



IMPACTS OF SUPPLY CHAIN COLLABORATION AND FIRM
PERFORMANCE: THE MEDIATING ROLE OF SUPPLY CHAIN
CAPABILITIES OF EXPRESS DELIVERY COMPANIES
IN KUNMING, THE PEOPLE'S REPUBLIC OF CHINA

By
Mrs. Chunmei LI

A Thesis Submitted in Partial Fulfillment of the Requirements
for Master of Engineering ENGINEERING MANAGEMENT
Department of INDUSTRIAL ENGINEERING AND MANAGEMENT

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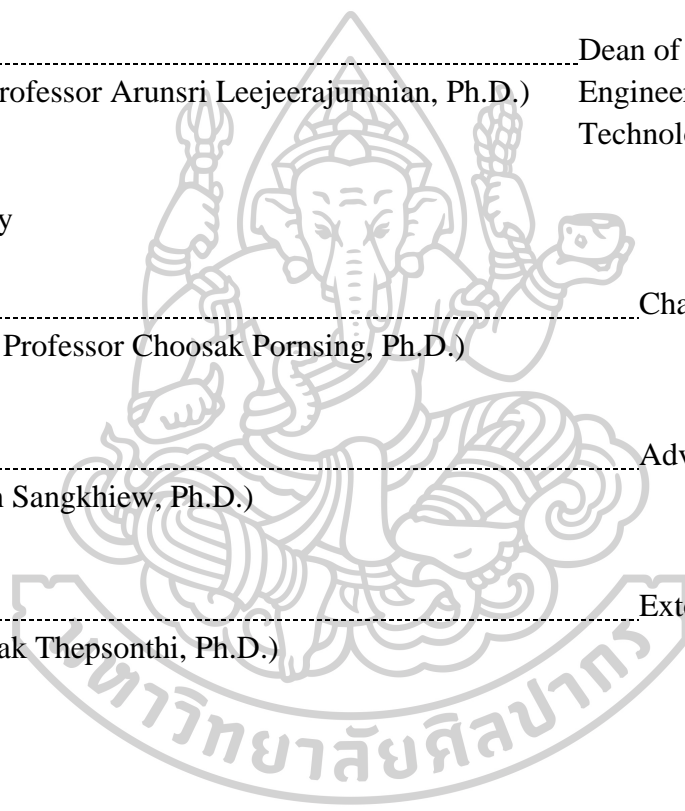
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The purposes of this research were (1) To study the importance of supply chain collaboration, supply chain capabilities, and firm performance, (2) To study the impact of supply chain collaboration, and supply Chain capabilities on firm performance, and (3) To test the mediating role of supply chain capabilities linking from supply chain collaboration to the firm performance express delivery companies in Kunming, the People's Republic of China. The sample group is 235 people, owners of businesses, and branch managers who have experience doing 9 Express Delivery Companies. The research tool was an online questionnaire. Data were analyzed using descriptive, inferential statistics were used to analyze data with a Structural Equation Model (SEM) by ADANCO and PROCESS program.

The results found that all factors were at a high important level. First, firm performance, followed closely by supply chain collaboration, and supply chain capabilities. Based on the findings of the SEM analysis, it was discovered that supply chain collaboration has the highest impact on supply chain capabilities, with a path coefficient of 0.647. Following this is the impact of supply chain capabilities on firm performance, which has a path coefficient of 0.481. Lastly, the path coefficient of supply chain collaboration on firm performance was found to be 0.435. Therefore, it can be concluded that supply chain capabilities play a crucial role in transferring the influence of supply chain collaboration through firm performance. The result of testing the mediating role of supply chain capabilities transfers the influence of supply chain collaboration to firm performance, and can reduce the total influence of supply chain collaboration to firm performance up to 49.7 percent. Therefore, supply chain capabilities are a very important variable in this scenario.

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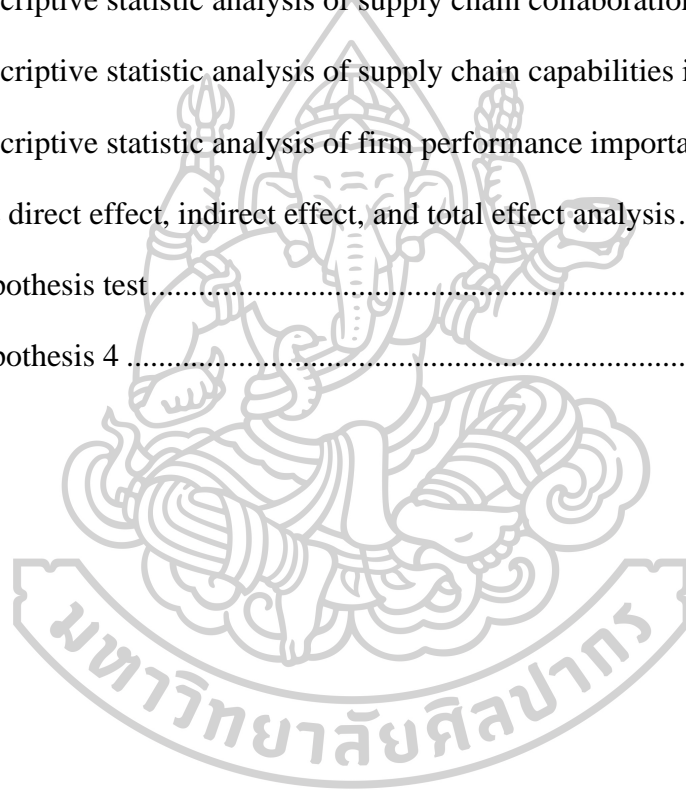
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CHAPTER 1

INTRODUCTION

1.1 Motivation

At present, competition in the economy and trade has intensified. Technological situations and unexpected changes, including the external environment, affect company management in terms of both new product launches and timely responses to customer needs. This has become a driving force for businesses to focus on trying to find ways to meet customer satisfaction. As a result, the business has to continuously adapt and develop its capabilities. Create a competitive advantage over your competitors and ensure your company's long-term viability. A way for companies to focus on supply chain management is to control the entire organization and reduce costs and expenses. It improves the operational efficiency of the organization and leads to the improvement of competitiveness (Lanleyet et al. 2009).

Supply chain management is management that focuses on building cooperation with members of the supply chain, and process management within the organization. The goal is to make production and service efficient (Frohlich and Westbrook, 2001; Ahmad and Dhafr, 2002). The supply chain management applied by an organization can be divided into two categories: internal coordination and operational performance. In general, the purpose of creating internal links is to improve information sharing, as well as external links and operational performance. There have been two different approaches to consider the impact of information exchange via external links on supply chain performance (Barratt and Barratt, 2011).

The processes of packing and storing in the warehouse and external supply chain are an operation that causes cooperation with members of the supply chain. It consists of two parts of cooperation with raw material suppliers. Modern marketing management has to focus on working with customers to meet their needs and satisfaction (Burt et al. 2003). Most companies seek to build strong relationships with members throughout their supply chain. This is because relationships with members of the supply chain influence an organization's operations and create long-term competitive advantages (Narasimhan and Kim, 2002; Leenders, et al. 2006; Handfield

and Nichols, 2007). Thus, building relationships within the supply chain is a collaboration, support, and development with supply chain members that gives manufacturers the ability to respond promptly to customer needs.

Companies are facing an era of globalization and intensifying competition. Entrepreneurs are beginning to realize that in order to gain and maintain a competitive advantage, businesses have to deliver the best value and service to their customers at the lowest possible cost. Due to modifications in client behavior, there is likewise better demand. In phrases of time, a quicker reaction is required. Product lifecycles are getting shorter and competition is increasing worldwide, so businesses must create shorter cycle instances and customized products and services. Certain skills, excellence, innovation, and knowledge of the service business are becoming increasingly important when developing new products. Companies have been seeking ways to collaborate with their supply chain partners over the last decade. To ensure supply chain efficiency and responsiveness, managers of organizations have to utilize resources; especially, the company's suppliers and customers, including network and expertise in business that is available both within and externally (Cao and Zhang, 2011).

The collaboration with stakeholders, therefore, enables companies to achieve a faster product development process. Reducing development costs can lead to better technology and innovation in dynamic market conditions, as well as better product quality. Changes in the external environment require supply chain partners to act more and more proactively. In order to respond to customer value in the form of ancillary services businesses and to produce added value from the perspective of customers, managers must concentrate on integrating operations, and responding to consumer value. Achieving business goals can seem daunting for individual organizations. However, it can easily be achieved through supply chain collaboration. Cooperative action of working groups and activities in supply chain management is great importance (Koçoglu et al. 2011). A lot of attention has been paid to this in the past. It is because all participants have different common competencies to work in the supply chain (Samaddar and Kadiyala, 2006).

Collaboration in a company's supply chain also leads to improved supply chain efficiency. Supply chain management and supply chain structure should be tailored to customer requirements. This will enable the company to compete at lower prices and reduce operating and labor costs, including improved service efficiency. Supply chain success, therefore, requires strong integration between suppliers and customers (Vereecke and Muylle, 2006). Firms form partnerships with supply chain partners to achieve both quantitative and qualitative goals, resulting in workforce flexibility and a sustainable competitive advantage (Nyaga et al. 2010). But the concept of Dyer and Singh (1998) argue that firms need to cooperate. Relationship rents can be achieved through certain assets. Acquired network relationships enable risk sharing, knowledge sharing, the activities of complementary resources inside and outside the organization, and effective oversight.

Supply chain management is essential to running a business in almost every industry. Due to the current competitive environment, all sectors of the economy are struggling on the subject of reducing operating costs. In today's competitive environment, it's not enough to cut costs within an organization. The product must pass through many manufacturers before it reaches the customer.

However, when it comes to supply chain relationships, it turned out to be at a cooperative level. It can happen between suppliers and suppliers. It is a relationship that shares common goals, increases efficiency, and strives collaboratively for purposeful, collaborative quality (Vereecke and Muylle, 2006). The supply chain has become a strategy for building competitive advantage and developing the core competencies of companies as a quality-oriented collaborative approach, defined on the basis of synergistic factors. Awareness of collaborative efforts affecting perceived delivery supply chain effectiveness (Simatupang and Sridharan, 2005).

Many researchers have investigated supply chain collaboration. However, there are few studies on collaboration in service industry supply chains. As a transportation services company, the company aims to support the growth of buyers and sellers in China, by bridging the needs of both groups as digitalization progresses and people's shopping opportunities become more diverse.

Now, demand in the transportation sector continues to grow due to ongoing government stimulus measures and the resulting innovation of new products and services, including marketing promotions offered to customers. Therefore, each transport company must develop and maintain high-quality services at reasonable prices in order to comprehensively respond to changing needs.

