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Supply Chain and Sustainability Research (SCSR) is an independently run non-profit journal dedicated to serve the worldwide scientific community through periodical of high-quality and high-impact scholarly, multi, and inter-disciplinary research that broadly resides in the arenas of supply chain and sustainability research. SCSR is committed to provide a platform that disseminates academic work, findings, and knowledge promptly, openly, and freely to all, and thus promote practical and public conversation and communication. By this, SCSR strives to be one of the important supply chain and sustainability journals in the world.

The Purpose: To support and encourage the writing of academic works. Disseminate academic works of faculty, academics and students both internally and externally as well as being a medium for education, research and dissemination of academic knowledge

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Greetings from Editor-in-Chief: Supply Chain and Sustainability Review (SCSR)

Jirasek Trimetsoothorn

The application of sustainability issues to supply chain management, logistics, transportation, and various optimization methods has been increasingly popular in recent years. One of the numerous issues that supply chain management encounters on an ongoing basis is operating in a sustainable manner. The goal of the SCSR is to investigate the use of sustainability in supply chain management, operation management, logistics, transportation, healthcare management, and fuzzy sets theory. The first issue of SCSR is to serve this purpose as how sustainable development must go hand in hand with logistics and supply chain management.

We invite academics from a variety of management-related disciplines to submit original, high-quality research papers that primarily address sustainability-management-related challenges and contribute to the SCSR's mission. The articles in the SCSR will emphasize both theoretical and empirical research. Literature reviews, conceptual theory development, qualitative survey research, such as case studies, and quantitative empirical methodologies may all be included in academic papers. SCSR rules must be adhered to by all submitted papers.

In view of current disruptions in global supply chains (e.g., chip crisis), the implications of supply chains for the climate and biodiversity discourse, new supply chain laws to increase social responsibility, and technological innovations (e.g., blockchain), supply chain management has become an imperative for global business.

In this inaugural issue, 6 research papers are presented

(1) Research on Safety Precautions of Pipeline Supply Chain Aiming at Zero Accidents.

(2) Optimization Strategy for the Collaboration of Home Decoration Supply Chain in Hunan, China.

(3) The Transwomen's Shopping Behaviour of Fashion Brand in Thailand. Self-Esteem, Body-Image.

(4) A Comparative Study on the Relocation of Chinese Manufacturing Industries to ASEAN, Africa and South Asia.

(5) The Impact of the Sino-US Trade War on the Sustainable Development of China's Industrial Supply Chain – Empirical Study based on Data from 2018 to 2019.

(6) Talent Cultivation in Software Service Supply Chain -Taking India as an Example.

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In addition, we would like to inform you about our next issues (Volume 2,…) in 2023. Recent announcement of the call for papers is accessible on the SCSR website. This issue marks the debut of the SCSR and its birth. It is my pleasure to address you on this occasion. I would like to express a warm welcome to the SCSR readership on behalf of the SCSR Editorial Team. I would like to thank our authors, editors, and anonymous reviewers, who have all voluntarily contributed to the journal's success. Without your participation, this initial issue would not exist.

We look forward to receiving your contributions.

Editorial Team

Editors

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Contents

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Research on Safety Precautions of Pipeline Supply Chain Aiming at Zero Accidents

Wang Li *

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Abstract

Oil and gas accidents typically involve leaks from pipelines that disrupt normal operations, particularly in pipeline sections. However, China's existing trunk pipeline capacity is insufficient, and the degree of pipeline networking is still low. Additionally, the construction of natural gas peak-shaving facilities supporting pipelines lags behind, some pipelines are aging, and safety hazards are prevalent. Moreover, the government supervision and legal systems remain imperfect. This paper adopts a case study approach to examine recent incidents in Jiangxi Province and identify shortcomings in China's oil and gas pipeline transportation. It is clear that China must accelerate the construction of pipeline transportation networks and supporting natural gas peak shaving facilities, promote scientific and technological advancements in pipeline transportation, and adopt a multi-pronged approach to ensure pipeline safety. Only then can China meet the requirements of resource diversification, supply networking, and deployment automation in oil and gas pipeline transportation.

Keywords: Pipeline Transportation, Natural Gas Pipeline, Network System, Accident Disaster

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Introduction

As global economies continue to grow, the demand for oil and natural gas resources has risen, resulting in an increasing need for oil and gas pipelines. These pipelines have proven to be efficient and cost-effective for transportation. In China, pipeline transportation has become the primary method for oil and gas transportation on land, with the establishment of strategic channels that run through southeast, northwest, and connect land and sea. However, 60% of China's existing pipelines are over 20 years old, with some crude oil pipelines in the east operating for more than 30 years. These aging pipelines, coupled with low automation, outdated communication facilities, extended service of storage facilities, among other issues, have led to frequent accidents that require constant adjustment and transformation. Additionally, pipeline safety is threatened by natural disasters and man-made destruction, making the control and operation of pipelines increasingly complex. Therefore, it is crucial to strengthen the safety guarantee of pipeline transportation (Hu et al., 2017; Wang et al., 2018).

The global natural gas supply and demand are changing structurally, with recoverable conventional natural gas resources at approximately 3,671,012m3, and 1,701,012m3 yet to be discovered as of 2018. Major natural gas exporting countries have surplus reserves, with a productivity reserve of over 50 times that can increase reserves and production in the long run. However, the remaining recovered resources are relatively concentrated accounting, with the top ten countries for 77.1% of total remaining recoverable reserves and

60.7% of output (Qi & Zhang, 2009; Gao et al., 2017). China's oil and gas pipeline safety management faces various challenges that hinder its effectiveness. These include: 1) Failure of some pipeline managers to enforce regulations, leading to frequent oil theft and hampering oil management; 2) Inadequate maintenance of long-running pipelines, resulting in oil leakage accidents that threaten lives and the environment; and 3) Potential safety hazards in some pipelines due to construction processes and personnel. To address these challenges, this paper examines case studies in Jiangxi Province and proposes solutions towards achieving zero-accident pipeline transportation.

Literature review

Analysis of pipeline transportation accident types.

1. Natural disasters:

Pipeline accidents can be categorized into primary and secondary disasters, which are caused by natural disasters and man-made accidents. Natural disasters, such as rainstorms and earthquakes, can have a significant impact on China's oil and gas pipelines and facilities. The nationwide oil and gas pipeline network system is vulnerable to environmental changes, and heavy rainfall during the flood season can cause water and soil erosion, leading to pipeline suspension. Water flow and external pressure can also cause pipelines to deform and leak. The impact of earthquakes on ground facilities is mainly affected by earthquake intensity and soil liquefaction.

2. Man-made disasters:

As urbanization continues, infrastructure construction is rampant, resulting in frequent ground-breaking activities. Improper use of diggers or lack of communication with oil and gas network management companies often lead to the inadvertent destruction of oil and gas pipelines and facilities.

Secondary disasters related to oil and gas pipelines include accidental injuries caused by explosion, corrosion, and fire. (Netto, et risks and exacerbate existing hazards.al., 2007) Oil and gas are highly flammable and explosive, and their transportation through pipelines occurs under high pressure. If the quality of the pipeline is poor or welding is inadequate, the pipeline may not withstand the pressure, leading to oil and gas leaks. These leaks can quickly mix with the air and ignite, causing explosions or fires. Pipeline corrosion can occur both internally and externally, and external corrosion is more complex and depends on several factors, including the pipeline's cathodic protection, external coating quality, soil, anti-corrosion measures, service time, current interference, and stress corrosion. Additionally, pipeline construction that deviates from established steps or takes shortcuts can also create potential

How to achieve zero disaster.

In the 1960s, the concept of risk acceptability from sociology was introduced to engineering decision analysis to address the issue of "enough safety is still not safe." (Starr, 1969). Since the 1970s, scholars have studied risk acceptance criteria as a link between risk assessment and decision-making. The book "Acceptable Risk" proposes that risk is acceptable only if the benefits outweigh the potential loss, and it puts forward risk acceptance standards to protect the interests of all parties (Bier, 2010). Pipeline risk acceptance standards fall into two categories: those formulated by operators from an economic perspective seeking to balance safety and efficiency using the ALARP principle and cost-benefit analysis, and those established from a social perspective aiming to protect the lives and environment of surrounding residents (Abrahamsen & Aven, 2012; Ale et al., 2015; Pei et al., 2018). To minimize the wide impact and serious consequences of oil and gas pipeline accidents, it is crucial to accelerate legislation on pipeline safety, enhance the pipeline integrity management system and basic database, conduct thorough research on related safety technologies, and develop widely applicable risk management measures. These efforts aim to ensure the safe, efficient, and cost-effective operation of oil and gas pipelines.

"Zero disaster" aims to reduce the impact of disasters caused by human factors by minimizing and avoiding them through daily work. Pipeline risk management is a continuous improvement process that involves pipeline risk and integrity management, including risk assessment and analysis, risk control and policy support, efficiency testing, and response. By drawing lessons from risk analysis methods used in Europe, America, and other countries for oil and gas pipelines and combining them with the characteristics of China's pipelines, we can gradually identify and assess risks and establish a set of widely applicable risk management methods for oil and gas pipeline transportation.

Research Method

A case study, also known as a case investigation, is a research method that focuses on a particular individual, unit, phenomenon, or subject. This type of research involves extensive data collection, detailed analysis, and sorting of information related to the emergence and development of the research object, as well as the internal and external factors and their relationships. The goal is to form an in-depth and comprehensive understanding and conclusion of relevant issues. Case studies can involve individuals, groups, organizations, events, or specific problems, resulting in case studies of personnel, living units or social groups, media cases, and various social problems.

Through case analysis, we can establish the causal relationship in an accident by analyzing previous experiences from the beginning, through the process, and to the conclusion, thereby achieving the research objective. Case studies have become a valuable tool for disaster prevention because the prevention of disasters and accidents heavily relies on past experiences

Results and discussion

Case analysis

Case 1: Case of the Second Line Project of West-East Gas Transmission

On May 26, 2013, at 7:00 a.m., a gas leakage accident happened in PetroChina's second line project of the West-East Gas Pipeline, which had been operational for less than six months. The incident occurred in the Shangli County branch of Pingxiang City, Jiangxi Province. The pipeline broke, caught fire, and exploded causing five injuries and an economic loss of approximately 7.94 million yuan

Figure 1 Pipeline Repair

The accident analysis revealed the following main causes: (1) Defects in the welding quality of No.19 RW joint, combined with pipeline stress, resulted in the pipeline rupture. (2) The pipeline was not handled using a pipe crane during laying, leading to damage and increased stress. (3) The welding process did not involve the use of an internal aligning device, and quality control was inadequate, resulting in welding defects. (4) The construction team carried out illegal operations and did not follow regulations on the use of special machinery, which led to pipeline damage. (5) The supervision unit did not effectively manage the construction process and lacked expertise, knowledge, and standards for welding and construction. The accident primarily resulted from inadequate pipeline quality and unprofessional construction practices leading to gas leakage.

Case 2: Fengxin branch natural gas pipeline case

The construction of the natural gas pipeline in the Fengxin branch section of Jiangxi Natural Gas Co., Ltd. commenced in April 2011 and was operational by July 2013. The pipeline's design pressure is 6.3MPa, its diameter is 219mm, it is made of L415 material, and 3PE reinforced anticorrosion has been implemented. Currently, the operating pressure is 4.6Mpa, and it transports high-pressure flammable and explosive natural gas. During a routine inspection on June 5th, 2017, the local line patrol of the new line patrol team of Nanchang Management Office discovered that the hydraulic protection foundation of the pipeline on the east side of Shibi Hexi River in Chishi Village, Shibi Town, Anyi County had partially collapsed due to heavy rain and river erosion. The original riverbed's hardened layer was also washed away by the river.

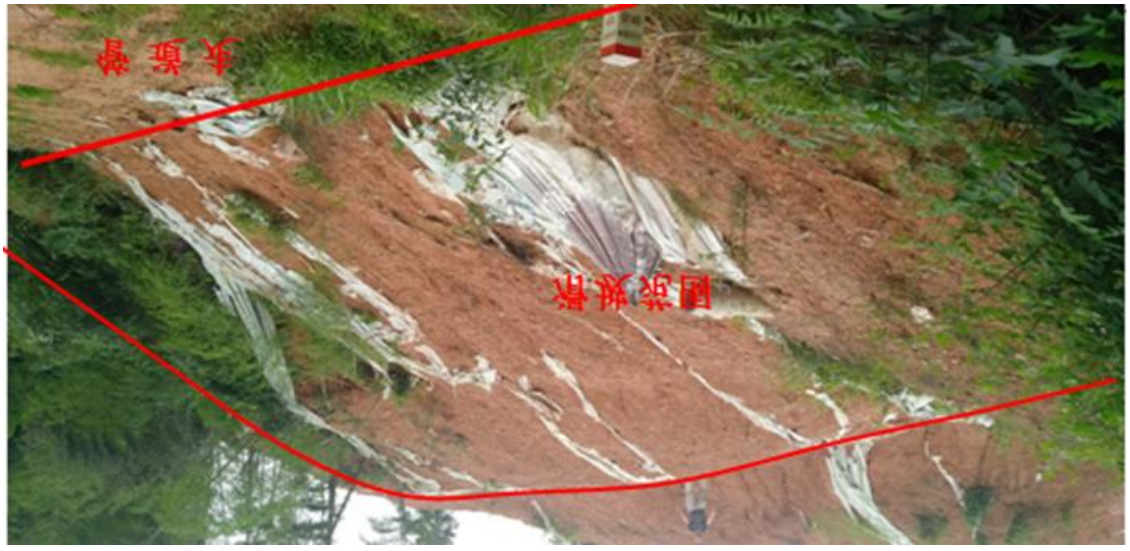

Figure 2 Schematic Diagram of Landslide Surface of Geological Disaster

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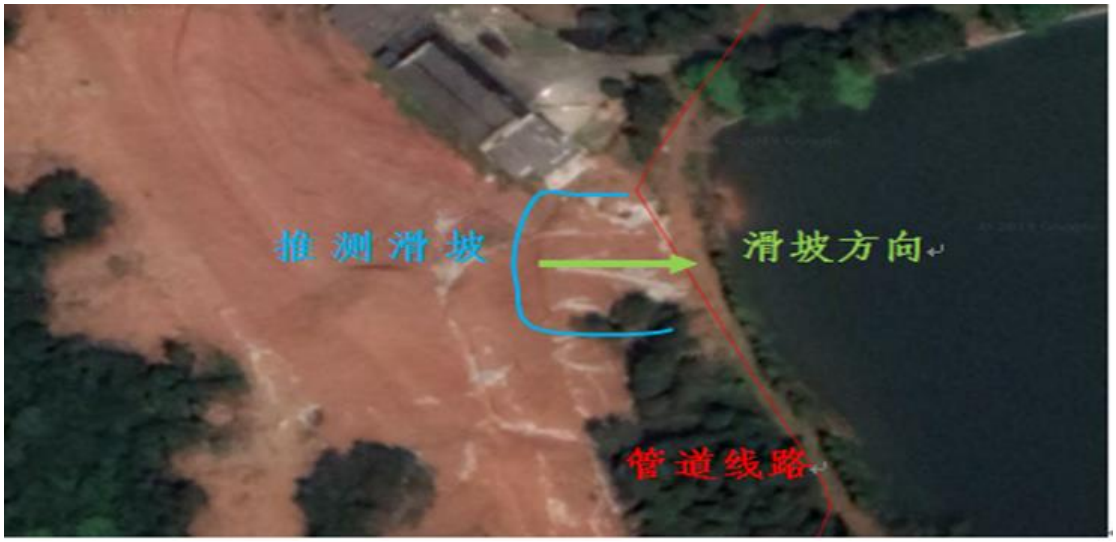

Figure 3 Schematic Diagram of Landslide Surface of Geological Disaster

Figure 4 Hydraulic protection and restoration

The main cause of the accident was due to the partial collapse of the hydraulic protection foundation of the pipeline on the east side of Shibi Hexi River, which was caused by continuous heavy rain and river erosion. When pipelines cross waterways, the foundation of the pipeline bottom may be partially hollowed out by the hydrodynamic force, creating a suspended pipeline section, which can result in the pipeline breaking, leaking, and even exploding. This is a common issue that can occur in such situations, and in this case, due to the geographical environment, the bottom of the pipeline was further hollowed out, leading to the gas leak

Case 3: Ganzhou Deep Combustion High Pressure Natural Gas Pipeline

On August 30, 2016, during the engineering geological survey project (No.QZK176, third contract) of Yingbin Avenue in downtown Ganzhou, Jiangxi Province, a sub-high pressure natural gas pipeline belonging to Ganzhou Shenran Natural Gas Co., Ltd. (406×7.1 in specification, 1.6MPa in design pressure, and 1.5MPa in operation pressure) was drilled through, causing gas leakage. There were no reported casualties, but the incident resulted in a loss of 2.53 million yuan (according to the original data source on construction safety).

Figure 5 Construction near the pipeline

Case analysis: Gas leakage occurred due to illegal operation by Ganzhou Municipal Engineering Company, the construction unit, during the excavation of the street lamp base, resulting in the cutting off of the gas pipeline. Improper construction practices by the unit led to the rupture of the pipeline and subsequent gas leakage.

Discussion

The main reasons for this study are discussed in the following table.

Table 1 Analysis and prevention methods of each case

	Name, time and place	Characteristics	Disaster loss situation	Prevention and cure method
Case 1 Case of the Second West-to-East Gas Pipeline Project	At 7: 00 a.m. on May 26, 2013, a leakage accident occurred in the second line project of PetroChina's West-East Gas Pipeline, which was put into operation for less than half a year. The natural gas pipeline located in Shangli County, Pingxiang City, Jiangxi Province, was broken, caught fire and exploded.	primary disaster	Five people were injured and the economic loss was about 7.94 million yuan.	1. Governments at all levels shall specify the competent departments or institutions of natural gas pipelines. 2. When the government makes urban planning, it should give full consideration to cross-construction, and increase the punishment for those units that build at random and construct savagely. 3. Pipeline enterprises should inform the relevant departments of the geographic information of pipelines for the record in time, and at the same time, they should strengthen the supervision and management of their own pipelines, and make 24-hour on-site monitoring during the third-party construction.
travel to watch industry Fengxin Branch Natural Gas Pipeline Case	On the morning of June 5, 2017, the hydraulic protection foundation of the pipeline on the east side of Shibi River was partially collapsed due to continuous heavy rain and river erosion, and the hardened layer of the original riverbed was also washed away	primary disaster	without	1. According to the collapse danger of the hydraulic protection part, start the emergency plan, and organize the construction unit to reinforce the collapsed part with sandbags. Due to the rapidity of the river, two full-time line patrol members of the line patrol team will be arranged at the scene to inspect the reinforcement every hour in the evening to ensure the safe and stable operation of the pipeline.

	by the river, which was prone to gas leakage.			2. According to the site conditions, formulate the protection construction scheme here, determine the slab culvert to protect the pipeline, and reinforce the hydraulic protection of the pipeline in the form of concrete retaining walls on both sides of the riverbank.
Case 3 Case of Ganzhou Deep Combustion High Pressure Natural Gas Pipeline	On August 30, 2016, engineering geological survey projects such as Yingbin Avenue, downtown Ganzhou City, Jiangxi Province, and related intersections led to gas leakage.	primary disaster	No casualties, loss of 2.53 million yuan.	1. The construction administrative departments of counties (cities, districts) earnestly perform their duties, benchmark the tables, and resolutely do it together, investigate and punish the gas safety accidents caused by illegal excavation and brutal construction. 2. To urge Natural Gas Company Limited to strengthen the daily management of line patrol personnel and strengthen the construction of emergency repair team. 3. To strengthen the daily safety supervision of pipeline construction projects.

Conclusions and suggestions

According to the results of the above case analysis, some suggestions are put forward:

Pipeline transportation is vulnerable to various uncertainties and risks due to the complex geological environment it spans. Soil erosion, landslides, floods, collapses, debris flows, and earthquakes are among the natural and human factors that lead to countless accidents every year (Liu & Cheng, 2017; Alvarado-Franco et al., 2017; Li et al., 2017).

1. Establish and improve the basic database related to oil and gas pipelines.

(1) Establish the basic database of oil and gas pipeline accident cases.

Examine both domestic and foreign incidents involving oil and gas pipelines, draw upon the best practices of international pipeline management, and create a foundational database of pipeline accidents tailored to the unique characteristics of China's pipeline infrastructure.

(2) Establish the database of environmental background value of oil and gas pipeline crossing area. Conduct surveys and monitor the environmental background values of surface water, groundwater, atmosphere, soil, environmental noise at stations along the pipeline, and equipment noise in the pipeline crossing area. Develop a database of pipeline environmental background values based on the collected data.

(3) Establish a database of potential environmental risks in oil and gas pipeline crossing areas.

Analyze and identify potential hazardous events and the severity of their consequences during oil and gas pipeline crossings. Establish a dynamic database of environmental risks and evaluate identified hazardous factors using scientific methods. Develop corresponding control measures for unacceptable risks.

2. Formulate and run the integrity management plan for oil and gas pipelines.

To face the constantly changing factors, pipeline companies must identify and evaluate risk factors in oil and gas pipeline operations. Through monitoring, detection, and inspection, they obtain information on pipeline integrity and combine this with professional management to formulate corresponding risk control measures. They continuously improve identified adverse factors to maintain pipeline operation within a reasonable and acceptable risk level. This circular process of inspection, risk identification, evaluation, and risk reduction is necessary to prevent accidents and ensure the safe and economically feasible operation of pipelines. Regular inspections and risk evaluations must be conducted at certain intervals to sustain the integrity management of the pipeline.

3. Strengthen safety technology research related to oil and gas pipelines.

To reduce the risk of failure accidents of oil and gas pipelines, research on geological disasters, earthquakes, meteorology, and other factors that have a significant impact on long-distance pipelines needs to be strengthened. The change of natural environment can cause external interference and become a critical cause of pipeline failure accidents. Therefore, conducting research on the above-mentioned natural environmental factors and establishing a database of their dynamic changes can effectively reduce the failure risks that pipelines face.

