

Research Article

The Impact of the US-China Trade War on the Motivation for Expansion in the Electronic Manufacturing Sector in Sichuan

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Abstract: The abstract examines the impact of the US-China Trade War on the motivation for expansion within Sichuan's electronic manufacturing sector. The trade conflict has introduced significant challenges, including increased tariffs and supply chain disruptions, compelling local firms to reassess their strategies. In response, companies have intensified their focus on innovation and technological advancement to enhance competitiveness and reduce reliance on foreign technologies. This drive for self-sufficiency has led to increased investment in research and development, fostering new capabilities and market opportunities. Moreover, the trade war has shifted attention toward domestic markets, prompting firms to diversify their supply chains and explore alternative business avenues. Government support has further facilitated this expansion, providing resources and incentives that bolster growth. The findings suggest that the motivations for expansion are closely intertwined with the broader geopolitical landscape, shaping the future of Sichuan's electronic manufacturing industry, based on insights gathered from a sample of 380 Sichuan electronic manufacturer operators in the study.

Keywords: US-China Trade War, Motivation for Expansion, Electronic Manufacturing Sector

1. Introduction

The US-China trade war, which began in 2018, had a significant impact on China's electronics manufacturing sector. It caused a mix of disruptions and changes. The US imposed high tariffs on important electronic parts and finished products. This created short-term challenges, especially for manufacturers that relied on supply chains crossing the Pacific. The costs of exporting electronics to the US increased, which hurt profit margins and limited growth plans that depended on exports [1]. At the same time, the trade war pushed manufacturers to seek technological independence and strengthen their supply chains. Concerns about losing access to advanced US semiconductor technology underscored the pressing need to build domestic capabilities [2]. This led to a greater focus on developing key technologies, particularly in semiconductor design and production. Investments in research, fabrication plants, and local supplier networks increased, supported by government programs such as the "Big Fund" and a growing awareness of risks in the private sector. Additionally, the trade conflict heightened the need for manufacturers to diversify their operations. To avoid tariffs and minimize risks, many electronics companies accelerated plans to set up or expand production in Southeast Asia, including countries such as Vietnam, Thailand, Malaysia, and India, as well as in Mexico and other regions. This expansion often went hand in hand with moving production within China, as companies shifted from traditional coastal regions to inland provinces that offered lower costs, government incentives, and better infrastructure [3]. Moreover, the trade war accelerated innovation within the sector. Companies recognized the need to enhance their technological capabilities and product offerings to remain competitive. Investments in research and development became a priority, with firms focusing on advanced manufacturing techniques and innovative technologies.

Research Objectives

This study explores Sichuan enterprises' expansion motivation in the electronics manufacturing sector under the US-China trade war: (1) To examine the influencing mechanisms

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of motivating the expansion of the Sichuan electronics manufacturing sector under the US-China trade war based on innovation and technology, business competitiveness, and government support.(2) To offer recommendations for the Sichuan electronic manufacturing sector in enhancing their professional development, fostering a positive company culture, and competitive advantages through technology and policy supports.

2. Theoretical Foundation

Definition of International Trade Theory on Sichuan Enterprises' Expansion Motivation

International Trade Theory, particularly in the context of Sichuan enterprises' motivations for expansion, analyzes how trade policies, tariffs, and global market dynamics influence business decisions. This theory suggests that companies engage in international trade to take advantage of comparative benefits, such as lower production costs or access to larger markets. For businesses in Sichuan, the motivations for expansion may stem from the need to adapt to external pressures, such as tariffs imposed during the US-China trade war. These tariffs can affect cost structures and market accessibility. As these enterprises navigate the complexities of international trade, they might seek to diversify their export markets or relocate production to reduce risks associated with trade barriers. The theory emphasizes the significance of understanding competitive advantages, consumer demand, and how firms strategically adapt to changes in the global economic landscape. Ultimately, International Trade Theory provides a perspective that enables Sichuan enterprises to assess their motivations for expanding operations both domestically and internationally in response to trade dynamics [4]