Collaboration in an organization's supply chain is a holistic process that relies on the interactions of people and the various relationships between internal and external environments. Supply chain improvements keep customers happy by cutting costs at multiple points. It includes suppliers, customers and educational institutions and private or public market mechanisms (Gunn and Salter, 2000). Rothwell (1992) presented this type of innovation as a multifactor process that requires a high level of integration within and between external organizations. Cooperation in the supply chain is taken into account. It is an example of "5th generation innovation" and is heavily influenced by the development of network integration. Collaboration and partnerships lead to external relationships between organizations. There is also channel integration. Supply chain diversification contributes to the formation of value-added innovations in supply chains (Lin et al. 2010).

Kunming is the capital of Yunnan province. Yunnan, People's Republic of China is the most ethnically populous province in China with a total of 26 different nationalities. The history of various countries has created special arts and cultures over a long period of time. It gives Kunming a unique identity, including the fact that it is a major tourist city in Southwest China. Known as the 'Spring Castle', Kunming is highly sought after by many tourists. As a result, many service companies were born. The transportation industry is one of the service industries that supports Kunming's tourism economy, Well-known and popular courier companies among consumers who use this service are his nine companies. namely; (1) Sto Express, Features: many outlets, low price, slow speed (2) Yto Express, Features: Pick up fast, good experience (3) Zto Express, Features: Pick up fast, good experience (4) Yunda Express, Features: Moderate price, moderate speed (5) Rabbit Express, Features: Affordable, good experience (6) Deppon Express, Features: The network covers 98% of counties in the country, the headquarters is directly operated, has its own logistics fleet, mainly large

express (7) Sf Express, Features: Apart from the high price, everything else is very good, especially fast (8) Jd.com Express, Features: Fast speed, good experience and (9) Deppon Logistics, Features: Suitable for mailing oversized pieces. These companies have many customers who use their services.

Based on the company information presented, it has been discovered that business owners of express delivery companies tend to focus only on marketing and profitability, ignoring many other factors, both internal and external, that can impact their business. In some company operations, in supply chain collaboration, there is still a lack of connections due to inefficient control processes in express delivery companies. These factors include slowing growth and intense competition in the market.

Therefore, it is important to be interested in supply chain capabilities, as cost management and good supply chain practices can help to manage costs and make businesses more profitable (Selvaraju et al. 2017). Effective supply chain management is crucial for businesses to reduce costs associated with production, transportation, and storage of products. This leads to improved profitability and adds value to service businesses. It is essential to focus on analyzing customers' orders and needs, production planning, purchasing, transportation, and distribution between all parties in the supply chain. By ensuring integration, all parties in the supply chain can benefit from mutual advantages, which results in the provision of high-quality services. Ultimately, the company's performance depends on achieving set goals, the total returns on shareholder, long-term profitability, market value, economic value added, and customer satisfaction. The key indicators of success are work flexibility and profitability.

In order to maintain high service quality in line with established standards, the key is to develop a system and employees who are prepared for change, such as securing human resources and managing employee qualifications. Service transportation companies are therefore challenged to manage supply chain collaboration at an efficient level in order to maximize efficiency and improve customer satisfaction. However, due to the development of the transportation business in the past big festivals, it is found that the daily parcel transportation capacity is very limited, slightly below plan, including on-time package delivery. Many customers are using express delivery services as consumer demand surges due to measures to encourage working from home

and due to the COVID-19 pandemic. However, poor service leads to delays, ultimately leading to customer dissatisfaction and impacting the courier's performance.

1.2 Research Question

1.2.1 How important are the supply chain collaboration, supply chain capabilities, and firm performance of express delivery companies in Kunming, the People's Republic of China?

1.2.2 Does the supply chain collaboration, supply chain capabilities, and firm performance of express delivery companies in Kunming, the People's Republic of China, affect each other?

1.3 Research Objective

1.3.1 To study the importance of supply chain collaboration, supply chain capabilities, and firm performance of express delivery company in Kunming, the People's Republic of China

1.3.2 To study the impact of supply chain collaboration, and supply chain capabilities on the firm performance of the express delivery company in Kunming, the People's Republic of China

1.3.3 To test the mediating role of supply chain capabilities linking supply chain collaboration to the firm performance of the express delivery company in Kunming, the People's Republic of China.

1.4 Research Scope

Research on the impact of supply chain collaboration and firm performance; The mediating role of supply chain capabilities of the express delivery company in Kunming, People's Republic of China. The researcher classified the scope into 4 aspects as follows:

1.4.1 The scope of the population was owners or managers of 9 express delivery companies, including branches operating in Kunming, the People's Republic of China.

1.4.2 The scope of content; Focus on supply chain collaboration, supply chain capabilities, and firm performance of an express delivery company in Kunming, the People's Republic of China.

1.4.3 Area boundaries; The researcher defined the area in this study as an express delivery company in Kunming, the People's Republic of China. There are 9 companies, including branches in Kunming, namely; (1) Zhaotong, (2) Qujing, (3) Yuxi, (4) Pu'er, (5) Baoshan, (6) Lijiang, and (7) Lincang.

1.4.4 Scope of time; Data collection is between June 2023 and December 2023.

1.5 Expected Results from the Study

1.5.1 Know the results of the level of importance of the supply chain collaboration, supply chain capabilities, and firm performance of the express delivery company in Kunming, the People's Republic of China.

1.5.2 Know the results of the impact of supply chain collaboration and firm performance; The mediating role of supply chain capabilities of the express delivery company in Kunming, People's Republic of China.

1.5.3 Know the results of testing the role of supply chain capabilities linking supply chain collaboration to the firm performance of the express delivery company in Kunming, the People's Republic of China.

1.6 Research Contribution

1.6.1 The express delivery company operators know the importance of collaboration in the service supply chain, bringing research results to suggestions, and emphasize its application in related industries that work together in the supply chain. It is the competitiveness of the industry in the future.

1.6.2 The partnership committee of the express delivery business uses the research results to plan operational strategies in order to have a system that is consistent with the supply chain of the service business leading to the ability to compete in the long run.

1.6.3 Kunming has a large regional business promotion office, the results of this research can be used to plan for promoting investment in the service sector. It is to stimulate the economic system of Yunnan Province to be effective.

1.7 Definition Terms

Supply chain collaboration can be defined as the inter-organizational processes among and between members of a supply chain, which aims to create a seamless and synchronized supply chain that leads to increased responsiveness and performance to satisfy customers. These activities are based on mutual goals and trust, along with shared risk and reward.

Supply chain capabilities are the ability of an organization to provide goods or services to customers. The term often refers to a company's manufacturing capabilities, but it can also include other areas such as customer service, order fulfillment, and logistics.

The firm performance of an express delivery company can be evaluated based on various factors such as financial and non-financial, including long-term profitability, inventory costs, product turnover rates, cash flow flexibility, the total return on shareholders, and customer satisfaction. These factors are measured in accordance with the expectations of stakeholders.

The mediating role of supply chain capabilities refers the supply chain capabilities linked from supply chain collaboration to the dependent variable, which is the firm performance of the express delivery business

CHAPTER 2

LITERATURE REVIEW

The related literature will be reviewed carefully. The rest of this chapter is organized as follows. Section 2.1 describes the express delivery company in Kunming, People's Republic of China, the timeline, and the types of express delivery. Section 2.2 explains the supply chain collaboration concept. This section expresses six steps to successful collaborations, sustainability, and trends. Section 2.3 presents details of supply chain capabilities, and their advantages and disadvantages. Section 2.4 examines the dependent variable. It contains elements of performance concepts and performance measurement, Section 2.5 briefly reports the supply chain collaboration theory. The conclusions of this chapter are drawn in Section 2.6.

2.1 Express Delivery Company Context in Kunming

2.1.1 Introduction

The current economic situation of each country has changed greatly from the past. As a result of social conditions with higher competition rates what used to be a subsistence economy became an industrial economy that focused on trading and making profits. As a result, production factors must be developed in order to be able to meet more demands. The government agencies of each nation are trying to push for international trade. in order to bring profits to develop the country to prosper further and all these changes have affected countries. As a result, adjustments must be made to prepare for the economic situation in the form of trade competition that occurs. Not even a superpower in Asia like the People's Republic of China despite the communist rule, still pays attention to trade liberalization with foreign countries as well.

China is a vast area consisting of counties and many cities that are known as the commercial center of Asia. One of them is Kunming which is located in Yunnan Province. It is a promising market for imported goods and services from around the world; especially, entrepreneurs who invested in Kunming have produced products that have made it the number one retail market in China.

Kunming's total population is 8,795,000. There are 3,055,000 people in the urban area, and 5,740,000 people in the metropolitan area. The per capita income of Kunming is about 5,300 yuan/year. Kunming is the southwestern city that best reflects modern China, rapid growth makes this city become the city where foreign businessmen are willing to invest the most. Especially for investors from ASEAN one of the factors driving Yunnan's provincial capital growth leaps and bounds is the throwing of federal government support. According to the Western development policy to grow on an equal footing with the East Coast whether promoting trade, investment, building infrastructure, or even linking transportation routes. These show the growth and development direction of the Kunming capital city of Yunnan province. Despite the rapid development of Kunming, and continued for many years. But instead of reaching the point of deceleration, Kunming is a city that still plays an important role in economic development because Kunming is the crossroads between western China and ASEAN countries.

Kunming, the capital city of Yunnan is China's fourth-largest port after Shanghai, Beijing, and Guangzhou, where the Chinese authorities intend to serve as a gateway to Western trade. After developing the R3A route connecting Thailand, Laos, and Vietnam to ASEAN, targeting logistics hubs Trade with allies looking to enter the Chinese market. There are about 4 million citizens who have taken up trading jobs in Kunming. While the population of Yunnan has 45 million people, they see trade opportunities as well as foreign businessmen who want to penetrate this market so much. In addition, general roadside stalls images of cyclists peddling goods can still be seen because it is a traditional selling culture of Kunming people. They have done this since in the past. But when entering the world of free trade, the Yunnan authorities saw the potential and opportunity of people for trade in the city.

Therefore, Kunming has been renovated into a "new city" along with the installation of important infrastructure such as the airport. A large electric train project that is expected in the next 2 years, all construction plans will be completed for the "port city". The support for trade will flow continuously. One business in Kunming that has grown exponentially over the past decade is mining, hydropower plants, pharmaceuticals, real estate, and retail (Waitayasewi, 2022).

The Luosiwan international trade city project is the most important project in the southwestern area of the People's Republic of China. Luosiwan is a large wholesale center and a transport hub in the southwestern part of the country. Luosiwan is located between the new city of Kunming (Chenggang) and the old city of Kunming. The project started construction in 2008 and is the second-largest wholesale market in the People's Republic of China. The model from the wholesale market of Yiwu, Zhejiang Province is the largest in the country. The construction plan in various parts is a wholesale center, an exhibition center, a warehouse, and a complete logistics management system within the same area.

Luosiwan is managed by one of the most advanced technology systems in China. This project has a total area of 12,000 mu, or approximately 5,000 rai, constructed in various buildings. The project has invested more than 58 billion yuan (about nine billion US dollars) covering an area of 12 million square meters. This wholesale center is very important to Kunming. An electric train station was built to transport passengers from the old city of Kunming to trade in the center. Besides, there is an intercity bus station near the center to create convenience for service users (Waitayasewi, 2022).