4. Strengthen the research on relevant detection technologies of oil and gas pipelines and improve the detection capability and level. Regular internal and external inspections and evaluations of pipelines should be conducted, and pipeline integrity management should be promoted and implemented as soon as possible. It is essential to develop an intelligent detection system for oil and gas pipelines that is suitable for the actual situation of Chinese pipelines, based on the digestion and absorption of foreign pipeline corrosion detectors. This will enable comprehensive detection and safety evaluation of existing Chinese oil and gas pipelines.

Through this research, we have gained a deeper understanding of the challenges faced by China's pipeline transportation and identified corresponding solutions. These findings can help to promote the development of China's pipeline transportation industry, increase the exploration and development of oil and gas resources, ensure the growth of reserves and output, and diversify import channels to mitigate over-reliance on foreign sources. Currently, natural gas has a better safety record compared to oil due to its more recent development and diversified sources. We calculated the Herfindal index for China's natural gas industry, which

suggests that the overall situation of China's natural gas security is still relatively loose, with a diversification level comparable to major EU countries (Wang et al., 2017; Huang, 2011); Zhao, et al., 2018).

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Optimization Strategy for the Collaboration of Home Decoration Supply Chain in Hunan, China

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Abstract

In order to improve the modernization level of the home-decoration industry, this study explored the optimization strategy for the collaboration of supply chain in Hunan China. The research investigated current situation of home decoration in Hunan, and formulated the optimized scheme of collaboration. Previous literature was surveyed, the research method of observation and interview was used to investigate the current situation, and the induction method was used to analyze and summarize the data. Research results show that the cloud system can provide a new model for service providers, a more reasonable resource sharing system between members of the home decoration supply is recommended to build. For business decisions between upstream and downstream members of the supply chain it is highly suggested. The application of cloud system as the platform of home decoration can also reduce the operating costs of suppliers and improve customer satisfaction at the same time.

Keywords: Decoration industry, Supply chain, Integration strategy, Cloud system, Home decoration platform

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Introduction

Research background and significance

Modernization of industrial and supply chains, developing strategic emerging industries, and accelerating the development of modern service industries are the main tasks of China's economic development at present (Central Committee of the Communist Party of China, (2020). Therefore, the strategy of "Three Highs and Four New" is put forward in Hunan, China, which requires leading industries to enhance their advantages, while the traditional industries are required to upgrade and build brands.

However, according to the " Regional Innovation Capability Evaluation Report for China (2020)", the regional innovation capability of Hunan in 2020 belongs to the second echelon, which is lower than the national average. Therefore, the province must increase its attention to the industrial chain of design from a height of strategic. Among them, it is of great value and significance to deeply study the industrial chain of architectural decoration design in Hunan. The collaborative optimization scheme of supply chain is put forward for upgrading of industry and development of high-quality product.

Research questions

The main research questions of this study are:

1. What is the situation of home decoration industry from a supply chain perspective in Hunan, China?

2. How to specify the optimized scheme of collaboration according to the industrial supply chain of home decoration in Hunan?

Research Scope

The building decoration industry can be divided into the following: public building decoration, residential decoration, and curtain wall decoration. However, the objects and purposes of decoration, and the construction methods and procurement channels are different. Therefore, this paper only takes the focus on residential decoration for discussion.

Changsha is the political, cultural, and commercial center of Hunan, as it is the capital of this Province. The decoration industry in Changsha are the most developed because it has the most abundant resources. Consumers in prefecture-level cities who pursue decoration quality will come to Changsha to find decoration companies and purchase building materials and home furnishing. Changsha is the representative and weather vane of the decoration industry. Therefore, the scope of field investigation and action research is mainly in Changsha.

The content in the text is relatively huge. For promoting the design industry, this article mainly analyze the home decoration industry from the perspective of business operation management rather than the view point of design itself.

Literature review

Home decoration industry

Home decoration market in China:

The space of the home decoration industry in China is broad and grow stably. The rate of standardization also continues to increase. iResearch (2021) proposed the market size in 2020 have reached 2,616.3 billion, a year-on-year increase of 12.4%. With the continuous release of the demand for renovation of old houses and the incentives of fine decoration policies, the market size of home decoration industry is expected to reach 3,781.7 billion in 2025, with an annual growth rate reached 7.6%.

Mode of home decoration:

After decades of development, the home decoration industry in Hunan now presents several modes at the same time. Among them, the traditional mode is the most common, and the integrated mode is the mainstream of future development. Integrated home decoration means the home decoration company breaks the pattern of simple combination of main materials and auxiliary materials in the previous home decoration mode by integrating all industrial resources related to home decoration, and combines building materials, furniture, household appliances, soft decoration, and all the materials needed for decoration to form a home decoration industry chain.

Service supply chain

Service of supply chain:

There is no doubt that supply chain is a hot topic in related research, and scholars have studied it in great detail. Scott and Westbrook (1991) proposed the pipeline map and the supplier relationship grid to develop a management strategy for enhancing supply chain effectiveness. Emerson and Grimm (1998) pointed out that customer service has increasingly become an important factor in the field of enterprise supply chain management. By providing various service activities to meet customer needs, enterprises can not only effectively improve their competitiveness, but also achieve good customer satisfaction, customer loyalty and enterprise performance. Lee and Whang (1999) studied the design of cooperative incentive mechanism and risk sharing among members in the supply chain. Ellram et al. (2004) pointed out that the service supply chain is a chain structure composed of the most upstream service suppliers to the most downstream customers in the service field. Sengupta et al. (2010)

proposed and verified a supply chain model suitable for the service sector with empirical research methods. In order to provide managers with a framework to be used in implementing supply chain management, Croxton et al. (2016) provided the strategic and operational descriptions of the eight supply chain processes identified by members of The Global Supply Chain Forum. In conclusion, there are many concepts, models, and research methods related to supply chain that can be referred to.

Cloud computing and supply chain

Most of the existing literatures only provide a preliminary model or framework for the combination of cloud computing and supply chain, while few literatures analyze the combination of cloud computing of and

supply chain in specific industry. Lindner et al. (2010, 2011) combined different cloud computing types and enterprise service requirements, combed different cloud computing service models, and established a framework of cloud supply chain. Schrdl (2012) believes that supply chain management, as an operation process, requires multi-directional interaction between different enterprises. Based on SCOR (supply chain operation reference model), this paper analyzes whether the information system based on cloud computing can provide better support for the supply chain. Zhou et al. (2012) gave a conceptual model of cloud supply chain based on the application of cloud computing in supply chain management and guided enterprises to find out how to migrate their own supply chain management to the cloud through six steps.

Research Method

Literature Survey

By consulting and collecting the literature and monographs on decoration industry management, business model and sustainable development of housing in China, European and American, a large number of data are collected, sorted and analyzed.

Field Survey

On-site investigation of large-scale home building materials markets in Changsha was conducted. These include Red Star Macalline Global Home Living Plaza, Xi Yingmen Building Materials and Furniture Plaza, Changsha Wan Jiali Home Building Materials Plaza, Ou Yada Building Materials Home Furnishing Plaza, San Xiang Home Furnishing Building Materials Plaza, and so on. The investigation provided better understanding of the categories, brands and supporting services provided by suppliers in Changsha. In the meantime, observations of the flow of people in shopping malls and the consumption tendency of consumers is also recorded in detail.

Personal interview

Face-to-face interviews to members of the Hunan Association of Home Decoration Industry was conducted to understand the development and trends of home decoration. Similar interviews to home decoration designers from mainstream home decoration companies and design studios was conducted to communicate the problems encountered and their solutions in home decoration process, meanwhile, to understand upstream and downstream supply chain conditions and consumer trends. Same interviews with major building materials and home furnishing suppliers and store managers were conducted to understand their turnover, operations and problems encountered. Finally, the interviews with consumers who are undergoing renovation or have home decoration needs was conducted to understand consumption strength, consumption intention, decoration problems encountered, decoration design, and procurement channels etc.

Induction

After collecting a large number of theoretical and field research data related to the market, consumers, employees, upstream and downstream industries and industry associations of Changsha home decoration

industry, the current situation of Changsha home decoration industry was summarized, and the collaborative optimization scheme of home decoration supply chain was put forward.

Results and Discussion

Results

The model of traditional home decoration industry in Hunan was obtained through network research, field investigation and personal interview (Figure 1). The upstream are building materials and furniture manufacturers, the midstream are home decoration enterprises, building materials and furniture dealers, and the downstream are consumers. It can be seen from the model that decoration companies play a leading role as the central link in the chain.

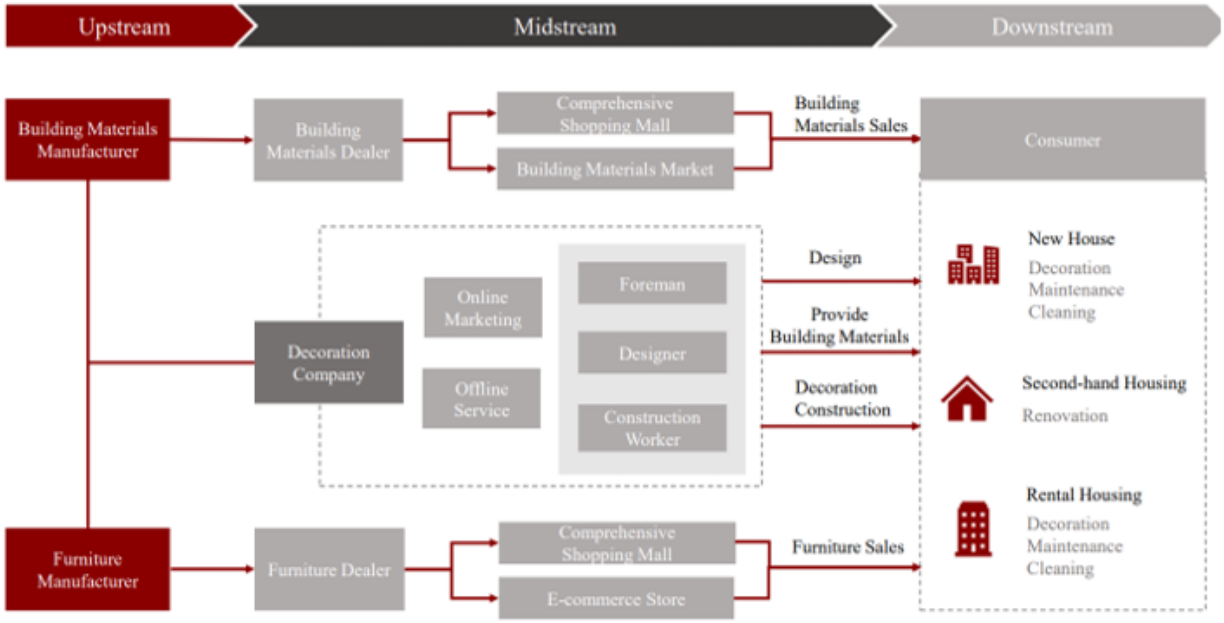

Figure 1 Traditional industry chain model of home decoration in Hunan

The top five problems need to be solved urgently in the process of home decoration service is shown in Figure 2 and Figure 3, as surveyed through field research and personal interviews of consumers and home decoration service providers (Figure 2, Figure 3).

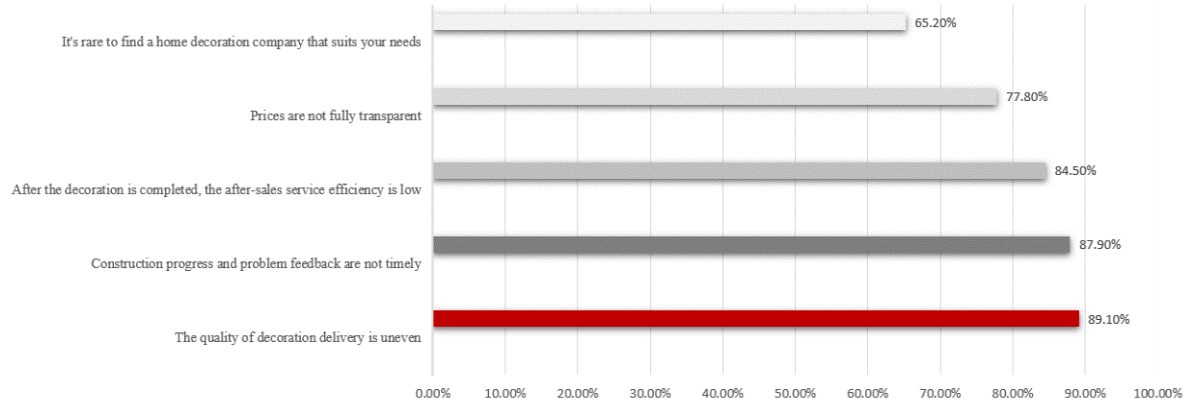

Figure 2 Survey results of the top five issues that consumers consider to be the most urgent to address in the home decoration service process

The results show that the uneven quality level of decoration delivery is the most urgent problem to be solved. The next problems to be solved urgently are the untimely feedback of decoration construction progress and problems; the low efficiency of after-sales service; opaque prices; and finding a home decoration company suitable for their own needs.

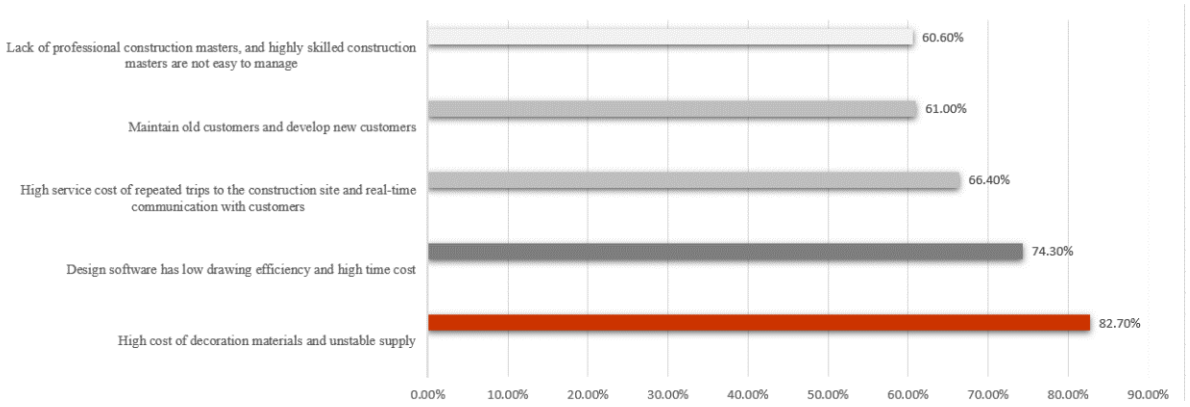

Figure 3 Survey results of the top five issues that home decoration service providers consider to be the most urgent to address in the home decoration service process

For home decoration service providers, the high cost of decoration materials and unstable supply are the most important problems to be solved, because the cost is directly linked to the final profit. As for the low drawing efficiency of the design software, the high cost of real-time communication with customers, the maintenance of old customers, the development of new customers, the lack of professional construction masters, and the difficult management of skilled construction masters are all headaches for suppliers.

Discussions

Current situation of home decoration supply chain

Home decoration companies are constantly upgrading from the traditional mode of non-standard process, difficult management, long construction cycle and poor reputation to the new integrated mode of integration, intelligence and Internet empowerment supply chain system. The whole industry tends to provide customers with integrated, personalized and customized home life solutions. The future competition of home decoration enterprises will be brand-based comprehensive competition in product richness, cost performance, delivery speed, service experience and customer participation. To a large extent, the essence of this competition will be reflected in the synergy of home decoration supply chain. At the same time, the collaborative optimization scheme of home decoration supply chain only focuses on the most urgent problems faced by consumers and home decoration service providers.

Cloud system of home decoration platform

Proposal of cloud system for home decoration platform

A cloud system for home decoration platform (Figure 4) as a collaborative optimization solution model for the pain points of the traditional home decoration industry is proposed. The cloud system for home decoration platform is oriented to the needs of supply chain members, relying on advanced IT technology to build an end-to-end, integrated and collaborative supply chain operation management platform.

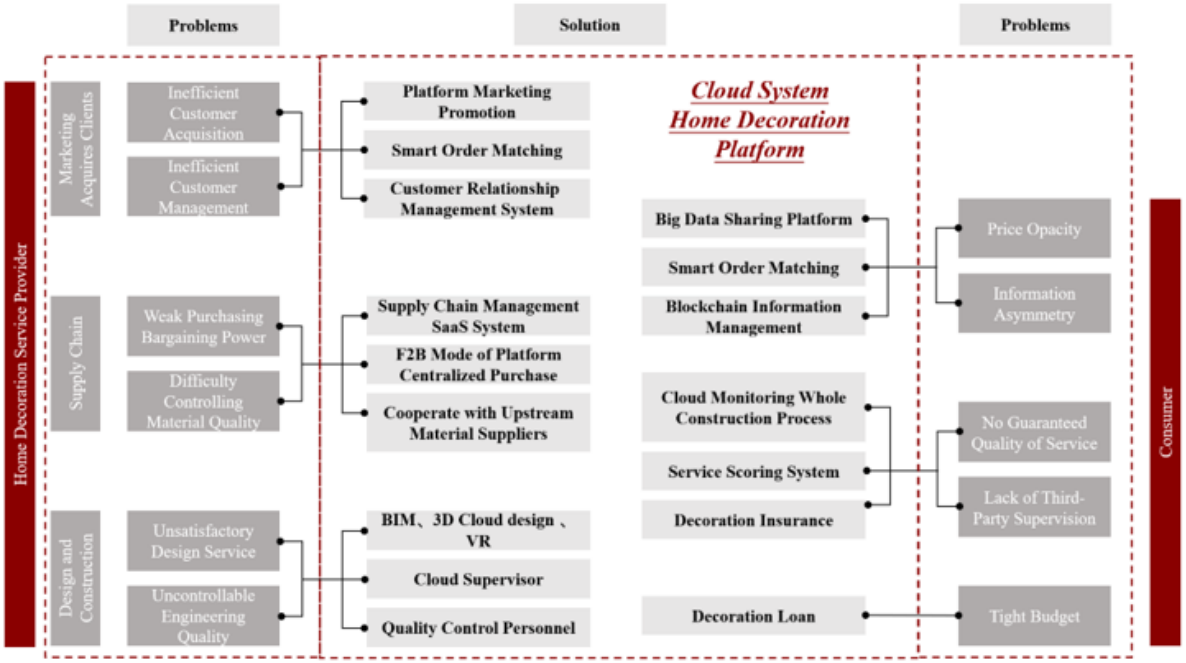

Figure 4 Pain points of traditional home decoration industry and solutions of cloud system home decoration platform model

The cloud system of home decoration platform provides marketing promotion, smart order matching and customer information management systems in response to the problems of low efficiency in customer acquisition and low efficiency in customer management. The platform provide SaaS system of supply chain management and f2b mode of centralized purchase of the platform, directly cooperating with upstream suppliers to reduce costs from the source. Thus, it can strengthen the weak bargaining power of procurement at the supply chain end and the difficulty in controlling the quality of materials. In response to the problems of unsatisfactory design service and uncontrollable engineering quality, the platform provides BIM, 3D cloud design, and VR software, combining online cloud supervision and offline quality inspection.

For consumers, the platform provides functions such as big data sharing and recommendation and smart order matching, which can solve the problem of opaque prices and asymmetric information of decoration materials and labor costs. Blockchain information management will ensure automatic data updates and information synchronization, which can eliminate consumers' trust anxiety. In view of the lack of guarantee of service quality and third-party supervision, the platform will provide equipment and technology to allow customers to monitor the whole construction process on the mobile client and score the service. In addition, the platform also offers renovation insurance and loans to address overall project delays due to lack of funds.

Two modes of cloud system for home decoration platform

There are two modes of cloud system for home decoration platform for the construction:

The first one is self-sufficient, in which home decoration companies build independently or jointly build with other companies. For example, DELL, through its self-built cross-enterprise collaborative management platform, integrates various resources well, helps enterprises manage and operate efficiently, and provides better services to customers.

The second is to manage the collaboration platform through the intervention of third-party managers. As for the choice of third-party managers, they must be jointly certified by all property rights parties. Only the third-party managers with credibility can better coordinate and manage all property rights subjects. That is, supply chain members do not need to develop their own platform. As long as they pay monthly, they can obtain the most rigorous and efficient collaborative management system, which has no investment risk and sunk cost, and can absolutely ensure the security of customer data. All relevant government management departments are also integrated into the supply chain management system to cooperate with each other and supervise each other, so as to effectively control and reduce the collaborative cost. The above two ways of platform construction need strong financial support.

Advantages of cloud system for home decoration platform

The cloud system for home decoration platform can help the product development of the whole chain. Under the supply chain management mode, through the forward-looking collaboration of product development and commodity management, the supply chain can provide professional advices on the early participation of building materials and furniture suppliers in the research and development process, and can solve the

contradiction between demand and supply from the source, which will affect supply chain operations. The system can detect problems in advance, reducing unnecessary risk and loss of efficiency.

The cloud system for home decoration supply chain platform also provides extended services through the supply chain. First, service-oriented supply chains serve consumers. The active communication with customers, the transparency of the order fulfillment process, the rapid response ability of delivery and after-sales reflected in the cloud system for home decoration platform can bring good customer experience and the spread of company reputation. Secondly, the service-oriented supply chain emphasizes the services to design companies, suppliers and dealers. The platform can help it improve the operate efficiency of the supply chain, reduce the inventory of the supply chain, reduce the waste and risk in the process, so as to reduce the cost of the system.

Conclusion

The cloud system for home decoration platform is an ideal Internet platform, but it must rely on advanced and appropriate IT information construction and requires a lot of capital to invest in preliminary research. China's Internet technology and informatization construction are constantly maturing and improving. Once conditions permitted, as the optimized solution, the cloud system for home decoration platform can solve various pain points and difficulties in the supply chain of home decoration and promote the modernization and upgrading of the entire home decoration industry.

