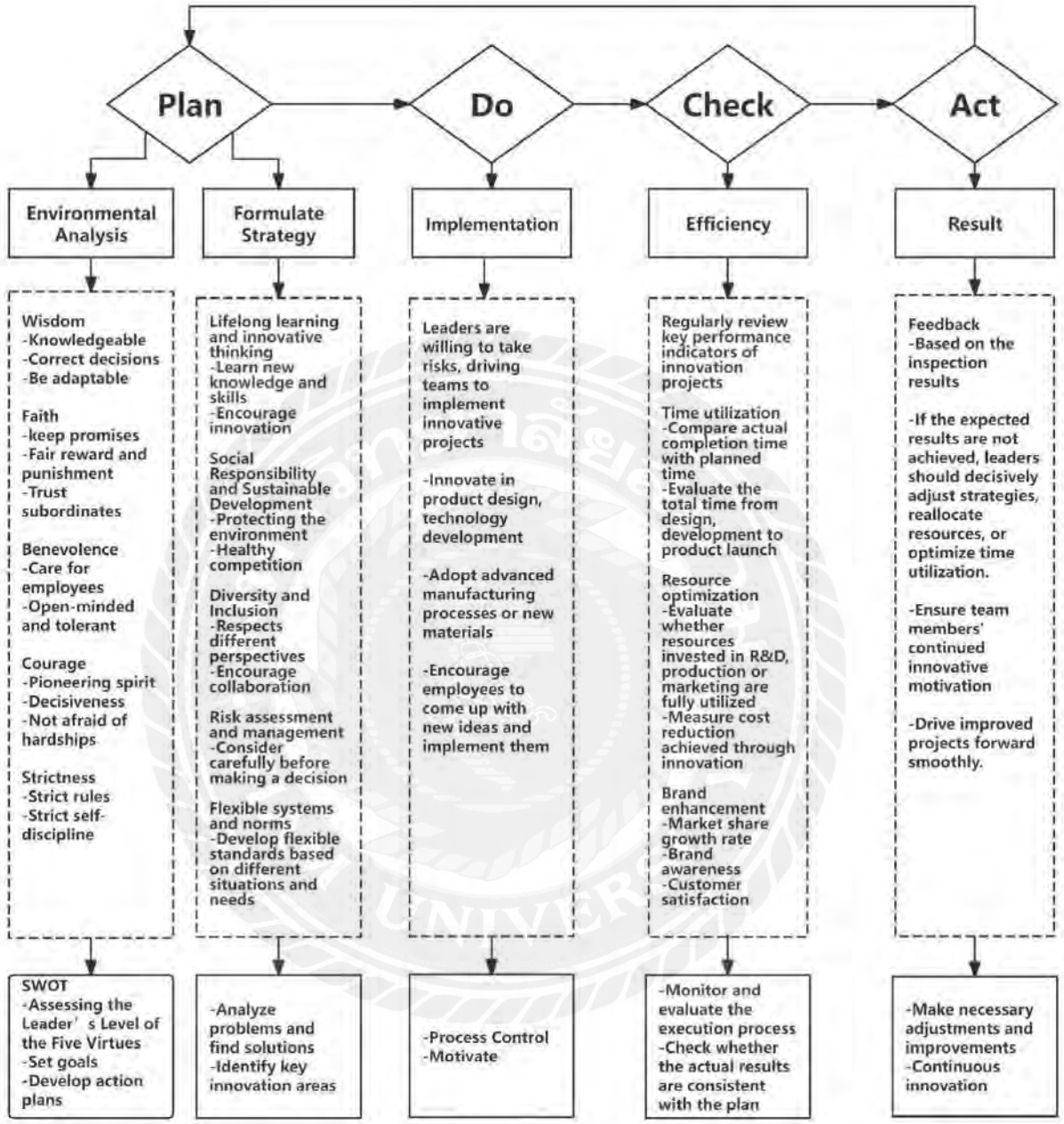
Traditional strict management often emphasizes rigid systems and norms, while modern management demands greater flexibility. Leaders should establish adaptable systems and standards based on varying situations and needs, ensuring smooth organizational operation while stimulating employees' enthusiasm and creativity.

Applying the Five Virtues Leadership Model within the PDCA management process can effectively enhance efficiency during innovation. Wisdom guides the planning phase, trust fosters teamwork, benevolence cultivates a culture supportive of innovation, courage drives bold execution, and strictness ensures process monitoring and feedback. This approach ultimately leads to significant improvements in time utilization, resource optimization, and brand enhancement in the Chinese brand passenger vehicle industry. See Figure 4.8 for details.

Scholars should continue to innovate and upgrade traditional leadership models to provide modern leaders with a more comprehensive, systematic, and effective leadership framework. By continuously applying and refining the Five Virtues Leadership Model in practice, leaders can better navigate complex and dynamic environmental challenges, guiding organizations toward sustainable development.

Figure 4.8

Flowchart for improving efficiency



CHAPTER 5
RESEARCH CONCLUSION, DISCUSSION AND RECOMMENDATION

This chapter presents a comprehensive overview of the study's findings, discusses their implications, and offers recommendations based on the results. The details in this chapter will be separated into three parts as follows:

5.1 Research Conclusion

5.2 Discussion

5.3 Recommendation

5.1 Research Conclusion

5.1.1 Questionnaire Results

This study selected 62 Chinese brand passenger vehicle enterprises across various regions of China, focusing on middle and senior-level managers from production, research and development, human resources, and sales departments. A total of 530 questionnaires were issued, and 495 valid questionnaires were collected. This research used SPSS and AMOS to analyze the data of 495 valid samples. The analysis includes General Information of the Respondents, Percentage Distribution of Constructs, Reliability Testing, Confirmatory Factor Analysis, and Hypothesis Verification.

1) General Information of the Respondents

The survey results show that most respondents were male, aged between 31-40 years, held a postgraduate degree, 4-6 years of work experience, worked in the research and development department. Lastly, and from the eastern region of China.

2) Percentage Distribution of Constructs for Sun Tzu's Art of War Five Virtues Leadership

This section presents the respondents' perception of Sun Tzu's Art of War Five Virtues Leadership. Wisdom got the highest average mean at the level of Agree (x = 3.76, S.D. = 1.09), followed by benevolence, faith, strictness, and courage.

For attitude towards wisdom, the average level of opinion is Agree. The highest opinion is the statement, “Your manager has a thorough understanding of various fields in the automotive industry,” and the lowest is “Your manager always makes wise decisions and chooses the best course of action.”

For attitude towards faith, the average level of opinion is Agree (x = 3.68, S.D. = 1.12). The highest opinion is the statement, “The rules set by your manager are consistently and fairly applicable to everyone,” and the lowest is “Your manager trusts their subordinates and delegates power to them.”

For attitude towards benevolence, the average level of opinion is Agree (x = 3.72, S.D. = 1.07). The highest opinion is the statement, “Your manager demonstrates a compassionate and caring attitude towards others, especially towards employees,” and the lowest is “Your manager pays attention not only to the employees’ career development but also their well-being” and “Your manager guides and advises employees in a combination of firmness and empathy, rather than indulging or slacking off”.

For attitude towards courage, the average level of opinion is Neutral (x = 3.37, S.D. = 1.13). The highest opinion is the statement, “Your manager persists in moving towards the right goals, even under pressure or unfavorable conditions,” and the lowest is “Your manager always takes responsibility.”

For attitude towards strictness, the average level of opinion is Agree (x = 3.47, S.D. = 1.14). The highest opinion is the statement, “Your company's rewards and punishments are fair,” and the lowest is “Your company's rules and regulations are precise and well-defined.”

3) Percentage Distribution of Constructs for Innovation

This section presents the respondents' perceptions of innovation. Service innovation got the highest average mean at the level of Agree (x = 3.82, S.D. = 1.20) followed by product innovation and technology innovation.

For attitude towards product innovation, the average level of opinion is Agree (x = 3.64, S.D. = 1.29). The highest opinion is the statement, “Your company always considers using eco-friendly materials in product development to protect the environment,” and the lowest is, “Your company will always launch new or improved products if there is a change in market demands and customers’ needs” and other two statements.

For attitude towards service innovation, the average level of opinion is Agree (x = 3.82, S.D. = 1.20). The highest opinion is the statement, “Your company always considers customers’ needs and preferences,” and the lowest is “Your company always provides customized services for customers.”

For attitude towards technology innovation, the average level of opinion is Neutral (x = 3.34, S.D. = 1.37). The highest opinion is the statement, “Your company develops clear policies and processes to ensure that the development and application of new technologies comply with rules and regulations,” and the lowest is, “Your company encourages the use of automation equipment and intelligent systems to optimize production processes.”

4) Percentage Distribution of Constructs for Efficiency

This section presents the respondents' perception of efficiency. Time utilization got the highest average mean at the level of Agree (x = 3.66, S.D. = 1.19), followed by resource optimization and brand enhancement.

For attitude towards time utilization, the average level of opinion is Agree (x = 3.66, S.D. = 1.19). The highest opinion is the statement, “Your company can always plan and allocate tasks effectively,” and the lowest is “Your company provides training in time management.”

For attitude toward resource optimization, the average level of opinion is Neutral (x = 3.40, S.D. = 1.28). The highest opinion is the statement, “Your company’s employee is skilled in utilizing cloud computing or other technologies, and it enhances the efficient use of resources,” and the lowest is, “Your company’s workspace layout is well designed, and it helps the company to reduce energy consumption.”

For attitude toward brand enhancement, the average level of opinion is Neutral (x = 3.44, S.D. = 1.25). The highest opinion is the statement, “Your company can monitor customer needs and expectations, and it can provide a better experience to customers,” and the lowest is, “Your company has a crisis management plan in place to deal with negative events that could impact your brand image.”