The big wholesale hub is Luosiwan wholesale market. There are many different product categories with a range of quality that can satisfy the expectations of consumers in each category as well as management that is effective and can help businesses cut expenses. This is prepared to serve as a distribution and collection hub for manufacturers from both China and other countries around the world. There are various types of customers such as business people, general consumers, and tourists. Moreover, both the location and the convenience of transportation is another advantage of this wholesale center.

There are many companies that offer delivery services in the Chinese mainland, but in Kunming, most of the delivery companies use Mandarin to communicate with their clerks. Many local companies are available. The main express delivery companies in Kunming are: (1) Sto Express, Features: many outlets, low price, slow speed. (2) Yto Express, Features: Pick up fast, good experience. (3) Zto Express, Features: Pick up fast, good experience. (4) Yunda Express, Features: Moderate price, moderate

speed. (5) Rabbit Express, Features: Affordable, good experience. (6) Deppon Express, Features: The network covers 98% of counties in the country, the headquarters is directly operated, and has its own logistics fleet, mainly large express. (7) Sf Express, Features: Apart from the high price, everything else is very good, especially fast. (8) Jd.com Express, Features: Fast speed, good experience. And (9) Deppon Logistics, Features: Suitable for mailing oversized pieces (Overseas Trade Promotion Office in Xiamen, 2023). As follows:

1. Shentong (Sto) Express, Features: many outlets, low price, slow speed. This company's main advantage is that it is a transportation firm with secure assets. It has the capacity to generate opportunities and establish network connectivity for all kinds of large-scale transportation worldwide. The company has over 20 years of experience and operates more than 25,000 branches globally.

2. Yto Express, Features: Pick up fast, good experience. The shipping company utilizes modern innovations like the order tracker system to track both domestic and international parcels, supported by a network of online branches worldwide.

3. Zto Express, Features: Pick up fast, good experience. This is a company that specializes in providing express delivery and logistics services in China, as well as in other countries across Asia, Europe, and America. They offer shipping services for both traditional merchants and e-commerce businesses, as well as other express service users. The company has an extensive transportation system in place to ensure that their network of partners and customers are always well-served.

4. Yunda Express, Features: Moderate price, moderate speed. This is a company based in China that offers both domestic and international express delivery solutions, including those from Hong Kong. They specialize in logistics and supply chain management, utilizing advanced manufacturing technology. The company is financially stable and has publicly traded shares, and their services are trusted by users all around the world thanks to their extensive network.

5. Rabbit Express, Features: Affordable, good experience. It is a transportation business that provides accommodation and food services worldwide. They also utilize top brokerage platforms for global InsurTech and FinTech products.

6. Deppon Express, Features: The network covers 98% of counties in the country, the headquarters is directly operated, has its own logistics fleet, mainly large express. The company has been operating since 1996 and has established a secure route in the shipping and logistics industry by providing contracting firms access to top-notch services. They specialize in large-scale express delivery, cross-border warehousing, logistics, and all aspects of the supply chain. One of Deppon Express's key strengths is their highly efficient tracking service.

7. Sf Express, Features: Apart from the high price, everything else is very good, especially fast. The company provides logistics services across all systems. Their business is expanding regionally, nationally, and globally to meet the unique needs of each market group by covering the complete supply chain. They are an intelligent logistics service provider with a network that includes air and terrestrial transportation, as well as data networks. Due to its strong management and network control, the company has a competitive advantage in terms of network scale.

8. Jd.com Express, Features: Fast speed, good experience. The company is a modern establishment, having been in business for over 20 years. It boasts of high income and stability and what sets it apart is its use of a major Chinese e-commerce platform. Customers and business partners can order products through an online platform that guarantees delivery within 24 hours. They use a logistics system that employs automatic delivery robots and drones to deliver goods during rush hours. Additionally, they have an intelligent warehouse system that uses robots to manage inventory and arrange for swift delivery of goods based on customer needs.

9. Deppon Logistics, Features: Suitable for mailing oversized pieces. These companies have a large customer base that relies on their services. They operate in the intelligent logistics industry and excel in using data and advanced technology like barcodes, radio frequency identification, GPS sensor systems, AI technology, automation systems, and integrated information systems. These technologies help increase the efficiency of the logistics process, whether it involves transportation, warehousing, storage, or product distribution. Their primary goal is to provide quick, convenient, and accurate service to customers while reducing turnover costs, improving operational efficiency, and increasing profits for the organization.

Therefore, all these 9 express delivery companies have many branches because there are a large number of transportation service users. In addition, operators of transport companies have developed modern transportation systems by bringing innovation to apply in order to have long-term competitiveness.

2.1.2 Types of express delivery company

Nowadays, there are many alternative transportation methods. The shipper must choose a transportation method that is suitable for the product, cost, and customer needs, which can be classified into 5 types of transportation with different advantages and disadvantages to help transport the most efficient and suitable products. The sender should study the transportation methods that are suitable for each type of product.

The type of transportation of goods, transportation has progressed and technology has developed even more, can be divided into 5 types as follows: (The Federation of China Industries, 2022).

1) Land transportation

Land transport is popular today, suitable for medium to large items. Which is convenient, fast, and can deliver goods at any time according to the needs of the sender and receiver suitable for short and medium-distance transportation. But the transportation cost is high compared to railway transportation, and low-security frequent accidents can't set a definite time. Depending on traffic and weather conditions can be classified into 3 types as follows;

1.1) Motor transportation or truck transportation that is currently very popular and suitable for medium to large-size products, convenient, fast, and able to transport goods at any time as needed.

1.2) Railroads are another important transportation route, which was very popular in the past or the pioneering era of transportation even today it is less popular. It is suitable for transporting heavy and bulky goods over long distances with very affordable service rates and can transport many types of goods.

1.3) Motorcycle transport, suitable for small and medium-sized items. Short transportation distances cannot be sent over a distance very affordable. Motorcycle transport is suitable for items that need speed in a short distance, see Fig.1



Figure 1 Land transportation

Source: <https://www.prosoftgps.com> (2023)

2) Water transportation

Water transport is an old method of transportation that has existed since ancient times, using rivers and canals as transport routes, including sea transportation which is mainly used for international transport. This water transport is suitable for large cargoes and can transport large quantities such as sand, ore, paddy, machinery, rubber, etc.

Water transport also includes sea transport. In general, water transport uses merchant ships that are largely able to transport large amounts of goods; especially, sea freight which water transport relies on the main infrastructure is the port. The cost per unit is low because of the large size of the ship, and low driving power per weight. It is able to transport large cargo and can support almost all kinds of products, see Fig. 2.



Figure 2 Water transportation

Source: <https://www.prosoftgps.com> (2023)

3) Air transportation

Air transport is very important nowadays; especially, international transportation because it can transport faster over long distances than other types of transport. It doesn't take much time to transport. It is convenient, safe, and suitable for transporting goods that are easy to lose, or suitable for transporting fragile products or fashion products. The companies can spread their products all over the world including living things such as pets' technology equipment, plants, fruits, etc. Air transport is not suitable for large products, heavyweight, and low-price. Air freight is more expensive than other types of transportation, see Fig. 3



Figure 3 Air transportation

Source: <https://www.prosoftgps.com> (2023)

4) Container system

Transportation by container was built to be strong and durable against the weather. It is able to lift and unload goods using a crane and switch modes of transportation to other forms on the way, for example, from a ship to a truck. Currently, the shipping by container system is very popular; especially, in transporting products from China to Thailand. Containers are resistant to weather conditions and can be placed outdoors container. Therefore, it can protect the product from damage as well, see Fig. 4



Figure 4 Container system

Source: <https://www.prosoftgps.com> (2023)

5) Pipeline transportation

The transportation of liquid and gas items, such as tap water, oil, natural gas, etc., by means of pipeline transportation, is different from other transportation because the equipment used in transportation does not need to move. The route of transportation may be on the ground, underground, or underwater. It depends on the topography and climate of each area. The first country to use the transportation system through the pipeline is the United States. It is used for transporting oil. But for Thailand, it is used for transportation in this format as well as a transportation system for oil and natural gas pipelines, see Fig. 5.



Figure 5 Pipeline transportation

Source: <https://www.prosoftgps.com> (2023)

2.2 Supply Chain Collaboration

2.2.1 Introduction

Supply chain collaboration is about coordinating with internal departments and external partners to sustain an optimized flow through the supply chain in order to efficiently meet demand and ensure on-time, in-full delivery. It means establishing real-time shared visibility and processes with supply chain partners to facilitate the identification and resolution of issues. Supply chain collaboration encompasses the full scope of supply chain functions, including purchase order processes, forecasting, capacity planning, and quality management. Cao and Zhang (2011) conducted supply chain collaboration as a partnership process where two or more autonomous firms work closely to plan and execute supply chain operations toward common goals and mutual benefits.

Supply chain collaboration is between two or more companies working together (Simatupang, and Sridharan (2005); Cao, and Zhang, (2011); Kumar, and Banerjee (2012). Let's both have a common goal of encouraging cooperation rather than competitive work and demonstrating mutual respect. They are involved in the decision-making process and provide assistance when needed rather than simply carrying out orders (Hoegl and Wagner, 2005). It is an important element that will lead to the quality

of raw materials. Rapid and continuously updated product delivery, and product efficiency (Traisilanan, 2011). The elements of working together will be defined as a recognized basis for collaborative efforts affecting the recognition of operations in the supply chain (Simatupang and Sridharan, 2005).

Many researchers are studying supply chain collaboration. For example, Min et al. (2005); Cao and Zhang (2011); Kumar and Banerjee (2012), researchers investigated elements of supply chain collaboration. Supply chain collaboration turned out to be the joint activities of information sharing, joint planning, joint decision-making, knowledge sharing, resource resolution, joint problem solving, appropriate revenue sharing, and joint performance measurement.

Kalwani and Narayandas (1995) conducted an empirical assessment of the impact of long-term relationships with specific customers on the performance of supplier firms. Use cross-sectional and longitudinal data available in compilations, databases, and compression exposure databases. It was found that those involved in production distribution center operators and retail operators must work together to develop innovation or technology in systematic work. The information is precise and accurate. Be current and timely with a connection from the upstream, midstream, and downstream in each organization.

Kumar's research et al. (1996) suggest classified inter-organizational systems (IOS) into three topologies: IOS centralized information resources, value, supply chain IOS, and networked IOS to identify potential conflict risks while working, work systems, and inter-organizational work and to recommend operational strategies to reduce the likelihood of conflicts arising from redundant work or such problems to a minimum. A study by Shore (2000) identified various factors that affect the flow of information between customers and suppliers, industry, market conditions, competitive environment, national culture, organizational culture, size of business, and information support of the country.