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The Transwomen's Shopping Behaviour of Fashion Brand in THAILAND; Self-Esteem, Body-Image

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Abstract

The study aims to investigate the consumer behaviour of "The 'Pink Pound' or the 'Pink Money'". These are the marketing term used to define the huge amount of money spent by gay, lesbian, bisexual and transgenders (LGBT). LGBT consumers have higher incomes than other consumers. Moreover, they are generally well educated and favour high-quality products and have a hedonistic lifestyle. In other words, they socialise more often than straight men and women. This might be because they tend to live in urban areas, have high disposable income and have no children. Furthermore, they are more brand loyalty, especially for the business that targets and support their communities. Also, they are more keen to network than counterparts. There were 80% of gay men, and 76% of lesbians are internet-user compared with 70% of straight men and 69% of women. Moreover, they spend 35% more on online shopping than non-LGBT. LGBT consumers are an early adopter and trendsetter; they pick up on the international trend quickly. Thus, they are considered as a useful indicator of market trend. Perhaps, their lifestyle influences the men's fashion and grooming market; for example, nowadays, men tend to do ear piercing and spend more time and money on their appearance and lifestyle. The research points out that 48% of LGBT consumers like to keep up the latest style and trends compared to only 38% of heterosexual. All of the information can emphasize a potential of this dream market, which seems to be not interested widely as much as it should be.

Keywords: consumer behaviour, transwomen, gay, lesbian, bisexual and transgenders

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Introduction

Background

The 'Pink Pound' or the 'Pink Money' are the marketing term used to define the huge amount of money spent by gay, lesbian, bisexual and transgenders (LGBT). Since the acceptance of homosexual has been increasing globally, more people identify themselves publicly as being part of this classification (BBC News, 2016). Thus, we often see LGBT people in our society (e.g. as a professional), including media such as in sitcoms, dramas, and several talk shows that hosted by openly homosexual celebrities (Euromonitor, 2010). For example, a celebrity, Sam Smith was the first openly gay artist who acquire the GRAMMY's Award in 2015. Although LGBT people still have to face through stigmatisation and discrimination as a significant amount of homophobia that is still run deep in societies, market researchers were interested in 'Pink Pound' and how they spend their money. Many multinational companies are kept an eye on this niche market (Euromonitor, 2016). It is believed that this market is valuable and able to produce lots of income to their company

The size of LGBT market is attractive. Therefore, a large amount of market effort is undertaken to seize the opportunity by tapping into this dream market like well-known companies such as IKEA, Levi's and Absolut Vodka. However, the accurate figure of LGBT is difficult to indicate. Many academics and marketing experts estimate approximately from 4% to 10% of any given population (Rudd, 1996; Solomon, 2014). According to the Barratt (2015), global LGBT market is worth more than a trillion dollars; besides, they earn 23% above the national average and spend around 30% of their income on lifestyle products and entertainments (Callander, 2011). In line with the study of Solomon (2014) which reveal that gays are twelve times more likely to have a professional job, eight times more likely to own a laptop and twice times to own a holiday home than heterosexual. The researches by Euromonitor (2010) and Nielsen (2015) also highlight the attractive of the dream market. They revealed that homosexual consumers are more affluent than heterosexual counterparts due to the fact that they are less likely to have dependents, and there is a predominance of DINK (Double Income No Kids) family in the gay community.

According to Euromonitor (2010) and Nielsen (2015) report that the average wage of a gay consumer is £38,000, compared with the UK average of £26,000.

Approach to the Research

The secondary research will be conducted through academic journals, newspaper and market reports from the library and online databases in order to develop the understanding of the homosexual's consumer behaviour and to identify the theory to explain such behaviour. By doing so, it can help to improve the quality of the primary research. Additional, due to the research about shopping behaviour of the transwomen is rarely conducted, the primary research is necessary.

The quantitative research will be strived through the online survey from a variety group of women and transwomen in Thailand, in order to engender the new knowledge and to understand more about transwomen. This study also fulfils the gap as no research has explored in this topic before.

The explanatory method will be undertaken to explain the result from the quantitative aspect by applying the relevant theory of the prior research. Finally, the IBM SPSS will be used to analyse the data which collect through the quantitative method.

Research Objectives

1. To develop an understanding of the shopping behaviour of transwomen in the fashion sector such as price consciousness, quality consciousness, shopping enjoyment, brand loyalty.
2. To compare the difference shopping behaviour between women and transwomen
3. To explore whether the transwoman sees themselves distinct or similar to other transwomen.
4. To explore the factors that influence the shopping behaviour of transwomen in the fashion sector such as body-image and self-esteem.
5. How fashion brand can approach this market by understanding the outcome.

Literature Review

Homosexual and Fashion

Gay men have come to light as a profitable niche for mainstream marketers (Kates, 2000), especially for fashion merchandising. As Braun et al. (2020) reveal that fashion plays an important role in the homosexual life. The one reason is that the physical attractiveness plays a major role in partner selection for homosexual (Braun & Walter, 2014). Besides, Sha et al. (2007) also point out that due to a homosexual character is socially constructed through appearance, homosexual consumers appearance and self-presentation can be very crucial and transmitted through clothing (Braun & Walter, 2014). Clothing is a product that generates self-image. It is not only key element in influencing people's impression, but also could be a communicator to transfer information between wearer and viewer (Holman, 1980). For example, if individuals who always dress in a formal way, he/she might be assumed that having neat character. Many researchers have indicated that gay men are more fashion conscious, fashion interest and fashion awareness (Braun & Walter, 2014; Reilly & Rudder, 2007) and sometime their style even guide the fashion trend in the male heterosexual communities (Sha et al., 2007). They also spend more time and money on clothes than heterosexual (Kates, 2002), especially for premium product (Braun et al., 2015). This might because the homosexual society particularly gay men have higher appearance expectation among others (Rudd, 1996, Stabiner, 1982). Moreover, this dream market seems to have more brand loyal than average consumers (Reilly & Rudder, 2007; Reilly et al., 2008). Additionally, gay men are willing to spend more to support gay society (Reilly & Rudder, 2007; Braun et al., 2015) and likely to shop from the gay-friendly brand such as companies which support homosexual employee or 5 target gay customers (Kates, 2000). On the other hand, they tend to avoid to purchase anythings from businesses that they perceived as homophobic. Kates (2000) explains that they use money as a weapon to show their market power against those companies they perceived as an opponent and support the gayfriendly company with brand loyalty. However, normally, when researchers mentioned about homosexual, they usually

refer to gay and lesbian. Therefore, it is possible that MTF behaviour might be different from other homosexuals. This research aims to find out the MTF shopping behaviour in the fashion sector.

Normative Expectation

The explanation why LGBT customer tends to be more fashion forward could be explained by the theory of "normative expectation" originated by Goffman (1963). As a result of struggling for acceptance and equal treatment within society (Braun et al., 2015), these people tend to have low self-esteem. Therefore, they use clothing consumption behaviour as a tool to achieve visibility and recognition (Kates & Belk, 2001), to improve other negative aspects of their life and to escalate their self-esteem (Reilly et al., 2008; Reilly & Rudder, 2007)

The Social Comparison Theory

The social comparison theory by Festinger (1954) can also be implemented to clarify why homosexual people are more fashion conscious. According to Lennon et al. (1999), the outcome of the comparisons affect feelings, perceptions of self-attractiveness, and body image; The study of Aspinwall and Taylor (1993) found that individuals with high self-esteem tend to make the upward comparison as it can contribute motivation and inspiration while individuals with low self-esteem prone to favour downward comparison as it can enhance their emotion. As Veblen (2007) state that the lower class purchase luxury product to associate themselves with or be perceived as a member of the higher class while higher class spend on a luxury product to dissociate themselves from the lower class. The work of Han et al. (2010) explain more about this by separating consumer into four groups: Patrician, Parvenu, Proletarian, Poseur.

Next, the Poseneur is a group that want to be what he or she not. They try to associate themselves with other haves. However, as they cannot afford the authentic product, they use the mimic goods instead. Finally, the Proletarian is less affluent consumers and less status conscious. On this basis, it could be inferred that homosexual might consumes conspicuous goods to signal status and improve their body-image leading to higher self-esteem (Nwankwo et al., 2014; Wang & Griskevicius, 2014), which were diluted by the society norms. Also, use the brand as a symbol to show status and distinct themselves from the other people, and the lower-class society while try to reach the ideal which they see as a higher-class society (Reilly et al., 2008). However, it is obscure which group they try to distinct. Do they try to separate themselves from their group or other heterosexuals? Moreover, do they perceive others homosexual as equality?

Body Image — Self-Esteem — Shopping Behaviour

Many pieces of research point out the connection between body images, selfesteem and shopping behaviours (Gatti et al., 2014; Reilly & Rudd, 2007; Williams & Currie, 2000). Body image is not only the way one feels and acts on themselves, but also the way person perceive about their body (Rabito & Rodríguez, 2015), thus body image is one of the significant components to develop the individual's self-esteem (Gatti et al., 2014).

The perception and feeling of our body and appearance can greatly influence the self-esteem (Szabó, 2015). The work of Gatti et al. (2014) and Williams and Currie (2000) reveal that the person who dissatisfies with their body and appearance has low self-esteem and vice versa. This is another explanation why homosexual tend to be fashion forward and spend more time and money for shopping. As they have low self-esteem from the discrimination and stigmatisation for not harmonising with the social norms; they use clothing, especially luxury brand to show that they are living well and better than other heterosexuals or even other homosexuals. Besides, consuming luxury goods can increase their body image leading to escalating the self-esteem. Self-esteem also links with shopping behaviour. Consumers with low self-esteem resort to compulsive buying as a mean to fell better about themselves (O'Guinn & Faber, 1989), to reduce their stress and tension and to raise the self-esteem (Hirschman, 1992). They tend to shop less frequently, spend less time shopping, and less enjoy than other homosexuals with high self-esteem; besides, they tend to shopping online or through the catalogue to avoid being seen and evaluated in brick and mortar store (Reilly & Rudd, 2007). On the other hand, homosexual with high self-esteem might want to express their strength through certain consumption behaviour of apparel (Reilly & Rudd, 2007). This is obviously seen in our daily life that they tend to dress more creative, more fashionable, and they do not hesitate to express that they are homosexual. The study of the Reilly and Rudd (2007) reveals that gay men tend to purchase the unaffordable goods by using a credit card. The reason might because they purchase expensive, designer-level clothing to compensate the body that not match with the expected standard of the social norm (Kates, 2000) or to demonstrate to society that despite the discrimination and stigma, they are well-being. Also, they feel they are expected to dress in a fashion-forward manner so they have to purchase the unique and latest clothing styles from speciality brand which is more expensive. Besides, they might choose to support gay-friendly business and happy to pay a premium for the goods as they think support such a business is worth the additional cost. By understanding this behaviour, marketers can derive ways to serve this potentially lucrative market segment,

What is Ka-thoey?

Transgender can be categorised as people who desire to change their sexes from male to so-called female transwomen — MTF, or female to male so-called transmen — FTM (Benjamin,1966) and crave to be a member of opposite sex (Schilt, 2006). In Thailand, those MTFs are named exclusively as 'lady-boys', 'ka-thoey' or 'phuying-praphet-song'. In fact, the word 'ka-thoey' can be a threatening term for MTF. They usually prefer to be called 'a second type of woman' or 'phuying-praphet-song' as they want to be accepted as a female (Ten, 1999).

The life of a person who born as a man but has a feminine mind is not a bed of roses. They have had a feeling of anxiety for being different from other people of the same sex, since childhood. They prefer activities of the other sex and start to wear clothes of the opposite sex from an early age, not for enjoyment but as an expression of the feeling of belonging to the other sex which is not theirs (Rabito & Rodríguez, 2015). Even though there is a wide acceptance and social integration of MTF in Asian, particularly Thailand (Euromonitor, 2010). For example, they are participating in some certain professional careers such as film star, chef, designer

(Ten, 1999). They still have to face the significant dilemma not only internally as their identity crisis between their mind and body (Shilling, 2008), but also externally like discrimination, stigma, verbal & physical abuse and prejudice. Therefore, MTFs have to face with difficulty in their life than other homosexuals as their appearance and body are not fit with their mind and not be accepted by social norm. Head (2008) report that it is unusual to see transgender work as headmaster and other professional jobs, but it is usual to find them work in bars, clubs and other night time economy careers.This job recruitment issue is only an example that highlight the prejudice and discrimination issue among MTF which undermines their self-esteem. Consequently, they might purchase cloth and luxury goods as a tool to increase their self-esteem as many researchers point out that the homosexual tend to consume expensive designer clothing to compensate for a body that does not meet the ideal (Kates, 2000), purchase luxury brand to compensation for bodily flaws (Kates, 2002), use clothing shopping to improve 10 other negative aspects of their life and to boost their self-esteem (Reilly et al., 2008; Reilly & Rudder, 2007).

As, Thailand has a large number of MTF which higher than the West countries (Winter, 2006) and this market seem to be neglected from the marketer; it is interesting to investigate in this area. Particularly, in this competitive era, every organisation seeks for the new opportunity to make more profit. Perhaps, the outcome of the research can shed the light on the new potential market which is overlooked by multinational companies and provide the new opportunity and knowledge to tap into this dream market. The proposed of this research is focused on the shopping behaviour of MTF in Thailand which has never been investigated before. In addition, the theory of normative expectation, social comparison, body-image and self-esteem will be used in this research to scrutinise whether these concepts can be applied in Thai society or not.

Research Methodology

Primary Research

The primary research for this project is necessary because the secondary data about the MTF is very limited especially about the shopping behaviour. Therefore, the quantitative analysis is needed to address all the research objective. While, the secondary data which already discuss in Chapter 1 will explain the findings and result which come from the primary research.

Sampling

The target population for the questionnaire is women and MTFs in Thailand. After providing informed consent, participants completed an online questionnaire designed through SurveyMonkey software. The snowball sampling technic will be use which can approach large target participants faster and easier. 250 participants (men = 7.60%, women = 47.60% and MTFs = 44.80%) ranging age from 19 to 50 (M = 27, SD = 4.982) and income ranging from lower than 15,000 to more than 45,000 baht (M = 15,001 - 30,000 baht, SD = .959) data were collected. The 74 data were collected from Facebook, 162 data were collected from personal contact and snowball technique and 14 data were collected from direct mail. 19 participants who are men were

excluded as there is not a target group in this research. Then 15 incomplete questionnaires were removed. Therefore, 216 participants (women = 50.46%, MTFs = 49.54%) remained in the study.

Materials and procedure

The questionnaire begins with the general information part which includes sex (Male, Female and Transwomen), age (open-end) and income (from 1 = lower than 15,000 to 4 = more than 45,001) Next, the shopping behaviour questionnaire part, Rosenberg Self-Esteem Scale (RSE) and body dissatisfaction subscale were employed in this study (see the questionnaire, English version in Appendix A)

The 10 shopping behaviour questions with Likert 5-point scales (from 1 = strongly disagree to 5 = strongly agree) were used to measure the participants' shopping behaviour such as time pressure (specific shopping trip), innovativeness (product purchase), shopping enjoyment, quality consciousness, price consciousness, brand consciousness and brand loyalty (e.g. It is important to me to buy highquality products, I usually purchase brand name products, I usually purchase items for sale only, I tend to be a fashion leader rather than a fashion follower). All the questions were guided by the work of Bruner et al. (2005). By using these studies as guidance, it provides comprehensive marketing scales and greater reliability of the questionnaire

The Rosenberg Self-Esteem Scale (RSE) is the most the widely use to measure participants' self-esteem (Gray-Little et al., 1997). This scale was used to measure MTF's self-esteem in this research. The RSE consists of 10 items, such as I take a positive attitude toward myself, on the whole, I am satisfied with myself and I feel that I have a number of good qualities, which use to measures global self-worth by measuring both positive and negative feelings about the self (Rosenberg, 1965) Additionally, this multiple-item scales were rated on Likert 4-point scales from strongly agree to strongly disagree (value = 0 - 4; Mean = 21.75, S.D. = 3.67). The reason to use multiple-item scales is to ensure content validity for multifaceted constructs (Robins et al., 2001). The reliabilities for the RSE ranging is between .72 and .88 (Gray-Little et al., 1997). The scale ranges from 0 - 30. Higher scores indicate higher self-esteem. Scores between 15 and 25 are within normal range; scores below 15 suggest low self-esteem (Rosenberg, 1965).

Finally, body dissatisfaction subscale is one of 11 sub-scales which are in Eating Disorders Inventory-2 (EDI-2). This scale is a good indicator to value body dissatisfaction (Rabito & Rodríguez, 2015). This scale was used to 15 measure MTF's body-image in this research. From previous research, the reliabilities for the EDI-2 ranging is between .90 and .93 (Jennings et al., 2006). A score lower than 11 indicates that a person has a body dissatisfaction (e.g. I think that my stomach is too big, I think that my thighs are too large, I feel satisfied with the shape of my body). This multiple-item scales use Likert 5-point scales to measure the participants' body-image (0 = Strongly Disagree, 1 = Disagree, 2 = Undecided, 3 = Agree, 4 Strongly Agree; Mean = 14.89, S.D. = 5.16)

Validity & Reliability

All the questions were used by other researchers which can ensure the validity and reliability of the questionnaire. However, due to the participants are Thai, the scholar will translate the question into the local language. Moreover, to avoid translation issue, the Thai questions are the one which is already translated and

used by other researchers (Jennings et al., 2006; Ross et al., 2006). Moreover, the pretesting will be carried out among 15 volunteer respondents to discover the faults before proceeding the survey

Result & Discussion

In this section will look into the result of the survey and as there is no research about MTF's shopping behaviour before, the primary research will address all the research objective. Firstly, the general information about the income will be compared between female and MTF. Then, the result of the social comparison theory among MTF society will be provided. Next, the t-test was run to find out the difference in shopping behaviours between female and MTF will be discussed. Follow by, the correlation between self-esteem, body-image, shopping behaviour will be explored. Finally, the regression was used to predict which factor between self-esteem and body-image is a better prediction of shopping behaviour.

MTFs are more affluent

The percentage respondents' income between female and MTF. The data indicates that MTFs have higher average income than female. This might because they are less likely to have dependents and there is a predominance of DINK (Double Income No Kids) family in MTF community. This result is in line with many pieces of research (Barratt, 2015; Euromonitor, 2010; Nielson, 2015; Solomon, 2014) which reveal that homosexuals are more affluent than heterosexual. Besides, as the scholar has an opportunity to conduct an informal interview with some of the MTF respondents, the another reason that they have to generate higher income, because they have higher expense than women. Since, they are not women and their body is also not even though how similar they are, they have to beautify themselves to be accepted as a female. Moreover, due Percentage of respondents Income per month (baht) Female (N = 119) MTF (N = 112) lower than 15,000 15 16 15,001 - 30,000 63 48 30,001 - 45,000 14 18 more than 45,000 17 25 Total 100 100 17 to there is no definitely way to define membership to one sex or another, a human body is an indicator and people will treat MTF as a woman if they perceive them corresponding to a female even their identities are different (Rabito et al., 2015). Therefore, they will make all efforts to ensure that their bodies suit their identities. For example, rhinoplasty, breast surgery, plastic surgery also cosmetic and garments, etc. One of the respondent use the phase "to be a MTF is expensive" to explain their life.

MTFs are equality.

A majority of MTF respondents agree that they are equity and not compare themselves with others. This indicates that they see other MTF equality. This might because MTFs are already different and they are minority group so they have to be united. Therefore, they might use garment and brand to fulfil and enjoy themselves also improve their self-image instead of use it as a tool to distinct from others. This outcome is inconsistency with the work of Han et al. (2010) and Veblen (2007) which state that individuals use the luxury product as a symbol to show their status, to associate or to distinct themselves with others.

Female & MTF Shopping Behaviour

An independent-samples t-test was run to determine if there are any difference in shopping behaviour between female and MTF. Only four from ten variables which consist of time pressure, fashion forward, innovativeness (product purchase) and brand consciousness are statistically significant. While quality consciousness (the intention on buying high quality products rather than compromising on quality to get a lower price), price consciousness (the degree to which a respondent focuses on sales and trying to get the best price), shopping enjoyment (the indication that shopping is something respondents like to do) and brand loyalty (the tendency to buy the same brand within a specified product category rather than seek variation) are no difference between both groups

First, MTFs have limited amount of time to use during a particular shopping episode, a statistically significant difference, M = -.296, 95% CL [-.586, -.005], t(211) = - 2.004, p = .046. Next, MTF (M = 3.30, SD = .886) are more fashion forward than female (M = 2.93, SD = .914) when shopping garment product, a statistically significant difference, M = -.367, 95% CL [-.610, -.124], t(211) = - 2.978, p = .003. Then, MTF (M = 3.67, SD = .859) are more innovative than women (M = 3.40, SD = .940) when shopping garment product, a statistically significant difference, M = -.268, 95% CL [-.511, -.025], t(211) = - 2.171, p = .031. Likewise, MTF (M = 2.60, SD = .891) have more brand consciousness than female (M = 2.35, SD = 1.002) while choosing the garment product, a statistically significant difference, M = -.258, 95% CL [-.514, -.002], t(211) = - 1.986, p = .048. The result indicates that MTFs have more time pressure when shopping. It might because most MTF earn more, they have to spend most of the time on their work; therefore, they might have time limited when shopping. Some of the respondents told the scholar that they have to work 7 days a week. This result disclaims the work of Kates (2002) which point out that homosexual spend more time than heterosexual. Also, there is no statistically significant difference between both groups on brand loyalty. This outcome disclaims the work of Reilly and Rudder (2007) and Reilly et al. (2008) which claim that LGBT has more brand loyalty than average consumers.