5) Reliability Testing

All the Cronbach's alpha are greater than 0.7, indicating high reliability of the research data. Regarding "Cronbach's alpha after item deletion," the reliability coefficient does not show any significant increase when any item is deleted. Regarding Concerning the "CITC", all the CITC values for the items are greater than 0.5, indicating good correlations among the items. In summary, reliability testing results indicate high data reliability and suitability for further analysis.

6) Confirmatory Factor Analysis

This study conducted a confirmatory factor analysis on Sun Tzu's Art of War Five Virtues Leadership Model, Innovation Model, and Efficiency Model. The Five Virtues Leadership Model includes five dimensions, while both the Innovation and Efficiency Models consist of three dimensions each. The standardized loadings for all measurement relationships exceed 0.6 and are statistically significant, indicating a strong measurement relationship. Additionally, all dimensions have AVE values above 0.5 and CR values exceeding 0.8, demonstrating good convergent validity. The results also show satisfactory discriminant validity. In terms of model fit, key indices such as $\chi 2/df$, GFI, RMSEA, CFI, NFI, TLI, and AGFI meet the criteria for acceptable model fit. This confirms that the models fit the data well and that the constructs are measured accurately.

5.1.2 In-depth Interview Results

This study used interviews to supplement the questionnaire survey, providing further explanation and in-depth analysis of the survey data. A total of 15 individuals were interviewed: 10 managers from Chinese brand passenger vehicle companies, two government officers, and three experts.

1) Opinion on Sun Tzu's Art of War Five Virtues Leadership

All interviewees believe that wisdom, faith, benevolence, courage, and strictness are closely related to leadership, corroborating the findings from the questionnaire survey. The interviewees' insights collectively reinforce the theoretical framework and empirical results of the study, emphasizing the importance of these qualities in effective leadership.

2) Opinion on Innovation

The interview results confirm that product, service, and technological innovation are all crucial aspects of corporate innovation, aligning with the findings from the questionnaire survey. Interviewees unanimously agreed on the significance of these innovations.

3) Opinion on Efficiency

The interview results confirm that time utilization, resource optimization, and brand enhancement are key indicators of corporate efficiency, aligning with the findings

from the questionnaire survey. Interviewees unanimously agreed on the significance of these aspects.

4) Opinion on the relationship between Sun Tzu's Art of War Five Virtues Leadership, Innovation and Efficiency

The interview results confirm a positive relationship between Sun Tzu's Art of War Five Virtues Leadership and both innovation and efficiency in the Chinese brand passenger vehicle industry, as well as a positive relationship between innovation and efficiency.

5.2 Discussion

5.2.1 The Relationship between Five Virtues Leadership and Efficiency

Hypothesis 1 Sun Tzu's Art of War Five Virtues Leadership is positively related to the efficiency of the Chinese brand passenger vehicle industry.

The measurement model analysis provided strong evidence of a good fit with the observed data, as indicated by several key fit indices. Specifically, the χ^2/df ratio was 1.016, RMSEA was 0.006, and both CFI and NFI exceeded the 0.90 benchmark, further supporting the model's fit. The AGFI was 0.923, providing additional confirmation of the model's adequacy. The path coefficient between Model X and Model Y was 0.569, with a P-value less than 0.001, indicating a statistically significant relationship. This result supports Hypothesis 1, demonstrating that Sun Tzu's Art of War Five Virtues Leadership has a significant positive impact on the efficiency of the Chinese brand passenger vehicle industry. This finding aligned with Itami and Roehl (1991), Hall (2009) and the Resource-Based View theory by. Wernerfelt (1984), who agreed that organizational efficiency was seen as a key outcome of leveraging resources. Tangible (profitability, location, systems) and Intangible (culture, innovation, corporate reputation) could contribute to operational efficiency. Therefore, Five Virtues Leadership could be conceptualized as a set of intangible resources within the RBV framework. These virtues were rare, difficult to imitate, and foundational in shaping leaders' decision-making processes and organizational culture.

Wisdom is often associated with strategic decision-making and long-term vision, which are essential for efficient resource allocation. According to Hlavatý and Ližbetin (2021), globalization of markets, intense competition, and the need for rapid innovation

require managers to make quick and correct strategic decisions. Five Virtues Leadership guides managers in making correct and quick strategic decisions. Wisdom enables leaders to foresee potential challenges and opportunities, thereby making informed decisions that enhance efficiency.

Faith, understood as trust and reliability within the organization, can significantly impact team dynamics and cooperation. Benevolence, or a leader's compassion and care for subordinates, can enhance employee motivation and loyalty. Zhang and Nasir (2022) noted that Faith and Benevolence help companies to actively fulfill their corporate social responsibilities and help corporate management shape a good brand image, thereby improving corporate efficiency.

Strictness, as a virtue, emphasizes discipline and adherence to procedures, both of which are critical for efficient operations. Juliana et al. (2021) highlighted the role of procedural rigor in minimizing errors and optimizing workflow. Similarly, Li et al. (2021) noted that strict management can promote the optimal allocation of manufacturing resources and improve resource utilization efficiency.

The viewpoints of the above literature are consistent with interview results. Interviewee No. 12 who said, “By practicing the Five Virtues leadership, leaders can not only boost employees' enthusiasm and team cohesion but also better allocate resources and optimize processes, which improves overall efficiency”. This is in line with interviewee No. 14 said, “If leaders can incorporate the Five Virtues leadership, it will definitely enhance the company's management efficiency and performance”.

In summary, Five Virtues leadership, as viewed through the lens of RBV, offers a novel perspective on the relationship between leadership and efficiency. By treating virtues as strategic intangible resources, this approach complements existing literature and extends the discussion on how leadership can be a source of competitive advantage.

5.2.2 The Relationship between Five Virtues Leadership and Innovation

Hypothesis 2 Sun Tzu’s Art of War Five Virtues Leadership is positively related to innovation.

The measurement model analysis provided strong evidence of a good fit with the observed data, as indicated by several key fit indices. Specifically, the χ^2/df ratio was 1.132, RMSEA was 0.016, and both CFI and NFI exceeded the 0.90 benchmark, further supporting the model's fit. The AGFI was 0.917, providing additional confirmation of

the model's adequacy. The path coefficient between Model X and Model M was 0.653, with a P-value less than 0.001, indicating a statistically significant relationship. This result supports Hypothesis 2, demonstrating that Sun Tzu's Art of War Five Virtues Leadership has a significant positive impact on innovation. This is consistent with the following relevant literature.

Five Virtues leadership contributes to a leadership style that not only supports but actively encourages innovation. Wisdom involves deep understanding and insight, which are crucial for identifying opportunities and navigating complex challenges in innovation. According to Arokodare and Asikhia (2020), strategic foresight is essential for driving innovative processes and adapting to market changes. Wisdom enables leaders to balance short-term gains with long-term innovation goals, aligning with Katarzyna (2020), who underscores the crucial role of strategic vision in fostering innovation.

Chen et al. (2021) suggested that trust within teams leads to greater openness to experimentation and creative problem-solving. Five Virtues Leadership, through the virtue of faith, builds a foundation of mutual trust that encourages employees to share ideas and take calculated risks, which are essential for innovative breakthroughs.

Khairy et al. (2023) said that benevolence encourages a collaborative atmosphere where diverse perspectives are valued, leading to more creative and innovative solutions. Yao and Hao (2023) mentioned that benevolent leadership has a positive impact on employee innovation behavior and new venture performance. Chatterjee et al. (2020) agreed that courageous leadership is critical in initiating and sustaining innovative projects, particularly in the face of resistance or failure. In Five Virtues Leadership, courage empowers leaders to make bold decisions and explore uncharted territories, driving innovation forward.

The viewpoints of the above literature are consistent with interview results. Interviewee No. 2 said, "There's a close link between leadership and innovation. Applying the Five Virtues leadership comprehensively can create an environment that supports innovation in companies and promotes sustainable innovation". Interviewee No. 3 said, "Wisdom and courage help leaders make decisive decisions in the innovation process, while faith and benevolence inspire team creativity and collaboration. Strictness ensures innovation projects run smoothly. Applying the Five Virtues

leadership comprehensively can create an environment that fosters sustainable innovation in companies".

In conclusion, Five Virtues Leadership provides a comprehensive framework for understanding the relationship between leadership and innovation. By viewing these virtues as strategic resources, this approach enhances our understanding of how leadership can foster a culture of innovation that is both dynamic and sustainable.

5.2.3 The Relationship Between Innovation and Efficiency

Hypothesis 3 Innovation is positively related to the efficiency of the Chinese brand passenger vehicle industry.

The measurement model analysis provided strong evidence of a good fit with the observed data, as indicated by several key fit indices. Specifically, the χ^2/df ratio was 0.975, RMSEA was 0.000, and CFI and NFI exceeded the 0.90 benchmark, further supporting the model's fit. The AGFI was 0.942, providing additional confirmation of the model's adequacy. The path coefficient between Model M and Model Y was 0.544, with a P-value less than 0.001, indicating a statistically significant relationship. This result supports Hypothesis 3, demonstrating that innovation has a significant positive impact on the efficiency of the Chinese brand passenger vehicle industry. This aligns with the Resource-Based View and is consistent with relevant literature.

Azeem et al. (2021) mentioned that innovation is widely recognized as a key driver of organizational efficiency, enabling firms to optimize resources, improve processes, and enhance overall performance. Product innovation involves the development of new or significantly improved products that meet evolving market demands. As Afum et al. (2021) highlight, product innovation can streamline business operations, reduce waste, and improve production processes. By introducing innovative products, firms can achieve higher economies of scale and optimize their production lines, thereby reducing costs and enhancing efficiency.