The relationship in the supply chain was found to be a relationship at the level of collaboration. It can happen between the raw material supplier and the partner company. It is a relationship that has common goals for both parties, collaborates to improve efficiency, and aims for goal-oriented, high-quality cooperation (Vereecke and

Muyllé, 2006). Supply chain alignment has therefore become a strategy for creating competitive advantage and developing core business capabilities. A quality-oriented approach to cooperation and elements of cooperation are defined as the accepted basis for cooperation. Collaborative efforts impact perceived performance in supply chains (Simatupang and Sridharan, 2005).

2.2.2 The elements of collaboration

The researcher has studied the elements of collaboration in the supply chain and found that collaboration in the supply chain is important because doing activities together since sharing information, joint planning, joint decision, knowledge sharing, resources solving problems together, appropriate allocation of returns, and measuring performance together the details are as follows:

2.2.2.1 Information sharing: It is an important element, foundation, and center of collaboration in the supply chain (Montoya-Torres, and Ortiz-Vargas, 2014). If you have access to partner company information, your disclosure must be accurate and complete, and you must be able to use the information you disclose this information too. This can be done through formal communication with each other in a meeting or through informal communication among people working together. (Min, et al. 2005). Information on production processes, marketing, and customer needs are necessary (Simatupang and Sridharan, 2005).

2.2.2.2 Joint planning; Components of working together is planning together. It works in close collaboration with partner companies and is based on the sharing of information used to plan together (Min et al. 2005). Working with partners requires joint planning with goal objectives, duties, and responsibilities of working together clearly, which the joint plan is bound to future continuously (Kumar, and Banerjee, 2012). Joint planning can arise from planning production operations and marketing, and joint planning has been shown to be an integral part of chain collaboration. Supply also enhances cooperation that leads to success (Kumar, and Banerjee, 2012).

2.2.2.3 Shared decision-making: It has been recognized as one of the key elements of supply chain cooperation (Ramathan and Gunasekaran, 2014). It is the process by which companies and their partners jointly determine the level of joint

planning by specifying the method. It is most effective in achieving goals and profitability-optimized operations in loop supply chains (Cao and Zhang, 2011). Togetherness can occur in meetings or joint conversations. The decisions are based on different levels according to the expertise of operations in the supply chain. But still, help each other to make decisions so that the decision-making results their most effective (Simatupang, and Sridharan, 2005).

2.2.2.4 Sharing knowledge: It is crucial for driving the company forward and making effective decisions. It's an essential part of cooperation, facilitating the exchange of ideas and information that not only leads to the development of new knowledge but also helps resolve work-related issues. Business information is shared among colleagues and partners to encourage cross-company learning and gain insights into partner companies. (Chen et al. 2014). It is also an exploration of knowledge and the use of existing knowledge to achieve a better understanding in response to the market and competitive environment (Cao, and Zhang, 2011); Crook et al. (2008) suggested that when independent firms collaborate and share knowledge with others. They can earn more than they can achieve on standard market exchanges.

2.2.2.5 Resource sharing: Companies working together must be ready to share resources, and initiatives (Barratt, 2004). Investing in the capabilities of existing assets in the partner company's supply chain, such as production equipment, facilities convenience, and technology (Cao, and Zhang, 2011) which these resources can be shared with partners to help the working relationship earns higher returns. In addition, sharing efficient resources demonstrate inventory reduction and cost savings.

2.2.2.6 Resource sharing: It is an important element in considering the benefits of collaboration (Kumar and Banerjee, 2012). Collaborative problem-solving is a solution for resolving conflicts between companies. With partner companies, problems can arise due to the nature of cooperation. Therefore, even in the event of an unforeseen disaster, it is important to work with our business partners to resolve the issue.

2.2.2.7 Joint problem-solving: Effort can be more creative than correction or control, identify issues, and take corrective action (Oh et al. 2008; Kumar and Banerjee, 2012). Business partners have problems with product quality. Business

partners can step in instead of finding new raw material suppliers. They should help find the cause of the problem and fix it (Min et al. 2005). Appropriate allocation of returns (incentive alignment), and properly distributing benefits involves sharing the business costs, risks, and benefits of suppliers in the supply chain.

2.2.2.8 Appropriate allocation of returns (incentive alignment) It is the process of sharing company costs, risks, and benefits from suppliers in the supply chain by encouraging business partners to act in line with their goals and make decisions that are best for the chain. The service as a whole, although there is a risk of synergies, proper revenue sharing ensures that the business partners are receptive to the benefits that may arise from the collaboration (Cao and Zhang, 2011). Joint performance measurement is an assessment of customer satisfaction. Satisfaction in working together between the company and its business partners improves the efficiency of the collaboration between the company and its partners (Kumar, and Banerjee, 2012). For this reason, it is an important factor in determining whether cooperation is improving (Nyaga et al. 2010). Performance can be measured in financial and non- financial (Min et al. 2005).

The study was launched and analyzed to examine the role of these variables in the information-sharing work strategy that contributes to long-term effectiveness. The national information supports a presentation and analysis study to examine the role of these variables in information-sharing work strategies that contribute to long-term performance, and national information support. A presentation analysis study to examine the role of these variables in information-sharing work strategies that contribute to long-term performance.

2.3 Supply Chain Capabilities

2.3.1 Introduction

Supply chain capabilities are the ability of an organization to provide goods or services to customers. The term often refers to a company's manufacturing capabilities, but it can also include other areas, such as customer service, order fulfillment, and logistics. Supply chain management has been grouped into 5 elements of supply chain capability as follows:

2.3.1.1 Supply sense: Organizations need to know what is possible in their supply chains. This capability includes processes such as supply chain planning, supply risk management, and supplier relationship management.

2.3.1.2 Supply response: The operations in a supply chain that make things happen-inbound logistics, manufacturing, and asset management-fall into this category.

2.3.1.3 Decide and commit: With their ability to sense supply and demand, companies can coordinate the supply chain from start to finish and make beneficial promises to customers. Processes that enable these actions include control towers, product lifecycle management, advanced sales, and operations planning.

2.3.1.4 Demand sense: This capability involves learning and monitoring what customers want. Demand management, forecasting, and demand sensing are included here.

2.3.1.5 Demand response: Processes like logistics, Omni channel fulfillment, and e-commerce allow companies to provide customers with the products and services they want.

The perception of supplier risk helps motivate the supply chain manager to enhance the integration capabilities of the supply chain and thus achieve higher resilience. Furthermore, the perception of external risks to a supply chain actually reduces the effort of deploying external capabilities to obtain resilience. Overall, the findings strongly support the view that resources, routines, and capabilities provide different results in terms of resilience depending on supply chain risk factors (Brusset and Teller, 2017).

2.4 Firm Performance

2.4.1 Introduction

Firm performance measures are indicators that determine how well an organization achieves its goals. This may include the direction of the request, client satisfaction, fiscal performance, profitability of the business, or other factors related.

The performance is measured numerous ways, similar to company performance, functional effectiveness, and fiscal effectiveness. Still, it has been accepted that there's no further competition between associations. But it's in the process of force chain capability.

Therefore, for global competition, it is very important to integrate all network members to integrate together. And should measure performance at the supply chain level. One organization with a better supply chain can keep business running smoothly, and efficiently (Singham et al. 2017). Managers must create a complete supply chain system having a clear approach with a positive effect on performance. The most effective is supply chain collaboration (Seo et al. 2015).

2.5 Conclusion

This study was conducted to understand how supply chain collaboration approaches contribute to firm performance. The current study finds out the approaches to enhance the firm performance literature through supply chain collaboration, supply chain capability, and firm performance. It has been proved that supply chain collaboration and supply chain capability have a direct and significant role in the firm performance of supply chain members of the express delivery company in Kunming, the People's Republic of China. This study shows the impact of the mediating role of supply chain capabilities through supply chain collaboration approaches on the firm performance of the express delivery company in Kunming Province.

In this article, the author proposes using force chain collaboration and capability to improve firm performance. Overall, this study provides further mindfulness of the developing field of the connections between the interceding part of force chain capabilities, through force chain collaboration and establishment performance measures. There are colorful other approaches and strategies available for enhancing firm performance, unborn exploration can be conducted on these approaches and a comparison of these approaches with other express delivery companies.

CHAPTER 3

RESEARCH METHODOLOGY

In this chapter, the research design and its methods are introduced. The research design can be developed on the basis of the research objectives.

3.1 Research Methodology

This research methodology is divided into 3 parts as follows:

Part 1. First of all, the study reviews the related firm performance of the express delivery company in Kunming, People's Republic of China, supply chain collaboration theory, and firm performance measurement. Then, the questionnaire was about supply chain collaboration, supply chain capabilities, and firm performance. The mediating role of the supply chain capabilities for the linking variable of the independent variable to the dependent variable will have an increase or decrease in the effect on the firm performance of the express delivery company in Kunming.

Population and Sample

According to Hair et al. (2010), the sample size should be determined based on the number of predictive variables. They suggest using a sample size of 10-15-20 samples per 1 parameter. Anderson and Gerbing (1988) also recommend a sample size of 10-15-20 times the number of observed variables. In this study, there are 3 latent variables: supply chain collaboration, supply chain capabilities, and firm performance, which results in 30 observed variables. Therefore, the recommended sample size is 300 people (30 x 10). The population for this study consisted of 235 owners or branch managers, and 78.33% of them responded, meeting the conditions of the Structural Equation Model (SEM). Those who respond to inquiries on behalf of the company have direct management knowledge and experience. Then, the existing questionnaire online delivery modes in perspectives of all owners or branch managers by asking for opinions or priorities that have been taken in the company to an ideal solution of the express delivery company in Kunming.

For my research, I will be used as a data collection tool.

Part 2. Research tools and online questionnaires were sent to entrepreneurs/ owners or branch managers, of 9 Express Delivery Companies.

Part 3. Data analysis for statistics

In this study, the researcher used descriptive statistics and inferential statistics to analyze the data with the following;

1) Descriptive statistics is for the analysis of percentage, mean, and standard deviation.

2) Inferential statistics with Structural Equation Model (SEM) by ADANCO technique.

3) To test the role of supply chain capabilities linking supply chain collaboration with the firm performance by PROCESS calculator for the significance of mediation. The dependent variable is the firm performance of the express delivery company in Kunming.

4) The summary of quantitative research results.

3.2 Research Process Flow Chart

Quantitative research process,

The researcher explains the research method as follows: 1) Problem statement, 2) Literature review, Research gap, and 3) Research plan. As follows:

3.2.1 A population is a group of analytical units. There are total 1,317 domestic transport companies located in Kunming City, There are 80 companies classified as 5A-level, 33 companies as 4A-level, 40 companies as 3A-level and 19 companies as 2A-level, all of which are national logistics companies with a total of 100 companies. The remaining companies are sub-branches. (Overseas Trade Promotion Office in Xiamen, 2023). A total of 300 people with direct management knowledge and experience in companies are included in sub-branches from 7 districts: Zhaotong, Qujing, Yuxi, Pu'er, Baoshan, Lijiang, and Lincang. The researcher used the ranking of Gross Domestic Product (GDP) Proportion of the transportation sector in China (2022). Therefore, they are owners or managers of nine express delivery companies, in Kunming, the People's Republic of China.