However, when comparing fashion forward and innovativeness between both genders, MTFs have the higher score on both points. This mean that as MTFs tend to be fashion leader than a fashion follower, they might have to engage more in exploratory behaviours, particularly when it comes to trying out new and different products to be fashionable all the time. This outcome is consistent with others research. Homosexuals are more fashion forward as they have higher appearance expectation among others. Besides, the MTF might have low selfesteem as their mind and body are not harmonising with the norms (Goffman, 1963), they use clothing as a tool to achieve visibility and recognition and to improve other negative aspects of their life and to escalate their self-esteem (Braun & Walter, 2014; Kates & Belk, 2001; Reilly & Rudder, 2007; Rudd, 1996; Sha et al., 2007; Stainer, 1982). Also, using the pressure garments to hide their masculinity and try to pass off as people of the opposite sex in public (Rabito & Rodríguez, 2015). Finally, the result indicates that MTFs have more brand consciousness than female. This mean MTFs have more desire to buy brand-name products preferring nationally known brands rather than private distributor brands or generic brand. Therefore, the brand is important to MTF than female. This might because they use the brand as a tool to show that despite the

discrimination, they are living well and better than other heterosexual or purchase expensive, designer-level clothing to compensate the body that does not match with the social norm (Kates, 2000).

MTF — Self-Esteem, Body-Image, Shopping Behaviour and Social Comparison Theory

The Pearson's product-moment correlation was run to assess the relationship between body image and shopping behaviour, self-esteem and body-image, also between self-esteem, shopping behaviour and social comparison in MTF (see also Table 4). The result shows that there was a moderate negative correlation between self-esteem and body-image, $r(87) = -.345$, $p < .001$, $0.001 < sig$.

This indicates that MTFs have high self-esteem, even though they have body dissatisfaction. The result opposes the work of Gatti et al. (2014) and Williams and Currie (2000) which point out that the person who dissatisfies with their body and appearance will have low self-esteem and vice versa. The explanation for the inconsistency result is might because when MTFs have high self-esteem, they might have high self-confidence; therefore, they might look through their body image. As a result, even though their body does not suit with the ideal, they still have high self-esteem

Next, there was no correlation between body-image and shopping behaviour but there was a moderate positive correlation between self-esteem and shopping enjoyment, $r(87) = .232$, $p < .031$, $0.031 < sig$.

This indicates that the more self-esteem MTFs have, the more enjoyment when they are shopping. The result in line with the work of Reilly and Rudd (2007) which reveal that individuals with low self-esteem enjoy less when they are shopping and prone to shopping online or through a catalogue to avoid being seen and evaluated in brick-and-mortar store and vice versa.

Next, there was also a moderate positive correlation between self-esteem and innovativeness (product purchase), $r(87) = .249$, $p < .020$, $0.020 < sig$.

This indicates that the more self-esteem MTFs have, the more innovativeness when they purchase garments. This might because MTF with high self-esteem want to express their strength via certain consumption behaviour of apparel as obviously seen them dress more creative and fashionable (Reilly & Rudd, 2007). Besides, they might feel that they are expected to dress in a fashion-forward manner so they have to wear the unique and latest clothing styles (Kates, 2000). This also in line with the research by Euromonitor (2010) and Nielsen (2015) which reveal that LGBT consumers are more early adopter and trend setter also like to keep up the latest style of the trend.

However, there was not any correlation between self-esteem and comparison with others ($M = 2.57$, $SD = 1.074$). This indicates that there is no correlation between self-esteem and social comparison theory which is inconsistency with the work of Aspinwall and Taylor (1993). They point out the relation between self-esteem and social comparison that individuals with high self-esteem tend to make the upward comparison to motivate and improve themselves and vice versa or make a two way comparison to distinct themselves from the lower society and to associate with higher one. Part of MTFs might compare themselves whether the evaluation is positive or negative to know their position relative to some standard, to feel better about themselves or to improve their self-image. However, this activity is not related with self-esteem.

Table 1 Correlation

Variables	Self-Esteem	Sig(2-tails)
Body-Image	- .345**	0.001
Shopping Enjoyment	.232*	0.031
Innovativeness (Product Purchase)	.249*	0.020
Comparison with others	-.086	??

** = significant 0.01, * = significant 0.05

Self-esteem/Body-image is a better prediction for shopping behaviour?

Table 2 Regression

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	27.734	3.241		8.557	0.000
	Self-Esteem	.178	.118	.173	1.512	.134
	Body-Image	.071	.085	.096	.838	.404

Dependent Variable: Shopping Behaviour

a. Dependent Variable:

Shopping Behaviour Multiple regression analysis was calculated (by Enter Method) to predict shopping behaviour based on their self-esteem and body-image. A significant regression equation was found. Participants' predicted shopping behaviour is equal to 27.734 + .178 (self-esteem) + .071. Participants' predicted shopping behaviour is equal to 27.734 + .178 (self-esteem) + .071 (body-image). Participant's shopping behaviour increased .178 point for each point of self-esteem while participant's shopping behaviourincreased only .071 for each point of body-image. This indicates that self-esteem is a better predictor of shopping behaviour than body-image. However, both self-esteem and body-image were no significant predictors of shopping behaviour

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Body-Image mediates Shopping Behaviour?

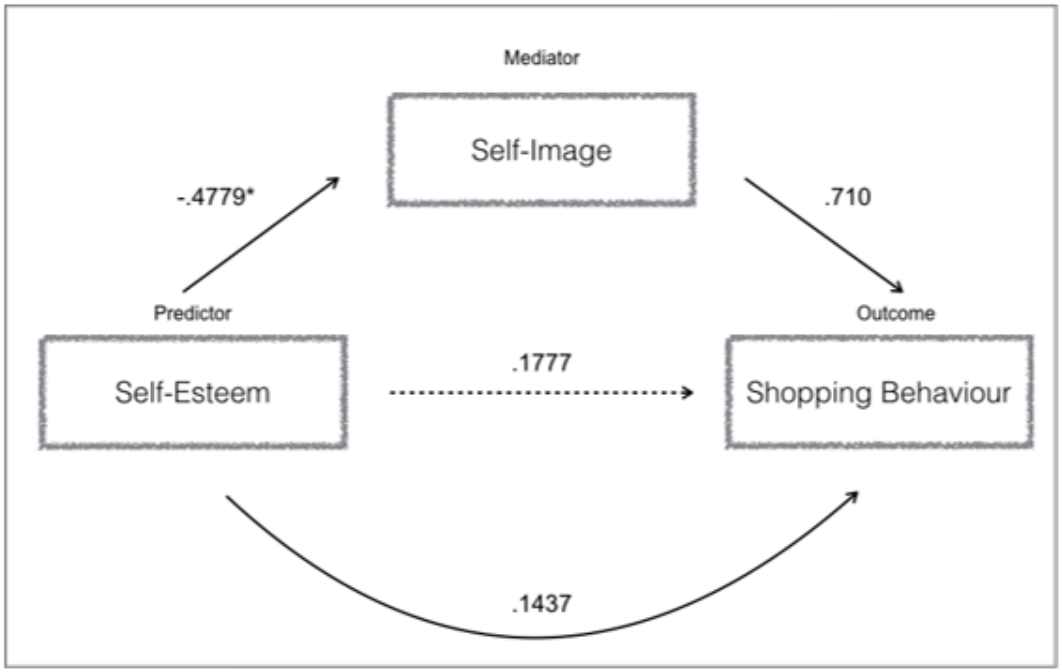

Figure 1 The body-image as a mediator of shopping behaviour

The Figure1 shows that regression analysis was used to investigate the hypothesis that body-image mediates shopping behaviour. Results indicated that self-esteem was a significant predictor of body image, b = -.48, SE = .14, p = .009 However, body-image was not a significant predictor of shopping behaviour, b = -.004, SE = .019, ns. These results support the not mediational hypothesis. SE was no longer a significant predictor of shopping behaviour after controlling for the mediator, attributional positivity, b = .024, SE = .026, ns, consistent with full mediation. Approximately 1.4% of the variance in SB was accounted for by the predictors (R2 = .014). The indirect effect was tested using a bootstrap estimation approach with 5,000 samples. These results indicated the indirect coefficient was significant, b = .002, SE = .01, 95% CL = -.0169, .0236. Self-esteem was associated with approximately .002 points higher self-esteem scores as mediated by body-image. Nevertheless, the mediation is not successful, (F (2,85) = .596, p > .05).

Conclusion of the Section

In this study, the results reveal many interesting points. First, when comparing the data between MTF and female it shows that MTFs are more affluent, more time pressure, more fashion forward, more innovativeness and more brand consciousness. Next, it shows that self-esteem and body image have negative correlation which is inconsistency with other research. Also, find out that there is positive correlation between self-esteem, shopping enjoyment and innovativeness. While, there is no correlation with self-esteem and social comparison which again, is inconsistency with other research. Further, the result states that self-esteem is a

better predictor of shopping behaviour than body-image. Finally, the regression analysis reveals that body-image is not mediate between self-esteem and shopping behaviour.

Conclusion

The research discovered many interesting results on MTF's shopping behaviour. It reveals that MTF is more time pressure, more fashion forward, more innovative and more brand conscious; also, more affluent than female. The resulting highlight the new opportunity for the fashion brand as MTF do not only have more purchasing power, but also the early adopter to the trend, which means they have to purchase new garments all the time to be in trend, and more desire to buy brand-name products. However, due to MTFs are more time pressure, the marketer has to provide convenience shopping channel which can save their time (such as online shopping, delivery, etc.). However, the outcome of this project is inconsistency with other research about social comparison theory. It shows that MTFs are likely to see other both female and MTF as equality. This indicates that MTFs are grouping together. The marketer can apply this behaviour to the marketing plan. For example, as MTFs are united, using opinion leader marketing might be one of the best ways to approach this market

Moreover, the research indicates that the self-esteem of MTF is a major factor which influencing shopping behaviour than body-image. There is a negative relation between self-esteem and body image. While, there is a positive relation between self-esteem, shopping enjoyment and innovativeness. This shows that marketers should emphasise on MTF's self-esteem rather than how they look. Because as long as they have high self-esteem, they are still an early adopter to the trend and will enjoy shopping even though their body-image seems unsatisfied. Besides, the result is inconsistency with other research about the relation between self-esteem and social comparison (both upward and downward). To conclude, because MTFs are different, they should be treated with an appropriate marketing strategy. As the research is entirely new in this field, there are many gaps in fulfilling. Many questions still need an answer; for example, are they willing to spend more than counterpart? Are they shopping more frequently? Are they keen to purchase from the brand supporting their communities? Are there any further factors that impact MTF shopping behaviour?

Moreover, from an informal interview scholar find out an interesting information. In MTF society, they separate themselves into 3 steps. First, 'tud' refers to the young generation of MTF who still dress like a boy but act as a counterpart (they willing to be as a counterpart, but as they still in high school, they have to obey the rule). Next, 'ka-thoey' refers to MTF who already dress like a female but not having a transsexual operation. Finally, 'phuying-praphet-song' refers to MTF who already have the transsexual operation, this is the full transformation of MTF. Therefore, they might have different shopping behaviour in each stage of their life which still need to be investigated

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A Comparative Study on the Relocation of Chinese Manufacturing Industries to ASEAN, Africa and South Asia

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Abstract

This paper explores the differences between China and ASEAN manufacturing environments through the study of the relocation of Chinese manufacturing to ASEAN. In view of the phenomenon of a large number of Chinese manufacturing industries relocating to ASEAN, this paper will analyze the advantages and crises brought by the manufacturing environment of China and ASEAN. This paper interprets it through literature research. The results of the research confirm that China's low-end manufacturing enterprises have already begun an irreversible outflow, and ASEAN is more attractive than Africa and South Asia in terms of land and manpower. Although the manufacturing transfer has certain drawbacks, it is still a win-win situation for China and ASEAN. ASEAN should raise the upper limit of market access, relax financing policies, increase fiscal and taxation support, and provide relevant citizen benefits, while China should also encourage companies to invest and start businesses abroad, so as to achieve positive interactions brought in by going global. The research in this paper can help governments and investors in China and ASEAN to make rational decisions.

Keywords: Chinese manufacturing industry, supply chain relocation, ASEAN, South Asia, Africa.

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Introduction

The strategic transformation of the manufacturing industry is cyclical and very regular. Since World War II, four waves of industrial transformation have occurred around the world. In the 1950s, American manufacturing was first transferred to Japan, and then Japan was transferred to Taiwan, South Korea, Hong Kong, Singapore, and then to China. Entering the 21st century, especially after 2005, labor costs in China's coastal areas increased, and industries began to transfer to other areas around China (Li, 2013). At the same time, foreign businessmen also began to move from various regions in China to regions outside China. While this shift is normal, it deserves further investigation. Therefore, in this paper, we mainly study the relocation of China's manufacturing industry.

This study will explore the following questions:

1. First, the reasons for the decline of China's manufacturing industry in recent years.

2. What is the status quo of the manufacturing industry in ASEAN, South Asia, and Africa, and what is their ability to undertake the transfer of China's manufacturing industry?

3. In the process of China's manufacturing transfer, what are their own advantages and the risks and opportunities they face?

Literature Review and Hypotheses Proposal

Reasons for the Decline of China's Manufacturing Industry

Only focus on marketing but not on core technology

Most companies spend far more on marketing than they do on core technology research. As a result, there are many impressions that the actual content is far worse than what is presented in advertisements and sales. The after-sales service of various products is poor and there is no sales guarantee. Consumers pay high costs but cannot enjoy high-level services, and in the marketing process, a lot of profits fall into the pockets of capitalists.

Lack of good management rules and systems

Chinese managers know nothing about technology, and their technology and creativity cannot convince consumers and the general public. The employees of the enterprise hate the managers, and the managers lack trust in the employees

The professional quality of purchasing personnel in China is low

The professional quality of Chinese procurement personnel is low, and their procurement behavior and results do not bring any benefits to the company. Often they buy just to make more money for themselves. Therefore, the production of fake and shoddy products is inseparable from the corruption of purchasing personnel.

Insufficient respect for intellectual property rights in China

In China, various pirated and counterfeit products emerge in an endless stream. This not only deceives consumers, but also deceives partners who come to China to invest.

Chinese people's living standards improve and their consumption capacity increases

Luo (2011) believes that the manufacturing industry in China has been unable to earn more profits. Take Shenzhen as an example: According to statistics from the Shenzhen Municipal Bureau of Statistics, Shenzhen's GDP was 80 million yuan in 2008, and rose to 2,243.8 billion yuan in 2017, nearly doubling its GDP in ten years. Per capita income was 26,729 yuan in 2008, compared to 52,938 yuan in 2017. Such a high income has resulted in a substantial increase in local labor costs.

Therefore, it can be seen from the above points that China's manufacturing industry is gradually going into the process of "declining".

Research on the status quo of ASEAN's manufacturing industry

According to Wang (2019) research, Singapore, Malaysia, Indonesia, the Philippines, and Thailand are the five more developed countries in ASEAN, and their economic aggregate and foreign trade volume account for a relatively large proportion in ASEAN.

In 2016, Singapore's foreign trade totaled US$623 billion, Malaysia's foreign trade totaled US$357.8 billion, Indonesia's foreign trade totaled US$280.1 billion, the Philippines' total foreign trade totaled US$142.2 billion, and Thailand's total foreign trade totaled US$409.3 billion. Dollar. In 2016, the total foreign trade volume of ASEAN was 2.23 trillion US dollars,

The total foreign trade volume of the above-mentioned five ASEAN countries is 1.82 trillion US dollars, accounting for 81.4% of ASEAN's total foreign trade volume. Statistics show that the import and export volume of merchandise trade between China and the five ASEAN countries accounted for more than half of the country's total merchandise trade, while the manufacturing exports of Singapore, Malaysia and Thailand accounted for more than 60% of the country's merchandise trade exports.

Research on the Current Situation of Manufacturing Industry in South Asia

Yang et al. (2018) stated that in order to get rid of their backward economic conditions, South Asian countries are actively seeking international cooperation in the process of self-reliance. From the perspective of economic development level, South Asian countries such as India, Pakistan and Sri Lanka are middle-income countries, while the other five countries are least developed countries, so their industrialization level is generally low. Except for India and Pakistan, the industrial foundations of other South Asian countries are weak, the products are single, and the industrial output value is at the national low level. Its share in GDP is also low. Therefore, each country in South Asia has a strong demand for industrial development.

Research on current situation of African manufacturing industry

Tang (1985) believed that in terms of production, the manufacturing industries of African countries are not very developed, and they always adopt the trade mode of trading natural resources to meet their own needs.

The role of manufacturing in Africa in economic development over the past few decades can be illustrated by the fact that although manufacturing is growing, its share in the national economy is still small. Africa's manufacturing industry is still in the initial stage of development and is still very fragile. It has not yet gone through a difficult process of going to the modernization stage.

However, Africa has abundant natural resources and abundant labor force. In the process of overcoming the above-mentioned difficulties, they have been trying to give full play to their own advantages, introduce appropriate technologies, and adjust appropriate policies to lay a good foundation for industrial modernization.

Research Methods

Research Framework

The first part is the introduction part. In this part, I will firstly introduce the background of this topic and the significance of choosing this topic; secondly, I will review and briefly describe the related research on the manufacturing trade competitiveness of ASEAN 10 countries and summarize it, and expound the significance of this research.

The second part is the literature review. It includes an analysis of the reasons for the decline of China's manufacturing industry today and literature, as well as the current status of the manufacturing industry in ASEAN, South Asia, and Africa.

The third part is the elaboration of the research method. This part will express the framework, method and main content of the research in this paper, clarifying the regulations for the subsequent research in this paper, and making the content of each part clearer.

The fourth part is the discussion of the research results. First of all, taking the Chinese enterprise Sany Heavy Industry as an example, it expounds the inevitability of the relocation of China's manufacturing industry, and compares and analyzes the current undertaking capacity of ASEAN, South Asia and Africa, and analyzes its competitive advantages and Trends in manufacturing development.

The fifth part is the discussion on the relocation of China's manufacturing industry in the future. This part mainly analyzes the advantages of Chinese enterprises relocating out of the manufacturing industry, the crises they face and the crises they will face in the future.

The sixth part is the conclusions and suggestions, mainly based on the actual situation, to put forward certain coping strategies for the future prospect of China's manufacturing industry, and to improve and maintain the trade competitiveness of China's manufacturing industry, expand China's trade volume, establish a sustainable Continuous and core competitiveness of the value chain to provide targeted advice and recommendations.

Type of Research

Literature survey

Refer to the research of literature in related fields, and on this basis, understand the current research status of China's manufacturing transfer in various countries around the world. Through relevant research results, learn from advanced results, find the crux of the problem, and combine the current situation, to put forward appropriate suggestions on how to deal with the crisis that China's manufacturing industry will face.

Comparative research

From the perspectives of ASEAN, South Asia, Africa, etc., the trend of China's manufacturing relocation and its impact on these regions are compared and analyzed, and the inevitability and crisis of China's manufacturing relocation under the trend of the general environment are discussed. Guidelines are thus drawn up to assist the relocation of manufacturing to appropriate regions.

Contents of the comparative study

Combining the relevant literature and results of scholars' research, compare the development status of ASEAN, South Asia and Africa's manufacturing industry, and their the ability to undertake the manufacturing industry, and analyze the advantages and risks of the relocation of China's manufacturing industry. And give some suggestions and countermeasures to the industry.

Results

Enterprise relocation is an inevitable trend - Taking Sany Heavy Industry as an example

The relocation of enterprises is an inevitable phenomenon when China's economy develops to a certain level, and it is also a manifestation of the modernization of China's industrial structure. After 30 years of development and progress, the original development model and industrial structure of the Chinese economy have accumulated many contradictions. At this stage, China's industries must be upgraded and transformed in order to achieve better development.

Intelligent manufacturing is the foundation of China's industrial upgrading, and its goal is to reduce labor costs, improve product quality, and achieve industrial upgrading. Achieve the "Made in China 2025" action plan issued by the Chinese government in 2015.

Take Sany Heavy Industry, the leader in China's construction machinery industry, as an example. Sany Heavy Industry is one of the pilot demonstrations projects of China's intelligent manufacturing. At present, Sany Heavy Industry has successfully transformed intelligent manufacturing with the help of huge industrial data. Sany Heavy Industry reached the peak of the industry in 2011-2012, and its operating income continued to decline in the following years. Under the industry's predicament, Sany Heavy Industry also began to implement transformation.

Not only internal reform and innovation, but also continue to promote the internationalization strategy, hoping to actively explore foreign markets by taking advantage of the "One Belt, One Road" strategic opportunity to hedge against the pressure of declining sales in the domestic market. In addition, Sany Heavy

Industry is also trying to diversify its operations, getting involved in military industry, housing industrialization, finance and other fields. In order to improve product quality, Sany Heavy Industry also promotes intelligent manufacturing and technological innovation (Alice, 2017). Through the remote control system, it is possible to accurately locate the machinery in the hands of distant customers, monitor the operating status, and improve the company's sales performance from the side.