Service innovation refers to the creation of new or improved services that enhance customer satisfaction and streamline operational processes. According to Katragadda (2023), service innovation boosts efficiency by automating routine tasks, improving customer interactions, and reducing service delivery times. It enables organizations to optimize resource allocation, improve service quality, and lower operational costs.

Technology innovation, encompassing the adoption of new technologies and the development of technological solutions, is a critical driver of efficiency in modern organizations. According to Li et al. (2021), low-carbon technological innovation significantly and positively impacts the performance of manufacturing enterprises. Technology innovation enhances efficiency by automating processes, improving data management, and reducing manual labor. Shao et al. (2020) emphasized that technological innovation lowers production costs and increases operational efficiency through continuous improvement and upgrades.

The viewpoints of the above literature are consistent with interview results. Interviewee No. 1 said, "By innovating in technology, products, and services, companies can boost production efficiency, cut operating costs, and enhance overall operational efficiency and competitiveness". Interviewee No. 4 said, "Innovation greatly impacts the overall efficiency of a company. With innovative technologies, processes, and strategies, businesses can improve production efficiency, lower costs, speed up decision-making and execution, and optimize resource use, leading to more efficient operations and management".

In conclusion, innovation, particularly in product, service, and technology innovation, plays a critical role in enhancing organizational efficiency. By viewing these dimensions of innovation as integral to operational efficiency, firms can better understand the strategic importance of innovation in achieving long-term success.

5.2.4 Explanation of Low Survey Scores

In this study, the mean scores for certain questionnaire dimensions were below 3.41, falling short of the "Agree" level and only reaching a "Neutral" level. The low scores were primarily concentrated in the dimensions of "Courage," "Technology Innovation," "Resource Optimization," and "Brand Enhancement." These dimensions reflect the performance scores of managers in Chinese brand passenger vehicle companies in terms of "Courage" and the companies' performance in "Technology Innovation," "Resource Optimization," and "Brand Enhancement." According to the questionnaire data, the majority of items within these dimensions received scores of "4" or "5," indicating that most respondents recognized the performance of their managers in "Courage" and their companies' performance in "Technology Innovation," "Resource

Optimization," and "Brand Enhancement." However, due to some scores of "1" or "2," the average scores for these four dimensions were below 3.41.

To ensure the study's rigor, the researcher conducted in-depth interviews to gather additional data and performed a detailed analysis. The interview data revealed that interviewees generally believed that the low scores in the "Courage" dimension for managers in Chinese brand passenger vehicle companies could be primarily influenced by the following three factors.

Risk-averse Culture: In the management culture of many Chinese brand passenger vehicle companies, there is a strong emphasis on risk avoidance, with a tendency towards stability and caution. Managers may prefer to adopt conservative strategies and avoid decisions involving high risks, leading to a more conservative performance in the "Courage" dimension.

Impact of Authority and Hierarchical Structures: Authority and hierarchical structures are prominent in many Chinese corporate organizations. When making significant decisions, managers may consider superiors' opinions or adhere to traditional decision-making models, which could limit their ability to exhibit sufficient courage in decision-making.

External Pressure and Market Uncertainty: The uncertainty of the market environment and competitive pressure may make managers more cautious. In recent years, global economic downturns and significant market fluctuations may have led managers to prefer maintaining the status quo, avoiding decisions that could jeopardize the company's survival due to potential mistakes.

The reasons for the low scores in the "Technology Innovation," "Resource Optimization," and "Brand Enhancement" dimensions may primarily be influenced by the following three factors.

The decline in Investment Capacity: The unfavorable economic situation has decreased overall corporate profits and tighter financial resources, making it difficult for companies to invest heavily in technological innovation. R&D projects typically require long-term investment, and during economic downturns, companies may prioritize cutting budgets in innovation areas to avoid taking on excessive financial risks.

Priority on Cost Control: In times of economic downturn, companies often prioritize cost control over the optimal allocation of resources. Resource optimization requires upfront investment and long-term planning, but during economic downturns, companies may focus more on short-term survival, neglecting long-term strategies for resource optimization.

Reduction in Marketing Budgets: During economic downturns, companies may reduce marketing budgets, cutting back on brand promotion and advertising expenditures. Brand enhancement requires continuous financial support, but companies might prioritize cutting these expenditures, which are not directly tied to immediate revenue in times of financial strain.

Most interviewees pointed out that the poor economic situation has had a systemic impact on companies' performance in technology innovation, resource optimization, and brand enhancement. When responding to economic downturns, companies adopt short-term survival strategies, reducing long-term investments in innovation, optimization, and brand building, leading to lower-than-expected scores in these dimensions. By conducting an in-depth analysis of the low-scoring dimensions, we not only gain an understanding of the reasons behind the questionnaire results but also provide valuable insights for future improvements and practices.

5.2.5 Limitations of the Study

While this study provides valuable insights into the relationship between Sun Tzu's Art of War Five Virtues Leadership, innovation, and efficiency within the Chinese brand passenger vehicle industry, several limitations should be considered.

1) In-Depth of Interviews

This study interviewed a total of 15 individuals. The interviews conducted in this study provided rich qualitative data, but the depth of these interviews varied. The interviews with experts and government officials are more detailed and in-depth, while some business managers have relatively brief interviews due to industry regulations. This may lead to uneven insights among different participants. In addition, the interviewees are experts, government officials, and managers related to the automotive industry, which may have industry limitations.

2) Cultural Context

The study is grounded in traditional Chinese culture and values. This cultural specificity may limit the extent to which the findings can be generalized to organizations in other cultural settings, particularly those in Western contexts where leadership values and practices may differ significantly. The effectiveness of the Five Virtues Leadership in driving innovation and efficiency might vary in environments where cultural norms and values differ from those in China.

3) Temporal Relevance

The data for this study was collected at a specific time point (From June to August 2024), during which the Chinese brand passenger vehicle industry was undergoing rapid changes. The relevance of these findings may diminish as the industry evolves, particularly if new technologies, market shifts, or policy changes alter the landscape of China's automotive industry. Therefore, while the study provides important insights, its conclusions should be viewed as reflective of a specific period and context, rather than universally applicable across all times and conditions.

5.3 Recommendation

5.3.1 Recommendations for Industry Practitioners

1) Implement Micro-Learning Modules on Five Virtues Leadership

Rather than relying on traditional training programs, introduce short, on-demand micro-learning sessions (5-10 minutes each) accessible via mobile devices. These modules can be integrated into employees' daily routines, offering practical examples of how to apply the Five Virtues in real-time situations. Follow up with brief reflective discussions during team meetings to reinforce learning.

2) Establish a "Five Virtues Challenge" Platform

Create an internal online platform where employees can submit ideas or projects that apply the Five Virtues to enhance innovation and efficiency. Provide small funding or resources for selected ideas, encouraging employees to test and refine their concepts in a supportive environment. This collaborative approach promotes continuous improvement and allows teams to experiment and share best practices without the pressure of competition.

3) Launch a "Efficiency Champions" Program

Develop a peer-nominated program where employees can nominate colleagues who demonstrate outstanding performance in time utilization, resource optimization, or brand enhancement. Offer frequent, small rewards (such as public recognition, lunch with executives, or team-building activities) to keep the program active and visible, encouraging everyday excellence and engagement.

5.3.2 Recommendations for Government

1) Facilitate Research and Development in Five Virtues Leadership

Provide Targeted Research Grants: Allocate specific funding for research on the practical applications of the Five Virtues leadership model, focusing on measurable outcomes in different industries. Ensure the findings from this research can directly inform leadership development programs in companies, making the model more actionable.

Promote Cross-Sector Collaboration: Establish government-led programs that encourage partnerships between universities, companies, and government agencies. Focus these collaborations on applying virtue-based leadership to enhance innovation, efficiency, and brand strength. Offer matching funds or tax breaks to companies participating in such initiatives.

2) Strengthen Brand and Market Development

Support Global Brand Expansion: Provide financial subsidies or co-funding for companies participating in international trade fairs or launching global marketing campaigns.

Reduce Market Entry Barriers: Simplify export regulations and create government programs that support companies aiming to expand into new markets. This can include offering market research resources, legal support, and financial assistance to help firms take on new challenges and position their brands effectively.

5.3.3 Recommendations for Next Research

Based on the findings of this study, future research could explore the following directions.

1) Larger and More Diverse Samples

Expanding sample size and diversity are crucial for improving the generalizability of research results. Future research should consider incorporating other companies in the Chinese automotive industry, such as imported brand passenger vehicle companies and commercial vehicle companies. In addition, we can explore the differences in implementing the Five Virtue leadership in Chinese state-owned and private enterprises.

2) Cross-Cultural Comparative Studies

Given the cultural specificity of this study, future research could explore the applicability of the Five Virtues Leadership in different cultural contexts. Comparative studies between Chinese firms and those in Western or other Asian countries could shed light on how cultural differences impact the effectiveness of these leadership principles. Research could also explore the potential for adapting the Five Virtues to align with leadership practices in non-Chinese contexts.

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APPENDIX A

History of Chinese Brand Passenger Vehicle

After nearly 70 years of development, China's passenger vehicle industry has evolved from nothing, growing from weakness to strength, transitioning from joint ventures and cooperation to independent research and development. Alongside China's rapidly growing economy and enhanced consumer spending power, automobile products have shifted from being high-end consumer goods to commonplace items. The development process of Chinese brand passenger vehicle, is filled with changes and opportunities, and can be summarized into the following four stages.