Table 1 Proportion of the number of sample units

Province	GDP (Billion Yuan)	Number of population was owners/ managers 9 express delivery companies (case)	Number of sample units from owners/ managers 9 express delivery companies (case)	Proportion of owners/ managers express delivery companies (Percentage)
1. Qujing	3802.20	338	77	25.67
2. Yuxi	2520.57	256	58	19.33
3. Zhaotong	1541.02	193	44	14.67
4. Baoshan	1262.44	161	37	12.33
5. Pu'er	1072.97	155	35	11.67
6. Lincang	1000.24	129	30	10.00
7. Lijian	620.10	85	19	6.33
Total		1,317	300	100.00

Source : Overseas Trade Promotion Office in Xiamen (2023); China GDP. (2022)

3.2.2 Online questionnaire survey

The researcher designed a questionnaire after reviewing related literature to ensure the inquiry's content was comprehensive and consistent with the objectives. Checking the quality of tools used in research for this study evaluated the instruments in two stages as follows:

First, it assessed the instruments for validity, reliability, and language smoothness prior to the survey. Then, it evaluated the overall confidence of the questionnaire after conducting the survey.

1) Checking the quality of the tools before the actual survey

The instrument used was a questionnaire which was tested for validity and reliability as follows:

To ensure content validity, the researcher presented the questionnaire to three academic experts for examination. They assessed the language used in the research and checked for consistency, including item-objective congruency (IOC). Confidence in measuring internal consistency was determined through reliability, following the model outlined below:

Experts determine the scores using the following process.

+1 means the questions are related to the variables' stories.

-1 means the questions are not related to the variables' stories.

0 means I'm not sure if the question aligns with the storyline of the variation.

The criteria for interpretation are listed below:

$IOC \geq .50$ means the questions are consistent with the research objectives.

$IOC < .50$ means the questions are not consistent with the research objectives.

The researcher collaborated with three experts in business administration and management to ensure that the questions aligned with the intended research objectives. The experts were Assoc. Prof. Dr. Piyakanit Chotivanich, from Ubon Ratchathani Rajabhat University, Thailand, Asst. Prof. Dr. Kanokwan Uthongsap, from the College of Interdisciplinary Studies, Thammasat University, and Assoc. Prof. Dr. Boonthawan Wingwon, from Faculty of Management Scienced, Lampang Rajabhat University, Thailand.

The validity of the content is consistent between the question and the objective. (Index of Item-Objective Congruence; IOC) for three-point was (1) Supply chain collaboration, ten elements (2) Supply chain capabilities, and (3) Firm performance. Let's measure the validity of the content by analyzing the consistency between the question items and the objectives (IOC) and the consistency between the questions (Rovinelli & Hambleton, 1997). Expert opinions are taken into consideration when determining the Index-of item congruence (IOC) for each question. Only questions with an IOC value ranging from 0.50 to 1.00 are selected. The questions with an IOC value

below 0.50 are improved based on suggestions and then further reviewed by an advisor for additional guidance. The results of the analysis to determine the reliability of the questionnaire. The average index of compliance IOC is between 0.66-1.00. The total average for content validity is equal to 0.92. Table 2 provides further details.

Table 2 Content validity of the scale

Scale	Content validity
Supply Chain Collaboration	Average total 0.89
1. It is important to prioritize working together effectively.	1.00
2. Collaborating with others leads to the formation of long-term and environmentally friendly business alliances.	0.66
3. The organization's goals align with those of its joint partners.	1.00
4. It is important to prioritize investments based on the agreement in order to achieve mutual benefits.	1.00
5. Electronic systems can support sending information within and between organizations.	1.00
6. Organizations exchange knowledge to establish collaborative partnerships.	0.66
7. Let's work together to reduce risk by establishing joint cooperation.	1.00
8. It is important to prioritize working together to effectively manage resources for optimal operational benefits.	1.00
9. Let's focus on supporting each other by sharing resources to decrease expenses in supply chain management.	0.66
10. To enhance operational efficiency, prioritize the development of joint personnel.	1.00

Table 2 (Cont.)

Scale	Content validity
Supply Chain Capabilities	Average total 0.93
1. It is important to prioritize flexibility when it comes to sourcing raw materials.	1.00
2. There is a focus on being flexible when it comes to adjusting work based on orders.	1.00
3. It's important to focus on one's ability to adapt to change.	1.00
4. Businesses can utilize forecasting to predict various factors that may have an impact.	1.00
5. It is important to focus on spreading out risks across the entire supply chain of the business.	0.66
6. Organizations have the ability to learn and consistently stay updated on what the customers desire.	1.00
7. The company can assess its capacity to acquire raw materials and equipment as per customer needs.	1.00
8. The company is capable of accurately recording information and managing the placement of raw materials in the warehouse.	0.66
9. The company offers various transportation options to meet customer delivery requirements.	1.00
10. The company efficiently improves operations by actively listening to customer feedback across all channels.	1.00

Table 2 (Cont.)

Scale	Content validity
Firm Performance	Average Total 0.93
1. The company emphasizes the importance of understanding information flow in order to improve supply chain management effectiveness.	1
2. It is important to prioritize the flexibility of cash flow.	1
3. The focus is on enhancing the capacity to generate higher the total return on shareholder.	1
4 Our focus should be on developing innovative strategies that lead to a competitive advantage for the organization.	1
5. The focus of the company's operations is to improve customer satisfaction.	1
6. Businesses can boost productivity to fulfill the demands of their customers.	1
7. Focus on the capability to efficiently manage the delivery of products and services within designated time frames.	.66
8. It is important to focus on inventory costs and product turnover rates that are suitable.	.66
9. Efficient time management reduces waste resources and solves problems	1
10. The business emphasizes long-term profitability	1

From Table 2, it is found that the questionnaire has a reliability value higher than 0.50 in all aspects, indicating that the questionnaire has a high reliability were 0.92.

Second, complete the revised questionnaire that has been reviewed by three experts. Then, administer the questionnaire to 30 individuals who have the same qualifications as the owner of the express delivery company in Guangxi Province, but

who are not a part of the research sample. Use the resulting data to calculate the reliability value, or alpha coefficient (α -coefficient), using Cronbach's method. The overall confidence value should be 0.7 or higher, as recommended by Nunnally (1978), which indicates a reliable measure of 0.70 or greater. The Cronbach's alpha coefficient of the between score = 0.9382 to 0.9682, The questionnaire has a total value of 0.9573, exceeding the acceptable threshold of 0.70 based on Nunnally & Bernstein's criteria (1994). The details are presented as shown in Table 3 as follows.

Table 3 Cronbach's alpha coefficient of scale

Scale	Cronbach's alpha
Supply chain collaboration	0.9382
Supply chain capabilities	0.9682
Firm performance	0.9657
Total average scale	0.9573

3.2.3 Data collection

Then, existing questionnaire online delivery modes in perspectives of all owners or branch managers of the express delivery company by asking for opinions or priorities that have been taken in the company to an ideal solution of supply chain collaboration, supply chain capabilities, and firm performance of the express delivery company, in Kunming.

The city of Kunming comprises of one main city, six districts, and seven counties (Royal Thai Consulate-General, Kunming, China, 2023). The research has focused on the seven districts due to their vast area, where nine express delivery companies have invested. The objective is to provide transportation services that cover all areas. The researcher contacted and coordinated with the president or vice president of the express delivery company owners' Association. The seven districts that have been identified are Zhaotong, Qujing, Yuxi, Pu'er, Baoshan, Lijiang, and Lincang.

There will be sub-branches in each district based on the target groups for data collection. The data can be collected either in person, via electronic mail (e-mail), WeChat, or Messenger. The data will be collected from the business owners, managers, or sub-branch managers of the express delivery companies that are members of the express delivery company owners' association. The total number of companies that have joined as members is 300. The researcher will send approximately 300 sets of online questionnaires over a period of 1 month (October 2023). The questionnaires were returned complete, totaling 235 sets, accounting for 78.33 percent. This sample size is sufficient to draw inferences about the population (Rattanamanee & Phasunon, 2019). The researcher verified the accuracy of the questionnaire by coding each question and filling in the necessary information for the ready-made program.

3.2.4 Data analysis

The researcher used descriptive statistics and inferential statistics with the Structural Equation Model (SEM) by ADANCO technique.

3.2.5 Conclusion and Implication

It is a summary of research results that have been integrated with related theories and research to provide a comprehensive coverage of research issues, as per the specified objectives.

3.2.6 New Knowledge

The research results have been integrated with related theories and research to provide comprehensive coverage of research issues, as specified. Additionally, new knowledge is generated. See Fig. 6

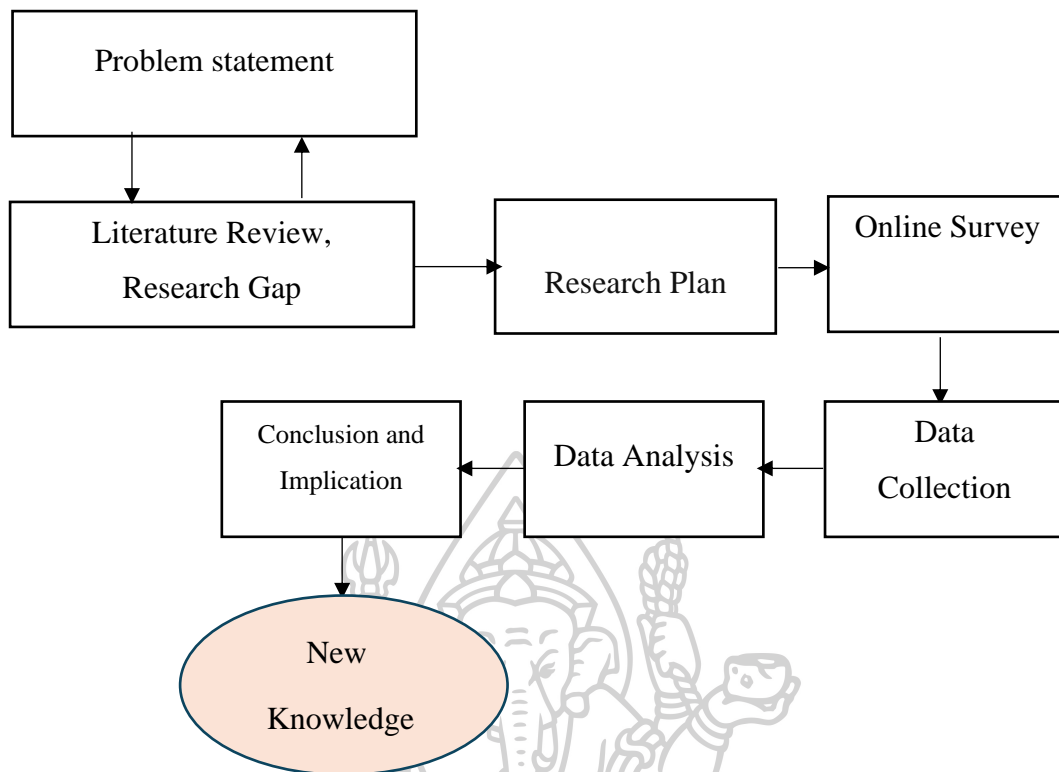


Figure 6 Research Process Flow Chart

3.3 Research Tools

Questionnaire about supply chain collaboration variable and supply chain capabilities variable. The following dependent variable is firm performance. The questionnaire will be created to concept review, theories, and research related to supply chain management in the related collaboration of stakeholders, and the ability to work of employees in the organization by manager approach, including the performance is evaluated whether it meets the set goals.