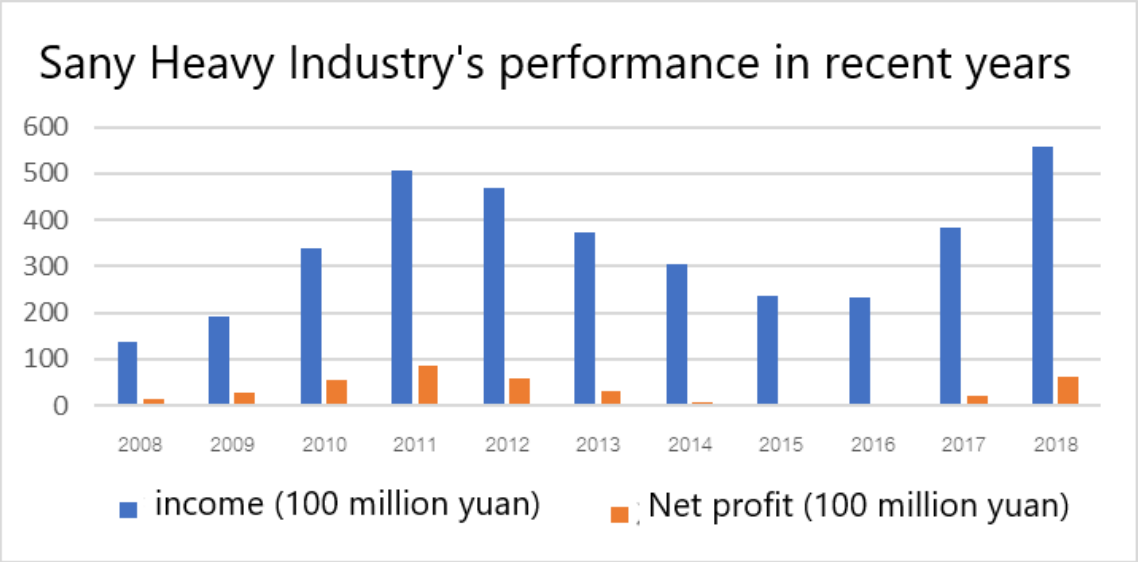

Figure 1 Performance of Sany Heavy Industry in recent years

Data source: Oriental Fortune Choice data

The figure 1 illustrates the performance of a company in recent years. In 2016, Sany Heavy Industry's operating income began to rise continuously. Relying on the previous profits, optimized and innovative products, and solid company fundamentals, the market share has continued to increase. In this round of industry recovery, Sany Heavy Industry's performance is far more flexible than other companies. With the increase in cash flow and revenue, the profit side will gradually be released (Li, 2017). Currently, Sany Heavy Industry's overseas sales account for 45% of its total revenue, and its products have been sold to more than 100 countries and regions around the world. Sany Heavy Industry vigorously promotes "big data" and has become a representative of the transformation and upgrading of China's traditional manufacturing industry to "intelligent manufacturing". In the future, Sany Heavy Industry will further enhance the level of internationalization.

Although the relocation of the manufacturing industry will have a certain impact on a country's economy, it will also provide more favorable conditions for the upgrading of China's domestic industrial structure. After the relocation of the enterprise, other enterprises can reuse the land resources of the original enterprise, which alleviates the local human resources to a certain extent.

For example, in China's southeast coastal areas, many low-end manufacturing industries have relocated out, which has relieved the pressure on the local labor force to a certain extent and freed up more

local resources for redistribution and utilization. Using the basic equipment left by previous enterprises, after certain transformation and improvement, can be used to attract investment and introduce high-tech enterprises. For some enterprises with high pollution and high energy consumption, relocation can greatly reduce the pressure on the local environment.

Current Capacity of ASEAN

Table 1 Population of ASEAN countries in 2017

	2017population （10 million）	Chinese provinces with similar populations in 2017
ASEAN	64.737	46.6% of China's total population
Indonesia	26.4	Guangdong + Henan + Jiangxi
the Philippines	10.49	Shandong
Vietnam	9.554	Sichuan
Thailand	6.904	Hunan
Myanmar	5.337	Anhui
Malaysia	3.162	Chongqing
Cambodia	1.6	Tianjin
Laos	0.686	Ningxia
Singapore Phi	0.561	Qinghai
Brunei	0.043	Tibet

Table 2 GDP and per capita GDP of ASEAN countries in 2017

	GDP (billion USD) GDP per capita (USD)	GDP (billion USD) GDP per capita (USD)
Indonesia	10155.39	3846
Thailand	4553.21	6593
Singapore Phi	3239.07	57714
Malaysia	3145.00	9944
the Philippines	3135.99	2988
Vietnam	2238.64	2343
Myanmar	693.22	1298
Cambodia	221.58	1384
Laos	168.53	2457
Brunei	121.28	28290
ten ASEAN countries	27670.91	/

As can be seen from the above table1 and table 2, the population of ASEAN member states is close to half of that of China, and the per capita GDP of some ASEAN countries is not high, indicating that the overall wages of ASEAN are relatively cheaper than that of China. But the overall economic strength of ASEAN is very strong. The cooperation between China and ASEAN is constantly developing, we can see it through the data. Between 2007 and 2017, ASEAN's foreign direct investment (FDI) increased from US$83.8 billion to US$114.5 billion, and the British government's forecast for ASEAN's foreign direct investment (FDI) will reach US$328.3 billion by 2030. Among the FDI inflows into ASEAN, FDI outside ASEAN accounted for a large proportion—in 2016, FDI outside ASEAN accounted for about 75% of the total FDI in ASEAN. Intra-ASEAN FDI, which normally accounts for about one-fifth of total inflows, increased to a quarter in 2016, showing a faster growth rate. From the source of FDI, the EU is the largest country of ASEAN FDI. In 2016, investment in the EU reached 30%, higher than investment within ASEAN (25%), followed by Japan (14%), the United States (12%) and China (10%).

From the perspective of foreign direct investment inflow industries, in 2017 the vast majority of foreign capital in China flowed into real estate, wholesale and retail, finance and insurance, manufacturing and construction. From 2014 to 2016, the top four industries were still finance and insurance, real estate, wholesale and retail, and manufacturing. However, the stock of FDI in the financial and insurance industry declined and was gradually replaced by the real estate, wholesale and retail industries.

From the perspective of ASEAN countries, China's FDI investment in Singapore, Indonesia and Malaysia is relatively high, but it is still lower than that of Japan and the United States. On the contrary, although China's FDI investment in ASEAN less developed countries is relatively low, it surpasses the United States in Myanmar, Laos and Cambodia, and surpasses Japan in Laos. This is mainly related to the large-scale infrastructure project contracts that China has signed with these less developed countries (Qin & Cao, 2018).

Recently, with the escalation of the Sino-US trade war, the competitiveness of the Southeast Asian manufacturing industry has become more prominent, and the Southeast Asian manufacturing industry will become the biggest beneficiary of the Sino-US trade war. On the other hand, parts exports from Southeast Asia to Chinese factories may slow down.

In this Sino-US trade war, Taiwanese businessmen are also affected and actively adjust their production routes. For example, Delta Electronics has converted a related company in Thailand, Delta Electronics Thailand, into a subsidiary and plans to gradually withdraw from its production base in China. In addition, Jinbao Group will also build a new factory in the Philippines. Group CEO Shen Shirong pointed out that the production line is being gradually transferred to Southeast Asia in response to customer requirements.

Current Capacity of South Asia

The population of South Asia is about 1.69 billion, and the total population of China and South Asia is 3 billion. It not only has a large population and a huge market, but also is the fastest growing region in the world and the largest emerging market in the world. It has huge cooperation potential and space for cooperation. An important area to promote the "One Belt, One Road" strategy (Xiao and Yang, 2018). In the short term, China and South Asia's manufacturing capacity cooperation presents asymmetrical mutualism, and in the long

run, it presents symmetrical mutualism. In order to realize the mutual benefit and symbiosis of China and South Asia's production capacity cooperation, the following tasks should be focused on. See Figure 2.

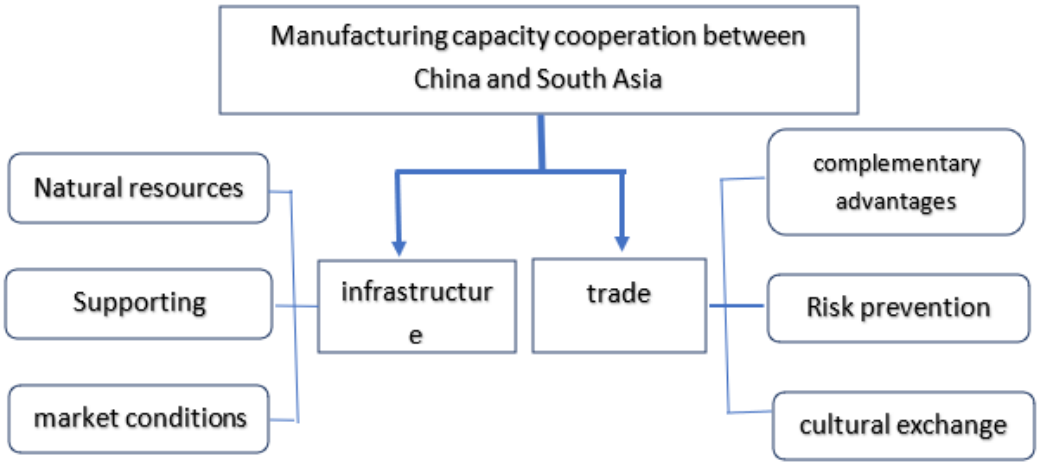

Figure 2 Key tasks of China-South Asia manufacturing capacity cooperation

Chinese industrial products have advantages in the international market due to their high cost performance. South Asia provides a huge market for Chinese industrial products. Collaboration with South Asian manufacturing capabilities can ease the saturation of China's domestic market. For example, most countries in South Asia are traditionally large agricultural countries, but the level of agricultural automation is not high. China's export of agricultural machinery and equipment to South Asian countries can improve the level of local agricultural automation and can also drive China's infrastructure related products such as roads, railways, and ports, as well as export power supplies such as thermal power, hydropower, and nuclear power. Equipment manufacturing, survey and design products and output of upstream and downstream industry products.

Medium and long-term production capacity cooperation will first realize the smooth flow of "five links", and correspondingly increase the degree of trade openness and trade facilitation, so that future trade activities will develop rapidly and provide new impetus for China's economic growth. By setting up industrial parks overseas to gradually transfer the manufacturing industry, make full use of the low-cost labor force in South Asia, provide a large number of local employment opportunities, and focus on the development of R&D design and high value-added activities. Terminal equipment manufacturing. Promote the transformation and upgrading of China's manufacturing industry (NCBS et al., 2018).

Current Capacity of Africa

There are many issues involved in the selection of industries for China's direct investment in Africa. The selection of industries plays a pivotal role in the investment process. Whether the selection of industries is correct and reasonable directly affects the effect and benefits of China's investment in Africa (Li & Zhou, 2012). Choosing a reasonable industry during the investment process is conducive to further developing the African market and achieving a win-win situation for the economic development of China and Africa. According

to the statistics in the report "China's Foreign Direct Investment in 2014", in 2014, the top five industries in China's investment in Africa according to the stock of direct investment were construction, mining, finance, manufacturing and in the scientific research and technical service industry, the manufacturing industry accounted for 16.35%, and the above-mentioned industries accounted for 83.4% of China's direct investment in Africa.

If only greenfield investment in Africa is counted, between 2003 and 2014, China invested in 77 projects in the manufacturing sector, with a total investment of US$13.3 billion, ranking first among all investment fields in Africa. A number of financial institutions stated in their research reports that the cumulative annual growth of China's manufacturing investment in Africa was around 10%. From 2003 to 2014, the manufacturing sector accounted for the largest proportion of new projects built by Chinese companies in Africa. The pie chart of China's investment in Africa in 2014 is as follows:

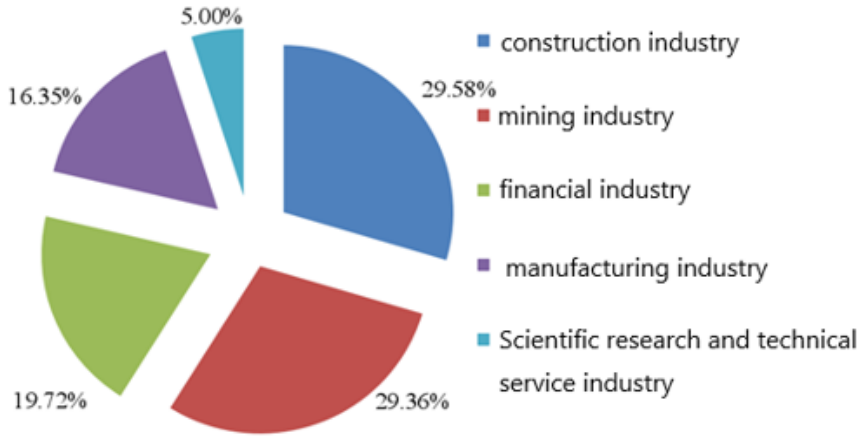

Figure 3 The proportion of China's investment in Africa in 2014

In 2019, the trade volume between China and Africa was 187.5 billion US dollars, a year-on-year increase of 0.7%, which was 3.1 percentage points higher than the growth rate of China's foreign trade, and continued the growth trend since 2017. Among them, China's exports to Africa were US$100.9 billion, a year-on-year increase of 5.6%; imports from Africa were US$86.5 billion, a year-on-year decrease of 4.5%. South Africa, Angola, Nigeria, Egypt, and Algeria have been among the top five trading partners for seven consecutive years. In addition, China's direct investment in the entire African industry reached US$2.8 billion, an increase of 4.6% against the trend. Zambia, Nigeria, Angola, Kenya and Congo (Kinshasa) are China's top five investment destination countries. Construction, manufacturing, leasing and business services, mining, wholesale and retail are the top five industries for Chinese investment in Africa. During the year, China's non-manufacturing investment increased by 172.8%, accounting for more than 20%.

Discussion on China's Future Manufacturing Relocation

Advantages and crises of trends

Grasp the industrial structure reform and enter a new production mode

The demographic dividend has helped South Asia modernize the manufacturing sector, especially labor-intensive industries.With the increase in production and labor income, the demographic dividend will also help to expand the consumer market. Foreign investment is attracted by the demographic dividend of the ASEAN region, and the speed and scale of joining ASEAN is expected to increase in the next decade. Demographic changes in Southeast Asian countries are still in their infancy, and the benefits of the demographic dividend will continue to be felt for decades to come. In 2012, China's labor force declined for the first time. Not only has the absolute number of China's labor force declined, but labor costs have also risen, and the trend of manufacturing bases migrating to South Asia has begun to emerge. While the relocation of a portion of China's manufacturing to South Asia has certain implications in some areas, it will be beneficial for both parties if Chinese manufacturing seizes the opportunity to move up-market and create a division of labor among labor-intensive industries in Southeast Asia. The development of Southeast Asia has also brought new opportunities to China.

The development of the manufacturing industry is not only affected by demographic factors, but also by infrastructure, investment environment, governance, political stability and vocational training. China has great potential to cooperate with Southeast Asian countries in these fields. Southeast Asian countries differ significantly from developed and other middle-income countries in terms of education spending and education quality. There is a huge gap between Southeast Asian countries and developed countries in terms of the share of GDP that the government spends on education. In order to take full advantage of the demographic dividend, Southeast Asian countries must increase investment in education and improve the quality of education. The impact of the demographic dividend depends on the economy's ability to use more labor. For example, some countries in Southeast Asia have benefited from a demographic dividend due to higher savings and investment rates, thereby accelerating the accumulation of physical capital and increasing the productive capacity of the labor force, in line with rapidly growing populations. Demographic dividends in developing countries should also be seen as a benefit, not necessarily from a favorable demographic structure, but as a potentially favorable opportunity that requires investment in physical and human capital, and Ensure that social, economic and political systems reflect the demographic dividend.

While some well-known Chinese manufacturers have started operations in Africa, few companies surveyed see Africa as their favorite investment destination, and large companies are generally more likely than smaller companies to expand or shift their production chains to foreign. Only 8% of foreign-invested enterprises tend to relocate abroad, but this is still four times the number of domestic and foreign private enterprises in China. Compared with private enterprises, foreign-funded enterprises in the Pearl River Delta have accumulated overseas investment experience. At the same time, in order to make full use of the low labor cost - overseas labor cost, only enterprises with a certain scale, overseas management experience, overseas

vertical supply chain and overseas operation risks can carry out overseas industrial transfer and fully benefit from it. Generally speaking, small companies are small in scale, only face the Chinese market, have weak anti-risk capabilities, have not been well integrated into the global industrial chain, lack preparation and ability, and are even more hesitant.

As China's working-age population decreases year by year, land resources are in short supply, and the demographic dividend decreases, economic growth must shift from being highly dependent on factors and resources to highly dependent on technological progress and improving the quality of the labor force. Building a strong manufacturing country and developing advanced manufacturing are not only the development needs of China's post-industrial era, but also the inevitable requirements of the global industrialization trend, especially the new round of technological and industrial revolution. After the international financial crisis in 2008, developed countries launched a re-industrialization strategy. At the same time, a new round of technological and industrial revolution characterized by manufacturing informatization, intelligence, and service has begun. From the perspective of challenges, under the background of a new round of technological and industrial revolution, the brutal development model of China's manufacturing industry is unsustainable, and it must turn to an innovation-oriented high-quality development model. From the perspective of opportunities, the new round of industrial technological revolution provides a technological and economic foundation for the innovation and modernization of China's manufacturing industry and guides the direction of development. As the world's largest manufacturing country, China must seize the historical opportunity of this technological and industrial revolution, greatly improve the quality of manufacturing development, and accelerate the construction of a manufacturing powerhouse.

The regional economy is also developing towards a positive level

Economic growth in Southeast Asia is expected to climb as global growth weakens, according to the latest forecast from the Asian Development Bank (Asian Bank). This is possible because of the generally stable development environment, heavy investment in infrastructure and industrial restructuring in South Asian countries, which are positive factors that uniquely provide the region with a unique way to attract investment, develop manufacturing, stimulate trade and domestic demand. Opportunity. As one of the most dynamic regions in the world economy, many Southeast Asian countries have increased investment in infrastructure development in recent years, adjusted their industrial structures, and used their advantages to make progress in global value chains.

Singapore focuses on innovation-led economic development; Malaysia seeks to establish regional economic hubs; the Philippines thrives on service outsourcing; Cambodia strives to improve the technological content of manufacturing; These are good illustrations of the economic dynamics of Southeast Asia. The ASEAN Economic Community was announced on December 31, 2015, and a region with a population of over 620 million and a gross domestic product (GDP) of US$2.6 billion offers tremendous opportunities. A study conducted by the Malaysian Ministry of International Trade and Industry showed that as many as 83% of market participants believe that the establishment of the ASEAN Economic Community will have a positive impact. By

reducing trade tariffs and the cost of labour, services and capital flows, the establishment of the ASEAN Economic Community will significantly improve regional connectivity, improve the business environment and attract more investment

Foreign high-end industries join China's manufacturing clusters

Problems such as over-reliance on low-end industries, over-reliance on cheap labor, and over-reliance on resources and the environment have not fundamentally changed, and the innovation capability and motivation to stimulate development are insufficient. China can launch the "Four-for-Three" project to deeply explore the investment potential for transformation and modernization, build economic clusters, and improve the quality and efficiency of economic development. "Four changes" are vacating cages for birds, machines for people, space for land, and e-commerce for markets. "Three names" are famous enterprises, famous products, and famous players. It is also one of the advantages of seeking efficient investments.

The true integration of informatization and industrialization will create opportunities for investment at the geometric level. China should speed up the construction of a national demonstration zone for the deep integration of industrialization and information, encourage enterprises to increase investment in "machine-to-human" and "e-commerce-to-market", and use digitization and intelligence to transplant and upgrade traditional manufacturing.

The focus of machine substitution is to crack the excessive dependence on labor and replace cheap labor with advanced equipment. E-commerce market exchange aims to eliminate over-reliance on traditional markets and actively use e-commerce to expand the market. Enterprises can also promote the deepening of economic transformation, and China must also strive to promote the construction of industrial clusters, focusing on areas such as better location selection, solid industrial foundation, more comprehensive supporting functions, integrated production, and concentration of high-end elements.

The work focus of each agglomeration area is two or three dynamic advanced industries, leading projects and basic projects coexist, and there are also special funding companies, so that the industry is based on continuous innovation, technological progress and profound development of human capital . Investment opportunities in these industrial zones have also increased. The agglomeration area focuses on the introduction of well-known large foreign enterprises, and the landed enterprises receive political support in the fields of land, taxation, finance, science and technology. China needs to explore more investment opportunities and generate greater chemical reactions. Industrial clusters are the greatest space, potential and hope for future economic development. Problems such as over-reliance on low-end industries, over-reliance on cheap labor, and over-reliance on resources and the environment have not fundamentally changed, and the innovation capability and motivation to stimulate development are insufficient.

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The modernization process of Southeast Asia will be accelerated, and the development will be accelerated

The development of manufacturing in Southeast Asia will make institutionalization and modernization affect employees, and then affect society. Advanced systems, such as KPI assessment, will speed up the system development and modernization of Southeast Asian countries.

The Crisis to Come

Cause irreversible damage to the original ecological environment in Southeast Asia

Taking the clothing manufacturing industry as an example, the environmental pollution that clothing can produce can be divided into two categories. The first category is in the process of garment production and processing, namely textile, printing and dyeing, printing and dyeing wastewater, textile noise, cutting corner waste, etc. (Qiu et al., 2007) According to statistics, the discharge of textile printing and dyeing wastewater accounts for about 35% of the total industrial wastewater discharge. About 600 million to 700 million tons of textile printing and dyeing wastewater are discharged into water bodies in China every year.

Noise is one of the main occupational hazards in the textile industry. It is estimated that the average noise of textile workshops is around 100dB(A), which not only affects the quality and efficiency of textile factory production, but also seriously harms the health of textile workers, especially the physical and mental health of

pregnant women. severely affected. The second category is the environmental pollution caused by the formation of a large amount of garbage after discarding clothes, especially the formation of chemical fiber clothes. The damage to the environment caused by this kind of pollution is often not environmental governance, but environmental protection can be restored. Cause irreversible damage to the tourism industry in Southeast Asia, which is famous for its environmental landscape.

China's low-end labor force has nowhere to export, bringing a large number of unemployed groups

Oversupply of labor, migrant workers who cannot meet development needs, and an increasingly unfavorable trade environment are the three main reasons for the wave of unemployment. Unemployment is sometimes not caused by the unemployed themselves, but the poor psychological quality of the unemployed may lead to extreme behavior and revenge on society. Unemployment will also stimulate family conflicts, and the divorce rate will also increase. People without jobs will turn their resentment against society and the government to family members, leading to alcoholism, domestic violence, etc. The widening gap between the rich and the poor caused by unemployment will also aggravate social conflicts.