1.1 Creation stage: 1950s to 1965

Xu and Ouyang (2017) noted that, in a bid to foster the development of the automobile industry, the Chinese government established the country's first automobile manufacturing plant in 1953—First Automobile Manufacturing Plant, now known as China FAW Group Corporation, located in Changchun City, Jilin Province. At first, the production process was very difficult, with problems such as low technical level and inadequate equipment emerging one after another. In July 1956, the first batch of domestically-produced "Jiefang" trucks, a brand personally named by Mao Zedong, were successfully trial-produced. Although there is still a big gap compared with the international advanced level at that time, this marked the successful start of China's automobile manufacturing industry, ended the history of China's inability to manufacture automobiles.

In April 1958, China's First Automobile Manufacturing Plant successfully produced the first Chinese Brand Passenger Vehicle named "Dongfeng" car (model CA71). This was the first car independently designed and produced in China. In July 1958, China's First Automobile Manufacturing Plant produced the "Hongqi" sedan (model CA72). At that time, Chinese Prime Minister Zhou Enlai took the lead in adopting the "Hongqi" CA72 as his own special car, setting an example for supporting the development of Chinese Brand Passenger Vehicle.

After 1958, a new situation emerged in China's automobile industry. Due to the decentralization of enterprises by the country, various provinces and cities used auto parts factories and repair shops to imitate and assemble automobiles, forming the first "boom" in the history of the development of China's automobile industry. A group of

automobile manufacturers, automobile assembly plants and modified car factories. The number of automobile manufacturers has grown from 1 in 1953 to 16 (in 1960), and the number of repair and modified car factories has grown from 16 to 28.

Before 1966, the automobile industry invested a total of 1.1 billion yuan, with an annual production capacity of nearly 60,000 vehicles and 9 vehicle models. By the end of 1965, there were nearly 290,000 civilian cars in the country, of which 170,000 were Chinese-made cars.

1.2 Growth stage: 1966 to 1980

From 1966 to 1980, China's automobile industry mainly manufactured trucks, which not only met the needs of war preparations, but also served economic construction. The most representative passenger vehicles at this stage were Hongqi CA770 and Shanghai SH760A. The first batch of Hongqi CA770 was planned to produce 20 units, which were used as special vehicle for national leaders. In 1974, Shanghai Automobile Manufacturing Plant decided to upgrade the SH760 sedan, and the modified model was named SH760A. The redesigned new vehicle is more in line with Chinese aesthetics and has left a deep impression on the Chinese people. In the mid-1970s, the annual output of Shanghai Automobile Manufacturing Plant was more than 2,000 units, which was far from meeting the needs of the national market. By 1979, nearly 20,000 Shanghai-brand vehicles had been produced. It was the first domestically produced vehicle that truly entered the lives of Chinese people and was the pride of the national automobile industry. Next, the Chinese automobile market officially entered a new era, and imported vehicles and joint venture vehicles began to spread in China.

1.3 Openness and cooperation stage: 1980s to 2000

At this stage, China gradually formed large-scale passenger vehicle manufacturers represented by FAW and Shanghai Automotive Group Co., Ltd. In the early 1980s, in order to introduce advanced technology and management experience, China began to establish joint ventures with foreign automobile manufacturers, such as FAW and Japan's Toyota, and Shanghai Automobile Group Co., Ltd. and Germany's Volkswagen. Chinese passenger vehicles companies have received technical, market, financial and brand support, and their technical level and production quality have improved.

During this period, passenger vehicles of joint venture brands occupied an absolute dominant position in the market. In 1981 and 1989, China's Hongqi and Shanghai brand sedans were discontinued. In 1986, China Geely Automobile Group Corporation (Geely Group) was established and its headquarters is located in Hangzhou, Zhejiang Province, China. Initially, Geely Automobile was mainly engaged in the production and sales of motorcycles and motorcycle parts. In 1997, Geely Automobile launched its first sedan, Geely Meiri (MR) Automobile. Through continuous independent research and development and brand promotion, it has become one of the leading companies in China's independent brands.

1.4 Rapid development stage: 2001 to present

In December 2001, China joined the World Trade Organization (WTO). Taking this opportunity, China's automobile industry ushered in a period of rapid development and made significant progress in technological innovation and quality improvement.

1.4.1 Gradually Expanding Market Share

From 2001 to 2010, Chinese brand passenger vehicles rose rapidly. Brands such as Great Wall, Geely, BYD, and Chery began to gain recognition in the domestic market and continued to improve product quality and technical levels. Zhao (2023), China’s passenger vehicle market has long been dominated by joint venture vehicle companies. Even after 2010, China's own brands have developed rapidly, but joint venture brands still account for more than half of the Chinese automobile market. According to the China Association of Automobile Manufacturers, the cumulative sales of Chinese brand passenger vehicles in 2022 reached 11.766 million units, a year-on-year increase of 22.8%, and the market share reached 49.9%. From the perspective of brand performance, data from the Passenger Car Association shows that in 2022, the Chinese brand BYD became the annual sales champion in the Chinese automobile market with a cumulative retail sale of 1,804,624 vehicles, with a market share of 8.8%.

In 2023, the production and sales of passenger vehicles in China reached 26.124 million and 26.063 million, respectively, with a year-on-year increase of 9.6% and 10.6%. Among them, the sales of Chinese brand passenger vehicles reached 14.596 million units, a year-on-year increase of 24.1%. The market share reached 56%,

an increase of 6.1 percentage points year-on-year. From the perspective of brand performance, data from the Passenger Car Association shows that BYD became the best-selling vehicle brand with a sales volume of 3.02 million vehicles in 2023. The steady increase in the market share of Chinese brands is not accidental, but the result of step-by-step accumulation. Behind it is the improvement of the strength of China's independent brands and the changes in the Chinese market, among which new energy vehicles and intelligent connected vehicles have played a key role.

1.4.2 Developing towards the Mid to High End Market

Tao et al. (2013) pointed out that since 2010, Chinese brand passenger vehicles have gradually changed the status quo of only seizing the market in the mid- to low-end market, and have entered the mid-to-high-end model market to further enhance their brand image and market competitiveness. In 2012, SAIC, FAW, BAIC, and Geely launched new models such as "Shanghai", "New Hongqi", Roewe 950, Pentium B90, BAIC Senova, and Geely EC7 to attack the mid-to-high-end model market. Zhang (2016), the advantages of Chinese brand passenger vehicles are mainly reflected in the mid- to low-end. Compared with similar products of joint ventures and similar products in the world, there is an obvious gap between mid- and high-end passenger vehicles. The mid- to high-end passenger vehicle market is almost monopolized by domestic foreign brands such as Audi, Mercedes-Benz, BMW, Cadillac and Infiniti.

Lei (2023), in 2022, independent brands such as BYD, Hongqi, Weilai, and Ideal will release high-end models one after another. Currently, independent brands are gaining momentum in the high-end luxury market, and Chinese people’s trust and reputation in high-end models of independent brands are constantly increasing. According to data from the Passenger Car Association, the sales volume of Chinese brand Hongqi passenger vehicles in 2022 will be 310,000 units, a year-on-year increase of 3%, ranking fourth among luxury brand sales. The top three were BMW with 792,000 units, Mercedes-Benz with 753,900 units, and Audi with 636,000 units. It can be seen from the data that the sales volume of Hongqi is still far behind the top three. The high-endization of independent brands is the result of years of joint efforts by the Chinese brand passenger vehicle industry to strive for upward product development. It has achieved initial results and there is still considerable room for growth in the future.

1.4.3 Steady Development of Chinese Brand-New Energy Passenger Vehicles

Facing increasingly severe environmental and energy pressures, the Chinese government is actively promoting the development of new energy vehicles. In 2012, China issued the "Energy Saving and New Energy Vehicle Industry Development Plan (2012-2020)", which set new energy vehicle sales targets and subsidy policies to promote the development and promotion of new energy vehicles. Policies such as subsidies and purchase tax exemptions encourage consumers to purchase new energy vehicles, driving the rapid growth of electric vehicles and plug-in hybrid vehicles. In 2020, China released the "Energy-Saving and New Energy Vehicle Industry Development Plan (2021-2035)", pointing out that China's new energy vehicle development faces weak core technological innovation capabilities, quality assurance systems that need to be improved, infrastructure construction still lagging behind, and industrial. The ecology is not yet sound and market competition is intensifying.

In recent years, the main Chinese brand new energy vehicles include BYD, GAC Aion, Geely, Great Wall Euler, Wuling, NIO, Xpeng, Ideal, WM, Roewe and other brands. The representative of Chinese brand-new energy passenger vehicles is undoubtedly BYD. In 2022, BYD announced that all fuel models will be discontinued. According to China Passenger Car Association (CPCA), BYD's sales reached 1.86 million units in 2022, a year-on-year increase of 159%. It successfully surpassed Volkswagen and ranked first in the annual sales volume of Chinese vehicle companies.

In short, Chinese brand passenger vehicles have experienced the hard work of several generations of Chinese automobile practitioners from their difficult start in the 1950s, to long-term reliance on joint ventures for development, to independent innovation and brand building. In the future, the Chinese brand passenger vehicle industry still has huge room for growth and development potential, especially in the fields of electric vehicles and autonomous driving technology.

APPENDIX B

Questionnaire

Sun Tzu's Art of War Five Virtues Leadership and Innovation in Leveraging the efficiency of Chinese brand passenger-vehicle industry in China

Researcher Ms. Yu Yan

Curriculum Doctor of Philosophy in Management, Siam University

This questionnaire is partial fulfillment of the requirements for the degree. The purpose of this study is to examine the relationship between Sun Tzu's Art of War Five Virtues Leadership, innovation, and the efficiency of Chinese brand passenger vehicle industry. Your information will be kept secret. Should you have any questions or suggestions, please contact me at the following addresses and numbers:

Siam university 38 Petkasem Road, Phasicharoen, Bangkok, 10160 Thailand; Tel 02-867-8000 or No.2 Wenchang Road, Chengzhong District, Liuzhou City, 545006 Guangxi China; Tel 13667723129.