There are 3 categories of 10 questions per category to ask owners/ managers in the express delivery company, including branch managers in Kunming.

It will be an online questionnaire about supply chain collaboration, capabilities, including firm performance, and the questionnaire is a rating scale of 5 levels (Rating Scale) applied according to Likert's method (Likert, 1967, p. 76), which specifies 5 levels of importance as follows:

1 = very low, 2 = low, 3 = moderate, 4 = high, and 5 = very high.

However, interpretation of average scores in the study, the researcher gave the criteria for 5 scales as follows:

Average of score	Interpretation
1.00-1.49	Very low level
1.50-2.49	Low level
2.50-3.49	Moderate level
3.50-4.49	High level
4.50-5.00	Very high level

3.4 Reliability of the Measurement Scales

Reliability analysis of the items can be explained by Cronbach's Alpha value, which should be more than 0.5; however, Hoque and Awang (2016) suggest that a value above 0.6 can ensure consistency. Moreover, composite reliability (CR) can also be used to assess the reliability of a principle measure of each construct in the measurement model. A cut-off point for composite construct normally, it used reliability is .70 (Hair, Ringle, & Sarstedt, 2011) However, sometimes the CR values are below .70, it could be acceptable if the study is exploratory in nature, but the CR value is more than 0.6 it can be accepted as well (Hair et al. 2011). As another evaluation method for construct reliability, the convergent validity by the result of the average variance extracted (AVE), the overall variance can be explained by variance extracted. It was the indicators explained by the latent construct. the variance extracted measure can be calculated to explain A higher variance extracted value can be interpreted that the indicators are exactly representative of the latent construct. The average variance extracted (AVE) value, it is recommended the proper value should be higher than 0.50 (Hair et al. 2011).

3.5 Conceptual Framework

The result of the concept review, theories, and related literature review shows that supply chain collaboration had a direct effect on the firm performance, supply chain

collaboration had a direct effect on the supply chain capabilities, and supply chain capabilities had a direct effect on the firm performance. The research conceptual framework is shown in Fig. 7.

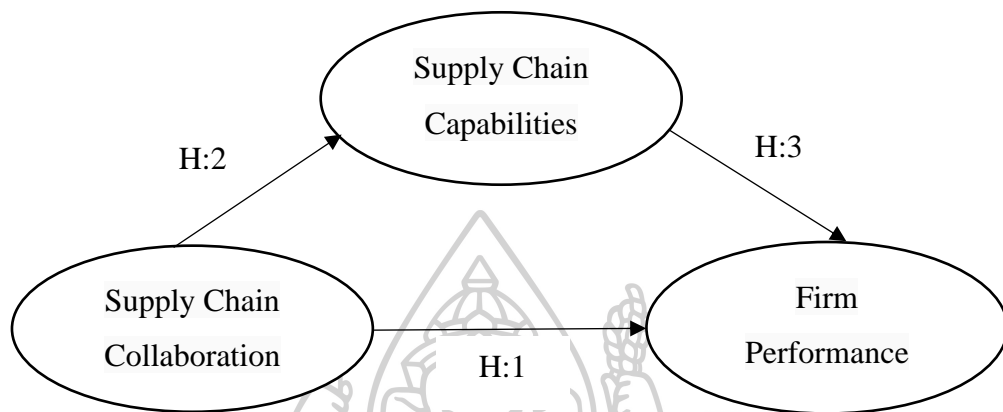


Figure 7 Conceptual Framework



3.6 Research Hypothesis

Hypothesis 1 Supply chain collaboration had a direct effect on the firm performance of the express delivery company.

Hypothesis 2 Supply chain collaboration had a direct effect on the supply chain capabilities of the express delivery company.

Hypothesis 3 Supply chain capabilities had a direct effect on the firm performance of the express delivery company.

Hypothesis 4 Test the role of supply chain capabilities linking supply chain collaboration with the firm performance of the express delivery company.

3.7 Summary

This chapter outlines the research methodology used in this study. Firstly, the researcher presented the research questions and framework. They also discussed the research design and survey instrument, including the population, sampling, and sample size, as well as the data collection procedures used in all three phases of the study. The statistical methods used, such as the index of item-objective congruence (IOC), factor analysis with common factor analysis, and structural equation modeling, were also explained. The researcher presented the measurement model and constructs used to assess the firm performance of the express delivery company and demonstrated the validity and reliability of the measurement scales. Finally, the indices for assessing and testing the role of supply chain capabilities in linking supply chain collaboration with firm performance were discussed.

CHAPTER 4

RESULTS AND ANALYSIS

The key points are to study the importance level of impacts of supply chain collaboration and firm performance: The mediating role of supply chain capabilities of express delivery companies in Kunming, the People's Republic of China. The research objectives were (1) To study the importance of supply chain collaboration, supply chain capabilities, and firm performance of the express delivery company, (2) To study the impact of supply chain collaboration, and firm performance: The mediating role of supply chain capabilities of the express delivery company, and (3) To test the role of supply chain capabilities linking supply chain collaboration with the firm performance of the express delivery company in Kunming. The research results are summarized, as follows:

4.1. Part 1 Result

4.1.1 Demography of entrepreneurs, managers including branch managers in the express delivery company in Kunming.

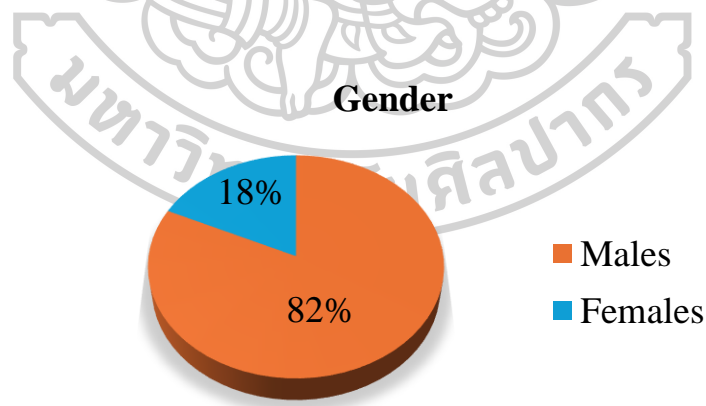


Figure 8 Gender

Figure 8, the gender by classifying it into two types. First, males were 82% and females 18% were entrepreneurs, managers including branch managers in the express delivery company in Kunming, the People's Republic of China. Most of the respondents are entrepreneurs and managers, including branch managers in the express delivery company (235).

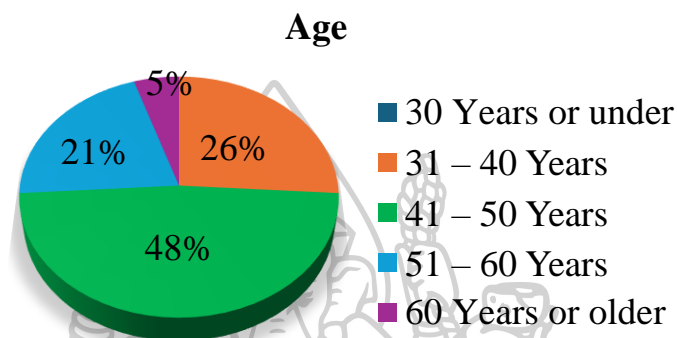


Figure 9 Age

Figure 9, The age by classified it into four types. First, 41-50 Years were 48%, 31-40 Years were 26%, 51-60 Years were 21%, and 30 Years or under 5% were entrepreneurs, branch managers, including branch managers in the express delivery company in Kunming, the People's Republic of China. Most of the respondents are entrepreneurs and managers, including branch managers in the express delivery company (235).

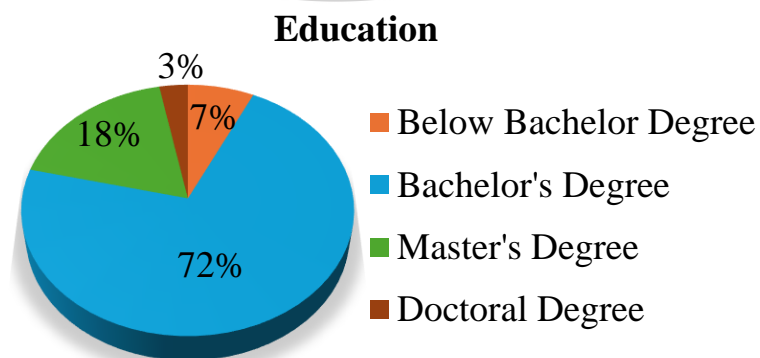


Figure 10 Education

Figure 10, Education by classifying it into four types. First, Bachelor's degrees were 72 %, Master's degrees were 18%, Below Bachelor's degrees were 7%, and Doctoral degrees 5% were entrepreneurs, managers including branch managers in express delivery company in Kunming, the People's Republic of China. Most of the respondents are entrepreneurs and managers, including branch managers in express delivery company (235).

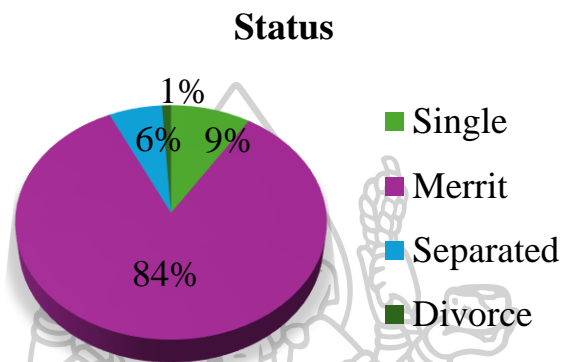


Figure 11 Status

Figure 11, The status by classified into four types. First, Merrit was 84%, single was 9%, separated was 6%, and divorced 1% were entrepreneurs, managers including branch managers in the express delivery company in Kunming, the People's Republic of China. Most of the respondents are entrepreneurs and managers, including branch managers in express delivery company (235).