The situation of high salary and low energy will appear on a large scale

With the development of manufacturing in Southeast Asia, the demand for labor will increase, and the resulting labor gap will also increase. In order to make up for the labor gap, high-paying employment will appear. The situation of high salary and low energy will also appear. Because the development of the manufacturing industry is too fast, the development of the education industry and the level of education of the workers are slowly improving.

The transfer of Southeast Asia's manufacturing industry has the risk of insufficient core competitiveness.

At present, the relocation of manufacturing industries to Southeast Asia has brought practical benefits to Southeast Asia, but there is no core technology in these manufacturing industries. In the 1900s, it was possible in China, in the 10s, in Southeast Asia, and in the 20s in Africa. Once the manufacturing industry flees again, Southeast Asia without core competitiveness will face the risk of "collapse" if it relies on the development of the manufacturing industry.

Conclusion

There are many factors for the relocation of manufacturing industries, which can be roughly divided into internal and external factors. As far as China itself is concerned, the first is that China should strive to improve high-end manufacturing strategically. The second is to focus on and encourage the upgrading of low-

end manufacturing. The third is to reduce China's industrial support costs and optimize the environment for industrial development. In the future, the relocation of China's manufacturing industry will continue to develop to a certain extent. Chinese companies and the government should follow this trend, and China should pay attention to the prospect of transferring low-end manufactured goods in Southeast Asian and African markets. Southeast Asia, as my country's profound strategic economy, is the threshold for China to become a world power. In fact, China and ASEAN took the lead in establishing a free trade area. China is the main source of ASEAN's surplus, and the industry has also formed a trend of taking China as the leader.

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The Impact of the Sino-US Trade War on the Sustainable Development of China's Industrial Supply Chain – Empirical Study based on Data from 2018 to 2019

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Abstract

This article examines the economic impact of the Sino-US trade war on China and the US by studying its effect on several companies and analyzing changes in macroeconomic indicators. Time series analysis is used to compare the actual situation of selected enterprises with the forecasted situation to determine the positive or negative effects of the trade war. Linear regression analysis is used to compare changes in China's macroeconomic indicators before and after the trade war began. The study finds that the growth rate of China's GDP has increased to some extent after the start of the trade war, while the US consumer index has declined due to increased tariffs on industrial and agricultural products. The supply of base currency has also fluctuated more since the start of the trade war. The study analyzes the stock trends of various industry sectors, including steel, chemicals, communication equipment, biotech, trade, electronics, pharmaceuticals, banking, and logistics, and finds that the trade protection of individual companies has a positive impact due to tariffs, but the industry sector is still negatively affected. Linear regression analysis is used to analyze US macro data, which shows that after the trade war broke out, the growth rate of US imports of goods and services slowed down, inflation rose slightly, government savings decreased, and the growth rate of GDP increased.

Keywords: Sino-US Trade War, Macro economy, Time series, Industry shock

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Introduction

Research Background

The integration of the world has made the global economy show a trend of integration, and economic globalization has also accelerated the process of trade liberalization, resulting in the development of the economies of all countries are closely linked. China is the largest developing country in the world, and the United States is the largest developed country in the world. Sino-US economic and trade relations are not only of great significance to the two countries, but also have a decisive impact on the stability and development of the global economy. Since the establishment of diplomatic relations between China and the United States, bilateral economic and trade relations have continued to develop, and the intersection of interests has continued to increase, forming a close cooperative relationship. At the same time, due to the different economic development stages and economic systems of China and the United States, there are bound to be economic and trade frictions and differences in management and control, which also planted hidden dangers for Sino-US trade relations. Until March 22, 2018, the Trump administration announced the imposition of $50 billion in tariffs on Chinese goods, and the Sino-US trade war officially kicked off.

On March 22, 2018, the Trump administration announced that it would "impose $50 billion in tariffs on Chinese goods and impose investment restrictions due to intellectual property infringement issues." In response to this, China actively responded with a clear attitude and resolutely safeguarded China's national interests. (ASIA PACIFIC Responding to Trump, China Plans New Tariffs on U.S. Goods March 23, 2018) Many scholars believe that the Sino-US trade war has officially started. It was not until March 7, 2019 that the two sides announced a temporary suspension of tariff increases after consultations that the Sino-US trade war came to an end. This article takes the Sino-US trade war as the background to discuss the impact of the Sino-US trade war on the economies of both sides. Apply the method of time series to conduct research, and provide experience for subsequent researchers.

Sino-US Trade War History

On March 22, 2018, the Trump administration announced that it would "impose $50 billion in tariffs on Chinese goods and impose investment restrictions due to intellectual property infringement issues." On April 4, 2018, the U.S. government released a list of goods subject to additional tariffs, which will impose a 25% tariff on 1,333 Chinese imports worth $50 billion. On April 5, 2018, U.S. President Trump asked the Office of the U.S. Trade Representative to impose additional tariffs on $100 billion of Chinese imports based on the "Section 301 investigation." At 00:01 on July 6, 2018 (12:01 on the 6th, Beijing time), the United States began to impose 25% import tariffs on 818 categories of Chinese goods worth US$34 billion on the first batch of lists. On July 10, 2018, the U.S. government announced a list of additional tariffs on China, planning to impose 10% tariffs on about US$200 billion of Chinese products, including seafood, agricultural products, fruits, daily necessities and other items. On August 2, 2018, the United States Trade Representative stated that it plans to increase the tax rate from 10% to 25%. On August 23, 2018, the United States imposed a 25% tariff on $16 billion of products imported from China under the Section 301 investigation. On February 24, 2019, U.S. President

Trump announced that he would postpone the plan to raise tariffs on Chinese goods exported to the United States on March 1. On March 7, 2019, after consultations, the two sides announced the temporary suspension of tariff increases. (Lei, 2019)

Reasons for the Sino-US Trade War

China believes that the United States is forcing trading partners to open their markets and surrender economic benefits through trade wars or the threat of launching a trade war. In order to maintain its hegemonic status in the world, the United States has always guarded against China, which has a rapidly developing economy. From the perspective of maintaining its global hegemony, the United States has criticized China's development mode The United States believes that China is the country with the largest goods trade deficit in the United States, accounting for 48% of the US goods trade deficit. The stabilization of Sino-US trade relations and the decline in US manufacturing jobs occurred at the same time. Therefore, Trump simply In the "employment" objective function, China is the most important target, and trade protectionism is the most important means. Trump expects his team to take tough trade protection measures, especially against China. The British media published an article, which believed that the reason for the Sino-US trade war is that there is unfair competition in trade between China and the United States. If the two sides impose tariffs on each other, the United States will suffer more serious losses. (Cai et al., 2018; Li, 2018)

Research Questions

This article studies the Sino-US trade war and raises the following questions

1. Which industries in China have a positive impact under the Sino-US trade?
2. What is the negative impact of the Sino-US trade war on Chinese industries?
3. What is the impact of the Sino-US trade war on the United States?

Literature Review

Chinese Scholars' Comments on the Sino-US Trade War

Viewpoint 1: China wants the US to relax export controls on high-tech products

There are new variables in the relationship between China and the United States. The United States is very concerned about China's trade deficit, exchange rate manipulation, intellectual property protection, and service market opening. China attaches great importance to the review of foreign investment in the United States, the export of high-tech products, and the investigation of surrogate countries. The United States is very concerned about the opening of the Chinese market and requires the full opening of China's service industry. China hopes that the United States will get rid of the Cold War mentality and relax the export control of high-tech products to China. By deepening Sino-US economic and trade cooperation, the cooperation bond between China and the United States will be narrowed. The article finally explains that deepening reform and opening up will continue to create space for the United States to seek cooperation.

Viewpoint 2: China can bear the short-term impact of friction

The reason for the Sino-US trade war is the changes in the domestic political and economic structures of the two countries. Facing the severe situation of the trade war, it must be clear that China and the United States will not move towards full-scale confrontation. In the face of the impact and impact of the Sino-US trade war, we must seize the initiative and promote peace through war in order to better handle Sino-US trade frictions. Sino-U.S. trade frictions will lead to a new pattern of Sino-U.S. cooperation. The economic and trade relationship between China and the U.S. is not a zero-sum game, but interdependent. While relying on each other, China's trade dependence on the United States is gradually declining. The article concluded that in the Sino-US trade friction, China can bear the short-term impact of the friction. (Hufbauer & Jung, 2020)

Viewpoint 3: Sino-US trade drives the Chinese and US economies

Yuan (2018) pointed out that the United States has continued to dispute China's trade expansion, and China is facing a sharp increase in the danger of trade friction. Sino-US trade has improved the purchasing power of American consumers and at the same time enhanced the competitiveness of American companies. Sino-US trade has enhanced the purchasing power of American consumers. The ever-expanding imports of Chinese products in the United States not only increase the diversity and choice of final consumption and intermediate products in the United States, but also reduce prices. Sino-US trade has enhanced the competitiveness of US companies. Among them, the fastest-growing industries in the US are imports of computers, electronic equipment, transportation equipment and chemical products with high added value from China. Free trade is the source of economic prosperity for both China and the United States, and the emergence of a trade war will make American consumers bear high prices. Therefore, the development of Sino-US trade has driven the rapid rise of the Chinese economy and the US economy.

Viewpoint 4: Sino-US trade should be resolved under the WTO framework

Zhang (2018c)'s research pointed out that the biggest feature of global trade is the strong recovery since the financial crisis. From the perspective of the recovery region, Asia and North America have achieved recovery with the help of the strong economic momentum of China and the United States. In the process of economic recovery China and the United States are the source of power. Not only in the field of trade, China and the United States have also played a leading role in other industrial fields. For example, the recovery of the manufacturing industry has driven a significant increase in the exports of primary product countries (resource countries). Although the trade structure between China and the United States is very complementary, from the perspective of the situation and trend, China is moving towards the high end of the entire industrial chain. Labor-intensive consumer goods are gradually shifting to electronic consumer goods, machinery and equipment, and then gradually to higher-end products. The direction of precision manufacturing is upgraded. The Sino-US trade war is not limited to the trade conflict between China and the United States, it will have a very big impact on American multinational companies and consumers. Multinational companies are an absolute leader in the global value chain, accounting for 80% of the overall international trade. For the world's largest 100 multinational companies, their overseas operating income is much higher than their local operating income. This paper finally points out China's position in the global value chain, and it should unite more trading partners

and global value chain partners to put Sino-US trade issues under the WTO framework or the multilateral framework, rather than under the bilateral framework.

Viewpoint 5: Trade wars are countercurrents to globalization

Today's world situation is undergoing profound and complex changes, geopolitical conflicts are intensifying, and regional focal points and difficult issues arise from time to time; some major countries and regions in the world are experiencing anti-globalization trends, and globalization is in a hesitant stage, facing more uncertainties. (Zhang, 2018a) From the perspective of global economic governance, there are three directions: one is to implement new rules bilaterally instead of multilaterally; the other is to pressure China to manipulate the exchange rate as a breakthrough point; the third is to minimize international responsibilities as a prelude to abandoning climate change.

Viewpoint 6: Trump promotes new trade protectionism

Trump proposed to focus on improving people's employment and welfare, and implement two doctrines at the same time, implementing "new" liberalism in the United States and promoting "new" trade protectionism internationally. The U.S. measures against China are to call on the American people not to buy Chinese products; to pass the U.S. Free and Fair Trade Act; to strengthen global coordination and cooperation to deal with China. And discourage American companies from investing in China; prevent some Chinese companies from acquiring or raising funds in the United States; strengthen monitoring and review of China; strengthen the control of the United States over high-tech fields.

Ultimately, it is necessary to actively communicate with the Trump administration and think tanks in multiple ways, and strengthen cooperation with the EU in global governance.

Viewpoint 7: China and the United States cooperate to stabilize the international economy

Many scholars pointed out that the international economy can be stable only when China and the United States cooperate (Zhu, 2018 ; Zhang, 2018b). Scholars used a combination of qualitative and quantitative research methods to analyze from the perspectives of the United States, China, and comprehensive aspects. The results showed that the growth rate of GDP in the United States The rate has a significant negative correlation with the US anti-dumping against China. There is a significant positive correlation between the US's import dependence on China, China's export dependence on the US, the real exchange rate growth rate of USD/RMB and the US's anti-dumping against China. It is also believed that the development of Chinese manufacturing has benefited from the dividends of economic globalization. Under the global value chain division of labor, Made in China relies on the accumulation of high-quality human capital, increasing technological advantages and government support to make full use of comparative advantages to gain international competitive advantages. The development of Chinese manufacturing in terms of quality and quantity has had a great impact on the United States. As the largest developing country and the largest developed country in the world, the two countries need more wisdom to get along with each other. Only when the two sides adhere to the path of win-win cooperation can the international economic structure be guaranteed to be stable. Some scholars have also pointed out that the main research object is the Sino-US trade relationship to study the impact of the Trump administration’s 25% global tariff on imported steel through the “232” investigation on

China. They use the GTAP model to quantitatively simulate the impact of the impact of US steel tariffs on China. By comparing four different simulation scenarios, they try to give China an effective strategy to deal with the US trade war (Jiang & Gao, 2018; Radar, 2018).

Viewpoint 8: The impact of the Sino-US trade war on China is not as good as Trump expected, but it has a great impact on Asia

Since March 22, 2018, the United States has started a trade war with China. Many researchers at home and abroad have begun to pay close attention to it. The focus is on the intention of the United States to launch a trade war against China and the impact of the Sino-US trade war on China and the United States. Research. First of all, the outbreak of conflicts in the Sino-US trade war is divided into economic conflicts, political conflicts, and civilizational conflicts (Bloomburg, 2018), and there is also a trend from a situation of one superpower to multi-polarity in today's complex and changeable world economic pattern Gradually deepening, the U.S. hegemony is gradually threatened by reasons (Zhou, 2019). The second is to study the impact of the trade war on both sides. The impact on the United States is that the short-term economic impact is likely to be unevenly distributed in the global market. The impact on China would be much less than President Trump imagined, but the collateral damage to regional economies in Asia could be significant (Bloomburg, 2018). The third is to study China's strategy to deal with the United States' violation of WTO rules. It should pay equal attention to economic counterattack and reform, strengthen the role of the market in the system, firmly promote the rise of major powers, and promote the integration of civilizations. Prepare for struggle, for a full-scale systemic response (Bloomburg, 2018). Finally, China must safeguard its own interests and promote mutual benefit and common development between the two countries, in order to maximize the interests of countries that seek peaceful development of trade exchanges (Zhou, 2019)

International Scholars' Views on the Sino-US Trade War

The international scholars have different views in the research, let us summarize below.

Viewpoint 1: Sino-US trade brings huge supply-side benefits to both sides

It is stated in the paper that although the two-way trade is orders of magnitude larger than that predicted by my country's financial department in the 1970s, due to the economic scale of the United States and China, the two-way trade is still far below its potential scale. Expanded trade brings significant supply-side benefits to both parties through comparative advantage, economies of scale, reduced markups, and faster adoption of best practices by lagging firms. (Hufbauer & Jung, 2020)

Viewpoint 2: The Sino-US trade war will cause the US to lose the spillover effect of technological innovation from China

Theodore et al. (2012) study shows that Chinese companies operating in the United States pay higher wages and conduct more investment, research and development than ordinary American companies. As China rapidly evolves from a technology imitator to a technology innovator, the United States will forego possible spillover benefits from the local presence of top Chinese companies. Only an ultra-nationalist can believe that American companies will remain best-in-class in every aspect of technology for the next two decades.

Viewpoint 3: The Sino-US trade war is the biggest threat to the world economy

Frenkel (2018) pointed out that the Sino-US trade war is the biggest threat to the world economy today. And now it's not a war just a friction he reminds of the disaster of 1931 A well-intentioned measure to protect America became a catalyst for a world war (Wiki: 1931 Hoover meddling in dollar prices. US economic policy has turned radical and interventionism.) The world is interdependent and connected. He sees bilateral deficits as irrelevant and tariffs as a terrible tactic and worries about calls for protectionism. Language should not be used to start a trade war, but to make the other side assume more international responsibilities. China is the most or second most important trading partner of many countries, and at the same time, he supports Trump's other policies, arguing that the reduction of tax rates and deregulation have received a good response from the business sector. (Bu & Mao.G2019; Shi, 2018)

Viewpoint 4: Sino-US trade should return to the WTO

Flassbeck (2018) argues that on one level, Trump's measures are right, although on the other side they seem offensive and criminal. The current economy is already in the midst of a global trade war, which is a new field opened by Trump. Pressure is exerted by trade deficit countries on trade surplus countries. He cites the example of Germany, where large trade surpluses are not a normal part of free trade, and France and Italy, which have large trade deficits. Bilateral deficits between China and the U.S. have escalated the trade war, with the U.S. devaluing the dollar and China taking countermeasures. Countries have to adjust to make trade more balanced, returning to WTO is a good idea, although it has many problems that make the exchange rate undervalued.

Viewpoint 5: The United States takes a tough attitude towards the Sino-US trade war, but China's attitude tends to be more relaxed

Ian Arthur Bremmer (Tan, 2018) pointed out that China has a considerable emerging market, but it is obviously not a developed country. In recent decades we have seen the center of the game move eastwards, not only China but also India and other parts of Asia. Some easing in the Chinese economy is a pretty good move. China believes that its holdings of assets are growing, which puts pressure on the United States. It is a friendly signal that China has reduced its foreign exchange reserves and devalued the dollar in an attempt to restart negotiations. Showing that they are concerned about being accused of currency manipulation and want to maintain some stability. They see Trump not caring about their allies as an opportunity, so they try to play a greater leadership role. He thought they could get Trump to compromise, but they couldn't. Trump will have a hard time striking a deal with China, as his advisers lean toward a tougher stance on Chinese trade. The reason they want free trade in North America is that they want to have a tough attitude towards trade. He got it from Mexico and Canada, but China is huge, and Europe and the United States cooperate more.

Brief Conclusion from Reviewed Article

Through reviewing the literature, it is found that scholars believe that launching a trade war is not a rational thing, and that China and the United States should cooperate with each other. The trade war will not only affect the economies of China and the United States, but also affect other countries. national interest. It can also be seen that not all opinions are inclined to either side of China and the United States, and they

believe that there is no advantage to the economic development of China and the United States, so we still hope that China and the United States can cooperate with each other, develop together, and benefit each other. in order to maximize the national interest. Therefore, this article will use the latest data based on the relevant theories and methods of previous studies, combine relevant theories with empirical evidence, discuss the economic impact of the trade war between China and the United States on both sides, and draw objective and fair conclusions and give Make useful suggestions.

The impact of the Sino-US trade war on China and United States

Research question: How has the US-China trade war affected the US?

1. Which industries in China have a positive impact under the Sino-US trade?
2. What is the negative impact of the Sino-US trade war on Chinese industries?
3. What is the impact of the Sino-US trade war on China's macro economy?

What is the impact of the Sino-US trade war on the United States?

Assumptions1:

H1: The Sino-US trade war has a negative impact on the growth rate of US imports of goods and services

Since the Sino-US trade war, China has repeatedly raised export tariffs to the United States in response to the new US tariff policy, inferring that US imports of goods and services will be negatively affected.

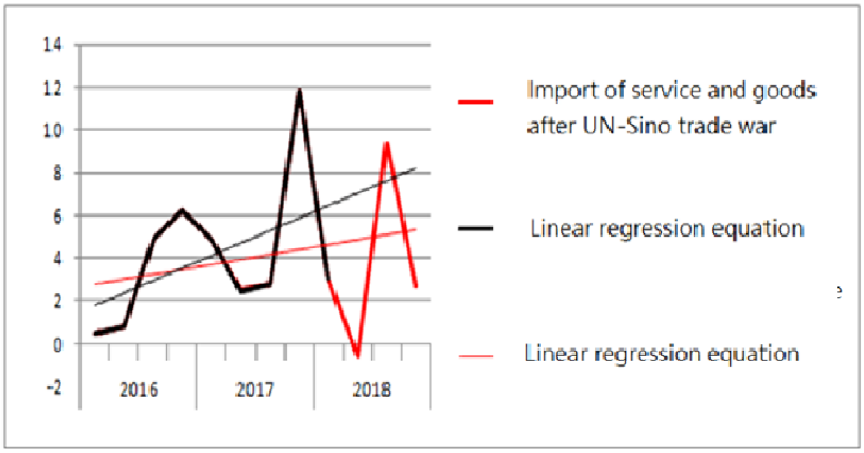

Figure 1 Comparison of the growth rate of US imports of goods and services after the Sino-US trade war

Table 1: The formula for comparing the growth rate of US imports of goods and services after the Sino-US trade war

Classification	linear equation	R^2
Before the US-China trade war	y = 0.585x + 1.219	0.218
Before and after the Sino-US trade war	y = 0.236x + 2.524	0.054

The Figure 1 and Table 1 to show that the growth rate of imports of goods and services in the United States has fluctuated greatly over the years. The growth rates of imports of goods and services in the United States before and after the Sino-US trade war were analyzed by linear regression, and the Sino-US trade war The growth rate slowed down after that happened. Because of the Sino-US trade war, the growth rate of goods and services has significantly decreased and fluctuated, and the linear regression has been significantly pulled away from the original trend, resulting in a low R2. hypothesis is valid.

Assumptions 2:

H2: The Sino-US trade war has a negative impact on the growth rate of US GDP

During the Sino-US trade war, China has repeatedly raised export tariffs to the United States. At the same time, the increase in tariffs by the United States has had a certain negative impact on local importers. It is inferred that the growth rate of the US GDP will be negatively affected.