This questionnaire has 8 pages and is divided into 5 parts as follows:

Part I: Personal Information

Part II: The level of company managers in Sun Tzu’s Art of War Five Virtues Leadership

Part III: The level of company managers in Innovation

Part IV: The level of the company's efficiency

Part V: Recommendation

Part I: Personal Information

Please select the appropriate response for the following.

1. What is your gender?

☐ 1) Male ☐ 2) Female ☐ 3) LGBTQ+

2. What is your age? (years old)

☐ 1) 18-30 ☐ 2) 31-40

☐ 3) 41-50 ☐ 4) above 51

3. What is your marital status?

☐ 1) Single ☐ 2) Married

☐ 3) Divorced ☐ 4) Separated

4. What is your education degree?

☐ 1) Under Bachelor ☐ 2) Bachelor or even ☐ 3) Postgraduate

5. What is the average monthly income (Yuan)?

☐ 1) Below 5,000 ☐ 2) 5,001 - 10,000 ☐ 3) 10,001 - 20,000

☐ 4) Above 20,001

6. How long have you been working for your company (years)?

☐ 1) 1 – 3 ☐ 2) 4 – 6 ☐ 3) 6 years or more

7. Which department are you currently in?

☐ 1) Production ☐ 2) R&D ☐ 3) Human Resources

☐ 4) Sales ☐ 5) Others……. (Specify)

8. Which province is your company located in?

……(Specify)

9. How many employees does your company have?

☐ 1) 300 or less ☐ 2) 301 – 1,000 ☐ 3) 1,001 or more

10. How many vehicles did your company produce in 2023?

☐ 1) 10,000 or less ☐ 2) 10,001 – 100,000 ☐ 3) 100,001 or more

Part II: The level of company managers in Sun Tzu's Art of War Five Virtues Leadership

Please select the performance of your company's managers, in the field of Sun Tzu's Art of War Five Virtues Leadership. Check one box for each item.

Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1	2	3	4	5

	Five Virtues Leadership Level				
	1	2	3	4	5
Wisdom					
11. Your manager has a thorough understanding of various fields in the automotive industry.					
12. Your manager always performs well in setting long-term goals and developing successful strategies.					
13. Your manager always makes wise decisions and choose the best course of action.					
14. Your manager can always solve problems even in complex situations.					
15. Your manager always effectively utilizes resources such as human, material, and informational assets to achieve strategic objectives.					
Faith					
16. You feel stable and harmonious in your company, and are less likely to feel stressed or anxious.					
17. The rules set by your manager are consistently and fairly applicable to everyone.					
18. Your manager trusts their subordinates and delegate power to them.					
19. Your manager can establish trust. Therefore, he or she can improve employee's performance and employee's commitment to the organization.					
20. Your company can actively fulfill social responsibilities and gain public trust.					

Benevolence					
21. Your manager demonstrates a compassionate and caring attitude towards others, especially towards employees.					
22. Your manager pays attention not only to the employees' career development but also their well-being.					
23. Your manager always listens to others, encourages brainstorming and open dialogue, and respects different viewpoints.					
24. Your manager guides and advises employees in a combination of firmness and empathy, rather than indulging or slacking off.					
25. Your manager exemplifies ethical behavior and moral integrity in leadership roles, setting a positive example for others to follow.					
Courage					
26. Your manager always takes responsibility.					
27. Your manager always pursues new ideas and take risks for progress and improvement.					
28. Your manager always makes quick and firm decisions without hesitation, especially in critical situations.					
29. Your manager persists in moving towards the right goals, even under pressure or unfavorable conditions.					
30. Your manager always has backup plans (contingency plans) to deal with the unexpected situation.					
Strictness					
31. Your company's rules and regulations are precise and well-defined.					
32. Your company's rewards and punishments are fair.					
33. Your company considers the reward and punishment based on merit system more than on personal relationship.					
34. Your company handle the violation properly.					
35. Your manager always follows company rules and regulations and ask all employees to behave on the same way.					

Part III: The level of company managers in Innovation

Please select the performance of your company, in the field of innovation. Check one box for each item.

Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1	2	3	4	5

	Innovation level				
	1	2	3	4	5
Product Innovation					
36. Your company always launch new or improved products, if there is a change on market demands and customers' needs.					
37. Your company always utilize the latest technology and design thinking to develop new product or functionalities.					
38. Your company not only do product development but also marketing research before launching the new product.					
39. Your company always considers to use eco-friendly materials in product development to protect environment.					
40. Your company emphasizes on the unique advantages of product innovation to improve brand communication.					
Service Innovation					
41. Your company always considers customers' needs and preferences.					
42. Your company always utilize artificial intelligence, automation, and other technologies to simplify service processes.					
43. Your company always collects feedback from customers and stakeholders regarding service quality.					
44. Your company always provides customized services for customers.					
45. Your company always collaborate with external partners and stakeholders to extent a wider range of customer needs.					
Technology Innovation					
46. Your company always monitors the development of emerging technologies.					
47. Your company encourages the use of automation equipment and intelligent systems to optimize production processes.					

	Innovation level				
	1	2	3	4	5
48. Your company has a technology talent training program or development mechanism for employees.					
49. Your company encourages sharing of technology innovation among employees.					
50. Your company develops clear policies and processes to ensure that the development and application of new technologies comply with rules and regulations.					

Part IV: The level of the company's Efficiency

Please select the performance of your company's efficiency. Check one box for each item.

Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1	2	3	4	5

	Efficiency level				
	1	2	3	4	5
Time Utilization					
51. Your company always plan and allocate tasks effectively.					
52. Your company always utilizes process optimization and automation technology to minimize task completion time.					
53. Your company provides a training of time management.					
54. Your company always encourages employees to integrate time management skills into their daily work practices.					
55. Your company has a certain measurement to reduce wasting time.					
Resource Optimization					
56. Your company always allocate inexpensive resources including materials, manpower, and funds.					
57. Your company always optimize energy usage in manufacturing processes.					
58. Your company’s workspace layout is well designed and help company to reduce energy consumption.					
59. Your company’s employee is skilled in utilizing cloud computing or					

	Efficiency level				
	1	2	3	4	5
other technologies and therefore it enhances the efficient use of resources.					
60. Your company apply recycling to decrease manufacturing raw material.					
Brand Enhancement					
61. Your company provides media to proper channels to make the company gain more recognition.					
62. Your company's marketing and advertising conveys the message effectively to make customers get more understand on company's core concept.					
63. Your company provides a guarantee period of the product to make customers believe in your brand.					
64. Your company has a crisis management plan in place to deal with negative events that could impact your brand image.					
65. Your company monitor customer needs and expectation to provide better experience to customers.					

Part V: Recommendation

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THANK YOU FOR YOUR TIME AND PARTICIPATION

APPENDIX C

问卷调查
《孙子兵法》五德领导力与创新在提升中国品牌乘用车行业效率中的应用研究

研究人员 喻言 女士

所在机构 泰国暹罗大学 管理学院

本研究旨在探讨孙子兵法五德领导力、创新与中国品牌乘用车行业效率之间的关系。您的信息将被保密。如您有任何问题或建议，请按以下地址和号码与我联系：

中国广西柳州市城中区文昌路 2 号，545006；电话 13667723129。

本问卷共 8 页，分为以下 5 个部分：

第一部分： 个人信息

第二部分： 公司管理者的孙子兵法五德领导力水平

第三部分： 公司的创新水平

第四部分： 公司的效率水平

第五部分： 建议

第一部分：个人信息

请在正确的选项前打√。

2. 您的性别是？

☐ 1) 男　　☐ 2) 女

2. 您的年龄是？

☐ 1) 18-30 岁　　☐ 2) 31-40 岁

☐ 3) 41-50 岁　　☐ 4) 51 岁及以上

3. 您的婚姻状况如何？

☐ 1) 未婚　　☐ 2) 已婚　　☐ 3) 离异

4. 您的学历是？

☐ 1) 专科及以下　　☐ 2) 本科　　☐ 3) 研究生

5. 您的平均月收入是？（元）

☐ 1) 低于 5000　　☐ 2) 5,001 - 10,000

☒ 3) 10,001 - 20,000　　☐ 4) 20001 以上

6. 您在贵公司工作了多久？

☐ 1) 1 – 3 年　　☐ 2) 4 – 6 年　　☐ 3) 6 年以上

7. 您现在贵公司哪个部门？

☐ 1) 生产部门　　☐ 2) 研发部门　　☐ 3) 人力资源部门

☐ 4) 销售部门　　☐ 5) 其他.....（请说明）

8. 贵公司位于哪个省？　　.....（请说明）

9. 贵公司有多少名员工？

☐ 1) 300 人及以下　　☐ 2) 301-1000 人　　☐ 3) 1001 及以上

10.贵公司 2023 年的汽车产量是？

☐ 1) 10,000 辆及以下　　☐ 2) 10,001-100,000 辆　　☐3) 100,001 辆及以上

第二部分：公司管理者的孙子兵法五德领导力水平

请评价贵公司经理的孙子兵法五德领导力水平，在您选定的方框内打√。

非常不同意　　不同意　　一般　　同意　　非常同意

1　　2　　3　　4　　5

	五德领导力水平				
	1	2	3	4	5
智					
66. 贵公司的管理者对汽车行业的各个领域都很了解。					
67. 贵公司的管理者在制定公司策略方面表现良好。					
68. 贵公司的管理者总能做出明智的决定。					
69. 贵公司的管理者总能在复杂的情况下解决问题。					
70. 贵公司的管理者总能有效地利用人力、物力资源来实现战略目标。					
信					
71. 贵公司的管理者会让您感到稳定、和谐，压力小、焦虑少。					
72. 贵公司管理者设置的规章制度，公司所有员工均需遵守。					
73. 贵公司的管理者信任下属，并下放权力。					
74. 贵公司的管理者通过建立与员工的信任，提高员工整体绩效和对公司的承诺。					
75. 贵公司的管理者积极履行社会责任，帮助公司获得公众的信任。					
仁					
76. 贵公司的管理者对他人，尤其是对员工表现出富有同情心和关怀的态度。					
77. 贵公司的管理者关注员工的职业生涯和福利待遇。					
78. 贵公司的管理者总是倾听他人意见，鼓励集思广益，尊重不同意见。					
79. 贵公司的管理者总是理解和体谅员工，但不放纵或松懈。					
80. 贵公司的管理者在领导角色中体现了道德操守，为他人树立了积极榜样。					