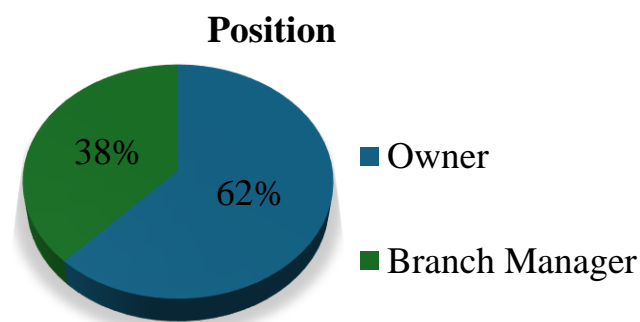


Figure 12 Position

Figure 12, The position by classified into two types. First, owners were 62%, and a branch manager 38% in the express delivery company in Kunming, the People's Republic of China. Most of the respondents are owners and branch managers in express delivery company (235).

Investment in a business

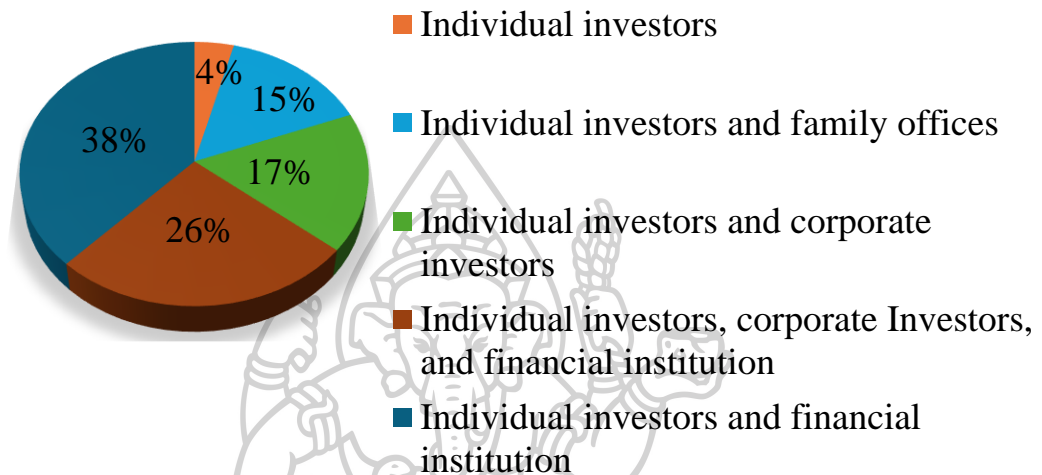


Figure 13 Investment in express delivery company

Figure 13, The investment in the express delivery company by classified it into five types. First, Individual investors and financial institution was 38%, Individual investors, corporate investors, and financial institution was 26%, Individual investors, corporate investors was 17%, Individual investors and family offices was 15%, and Individual investors, 4% were owners and branch managers in express delivery company in Kunming, the People's Republic of China. Most of the respondents are in express delivery company (235).

Number of employees

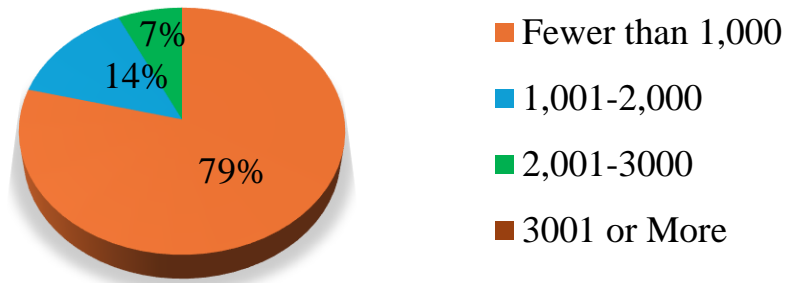


Figure 14 Number of employees

Figure 14, The number of employees in express delivery company by classified into three types. First, Fewer than 1,000 79%, 1,001-2,000 12%, and 2,001-3,000 7% were owners and branch managers in express delivery company in Kunming, the People's Republic of China. Most of the respondents are in express delivery company (235).

Age of the company

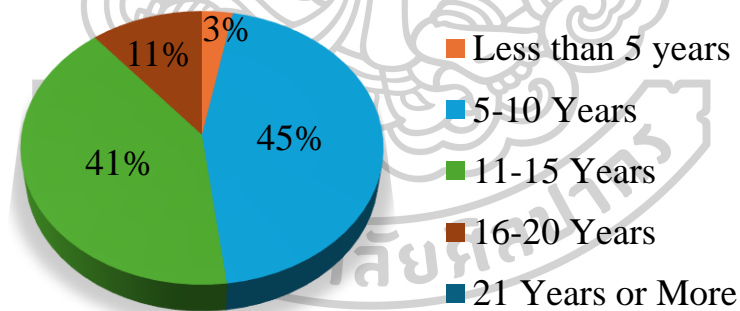


Figure 15 Age of the company

Figure 15, The age of the company in express delivery company by classified into four types. First, 5-10 Years was 45%, 11-15 Years was 41%, 16-20 Years was 11%, and less than 5 Years was 3% were owners and branch managers in the express delivery company in Kunming, the People's Republic of China. Most of the respondents are in express delivery company (235).

Size of Express Delivery Companies

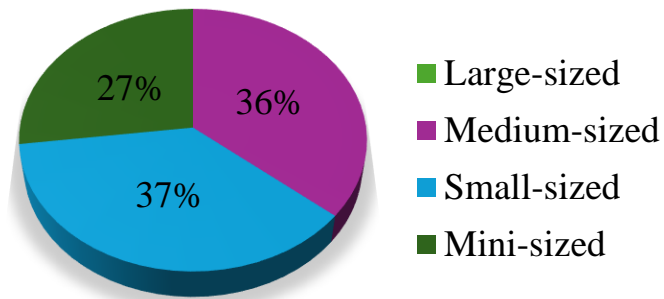


Figure 16 Size of Express Delivery Companies

Figure 16, The size of the express delivery company by classified into three types. First, small-sized 37%, medium-sized 36%, and mini-sized 27% were owners and branch managers in express delivery company in Kunming, the People's Republic of China. Most of the respondents are in express delivery company (235).

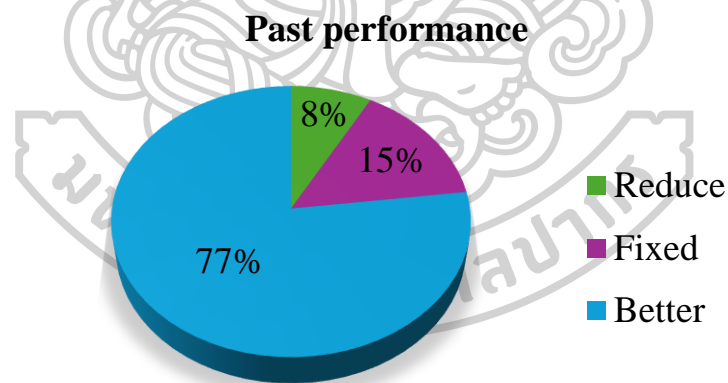


Figure 17 Past performance

Figure 17, The past performance of the express delivery company by classifying it into three types. First, better was 77%, fixed was 15%, and reduced was 8% were owners and branch managers in express delivery company in Kunming, the People's Republic of China. Most of the respondents are in express delivery company (235).

Express Delivery Companies income

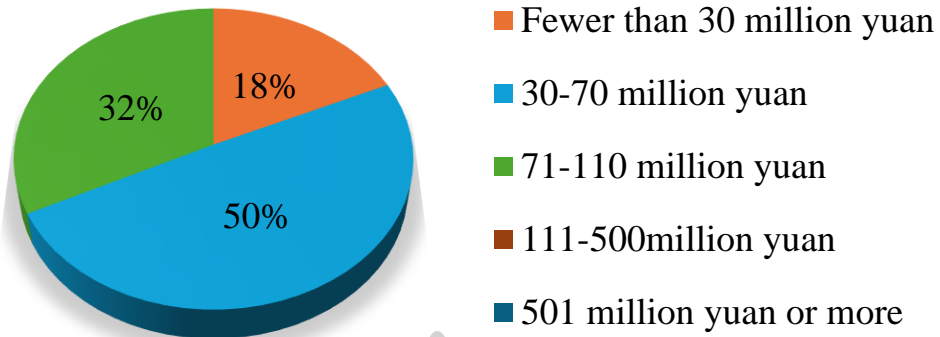


Figure 18 Express Delivery Companies income

Figure 18, The express delivery company income by classifying it into three types. First, 30-70 million yuan was 50%, 71-110 million yuan was 32%, and fewer than 30 million yuan was 27% were owners and branch managers in express delivery company in Kunming, the People's Republic of China. Most of the respondents are in express delivery company (235).

Type of express delivery company

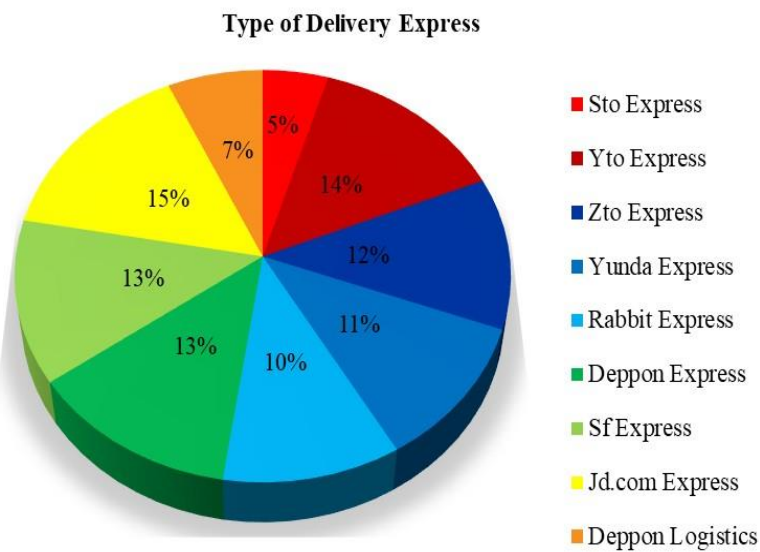


Figure 19 Type of Express Delivery Company

Figure 19, The type of express delivery company by classified into nine types. First, Jd.com Express, Features: Fast speed, good experience was 15%, followed by Yto Express, Features: Pick up fast, good experience was 14 Deppon Express, and Sf Express was 13%, Zto Express, Features: Pick up fast, the good experience was 12%, Yunda Express, Features Moderate price, moderate speed was 11%, Rabbit Express, Features: Affordable, good experience was 10%, Deppon Logistics, Features: Suitable for mailing oversized pieces was 7%, and lastly Sto Express, Features: many outlets, low price, slow speed was 5%, The information provider by owners and branch managers in express delivery company in Kunming, the People's Republic of China. Most of the respondents are in express delivery company (235).

4.2 Part 2 Result

4.2.1 Research Objective 1. To study the importance of supply chain collaboration, supply chain capabilities, and firm performance of express delivery company, in Kunming, the People's Republic of China.

Table 4 Descriptive statistic analysis of supply chain collaboration importance.