Definition of Institutional Theory on Sichuan Enterprise Expansion Motivation

Institutional Theory serves as a valuable framework for understanding the motivations behind the expansion of enterprises in Sichuan. This theory explores how various institutional environments, including regulations, norms, and cultural expectations, shape business behavior. It suggests that organizations are influenced by the rules and standards established within their specific contexts, which in turn affect their strategies and decision-making processes. For Sichuan enterprises, institutional factors are vital drivers of expansion efforts. Local government policies, along with incentives and support for international trade, can create a conducive environment for businesses seeking to expand their operations. Furthermore, cultural expectations surrounding innovation and competitiveness may encourage these enterprises to pursue opportunities beyond their immediate markets. Overall, Institutional Theory emphasizes the importance of acknowledging how external pressures and institutional frameworks influence the motivations of Sichuan enterprises as they expand both domestically and internationally [5]

Definition of Terms

- Enterprise expansion motivation - several interconnected factors drive companies in the electronics manufacturing industry to expand, particularly during trade conflicts. Businesses must adapt to changing market conditions and regulations resulting from trade wars, which impact tariffs and supply chains. To stay competitive, many companies seek new markets beyond their traditional trading partners. This helps them diversify their customer bases and reduce reliance on any single market. Cost efficiency is also a priority as companies try to manage rising operational costs from tariffs. This might involve relocating production to countries with more favorable trade agreements or lower labor costs. Furthermore, businesses recognize the value of innovation, resulting in increased investment in research and development to enhance their products and technology [6]
- Innovation and technology – they are crucial for the growth of the electronics manufacturing industry, particularly amid ongoing trade conflicts. In light of the uncertainties caused by tariffs and supply chain disruptions, companies are increasingly investing in research and development to improve their product offerings and technological capabilities. This push for innovation is essential for maintaining competitiveness in a rapidly changing market. To enhance production efficiency and reduce costs, firms are adopting advanced technologies, including automation and artificial intelligence, to drive improvements in their operations. These innovations allow

manufacturers to streamline their operations and lessen the impact of rising expenses associated with trade barriers. Moreover, the demand for new products that meet evolving consumer preferences drives companies to innovate continuously [7]

- **Business competitiveness** - in the electronic manufacturing industry, during trade conflicts, is mainly driven by the need to adapt to rapidly changing market conditions and regulatory environments. Companies are motivated to expand their operations to strengthen their competitive edge by exploring new markets and diversifying their customer bases. This expansion helps firms mitigate the risks associated with tariffs and supply chain disruptions, reducing their reliance on any single market. In this context, companies aim to maintain or improve their market position by investing in innovation, enhancing product quality, and increasing production efficiency. The pressure to stay competitive often leads firms to adopt advanced manufacturing technologies and automation, which can lower costs and improve productivity[8]
- **Policy support** – it plays a crucial role in motivating the expansion of the electronics manufacturing industry during trade conflicts. Governments often implement favorable policies to mitigate the adverse effects of tariffs and trade barriers, incentivizing companies to expand their operations. These policies may include financial incentives such as tax breaks, subsidies, and grants, which lower operational costs and encourage investments in new technologies and facilities. Furthermore, trade agreements and bilateral negotiations can create more advantageous conditions for businesses, allowing them to access new markets and diversify their supply chains. Additionally, governments may enhance infrastructure development, improving logistics and transportation networks to facilitate easier market entry and operational efficiency [9]

Conceptual Framework

The conceptual framework of innovation, technology, business competitiveness, and policy support in the context of the US-China trade war, specifically for the Sichuan electronic manufacturing sector, highlights the interplay among these elements that drives enterprise expansion. Innovation and technology are crucial enablers, prompting companies to invest in advanced manufacturing processes, automation, and research and development. This emphasis on technological advancement allows firms to enhance operational efficiency, reduce costs, and adapt to changing market demands, helping them maintain a competitive edge despite trade uncertainties [10]. Business competitiveness is shaped by the need to navigate complexities introduced by tariffs and supply chain disruptions. Companies are motivated to diversify their markets and reduce reliance on specific regions, which encourages a proactive approach to exploring new opportunities. Agility in responding to consumer needs and market trends becomes essential as firms leverage their technological capabilities to improve product offerings and operational resilience [11]. Policy support plays a vital role in shaping the expansion motivations of these enterprises. Government initiatives, including financial incentives for domestic production and strategic investments in research, create a favorable environment for growth. Policies designed to encourage innovation and support supply chain diversification further empower firms to adapt to geopolitical challenges. Collectively, these factors form a cohesive framework that drives the expansion of the electronic manufacturing industry in Sichuan, enabling businesses to thrive despite the adversities posed by the trade war [12]