勇					
81. 贵公司的管理者总是勇于承担责任。					
82. 贵公司的管理者总是追求新的想法，并为之承担风险。					
83. 贵公司的管理者总能坚定做出决定，尤其是在危急情况下。					
84. 即使在压力或不利的条件下，贵公司的管理者也会坚持朝着正确的目标前进。					
85. 贵公司的管理者总有备用计划（应急计划）来应对意外情况。					
严					
86. 贵公司管理者制定的规章制度清晰明了。					
87. 贵公司的管理者总是施行公平的奖惩制度。					
88. 贵公司的管理者总是根据公司制度而不是个人关系来考虑奖惩。					
89. 贵公司的管理者能妥善处理违规行为。					
90. 贵公司的管理者严格要求自己遵守公司的规章制度，并要求所有员工都如此。					

第三部分：公司的创新水平

请评价贵公司在创新领域的表现，并在您选定的方框内打 √。

非常不同意　　不同意　　一般　　同意　　非常同意

1　　2　　3　　4　　5

	创新水平				
	1	2	3	4	5
产品创新					
91. 如果市场需求和客户需求发生变化，贵公司总是会推出新的或改进的产品。					
92. 贵公司总是利用最新的技术和设计思维来开发新的产品或功能。					
93. 贵公司在推出新产品之前不仅进行产品开发，还开展市场调查。					
94. 贵公司总是在产品开发中考虑使用环保材料来保护环境。					
95. 当贵公司强调产品创新的独特优势时，将有助于品牌提升。					

服务创新					
96. 贵公司总是考虑客户的需求和偏好。					
97. 贵公司总是利用人工智能、自动化和其他技术来简化服务流程。					
98. 贵公司总是收集客户和利益相关者对服务质量的反馈。					
99. 贵公司总是为客户提供定制化的服务。					
100. 贵公司总是与合作伙伴和利益相关者交流合作，以满足更广泛的客户需求。					
技术创新					
101. 贵公司始终关注新兴技术的发展。					
102. 贵公司鼓励使用自动化设备和智能系统来优化生产流程。					
103. 贵公司有技术人才培养计划或发展机制。					
104. 贵公司鼓励在员工之间分享技术创新。					
105. 贵公司制定明确的政策和流程，以确保新技术的开发和应用符合规章制度。					

第四部分：公司的效率水平

请评价贵公司的效率水平，并在您选定的方框内打 √。

非常不同意　　不同意　　一般　　同意　　非常同意

1　　2　　3　　4　　5

	效率水平				
	1	2	3	4	5
时间利用					
106. 贵公司总是能够有效地计划和分配任务。					
107. 贵公司总是利用流程优化或自动化技术来减少任务完成时间。					
108. 贵公司提供时间管理培训。					
109. 贵公司总是鼓励员工将时间管理技能融入日常工作实践。					
110. 贵公司有一定的措施来减少时间浪费。					

资源优化					
111. 贵公司总能合理分配资源，包括材料、人力和资金等。					
112. 贵公司总能优化生产过程中的能源使用。					
113. 贵公司的办公布局在能源消耗方面做得很好。					
114. 贵公司总是鼓励员工熟练地利用云计算或其他技术来提高资源的有效利用。					
115. 贵公司总是采用回收利用来减少生产原材料消耗。					
品牌提升					
116. 贵公司总是使用合适的媒体或其他渠道来提高公司知名度。					
117. 贵公司的市场营销和广告总是能有效地传达公司的核心理念。					
118. 贵公司总是提供产品保证使客户信任公司的品牌。					
119. 贵公司制定危机管理计划，应对可能影响公司品牌形象的负面事件。					
120. 贵公司通过监控客户的需求和期望，为客户提供更好的体验。					

第五部分：建议

请进入下一页。

第五部分：建议

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感谢您的参与！

APPENDIX D

Interview Form

Sun Tzu's Art of War Five Virtues Leadership and Innovation in Leveraging the Efficiency of Chinese Brand Passenger-vehicle Industry in China

Researcher Ms. Yu Yan

Curriculum Doctor of Philosophy in Management, Siam University

Instruction:

1. Interviewees are company managers, government officers and experts.
2. All participants will be requested to sign the consent form.
3. The purpose and nature of the study will be explained to participants prior to do the interview and participants has opportunity to ask questions about the study.
4. All participants rights for the interview will be listed in the consent form.
5. Your information will be kept secret. Without your permission, your identity, any related persons, and organization names will remain anonymous.
6. 14 questions will be asked to collect information from participants
7. The interview will be most benefit to the research. Therefore, participation of all participants will be highly appreciated.

Consent Form

Sun Tzu's Art of War Five Virtues Leadership and Innovation in Leveraging the Efficiency of Chinese Brand Passenger-vehicle Industry in China

I, ……..……..……..…… voluntarily agree to participate in this research study.

- I understand that all information I provide for this study will be treated confidentially.
- I agree to my interview being audio-recorded.
- I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.
- I understand that I can withdraw permission to use data from my interview within two weeks after the interview, in which case the material will be deleted.
- I understand that participation involves **Chinese brand passenger-vehicle industry in China**.
- I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.
- I understand that I will not benefit directly from participating in this research.
- I understand that in any report on the results of this research my identity will remain anonymous. This will be done by changing my name and disguising any details of my interview which may reveal my identity or the identity of people I speak about.
- I understand that disguised extracts from my interview may be quoted in dissertation, conference presentation, and published papers.
- I understand that if I inform the researcher that myself or someone else is at risk of harm, they may have to report this to the relevant authorities - they will discuss this with me first but may be required to report with or without my permission.

- I understand that signed consent forms and original audio recordings will be retained in Siam University, Thailand by the researcher until the exam board confirms the results of researcher's dissertation.
- I understand that a transcript of my interview in which all identifying information has been removed will be retained for two years from the date of the exam board.
- I understand that under freedom of information legalization I am entitled to access the information I have provided at any time while it is in storage as specified above.
- I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

Researcher name: Ms. Yu Yan

Degrees: Doctor of Philosophy in Management

Address: Siam university 38 Petkasem Road, Phasicharoen, Bangkok, 10160 Thailand; Tel 02-867-8000 or No.2 Wenchang Road, Chengzhong District, Liuzhou City, 545006 Guangxi China; Tel 13667723129.

Signature of research participant

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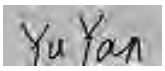
Signature of participant Date

Signature of researcher

I believe the participant is giving informed consent to participate in this study.



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Signature of researcher Date

Date of interview:_____ Time: _____

Part I: Personal Information

1. Organization name_____

2. Participant name _____

3. Contact address _____

_____

4. Organization information

4.1 Which province is your company located in?_____

4.2 How many employees does your company have? _____

4.3 How many vehicles did your company produce in 2023? _____

5. Participant information

5.1 What is your gender? ☐ 1) Male ☐ 2) Female ☐ 3) LGBTQ+

5.2 What is your age? _____

5.3 What is your education degree?_____

5.4 Number of years working with the organization _____

5.5 Which department are you currently in? _____

Part II: Opinion on Sun Tzu's Art of War Five Virtues Leadership

1. Can you describe if the **wisdom** is related to the leadership?

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2. Can you describe if the **faith** is related to the leadership?

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3. Can you describe if the **benevolence** is related to the leadership?

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4. Can you describe if the **courage** is related to the leadership?

……

……

……

5. Can you describe if the **strictness** is related to the leadership?

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……

Part III : Opinion on Innovation

6. Could you please talk about the important role of **product** innovation in innovation?

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7. Could you please talk about the important role of **service** innovation in innovation?

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8. Could you please talk about the important role of **technology innovation** in innovation?

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Part IV: Opinion on Efficiency

9. Do you think **time utilization** can reflect the efficiency of a company? Why?

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10. Do you think **resource optimization** can reflect the efficiency of a company? Why?

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11. Do you think **brand enhancement** can reflect the efficiency of a company? Why?

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Part V: Opinion on the relationship between Sun Tzu's Art of War Five Virtues Leadership, Innovation and Efficiency

12. Do you believe that Sun Tzu's Art of War Five Virtues **Leadership** is positively correlated with the **efficiency** of Chinese brand passenger vehicle industry? Why?

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13. Do you believe that Sun Tzu's Art of War Five Virtues **Leadership** is positively correlated with **innovation**? Why?

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14. Do you believe that **innovation** is positively correlated with the **efficiency** of Chinese brand passenger vehicle industry? Why?