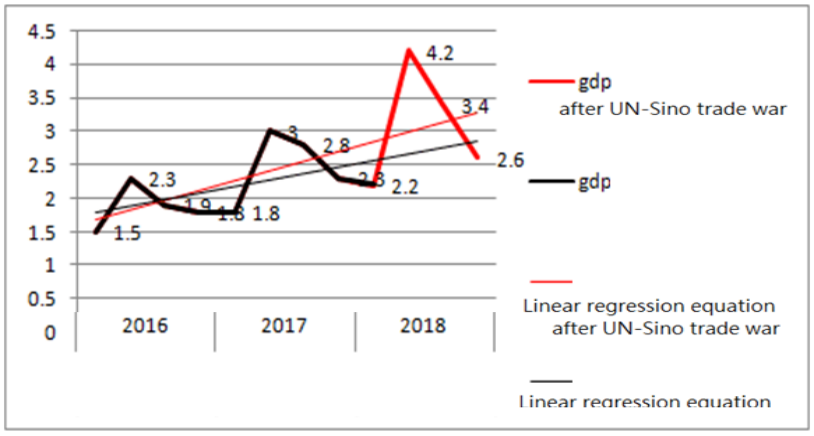

Figure 2 Comparison of US GDP growth rates after the Sino-US trade war

Table 2 Comparison formula of U.S. GDP growth rate after the Sino-U.S. trade war

Classification	linear equation	R^2
Before the US-China trade war	y = 0.096x + 1.694	0.292
Before and after the Sino-US trade war	y = 0.144x + 1.542	0.457

The Figure 2 and Table 2 show that the growth rate of the GDP of the United States has fluctuated greatly over the years, but the volatility has changed significantly after the Sino-US trade war. Linear regression analysis was performed on the growth rate of the U.S. GDP before the Sino-U.S. trade war and after the Sino-U.S. trade war, and it was concluded that the U.S. GDP growth rate after the Sino-U.S. Trade war US GDP growth rate. Hypothesis does not hold

Assumptions 3:

H3: Inflation will rise after the Sino-US trade war

In the Sino-US trade war, China has repeatedly raised export tariffs to the United States, and the United States has repeatedly raised tariffs to China. There will be fewer cheap imports in the United States, inferring that inflation will rise after the Sino-US trade war.

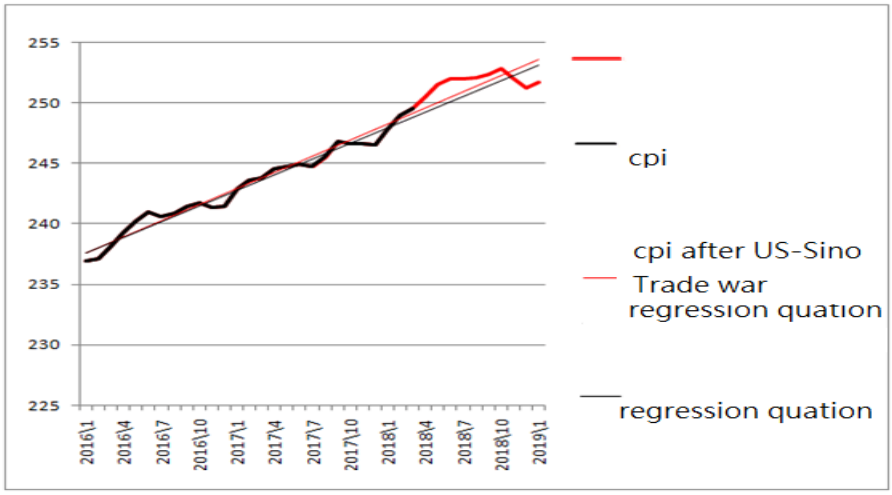

Figure 3 Comparison of US consumer price index after the Sino-US trade war

Table 3 Comparison formula of U.S. consumer price index after the Sino-U.S. trade war

Classification	linear equation	R^2
Before the US-China trade war	y = 0.432x + 237.2	0.972
Before and after the Sino-US trade war	y = 0.444x + 237.1	0.970

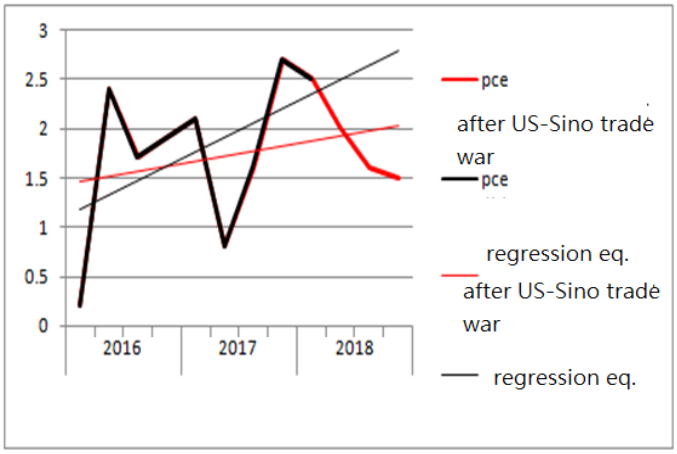

Figure 4 Comparison of the growth rate of the U.S. personal consumption expenditures price index after the Sino-U.S. trade war

Table 4 Comparison formula of US personal consumption expenditure price index growth rate after the Sino-US trade war

Classification	linear equation	R^2
Before the US-China trade war	y = 0.146x + 1.033	0.240
Before and after the Sino-US trade war	y = 0.051x + 1.413	0.069

The data showed that the consumer price index showed a steady upward trend, while the growth rate of the personal consumption expenditures price index changed drastically. Linear regression analysis of the U.S. consumer price index before the Sino-US trade war and after the Sino-U.S. trade war showed that there was no significant change in the U.S. consumer price index. The linear regression analysis of the growth rate of the US personal consumption expenditures price index before the Sino-US trade war and after the Sino-US trade war respectively shows that the growth rate of the US personal consumption expenditures price index has a significant decline. The market inflation rate reflected by Cpi has no significant change, while the potential inflation rate reflected by pce has a slowing down trend. After the outbreak of the Sino-US trade war, due to the sharp decline and fluctuation of the personal consumption expenditure price index, the regression linearity was significantly pulled away from the original trend, resulting in a low R^2. Hypothesis does not hold

Assumptions 4:

H4: The Sino-US trade war has a negative impact on the net saving growth rate of the US federal government

Tariff policies may lead to an increase in U.S. government spending, while the Sino-U.S. trade war has reduced the confidence of many investors in U.S. Treasury bonds. Infer a negative impact on US federal government net saving.

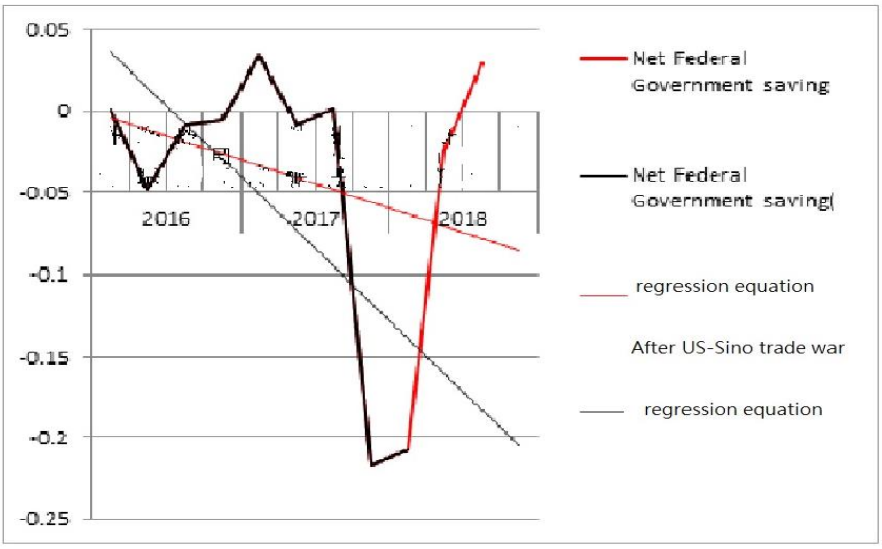

Figure 5 Comparison of net savings growth rates of the US federal government after the Sino-US trade war

Table 5 Comparison formula for net savings growth rate of the US federal government after the Sino-US trade war

Classification	linear equation	R^2
Before the US-China trade war	y = -0.021x + 0.058	0.509
Before and after the Sino-US trade war	y = -0.007x + 0.002	0.078

The Figure 5 and Table 5 show that the growth rate of net savings of the US federal government is in an upward trend. The net savings growth rate of the U.S. federal government before the Sino-U.S. trade war and after the Sino-U.S. trade war were analyzed by linear regression, and the net savings growth rate of the U.S. federal government increased significantly after the Sino-U.S. trade war. Because after the Sino-US trade war broke out, the growth rate of the net savings of the federal government increased significantly, which caused the linear regression line to be significantly pulled away from the original trend, resulting in a low R2. is assumed to be false.

What is the negative impact of the Sino-US trade war on Chinese industries?

It can be seen from the figure that the predicted stock price will start to be higher than the actual stock price, and it will drop sharply around April 2018 to August 2018, and it will be lower than the actual stock price for a long time in September. In order to find out the reason for this phenomenon, Found the US tax increase table for Chinese products

Table 6 Tax collection scale and Proportion of total exports in China

Category	Tax collection scale (100 million U.S. dollars)	Tax collection scale (100 million U.S. dollars)	total US exports	Proportion of total exports(%)	Proportion of total exports(%)	Total tax ratio (%)
1	0	15.5	20.1	0	77.2	77.2
2	0	10.8	15.9	0	67.8	67.8
3	0	0.1	0.8	0	11.4	11.4
4	0	18.5	38.3	0	48.4	48.4
5	0.5	14.1	16.2	3.1	89.8	89.8
6	4.6	98.0	139.5	3.3	73.6	52.1
7	49.7	46.8	185.4	26.8	52.1	52.1
8	0	43,7	68.2	0	64.0	64.0
9	0	35.3	39.9	0	88.6	88.6
10	0	31.2	41.4	0	75.4	75.4
11	0	40.9	424.5	0	9.6	9.6
12	0	15.8	159.6	0	9.9	9.9
13	0.1	52.5	73.4	0.1	71.6	71.6

	14	0	6.7	35.9	0	18.6	18.6
	15	40.9	123.7	225.1	18.2	54.9	73.1
	16	245.5	1016.4	1985.4	12.4	51.2	63.6
	17	93.9	95.5	196.8	47.7	48.5	96.2
	18	48.1	19.6	108.4	45.2	18.4	63.6
	18	0.4	0	0.8	45.5	0	45.5
	20	16.3	250.9	510.3	3.2	49.2	52.4
	21	0	0.5	0.5	0	96.7	96.7
	22	0	0	13.2	0	0	0
Total		500	2000	4297.6	11.6	46.5	58.2

Among them, Category 1 - Live Animal Products Category 2 - Plant Products: Category 3 - Animal and Vegetable Oils and Fats. Edible Oils and Fats: Category 4 - Food: Beverages, Wine and Vinegar, Tobacco and Products Category 5 - Minerals Products: Class 6-Products of the chemical industry and related industries: Class 7-Plastic and its products: rubber and its products; Class 8-Leather, fur and its products; bags; gut products Class 9-Wood and its products Products: charcoal; cork; knitting products; Class 10 - wood pulp, etc.; waste paper: paperboard and its products: Class 11 - textile raw materials and textile products; Class 12 - shoe finger umbrellas, etc.; processed feathers and Articles thereof: Artificial flowers, articles of human hair; Class 13 - Products of mineral materials: Ceramics: glass and articles thereof; Class 14 - Jewellery, precious metals and articles thereof; imitation jewellery; coins; Class 15 - Metals and articles thereof; Class 16 - Electromechanical audio-visual equipment and its parts and accessories: Class 17 - Vehicles, aircraft, boats and transportation equipment; Class 18 - Optical, medical and other instruments: Clocks and watches: Musical instruments: Class 19 - Weapons, ammunition and their parts; Class 20 - Miscellaneous Products (Furniture, Players, etc.); Class 21 - Artwork, Collectibles and Antiques; Class 22 - Special Trade Items and Unclassified Commodities, Class 15 is Metal.

Which industries in China have a positive impact under the Sino-US trade?

To study which Chinese industries have a positive impact under the Sino-US trade war, we decided to explain through the changes in certain industries in the Chinese stock market under the Sino-US trade war. After analysis, we first have a premise that the Sino-US trade war will affect both sides. Therefore, we began to think about whether such an impact is only negative, so we made a hypothesis: the Sino-US trade war has a positive impact on certain industries in China, so as to find out the industries that have a positive impact , thus proving that the hypothesis holds.

The study started to analyze which industries may have a positive impact under the Sino-US trade war. First of all, I thought of the wine industry, because the Sino-US trade war will have a huge negative impact on domestic enterprises, such as foreign trade companies and logistics companies, so these companies In order to save costs, various measures will be taken, such as layoffs and the like. In this way, the employees will be under great pressure. The old saying goes: one drunk can relieve all worries. Under such pressure, it

happened to be summer at that time. I guess under such circumstances, these stressed people would go to drink at night. Solve the pressure in the heart, so the sales volume of wine will increase, which will be reflected in the stock, and the stock will have a big upward trend.

Next, under the China trade war, the United States will increase taxes on various Chinese export products. After investigation, the United States will increase taxes by 25%-50% on my country's metal exports, so we think Chinese metal traders They will no longer export their own metals, so China's domestic metal reserves will increase a lot. Once the supply increases, the price will drop. At this time, China Railway will not miss such an opportunity, and will definitely buy large quantities of metals with reduced prices Material, the cash flow of China's railways will drop sharply, and after a period of time, after the railway is completed, there will be a huge increase. This can prove that the Sino-US trade war will have a positive impact on China's railways.

Finally, car manufacturing is considered. Since the United States has increased taxes on China, China will not simply be sanctioned. In order to protect its own interests, China will also increase taxes on the goods exported to China from the United States. When exporting to China, the price will also rise. In comparison, Chinese cars will be more competitive with American cars during the Sino-US trade war. The sales of Chinese cars will increase and the stock of cars will rise, which proves that China Under the US trade war, it has a positive impact on the auto industry.

Tsingtao Brewery

In order to verify the conjecture, it is found the stock price data of Tsingtao Brewery, China Railway and Steyr at the beginning of each month from 2014.3.1 to 2018.3.1, and obtained the predicted stock price after 2018.3.1 through the time series analysis in the spss software Trend chart, and then we took out the actual stock price change chart of the three companies from March 1, 2016 to March 1, 2019, and compared the forecast chart with the actual chart.

Figure 6. The impact of Sino-US trade war to Tsingtao Brewery's stock price

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It can be seen from the consolidated chart of Tsingtao Brewery's stock market actual and forecast that under the Sino-US trade war, the actual stock price of Tsingtao Brewery is indeed higher than the predicted stock price. There are doubts about the cause of this phenomenon. The Sino-US trade war is really Will it increase the pressure on the people so that they can hangover and relieve their worries? We found the research of JPMorgan Chase, a credit company. They pointed out that the Sino-US trade war will cause the loss of 5 million jobs in China. The annual change in the employment rate.

It can be seen that the decline in the employment rate in 2017-2018 reached the maximum value of 0.51. According to Maslow's demand theory, these unemployed people cannot meet the most basic survival theory, so the unemployed will have a lot of pressure, and the pressure needs to be released. , so that these people's demand for wine will increase, and the price of Tsingtao Beer is not high compared to other wines. These people who have no financial resources will choose Tsingtao Beer with a low value, which will lead to the turnover of Tsingtao Beer Soaring and the stock price will rise at the same time.

In the same way, put China Railway Construction's forecast and actual stock price together.

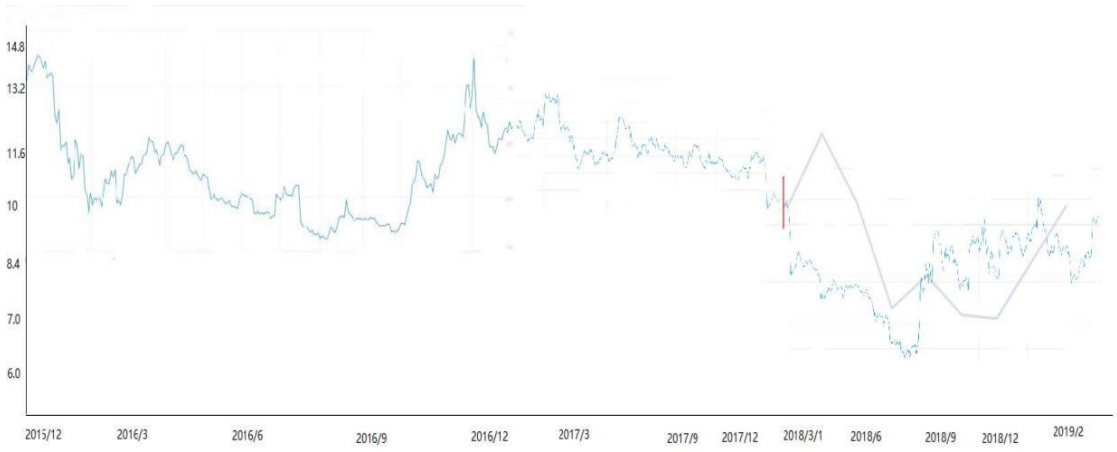

Figure 7 The impact of Sino-US trade war to China Railway Construction's stock price

China Railway Construction

After 2 rounds of tax increases, use China has to pay 70% more taxes on metals exported to the United States, which will increase the supply of metals in the domestic market. The increase in supply will reduce the price. China Railway Construction will take the opportunity to hoard cheap metals. This approach makes China Railway Construction in China and the United States. At the beginning of the trade war, the stock price will drop, and after a period of railway construction, the stock price will rise rapidly, which also verifies the conjecture that China Railway Construction was chosen at the beginning.

Steyr

Finally, look at Steyr's forecast and actual stock price forecast.

Figure 8 The impact of Sino-US trade war to Steyr 's stock price

The figure 8 shows that the forecast and the reality did not change much at the beginning, but the stock suddenly rose from July 2018 to August 2018. This reminds me of the previous view that the United States will increase taxes on goods exported from China to the United States. China will also take corresponding measures to counter the United States to protect itself, so I found the official document issued by China.

The official document clearly stated that China will increase tariffs on American cars on July 6, 2018, and increase tariffs by 25% on the original basis. American car manufacturers will naturally reduce car exports to China. The competitiveness of the company will be improved, which will have the effect of rising stocks, which explains why the stock price has risen after July 2018.

Through the time series method, the forecast and actual comparison of the stocks of Tsingtao Brewery, China Railway Construction, and Steyr, according to the data, it can be seen that under the Sino-US trade war, the stocks of these three companies have all risen to varying degrees, which proves that The initial hypothesis: The Sino-US trade war has a positive impact on certain industries in China.

Conclusion

1. China and the United States should establish an early warning and response mechanism for foreign economic and trade frictions, including complaints and responses. In accordance with the relevant provisions of international law, submitted to the WTO Dispute Settlement Body. Actively communicate with the World Trade Organization, proceed from the overall international situation, and avoid pan-politicization of trade frictions with other countries and regions. In the case of escalating trade frictions, multilateral trade negotiations and consultations should be actively strengthened, and the most effective bilateral or multilateral solutions should be sought through the World Trade Organization.

2. China and the United States should continue to open up to the outside world. When developing international markets and investing abroad, free trade agreements should be the basis, and the opening-up strategy should not be affected by trade frictions and conflicts. There should be deeper participation in the World Trade Organization Comply with the trend of global economic development and the new opening-up strategy of the changing situation between China and the United States, expand opening up, expand the

international trade market, cultivate new momentum for foreign trade development, and benefit other countries to share the fruits of international trade.

3. This trade war has exposed the problems of the industrial chain between China and the United States. The technical shortcomings of China's high-tech industry have also exposed the irrational structure of China's foreign trade import and export, with a large proportion of commodity trade and a serious shortage of service trade. In this regard, China should further promote the opening of the service industry, expand productive service trade, and expand emerging service trade; play its strengths in international trade, and encourage financial services, insurance services and other knowledge or capital-intensive industries to go out; for computers and information Actively cultivate comparative advantages in knowledge- and technology-intensive industries such as service, bioengineering, and medical services, and provide policy support for these industries to participate in international trade. The United States should continue to maintain an open and friendly relationship with China, which is beneficial to both parties.

A new type of opening strategy, expanding opening up, expanding the international trade market, cultivating new momentum for foreign trade development, and benefiting other countries to share the fruits of international trade.

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Talent Cultivation in Software Service Supply Chain - Taking India as an Example

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Abstract

The purpose of this study is to explore talent development in the software service supply chain, taking India as an example for discussion. This study was conducted concerning India has reputation on its excellent achievements in the field of software services. The main questions of this study mainly discuss the following: 1. What are the contents of the software service supply chain? 2. What capabilities should software service talents have? 3. What are the complete software service courses? And 4. What are the characteristics and advantages of India in cultivating software service talents? This research adopts the method of expert interview to carry out the research of this paper. During the research period, a total of ten people including five industry professionals and five university teachers were interviewed. The understanding of India is interpreted through the collection of public information and the conclusions of expert interviews. The results of this study show that the complete software service talent supply chain includes online personnel and product service personnel. Depending on the difficulty of the program, the service personnel need to have different levels of program service capabilities. This research also designs the basic courses required for cultivating software service talents at this stage. As for why India can occupy a place in the software service industry, it should be attributed to the way of education in India and the unique thinking habits of Indians.

Keywords: Talent Cultivation, Information Service, Indian Education, Service Supply Chain, Software Service

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Introduction

Composition and Value Chain of Information Products

The concept of value chain was first proposed by Michael Porter in 1985. (Porter, 1980; Porter & Kramer, 2011). Originally, the value chain Porter was referring was primarily aimed at vertically integrated firms, emphasizing the competitive advantage of individual firms. With the development of international outsourcing business, Porter further proposed the concept of value system in 1998, extending the research perspective to different companies, which is similar to the concept of global value chain that emerged later, have something in common (Kaplinsky, 2000; Pandey, et al. 2004)

Later, Kogut (1985) also put forward the concept of value chain, and his view reflects the relationship between the vertical separation of value chain and the reconfiguration of global space more than Porter's view. In 2001, Griffin put forward the concept of global value chain when analyzing the problem of international division of labor and industrial linkages on a global scale. The concept of global value chains provides a network-based analytical method for analyzing the geographic and organizational characteristics of international production, revealing the dynamic nature of global industries (Fu, 2013; Tsai, 2021)

The production of information products is also processed through a series of division of labour and industrial links. The simplest division is to divide it into two parts: hardware and software. Hardware refers to the physical part that has an image, while software refers to the system that causes the hardware to operate. This is mainly the computer program and human-machine interface. In the past, because only the appearance of the body was seen, it was often overlooked that the software was the main part that made the hardware work. And because the soft body is invisible and intangible, people who don't understand it can't put a beak on it. In addition, the entry barrier to making soft works is also high, which makes many people discouraged.