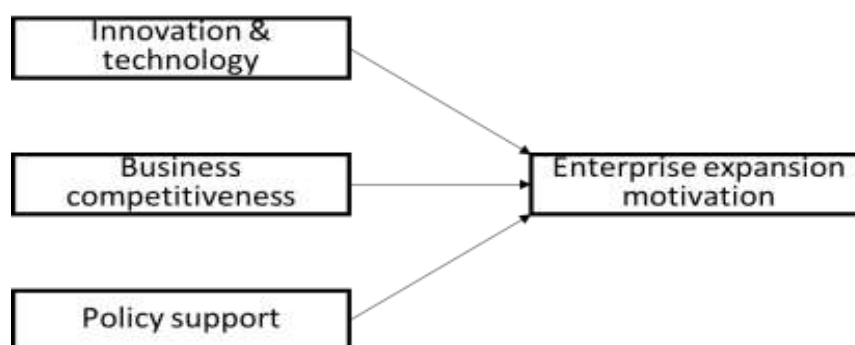


Figure 1. The Conceptual Framework

Researching how the US-China trade war affects the expansion of Sichuan's electronic manufacturing sector can be done in different ways.

First, it may be challenging to find complete data because some companies are reluctant to share sensitive information about their strategies or operational changes. Additionally, trade policies can change rapidly, making it challenging to obtain timely and relevant data. This makes it hard to tell whether changes are short-term reactions or long-term trends.

Geopolitical issues can also complicate research, as different national views and government policies can influence how people perceive the impact of the trade war. Researchers may find it difficult to access specific markets or regions, which limits their ability to draw broader conclusions from more localized studies.

Moreover, because supply chains are complex, the effects of the trade war can vary significantly across different parts of the electronics manufacturing sector. This difference makes it more difficult to identify clear patterns or reasons for expansion. Lastly, insights from industry experts may be subjective since personal biases can influence how they interpret the trade war's impact on expansion motivations.

Research Hypothesis

The Correlation between Innovation and Technology, and Enterprise Expansion Motivation

The hypothesis suggests that the trade war has prompted companies to adopt more technology, enabling them to discover new business opportunities and expand their market presence. In Sichuan's electronic manufacturing sector, the trade conflict encourages local firms to boost their innovation. This shift is essential as companies strive to reduce their dependence on foreign technologies due to tariffs and supply chain disruptions. To stay competitive, companies in Sichuan are likely to invest more in research and development. This investment will help create new technologies and solutions. By being innovative, they can tackle current challenges and support their goal of expanding their business in domestic markets and diversifying their operations. Overall, the trade war pressures have accelerated the push for technological advancement, enabling companies to explore new opportunities and grow [13]

H1 There is no positive correlation between innovation and technology, and the enterprise expansion motivation of the Sichuan electronic manufacturing sector under the US-China trade war.

The Correlation between Business Competitiveness and Enterprise Expansion Motivation

The hypothesis regarding the relationship between business competitiveness and the motivation for enterprise expansion in the electronic manufacturing sector in Sichuan, amid the US-China Trade War, suggests that the trade conflict has heightened competitive pressures. As a result, local firms are driven to pursue expansion as a strategic response. The disruptions caused by tariffs and supply chain uncertainties have compelled companies to re-evaluate their market positions and seek new opportunities. As businesses encounter increased competition both domestically and internationally, they are motivated to expand their operations to strengthen their market presence. This expansion can take the form of investments in new technologies, product lines, and facilities designed to improve efficiency and reduce costs. Firms that can effectively leverage their competitive advantages are likely to experience growth, driven by the need to adapt to changing market conditions and consumer demands [14]

H2 There is no positive correlation between business competitiveness and the enterprise expansion motivation of the Sichuan electronic manufacturing sector under the US-China trade war.