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Part VI: Recommendation

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APPENDIX E

访 谈

《孙子兵法》五德领导力与创新在提升中国品牌乘用车行业效率中的应用研究

研究者： 喻 言

项 目： 暹罗大学 管理学博士论文

简 介:

8. 受访者为公司管理人员、政府官员和行业专家。
9. 所有受访者都将被要求签署同意书。
10. 在进行访谈之前，将向受访者解释研究目的和性质，受访者有机会提问。
11. 受访者在访谈中的所有权利将列在同意书中。
12. 您的信息将被保密。未经您的许可，您的身份、任何相关人员和组织名称都将保持匿名。
13. 合计 14 个访谈问题。
14. 访谈对本研究大有裨益，非常感谢您的参与！

同 意 书

《孙子兵法》五德领导力与创新在提升中国品牌乘用车行业效率中的应用研究

我, _____自愿同意参加此研究项目。

- 我了解我为本研究提供的所有信息将被严格保密。
- 我同意我的访谈被录音。
- 我明白，即使我现在同意参与，我可以在任何时候退出研究或拒绝回答任何问题，而不会因此承担任何后果。
- 我明白，如果我在访谈后两周内撤回使用访谈数据的许可，研究人员将删除相关材料。
- 我明白，此次参与涉及中国品牌乘用车行业。
- 我已经以书面形式得到了关于研究目的和性质的解释，并且我有机会就此研究提出问题。
- 我明白，参与此研究我不会直接受益。
- 我明白，在任何研究结果报告中，我的身份将保持匿名。这将通过更改我的姓名以及隐去可能透露我身份或我所谈及的其他人身份的访谈细节来实现。
- 我明白，经过处理的访谈摘录可能会在论文、会议演讲和已发表的论文中引用。
- 我明白，如果我告知研究人员我或他人有受到伤害的风险，研究人员可能需要向相关部门报告——他们会首先与我讨论此事，但可能需要在有或无我同意的情况下进行报告。
- 我明白，签署的同意书和原始录音将由研究人员所在的泰国曼谷暹罗大学保存，直至研究人员的论文答辩委员会确认研究结果为止。
- 我明白，经过处理的访谈记录（其中所有识别信息均已删除）将在答辩委员会作出决定之日起保存两年。
- 我明白，根据信息自由化法律，在上述指定的存储期内，我有权随时访问我所提供的信息。
- 我明白，我可以随时联系研究项目中的任何相关人员，以寻求进一步的澄清和信息。

研究人员姓名: 喻 言

学位: 管理学博士

地址: 暹罗大学，泰国曼谷 Phasicharoen Petkasem 路 38 号，10160；电话：02-867-8000 或 中国广西柳州市城中区文昌路 2 号，邮编：545006；电话：13667723129

受访者签名

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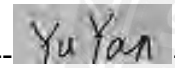
受访者签名 日期

研究者签名

我相信参与者是在知情同意的情况下参与本研究的。

---  ------ ----------

研究者签名 日期

访谈日期:_____ 具体时间:_____

第一部分: 个人信息

1. 公司名称_____

2. 参与者姓名 _____

3. 联系地址 _____

_____

4. 公司信息

4.1 贵公司所在省份?_____

4.2 贵公司有多少员工？ _____

4.3 贵公司 2023 年汽车产量？_____

5. 参与者信息

5.1 您的性别是？ ☐ 1) 男 ☐ 2) 女

5.2 您的年龄是？_____

5.3 您的学历是？_____

5.4 您在该公司工作的年限是？_____

5.5 您目前所在的部门是？_____

第二部分: 孙子兵法五德领导力

15. 您能描述一下“智”是否与领导力有关吗？

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16. 您能描述一下“信”是否与领导力有关吗？

……

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17. 您能描述一下“仁”是否与领导力有关吗？

……

……

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18. 您能描述一下“勇”是否与领导力有关吗?

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19. 您能描述一下“严”是否与领导力有关吗?

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第三部分 : 创新

20. 您能谈谈产品创新在创新中的重要作用吗?

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21. 您能谈谈服务创新在创新中的重要作用吗?

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22. 您能谈谈技术创新在创新中的重要作用吗?

……

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……

第四部分: 效率

23. 您认为时间利用能反映公司的效率吗？为什么?

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24. 您认为资源利用能反映公司的效率吗？为什么?

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……

25. 您认为品牌提升能反映公司的效率吗？为什么?

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……

第五部分: 孙子兵法五德领导力、创新与效率的关系

26. 您是否认为孙子兵法五德领导力与中国品牌乘用车行业的效率呈正相关？为什么?

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27. 您是否认为孙子兵法五德领导力与创新呈正相关？为什么?

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28. 您是否认为创新与中国品牌乘用车行业的效率呈正相关？为什么?

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第六部分: 建议

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非常感谢您的帮助！

APPENDIX F

Questionnaire

Sun Tzu's Art of War Five Virtues Leadership and Innovation in Leveraging the efficiency of Chinese brand passenger-vehicle industry in China

Researcher Ms. Yu Yan

Curriculum Doctor of Philosophy in Management, Siam University

This questionnaire is partial fulfillment of the requirements for the degree. The purpose of this study is to examine the relationship between Sun Tzu's Art of War Five Virtues Leadership, innovation, and the efficiency of Chinese brand passenger vehicle industry. Your information will be kept secret. Should you have any questions or suggestions, please contact me at the following addresses and numbers:

Siam University 38 Petkasem Road, Phasicharoen, Bangkok, 10160 Thailand; Tel 02-867-8000 or No.2 Wenchang Road, Chengzhong District, Liuzhou City, 545006 Guangxi China; Tel 13667723129.

This questionnaire has 8 pages and is divided into 5 parts as follows:

Part I: Personal Information

Part II: The level of company managers in Sun Tzu’s Art of War Five Virtues Leadership

Part III: The level of company in innovation

Part IV: The level of company's efficiency

Part V: Recommendation

Part I: Personal Information

Please select the appropriate response for the following.

3. What is your gender?

☐ 1) Male ☐ 2) Female ☐ 3) LGBTQ+

2. What is your age? (years old)

☐ 1) 18-30 ☐ 2) 31-40

☐ 3) 41-50 ☐ 4) above 51

3. What is your marital status?

☐ 1) Single ☐ 2) Married

☐ 3) Divorced ☐ 4) Separated

4. What is your education degree?

☐ 1) Under Bachelor ☐ 2) Bachelor or even ☐ 3) Postgraduate

5. What is the average monthly income (CNY)?

☐ 1) Below 5,000 ☐ 2) 5,001 - 10,000 ☐ 3) 10,001 - 20,000

☐ 4) Above 20,001

6. How long have you been working for your company (years)?

☐ 1) 1 – 3 ☐ 2) More than 3 – 6 ☐ 3) More than 6

7. Which department are you currently in?

☐ 1) Production ☐ 2) R&D ☐ 3) Human Resources

☐ 4) Sales ☐ 5) Others……. (please specify)

8. Which province is your company located in?

…… (please specify)

9. How many employees does your company have?

☐ 1) 300 or less ☐ 2) 301 – 1000 ☐ 3) 1001 or more

10. How many vehicles did your company produce in 2023?

☐ 1) 10,000 or less ☐ 2) 10,001 – 100,000 ☐ 3) 100,001 or more

Part II: The level of company managers in Sun Tzu's Art of War Five Virtues Leadership

Please select the performance of your company's managers, in the field of Sun Tzu's Art of War Five Virtues Leadership. Check one box for each item.

Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1	2	3	4	5

	IOC from Experts						
	1	2	3	4	5	Total	Average
Wisdom							
11. Your manager has a thorough understanding of various fields in the automotive industry.	1	1	1	1	1	5	1
12. Your manager always performs well in setting long-term goals and developing successful strategies.	1	1	1	1	1	5	1
13. Your manager always makes wise decisions and choose the best course of action.	1	1	1	1	1	5	1
14. Your manager can always solve problems in complex situations.	1	1	1	1	1	5	1
15. Your manager always effectively utilizes resources such as human, material, and informational assets to achieve strategic objectives.	1	1	1	1	1	5	1
Faith							
16. Your manager make you feel stable, harmonious, less stressed and less anxious.	1	1	0	1	0	3	0.6
17. The rules set by your manager are consistently and quite applicable to everyone.	1	1	1	1	1	5	1
18. Your manager trusts subordinates and delegate power to them.	1	1	0	1	1	4	0.8
19. Your manager can establish trust, and improve employee's overall performance and employee's commitment to the organization.	1	0	1	1	1	4	0.8
20. Your company can actively fulfill social responsibilities,	0	0	1	1	1	3	0.6

	IOC from Experts						
	1	2	3	4	5	Total	Average
and gain public trust.							
Benevolence							
21. Your manager demonstrates a compassionate and caring attitude towards others, especially towards employees.	1	1	1	1	1	5	1
22. Your manager pays attention not only to the employees' career development but also their well-being.	1	1	1	1	1	5	1
23. Your manager always listens to others, encourages brainstorming and open dialogue, and respects different viewpoints.	1	1	0	1	1	4	0.8
24. Your manager guides and advises employees in a combination of firmness and empathy, rather than indulging or slacking off.	1	1	1	1	1	5	1
25. Your manager exemplifies ethical behavior and moral integrity in leadership roles, setting a positive example for others to follow.	1	1	0	1	1	4	0.8
Courage							
26. Your manager always takes responsibility.	1	1	0	1	1	4	0.8
27. Your manager always pursues new ideas and take risks for progress and improvement.	1	1	1	1	1	5	1
28. Your manager always makes firm decisions especially in critical situations.	1	0	1	1	1	4	0.8
29. Your manager persists in moving towards the right goals, even under pressure or unfavorable conditions.	1	1	0	1	1	4	0.8
30. Your manager always has backup plans (contingency plans) to deal with the unexpected situation.	1	1	0	1	1	4	0.8
Strictness							
31. Your company's rules and regulations are precise and well-defined.	0	1	0	1	1	3	0.6
32. Your company's rewards and punishments are fair.	0	1	1	1	1	4	0.8
33. Your company considers the reward and punishment	0	1	1	1	1	4	0.8

	IOC from Experts						
	1	2	3	4	5	Total	Average
based on merit system more than on personal relationship.							
34. Your manager can handle the violation properly.	0	1	1	1	1	4	0.8
35. Your manager always follows company rules and regulations and ask all employees to behave on the same way.	1	1	1	1	1	5	1

Part III: The level of company in Innovation

Please select the performance of your company, in the field of innovation. Check one box for each item.

Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1	2	3	4	5

	IOC from Experts						
	1	2	3	4	5	Total	Average
Product Innovation							
36. Your company will always launch new or improved products, if there is a change on market demands and customers' needs.	1	1	1	1	1	5	1
37. Your company always utilize the latest technology and design thinking to develop new product or functionalities.	1	1	1	1	1	5	1
38. Your company not only do product development but also marketing research before launching the new product.	1	1	0	1	1	4	0.8
39. Your company always considers to use eco-friendly materials in product development to protect environment.	1	1	1	1	1	5	1
40. Your company emphasizes on the unique advantages of product innovation, and it can help to improve brand communication.	1	1	1	1	1	5	1

Service Innovation							
41. Your company always considers customers' needs and preferences.	1	1	1	1	1	5	1
42. Your company always utilize artificial intelligence, automation, and other technologies to simplify service processes.	1	1	1	1	1	5	1
43. Your company always collects feedback from customers and stakeholders regarding service quality.	1	1	1	1	1	5	1
44. Your company always provides customized services for customers.	1	1	1	1	1	5	1
45. Your company always collaborate with external partners and stakeholders to extent a wider range of customer needs.	1	1	1	1	1	5	1
Technology Innovation							
46. Your company always monitors the development of emerging technologies.	1	1	1	1	1	5	1
47. Your company encourages the use of automation equipment and intelligent systems to optimize production processes.	1	1	1	1	1	5	1
48. Your company has a technology talent training program or development mechanism for employees.	1	1	1	1	1	5	1
49. Your company encourages sharing of technology innovation among employees.	1	1	1	1	1	5	1
50. Your company develops clear policies and processes to ensure that the development and application of new technologies comply with rules and regulations.	1	1	1	1	1	5	1

Part IV: The level of company's Efficiency

Please select the performance of your company's efficiency. Check one box for each item.

Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1	2	3	4	5

	IOC from Experts						
	1	2	3	4	5	Total	Average
Time Utilization							
51. Your company can always plan and allocate tasks effectively.	1	1	1	1	1	5	1
52. Your company always utilizes process optimization and automation technology to minimize task completion time.	1	1	1	1	1	5	1
53. Your company provides a training of time management.	1	1	1	1	1	5	1
54. Your company always encourages employees to integrate time management skills into their daily work practices.	1	1	1	1	1	5	1
55. Your company has a certain measurement to reduce wasting time.	1	1	1	1	1	5	1
Resource Optimization							
56. Your company can always allocate inexpensive resources including materials, manpower, and funds.	0	1	0	1	1	3	0.6
57. Your company can always optimize energy usage in manufacturing processes.	1	1	1	1	1	5	1
58. Your company’s workspace layout is well designed, and it help company to reduce energy consumption.	1	1	0	1	1	3	0.6
59. Your company’s employee is skilled in utilizing cloud computing or other technologies, and it enhances the efficient use of resources.	1	1	1	1	1	5	1
60. Your company apply recycling, and it can decrease manufacturing raw material.	1	1	1	1	1	5	1

Brand Enhancement							
61. Your company provides media to proper channels, and it can make the company more recognizable.	1	1	1	1	1	5	1
62. Your company's marketing and advertising conveys the message effectively, and it can make customers understand more on company's core concept.	1	1	1	1	1	5	1
63. Your company provides a guarantee period of the product, and it can make customers believe in your brand.	1	1	0	1	1	4	0.8
64. Your company has a crisis management plan in place to deal with negative events that could impact your brand image.	1	1	1	1	1	5	1
65. Your company can monitor customer needs and expectation, and it can provide better experience to customers.	1	1	1	1	1	5	1

Part V: Recommendation

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THANK YOU FOR YOUR TIME AND PARTICIPATION

APPENDIX G

ใบรับรองจริยธรรมการวิจัยในมนุษย์
สถาบันการจัดการปัญญาภิวัฒน์

หมายเลขใบรับรอง: PIM-REC 027/2567

ข้อเสนอการวิจัยนี้ และเอกสารประกอบของข้อเสนอการวิจัยตามรายการแสดงด้านล่าง ได้รับการพิจารณาจากคณะกรรมการจริยธรรมการวิจัยในมนุษย์ สถาบันการจัดการปัญญาภิวัฒน์แล้ว คณะกรรมการฯ มีความเห็นว่าข้อเสนอการวิจัยที่จะดำเนินการมีความสอดคล้องกับหลักจริยธรรมสากล ตลอดจนกฎหมาย ข้อบังคับและข้อกำหนดภายในประเทศ จึงเห็นสมควรให้ดำเนินการตามข้อเสนอการวิจัยนี้ได้

ชื่อข้อเสนอโครงการ: Sun Tzu's Art of War Leadership and Innovation in Leveraging the Efficiency of Chinese Brand Passenger Vehicle Industry in China

รหัสข้อเสนอการวิจัย (ถ้ามี): -

หน่วยงาน: Siam University

ผู้วิจัยหลัก: Yu Yan

ลงนาม.....

(อาจารย์ ดร.พิเชษฐ์ มุสิกะโปดก)
ประธานคณะกรรมการจริยธรรมการวิจัยในมนุษย์
สถาบันการจัดการปัญญาภิวัฒน์

วันที่รับรอง: 1 มิถุนายน 2567 **วันหมดอายุ:** 1 มิถุนายน 2568

เอกสารที่คณะกรรมการรับรอง
1. โครงร่างการวิจัย
2. ข้อมูลสำหรับชี้แจงกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย และ ใบแสดงความยินยอมจากกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย
3. เครื่องมือที่ใช้ในการวิจัยสำหรับรวบรวมข้อมูล เช่น แบบสอบถาม แบบสัมภาษณ์ ประเด็นในการสนทนากลุ่ม เป็นต้น

เงื่อนไขการรับรอง
1. นักวิจัยดำเนินการวิจัยตามที่ระบุไว้ในโครงร่างการวิจัยอย่างเคร่งครัด
2. นักวิจัยรายงานเหตุการณ์ไม่พึงประสงค์ร้ายแรงที่เกิดขึ้นหรือเปลี่ยนแปลงกิจกรรมวิจัยใดๆ ต่อคณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ภายในกำหนด
3. นักวิจัยส่งรายงานความก้าวหน้าต่อคณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ตามเวลาที่กำหนดหรือเมื่อได้รับการร้องขอจากคณะกรรมการฯ
4. หากการวิจัยไม่สามารถดำเนินการแล้วเสร็จภายในกำหนด ผู้วิจัยต้องยื่นขออนุมัติใหม่ก่อนอย่างน้อย 1 เดือน
5. หากการวิจัยแล้วเสร็จสมบูรณ์ ผู้วิจัยต้องแจ้งปิดโครงการตามแบบฟอร์มที่กำหนด

APPENDIX H

CERTIFICATE

OF COMPLETION

PHRP Online Training, Inc. certifies that

yan yu

has successfully completed the web-based course "Protecting Human Research Participants Online Training SBE."

Date Completed: **2023-08-16** Certification Number: **2991230**

PHRP
Protecting Human
Research Participants
Online Training

APPENDIX I

No. SU 0210.7/85

Graduate School of Management,
Siam University
38 Petkasem Rd., Bang-wa,
Phasi-charoen, Bangkok, 10160.

May 16th, 2024

Subject: Request for Data Collection via Questionnaire Distribution
To Whom It May Concern:

Ms. Yu Yan Student ID # 6 3 1 9 2 0 0 0 1 0, a doctoral student of the Graduate School of Management, Siam University (Mobile Phone No. 13667723129 and email: 6140652@qq.com) is currently working on the Ph.D. Dissertation entitle: "Sun Tzu's Art of War Five Virtues Leadership and Innovation in Leveraging the efficiency of Chinese brand passenger-vehicle industry in China" under the supervision of Dr. Burin Santisarn.

In this regard, the Graduate School of Management would like to request for your cooperation by corresponding the attached questionnaire form. The completion of this questionnaire form will allow Ms. Yu Yan to further proceed on her research with data accuracy and overall quality. Your kind assistance is fully appreciated.

Best Regards,

(Associate Professor Dr. Chaiyanant Panyasiri)
Dean of the Graduate School of Management

Graduate School of Management
Telephone +662-867-8000 ext. 5311
E-mail: phd_m1@siam.edu

AUTHOR'S BIOGRAPHY

Name and Surname YU YAN

Work Experience

2007 – Current	Administrative management personnel: Guangxi University of Science and Technology

Education

Bachelor's Degree

Degree	Bachelor of History
Major	History Education
Institution	Hunan Normal University
Country	China
Year	2001-2005

Master's Degree

Degree	Master of History
Major	Ancient Chinese History
Institution	Renmin University of China
Country	China
Year	2005-2007

Publishing Research

Yu Yan. (2024). Sun Tzu's Art of War Five Virtues Leadership and Innovation in Leveraging the Efficiency of Chinese Brand passenger-vehicle Industry in China. ***Joumal of Infrastnucture, Policy and Devclopment***, Vol 8, Issue 15.