To extend the concept of division, the value chain of information products is also composed of hardware and software. The value-added activities of the value chain can be divided into basic value-added activities and auxiliary value-added activities. The basic value-added activities of an enterprise, that is, the "production and operation links" in the general sense, such as material supply, finished product development, production operation, finished product storage and transportation, marketing and after-sales service. These activities are directly related to the processing and circulation of commodity entities. The value of software services is mainly the value-added part that promotes the multiplication of information products.

Cultivation of Software Service Talents

Since the function of software is to promote the rapid value-added of information products, the cultivation of software service talents becomes very important in the field of high-tech. How to cultivate good software service talents is the most important issue in the high-tech industry.

From the perspective of today's software service field, there is no doubt that India plays a very important role. Indians account for a large proportion either in software service industry or an individual software enterprise. Why does India have such good achievements? If other countries want to catch up, what are the factors that must be learned? These are the answers worthy to know (Arora & Bagde, 2010; Humphrey, 2004).

Research Questions

This research will focus on the following four parts:

1. What does the supply chain of software services include?
2. What abilities should software service talents have?
3. What does the complete software service course include?
4. What are the characteristics and advantages of India in cultivating software service talents?

Innovation and Contribution of this Research

Due to the fierce competition in the high-tech industry, how to maintain a competitive advantage in this rapidly changing world depends on continuous innovation and improvement. Therefore, this study discusses the core competitiveness of the software service supply chain and the cultivation of software service talents. In addition, this study also discusses what are the main reasons why India has a place in the software service industry? (Zhang & Feng, 2018; Mani, 2013)

Literature review

Contents of the Software Industry

The software industry has always been classified into confusion. The Internet Lab has combined the product characteristics, technical characteristics, market characteristics and historical development characteristics of software to synthesize the above table. The entire software product is divided into four categories: (Patibandla & Petersen, 2002)

1. Hardware + embedded application software
2. Hardware + operating system + general application software
3. Hardware + operating system + basic software + general industry application software
4. Hardware + operating system + basic software + business basic software + complex industry application software

It basically summarizes the entire process and course of the evolution of the software industry from the primary stage to the advanced stage in four categories. Moreover, it must be pointed out that the emergence of each high-level stage does not simply replace the original low-level stage, but various stages coexist at the same time, and each of them is developing rapidly. Therefore, this map also represents the current (including the near future) of the software industry in its entirety.

From the first to the fourth category, there are obvious changes:

- The software integration degree increases, and the application complexity increases;
- Increased value-added space and enhanced personalization;
- The development cost increases and the competition barrier increases;
- The organic degree of informationization increases, and the value generated by applying it increases.

Of course, from another point of view, the versatility is reduced, the number of users is reduced, and the number of competitors is reduced.

The Value of the Software Industry

The software industry is the core of the information industry and the basic and strategic industry of the information society. The software industry can not only create considerable economic benefits, but also play an important role in promoting the adjustment and optimization of the economic structure, the transformation and upgrading of traditional industries, and the building of a well-off society in an all-round way due to its strong penetration and radiation effect. and the "multiplier" of social development (Guan, 2001).

The software market is mainly divided into three parts: software services (writing software for one customer, no intellectual property rights), software products (compiling software, selling it to many customers, and having its own intellectual property rights) and self-sufficient software (enterprises apply for themselves or Open software for its own supporting products). Generally speaking, the so-called software industry mainly includes the first two parts. Although the number of programmers employed in the third part is not lower than the sum of the first two categories, but because their labour products are not used for trading or direct use. Buying and selling is therefore generally not included in the scope of the industry. But when the bubbles pop, how to calculate becomes an art.

There are at least the following ways to calculate software revenue:

1. Software product × (water exchange coefficient)
2. (software product + software service) × (water exchange coefficient)
3. (software product + software service + self-sufficient software) × (water exchange coefficient)
4. (software product + software service + self-sufficient software + hardware income) × (water exchange coefficient)
5. (software products + software services + self-sufficient software + hardware income + real estate income and other income) × (water exchange coefficient) (Fubon Securities, 2002, January)

The History of Software Service Education

Taiwan's Ministry of Education calls the new generation of software education courses the "Smart Innovation Cross-domain Talent Cultivation" program, which includes: (Ministry of Education, 2022)

Smart Innovation Micro Program

New-type digital talent development model

These include

1. Smart perception and interactive experience
2. Big data analysis (data science)
3. E-commerce financial technology
4. Cultural creativity and multimedia.

It can be seen that the development of software services will keep pace with the times. It must also cooperate with the surrounding products.

Software Service Supply Chain

The software service industry can be divided into application/system software design and development, system integration services, data processing services, channel distribution and other industries. Application/system software design and development companies are engaged in application software in various fields, system integration service providers are responsible for the integration of hardware and software services and technical services, e-commerce is the use of the Internet to conduct business transactions, and data processing service providers are Provide database information establishment, retrieval and analysis services, website hosting and other related businesses, channel distributors are engaged in various software agency sales business (Saraswati, 2012).

Research Methods

Expert Interviews

To conduct an interview with experts, first give them an open-ended questionnaire, including the following questions:

1. What do you think the content of the software service supply chain should include?
2. What do you think the software service course should include?
3. What do you think are the advantages of the Indian education system in software services?

Fuzzy Evaluation Method

After opening the questionnaire, through the method of fuzzy questionnaire, it is decided which courses should be introduced in the software service.

Results and Discussion

What is the Content of the Supply Chain of Software Services?

The contents of the software service supply chain are as follows:

Application/system software design and development

Application/system software design and development companies mainly develop specific application/system software in accordance with the operational needs of customers. There is application software developed according to specific industries, such as finance, medical care, and distribution; or special application software developed according to software functions, such as Business Intelligence (BI), Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Information Security, etc.

System Integration Services

System integration service providers build software and hardware according to customers' specific operational needs. Their services range from front-end planning, design, execution, overall project management, consulting services, and integrated information system services. Most of the system integration service projects include different platforms and technologies, such as system and customized application development and integration of existing application software. Due to the high degree of customization of system integration projects, a contract must be established for each project. This defines the specifications of the solution and the output performance of different levels. The final project output is a complete system, which can meet the purpose and technical specifications of the project definition.

Data processing services

Data processing services refer to data backup, restoration, data duplication backup, and provision of website hosting services. Because the computer system is composed of many components, the failure of any one component may lead to data damage or loss, which will destroy the long-established data. Therefore, data processing services are a necessary part of maintaining enterprise information security, and due to the demand for information security, market opportunities for solving enterprise information security solutions are driven; as enterprises gradually become electronic, the product and service ecosystem of the information security system is gradually increasing. With the difference between emerging technologies and emerging scenarios, in the future era of cloud computing, 5G and the Internet of Everything, firewalls, user and physical device behaviour analysis, endpoint detection and response, information security coordination, automation and response, Network traffic analysis and other related technologies, with different scenarios such as cloud computing, 5G, Internet of Things, big data, Internet of Vehicles, Metaverse, and industrial control, have quite different information security practices. It is estimated that it will drive a new wave of Information security technology development and market opportunities.

Channel Distribution

Channel distributors provide packaged software sales, including commercial software, development software, office application software, etc. for domestic and foreign brand operators. They also provide education and training on customer-related software to help customers and consumers use the software they sell as agents.

What are the Capabilities that Software Service Talents Should Have?

We divide the abilities that software service talents should have into soft and hard. described as follows:

Soft skills

According to the expert questionnaire and fuzzy evaluation results, the following ten abilities are obtained, which are the skills that software service personnel must have.

Table 1. Soft skills that software service personnel must have,

No.	Skill	Description of skills
1.	ability to innovate	Software service personnel must have the ability to come up with creative ideas on a regular basis.
2.	ability to communicate	Software service personnel must have good communication skills with customers and know the needs of customers.
3.	ability to listen	Software personnel need to know what is in the mind of the customer? What do they want? Therefore, they must have good listening skills.
4.	Ability to interview and ask questions	Software service personnel should have the ability to interview and ask questions. For some problems, perhaps the customer does not know where the problem is. At this time, the software service personnel must have the ability to ask questions about the problem.
5.	analytical ability	Software service personnel must have the ability to analyze problems in detail.
6.	enabling ability	For some problems, sometimes software service personnel are required to facilitate them to be successful, so the ability to facilitate the success of things is one of the abilities that software service personnel must have.
7.	ability to observe	Whether a software can run smoothly or not depends on the service personnel to observe its subtleties and understand whether it can work. Therefore, the ability to observe is also one of the skills that software service personnel need to have.
8.	ability to write	Only by putting ideas into words can ideas not be fleeting. This is the ability of writing. It can faithfully record various ideas and turn them into experiences that can be accumulated.
9.	organizational capacity	Organization is one of the conditions that make software work smoothly. Therefore, software service personnel must have the ability to assist the organization to operate smoothly.
10.	interpersonal skills	The interpersonal relationship is the key to discovering the smooth functioning of software. Therefore, good software service personnel, of course, must also have this ability.

Hard skills

The professional knowledge required by software service talents can be roughly divided into three categories: software engineering, project management and business areas.

First of all, due to the importance of requirement analysis, many important technologies and methods have been developed for requirement analysis in software engineering, such as use case and data modelling, which should be learned by software service professionals and flexible use in the project.

In addition, software service talents must also be proficient in the so-called requirements engineering and management skills, understand that in addition to establishing requirements, they also need to be managed. Process analysts must also possess expertise in sound project management, risk management, and quality requirements, and how to apply this knowledge at different stages of the software development life cycle to ensure project success.

What should be Included in the Software Service Course

Professionally, the required courses are as follows:

Table 2 Basic compulsory courses

Course Title	Course name for different courses	credits
programming	computer programming Computer Programs and Applications Advanced Language Programming Internship Computer Programming Internship	3
Object Oriented Methods	Object Oriented Programming	3
data structure	data structure	3

Table 3 Intermediate elective courses

Course Title	Course name for different courses	credits
Internet Technology and Application	database system Introduction to Databases Database management Database Systems and Applications	3
database system	Internet Services Software Engineering	3
software engineering	software engineering Introduction to Software Engineering	3

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Application software design	Application software design Applied Software Design Internship	3

Table 4 Advanced elective courses

Course Title	Course name for different courses	credits
Advanced Object-Oriented Programs	Object Oriented Programming	3
Object Oriented Software Engineering	Object Oriented Analysis and Design software engineering Software Testing and Verification Object Oriented System Analysis	3
Internet Services Software Engineering	Internet Services Software Engineering	3
Personal software program	Personal software program	3
software architecture	software	3

Advantages of India's Education System in Software Services

From the abilities and courses that software talents must have above, let's look back and see why India's education system can give him a great advantage in software services? (Tilak, 2013).

India, where 70% of the population is illiterate, is an important canter for the cultivation of global software talents. How can poor India cultivate the world's hottest software engineers? What kind of education method can make students show competitiveness as soon as they leave campus?

One-third of software engineers in the US are Indian. It is not news that 250,000 Indians have penetrated into Silicon Valley (Vijayabaskar & Babu, 2022).

Nearly half of the high-tech talent work visas (H1-B) in the United States are issued to Indians, and the remaining half are divided among dozens of other countries.

Ask Indian engineers why they are strong in software, and the first answer must be: "We are good at math."

Mathematics deduces from definitions and theorems, and solves problems step by step, which is consistent with the analysis, logic, and ability required to write software.

Indians not only invented numbers and arithmetic, but also discovered many important mathematical theorems, such as the formula for the area of a triangle and pi. From ancient India to modern times, mathematics is the driving force behind the logical thinking of Indians and is as precious as Indian religious philosophy.

Strong communication skills are an important part of Indian software talents. Most of the Taiwanese engineers are "reticent, do more and talk less", but the Indian engineers can talk for an hour, still radiant, with

dark faces and bright eyes. And I have to admit that they have something to say and are coherent. This is actually part of software education.

Most Indian engineering colleges have a class: communication skills. "We have to keep giving speeches on stage," said Prakash, a junior at the Hyderabad Institute of Information Technology, with a smile. "At first I was nervous and shivering, but now I'm used to it."

The family system of schools and industries has also created the unique software capabilities of Indians. In addition to the students' hard work and excellent professional ability, software education in India has a special feature, that is, it has a very close interaction with the industry, and students are completely independent of the development of new technologies. This is one of the reasons why Silicon Valley has a particular preference for Indian engineers. (Parthasarathy, 2000, 2004)

In addition, high English proficiency is also a forte of Indians. All intellectual Indians can speak fluent English, which can be said to have an innate advantage in a world where most of the software world uses English to communicate.

Conclusion

This study explores how the software supply chain can cultivate outstanding talents, and draws the following conclusions from the results of the study:

1. The supply chain of software services, including application/system software design and development, system integration services, data processing services, and channel distribution, etc.

2. The abilities that software service talents should possess, including both soft and hard abilities, are indispensable.

3. The content that the software service course should include includes three parts: basic, intermediate, and advanced.

4. The advantages of India's education system in software services are reflected in their education system and thinking, which also enables their software service industry to develop rapidly.

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Author Guidelines

For Paper Submission and Manuscript Preparation

General Instructions

The Journal of Supply Chain and Sustainability Research (SCSR) accepts research papers, academic articles, and review articles written in Standard British or American English, not a mixture. Poorly written English may result in rejection or return of the submission for language editing. The articles must fall within the aim and scope of the journal, that is, science, social science, technology, management, and related issues (see about Journal).

Please note that papers in these areas in order to be published in the SCSR journal Research or academic papers must be 15-20 pages in length inclusive of references, tables, graphs, charts, and figures.

For research papers, the author is advised to include all elements of the structure below:

- **Title** of paper must be clear, concise, and informative, all in uppercase within three typeset lines.
- **Abstract** (150-250 words) Abstracts must include sufficient information for readers to judge the nature and significance of the topic, the adequacy of the investigative strategy, the research results and conclusions. The abstract should summarize the major results of the work and not merely list topics to be discussed. It is an outline or brief summary of your paper in a well-developed paragraph, should be exact in wording, and understandable to a wide audience.
- **Keywords** (3-5)**,** immediately after the abstract**,** keywords are for indexing purposes, and should be different from the title.
- **Introduction** This section provides necessary background of the paper and a brief review the existing knowledge, and importance of the problem.
- **Objectives**
- **Literature Review, Conceptual Framework (**Discussion of the research work of others in the field or topic area and how your work will enhance and contribute to the field. Citation of work by others should follow APA (7th edition) style e.g.

Example: Maslow (1970) asserts that……; ……. (Maslow, 1970)
Wang and Pettit (2021).....; ..... (Wang & Pettit, 2021)
Hisrich et al. (2020)……;……. (Hisrich et al., 2020)
Novack et al. (2018)……; ……. (Novack et al., 2018)

- **Research Methodology** This section indicates clear research objectives, conceptual framework(s) (if any), research question(s), hypotheses, population and sample, research instruments, and the data collection process. This section provides clear steps used in conducting your research. It means all procedures need to be described in sufficient detail to allow someone to replicate it.
- **Results and Discussion** This section covers the analysis of the data. It should include statistics in tables, charts, graphs, or pictures analyzed against hypotheses or in answering the research question(s) in quantitative research, or descriptive analyses of categories in qualitative research. **Results** is purely descriptive. **Discussion** describes and interprets the findings, placing them in a bigger context, relating them to other work(s) and issues outlined in the Introduction.
- **Research Benefits**
- **Conclusion and Recommendations** This section summarizes your study's key findings and implications. It should not be long and repetitive, but capture the essence of the study discussed in all previous sections. It should briefly cover the limitations of your research and suggested future direction for further research.

For academic articles, we recommend the structure below:

1. **Introduction**
2. **Discussion**
   - **2.1 subheading**
   - **2.2 subheading**
3. **Conclusion**

The author is advised to follow a logical, understandable point of argument. Break your main argument into sub-headings and present them in an outline at the end of the Introduction.

- **References List** all the sources you have cited in the body of your research. It states the author/s of the source, the material's year of publication, the name or title of the source material, as well as its electronic retrieval information, including the date it was accessed, if these were gathered from the Internet (Research articles, academic articles, reports, academic conferences, references, no later than the last 5 years and Books, unlimited years of reference)

Submission Guide

Authors are welcome to submit their manuscripts.

All submissions will be given an initial check by our editorial team, within **6-8 weeks after submission date** you will be notified of the initial check result on thaijo system. Only the article which passes the initial check will proceed to the review process (6 -8 weeks). The author will be kept informed of the current status of their paper.

Articles being currently considered for publication by other journals will not be accepted by The Journal of Supply Chain and Sustainability Research (SCSR). If the author withdraws or sending a manuscript to other journals any time after the manuscript has been sent to peer review till the final decision, the Journal will charge the author a penalty fee for its time and resources spent. The authors must always pay the page charge even if the withdrawal is permitted.

Specific Instructions:

- **Format** The preferred format for the text and tables of a manuscript are MS Word DOC and PDF.
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- **Margins** Use a 1-inch margin on all sides of each page-left, right, top, and bottom.
- **Spacing** Double space lines throughout the paper including appendices, footnotes. Exceptions: Triple or quadruple spacing can be done around equations. Single or one-and-a-half spacing can be done in tables or figures. Indent the first line of every paragraph a standard Tab key space (½ inch).
- **Font Size and Type**. Browallia New font (20 pts. bold for title; 14 pts. for author(s) and affiliation; 16 pts. bold for headings and 16 pts. bold subheadings; and 14 pts. for text)
- **Titles** should be no more than three typeset lines.
- **Headings** should be in bold type, in 16 point Browallia New font. First-level headings should be aligned to the left with initial caps. One line space should separate headings from the preceding text.
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SUB-HEADING ONE Bold, Left, UPPERCASE HEADING

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Sub-heading Three Indented, bold, Capitalize Each Word

- Tables, Graphs, Charts, and Figures in 12-point Browallia New font, Bold
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  - Include only those sources you have cited in your paper.
  - Position the first line of each reference flush left, with subsequent lines wrapping with a ½-inch (hanging) indent.
  - Organize the list in alphabetical order according to the first letter beginning each entry. Usually, the author's last name is the first piece of information in each entry. Use initials for the author's first/middle names.

- Use the following format for your reference list:

Cokins, G., Pohlen, T., & Klammer, T. (2018). *Supply Chain Costing and Performance Management* (2nd ed). New Jersey : Wiley.

Hisrich, R. D., Peter, M. P., & Shepherd, D. A. (2020). *Entrepreneurship* (11th ed). New York : McGraw- Hill.

Heizer, J., Render, B., & Munson, C. (2020). *Operations Management Sustainability and Supply Chain Management* (13rd ed). U.K : Pearson.

Kumar, V., Leone, R. P., Aaker, D. A., & Day, G. S. (2018). *Marketing research* (13th ed). U.S.A.: John Wiley & Sons.

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Novack, R. A., Gibson, B. J., Suzuki, Y., & Coyle, J. J. (2018). *Transportation A Global Supply Chain Perspective* (9th ed). Singapore : Cengage.

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Wang, Y., & Pettit, S. (2021). *E*- Logistics (2nd ed). U.S.A.: Kogan page.

- **Tables and Figures**
  - Line drawings should be of high resolution and high contrast. For color or grayscale photographs (halftones), use a minimum of 300 dpi (.JPG).
  - Provide captions to figures
  - Use the table function of Microsoft Word.
  - Figure and tables should be placed as close as possible to where they are mentioned in the text
- **Page Numbering**: Number all pages of the paper, beginning with the title page. The number is in the bottom right corner (1 inch from right and ½ inch from the bottom page edges).

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Publication Charge

The process of payment will be required to enable an effective and efficient screening process. Fee payment will be due at registration, will be **150 USD for both Thai and international authors. This fee is non-refundable.**

Remark: The fee shall be in effect from October 1, 2026 onward.

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As part of the submission process, authors are required to check off their submission's compliance with all of the following items, and submissions may be returned to authors that do not adhere to these guidelines.

1. The manuscript must not have been published or submitted elsewhere for consideration. (A brief explanation will be necessary to clarify this matter.)
2. The submitted file is in **Microsoft Word** and **PDF** document file with a single column format.
3. Where available, URLs for the references must be provided.
4. Research or academic papers must be 15-20 pages in length inclusive of references, tables, graphs, charts, and figures.
5. The text must be double-spaced; (a 14-point font Browallia New; italics rather than underlining except for URL addresses); and all illustrations, figures, and tables must be placed within the text at the appropriate points, rather than at the end.

6. The text adheres to the stylistic and bibliographic requirements outlined in the Author Guidelines.
7. Attached to all submitted articles must be a **150-250 words abstract**, **Keywords** (3-5) and a statement containing the author's present academic or nonacademic position and an address where he or she may be contacted by the editors or interested readers. Authors should place their names on the cover page, but the name should not appear on headers or elsewhere in the body of the article. Full contact details for the corresponding author, including email, mailing address and telephone numbers should also be provided. As the Journal of Supply Chain and Sustainability Research (SCSR) is a peer reviewed journal, the author must be follow the instructions about Ensuring a Blind Review.
8. Make sure that there are no grammatical, spellings, or content errors in articles prior to submitting to the Journal of Supply Chain and Sustainability Research (SCSR).
9. The Journal of Supply Chain and Sustainability Research (SCSR) uses American Psychological Association **(APA) style** (7th edition).
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