The Correlation between Policy Support and Enterprise Expansion Motivation

The hypothesis concerning the relationship between political support and the motivation for enterprise expansion in Sichuan's electronic manufacturing sector, particularly in light of the US-China Trade War, posits that strong government backing significantly influences companies' growth decisions. As the trade conflict creates uncertainties and challenges, local governments play a crucial role in providing the necessary resources, policies, and incentives to facilitate business growth and development. Political support can manifest in various forms, such as financial subsidies, infrastructure development, and favorable regulations designed to strengthen the electronics industry. This support not only alleviates some of the pressures resulting from the trade war but also encourages firms to pursue expansion strategies that enhance their competitiveness and market reach [15]

H3 There is no positive correlation between policy support and the enterprise expansion motivation of the Sichuan electronic manufacturing sector under the US-China trade war.

3. Research Methods

Correlation Analysis

Correlation analysis is widely used to measure the degree of association between two or more variables. The Pearson correlation coefficient is commonly used to measure the strength of correlation. The value of the correlation coefficient (r) indicates the strength of the correlation between variables, while the significance level of the correlation is shown in the P-value.

Table 1. Correlation Coefficient Classification

Correlation coefficient r	Degree of relevance
$ r = 1$	Totally correlated
$0.70 \leq r < 0.99$	Highly correlated
$0.40 \leq r < 0.69$	Moderately correlated
$0.10 \leq r < 0.39$	Low correlation
$ r < 0.10$	Weak or unrelated

Correlation Analysis of Innovation and Technology, and Enterprise Expansion Motivation.

The correlation coefficient r between innovation and technology, and enterprise expansion motivation is 0.722, and $P = 0.000$ is less than 0.01. Thus, innovation and technology significantly correlate with enterprise expansion motivation

4. Research Results

Research demonstrates a significant relationship between innovation, technology, business competitiveness, and policy support in Sichuan's electronic manufacturing sector, especially during the Sino-U.S. Trade War. Companies that focus on innovation and technological advancements are often better equipped to respond to market disruptions associated with the trade conflict. These businesses enhance their product offerings and improve operational efficiencies, leading to increased competitiveness in the market. As a result, firms that prioritize innovation can successfully differentiate themselves, gain a larger market share, and create greater opportunities for growth. Additionally, strong policy support from local governments plays a critical role in amplifying these positive effects. Initiatives such as financial incentives, infrastructure enhancements, and favorable regulatory frameworks foster a supportive environment for business expansion. When companies recognize robust political backing, they are more inclined to invest in research and development, with the confidence that their efforts will be rewarded. In summary, the combination of innovation, competitiveness, and policy support cultivates a dynamic ecosystem that drives enterprise growth in Si-

chuan's electronic manufacturing sector. This synergy not only helps companies navigate external challenges but also positions them for sustainable success in an increasingly competitive and evolving industry [16]

H1 There is a positive correlation between innovation and technology, and the enterprise expansion motivation of the Sichuan electronic manufacturing sector under the US-China trade war.

H2 There is a positive correlation between business competitiveness and the enterprise expansion motivation of the Sichuan electronic manufacturing sector under the US-China trade war.

H3 There is a positive correlation between policy support and the enterprise expansion motivation of the Sichuan electronic manufacturing sector under the US-China trade war.

Managerial Implications:

The managerial implications for electronic manufacturing firms navigating the Sino-US trade war while considering market expansion in the face of future uncertainties are significant. Leaders must adopt a proactive approach to enhance resilience and competitiveness.

First, companies should prioritize innovation and investment in research and development to create advanced technologies that can mitigate the impact of tariffs and supply chain disruptions. By fostering a culture of innovation, managers can ensure their firms remain agile and responsive to changing market conditions.

Diversifying supply chains becomes crucial. Relying on a single source or market can expose firms to greater risks, so exploring alternative suppliers and markets can help mitigate these vulnerabilities. Managers should also consider expanding into domestic markets to capitalize on local demand driven by the trade war.

Building strategic partnerships and collaborations can enhance capabilities and resource sharing, allowing firms to navigate uncertainties more effectively. Engaging with government initiatives and leveraging support can also provide additional resources and incentives for growth.

The ability to adapt through innovation, supply chain diversification, and strategic partnerships will be vital for electronic manufacturing firms as they seek to expand their markets and navigate the complexities introduced by the Sino-US trade war[17]

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