Supply Chain Collaboration	Mean	S.D.	Level of importance
1. It is important to prioritize working together effectively.	4.11	.936	High
2. Collaborating with others leads to the formation of long-term and environmentally friendly business alliances.	4.40	.699	High
3. The organization's goals align with those of its joint partners.	4.39	.662	High
4. It is important to prioritize investments based on the agreement in order to achieve mutual benefits.	4.31	.681	High

Table 4 (Cont.)

Supply Chain Collaboration	Mean	S.D.	Level of importance
5. Electronic systems can support sending information within and between organizations.	4.28	.716	High
6. Organizations exchange knowledge to establish collaborative partnerships.	4.36	.752	High
7. Let's work together to reduce risk by establishing joint cooperation.	4.35	.739	High
8. It is important to prioritize working together to effectively manage resources for optimal operational benefits.	4.34	.752	High
9. Let's focus on supporting each other by sharing resources to decrease expenses in supply chain management.	4.51	.518	Highly
10. To enhance operational efficiency, prioritize the development of joint personnel.	4.48	.526	High
Total average	4.36	.698	High

According to Table 4, supply chain collaboration is high important. The total average score was 4.36 with a standard deviation of 0.698. which indicates a high level of importance. When analyzing the factors, it was found that let's focus on supporting each other by sharing resources to decrease expenses in supply chain management was the most important factor, with a mean score of 4.51, and S.D was 0.518. Following this, to enhance operational efficiency, prioritizing the development of joint personnel was a mean score of 4.48, and S.D. was .526. Lastly, It is important to prioritize working together effectively, with a mean score of 4.08, and S.D. was 0.936.

Table 5 Descriptive statistic analysis of supply chain capabilities importance.

Supply Chain Capabilities	Mean	S.D.	Level of importance
1. It is important to prioritize flexibility when it comes to sourcing raw materials.	4.52	.534	Highly
2. There is a focus on being flexible when it comes to adjusting work based on orders.	4.23	.710	High
3. It's important to focus on one's ability to adapt to change.	4.26	.779	High
4. Businesses can utilize forecasting to predict various factors that may have an impact.	4.25	.795	High
5. It is important to focus on spreading out risks across the entire supply chain of the business.	4.20	.846	High
6. Organizations have the ability to learn and consistently stay updated on what the customers desire.	4.27	.841	High
7. The company can assess its capacity to acquire raw materials and equipment as per customer needs.	4.24	.775	High
8. The company is capable of accurately recording information and managing the placement of raw materials in the warehouse.	4.19	.833	High
9. The company offers various transportation options to meet customer delivery requirements.	4.11	.883	High
10. The company efficiently improves operations by actively listening to customer feedback across all channels.	4.15	.936	High
Total average	4.24	.793	High

According to Table 5, supply chain capabilities. is high important. The total average score was 4.24 with a standard deviation of 0.793. which indicates a high level of importance. When analyzing the factors, it was found that the organizations have the ability to learn and consistently stay updated on what the customers desire with a mean score of 4.27, and S.D was 0.841. Following this, It's important to focus on one's ability to adapt to change was a mean score of 4.26, and S.D. was .779. Lastly, The company offers various transportation options to meet customer delivery requirements, with a mean score of 4.11, and S.D. was 0.883.

Table 6 Descriptive statistic analysis of firm performance importance.

Firm Performance	Mean	S.D.	Level of importance
1. The Company emphasizes the importance of understanding information flow in order to improve supply chain management effectiveness.	4.16	.789	High
2. It is important to prioritize the flexibility of cash flow.	4.46	.477	High
3. The focus is on enhancing the capacity to generate higher returns on investments.	4.56	.509	Highly
4 Our focus should be on developing innovative strategies that lead to a competitive advantage for the organization.	4.51	.517	Highly
5. The focus of the company's operations is to improve customer satisfaction.	4.01	.857	High
6. Businesses can boost productivity to fulfill the demands of their customers.	4.55	.498	Highly
7. Focus on the capability to efficiently manage the delivery of products and services within designated time frames.	4.53	.508	High

Table 6 (Cont.)

Firm Performance	Mean	S.D.	Level of importance
8. It is important to focus on inventory costs and product turnover rates that are suitable.	4.51	.517	Highly
9. Efficient time management reduces waste resources and solves problems.	4.48	.525	High
10. The business emphasizes long-term profitability.	4.47	.533	High
Total average	4.42	.573	High

According to Table 6, firm performance is high important. The total average score was 4.42 with a standard deviation of 0.573. which indicates a high level of importance. When analyzing the factors, it was found that the focus is on enhancing the capacity to generate higher returns on investments, with a mean score of 4.56, and S.D. was 0.509. Following this, Businesses can boost productivity to fulfill the demands of their customers was a mean score of 4.55, and S.D. was .498. Lastly, The focus of the company's operations is to improve customer satisfaction, with a mean score of 4.01, and S.D. was 0.857.

4.2.2 Research Objective 2. To study the impact of supply chain collaboration, and supply chain capabilities on the firm performance of express delivery company in Kunming.

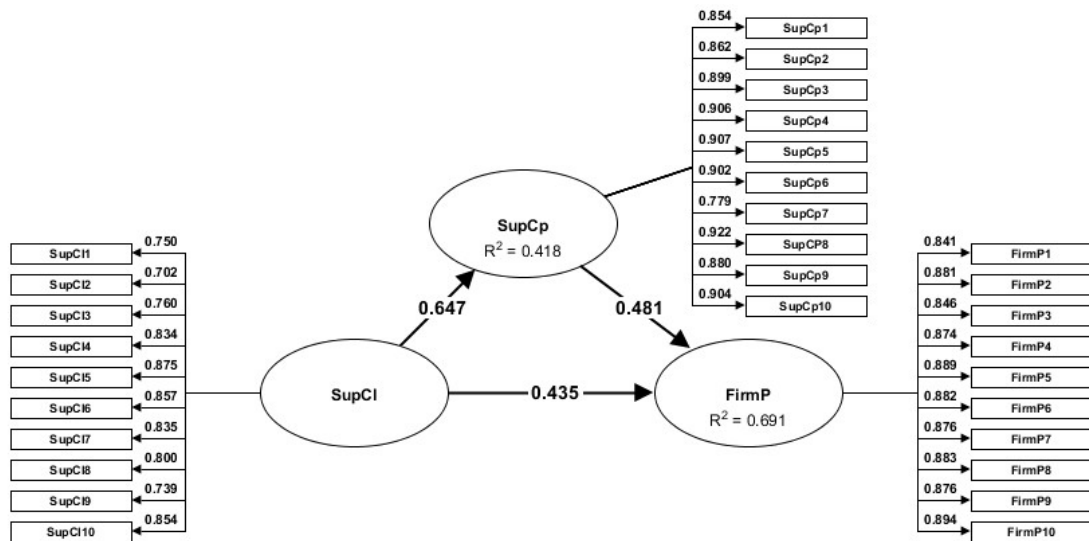


Figure 20 Result of Structure Equation Model Analysis

Based on the data presented in Figure 20, it was discovered that the correlation between all variables impacts the operational outcomes. In particular, the supply chain collaboration variables have the most significant impact on the supply chain capabilities, with a path coefficient of 0.647, and R² of 0.418. This is followed by the impact of supply chain capabilities on performance, with a path coefficient of 0.481, and R² of 0.691. Lastly, the influence of supply chain collaboration on firm performance with a path coefficient of 0.435.

Table 7 The direct effect, indirect effect, and total effect analysis

Dependent Variable	R ²	Effects	Supply Chain Collaboration	Supply Chain Capabilities
Supply Chain Collaboration	-	DE	N/A	N/A
		IE	N/A	N/A
		TE	N/A	N/A
Supply Chain Capabilities	0.418	DE	0.647	N/A
		IE	0.000	N/A
		TE	0.647	N/A
Firm Performance	0.691	DE	0.435	0.481
		IE	0.311	0.000
		TE	0.746	0.481

Remark; TE=Total Effect, DE=Direct Effect, IE=Indirect Effect, Supply Chain Collaboration=SupCl, Supply Chain Capabilities =SupCp, Firm Performance=FirmP.

Based on the data presented in Table 7, the ADANCO program was used to test the structural equation hypothesis. The results showed that supply chain collaboration has a direct effect on supply chain capabilities, with the highest value being 0.647 and an R2 value of 0.418. The total influence was also found to be 0.647. Additionally, it was discovered that supply chain collaboration has a direct effect on firm performance, with a value of 0.435 and an R2 value of 0.691, as well as an indirect effect of 0.311 and a total influence of 0.746. Finally, supply chain capabilities were found to have a direct effect on firm performance, with a value of 0.482 and an R2 value of 0.691. The total influence was equal to 0.481. It's important to note that there are correlations among these variables.

Table 8 Hypothesis test

Hypothesis	Coefficient path	T-stat	Conclusion
Supply chain collaboration→ Supply chain capabilities	0.647	15.530	Support
Supply chain collaboration→ Firm performance	0.435	7.777	Support
Supply chain capability→ Firm performance	0.481	8.426	Support

Remark; Accept $p \leq 0.10$, T-stat $t \geq 1.96$

From Table 8, when considering the variables that influence each other, the conclusion is as follows:

Hypothesis 1 Supply chain collaboration had influences on supply chain capabilities with a coefficient path value of 0.647, support.

Hypothesis 2 Supply chain collaboration had influences on firm performance with a coefficient path value of 0.435, support.

Hypothesis 3 Supply chain capabilities had influences on firm performance with a coefficient path value of 0.481, support.

4.2.3 Research Objective 3. To test the mediating role of supply chain capabilities linking supply chain collaboration to the firm performance of the express delivery company in Kunming, the People's Republic of China.

Hypothesis 4 To test the mediating role of supply chain capabilities linking supply chain collaboration to the firm performance of the express delivery company in Kunming, the People's Republic of China.

Table 9 Hypothesis 4

	coeff	se	t	p	LLCI	ULCI
constant	.0000	.0456	.000	1.0000	-.0898	.0892
SupClz	.3149	.0609	5.1724	.0000	.1950	.4349
SupCpz	.4702	.0609	7.7223	.0000	.3502	.5902
R	R-sq	MSE	F	df1	df2	p
.7184	.5161	.4880	123.7411	2.0000	232.0000	.0000
Total effect of X on Y						
Effect	se	t	p	LLCI	ULCI	
.6259	.0511	12.2508	.0000	.5253	.7266	
Direct effect of X on Y						
Effect	se	t	p	LLCI	ULCI	
.3149	.0609	5.1724	.0000	.1950	.4349	
Indirect effect (s) of X on Y						
Effect	BootSE	BootLLCI		BootULCI		
SupCpz	.3110	.0507	.2148	.4094		

Remark: Total Effect = 0.626(t=12.251), R²=0.392

Direct effect = 0.315(t=5.172)

Indirect Effect = 0.311(BootCL=0.215, BootCU=0.0.409)

had Significant at 0.01

4.2.4 Conclusion

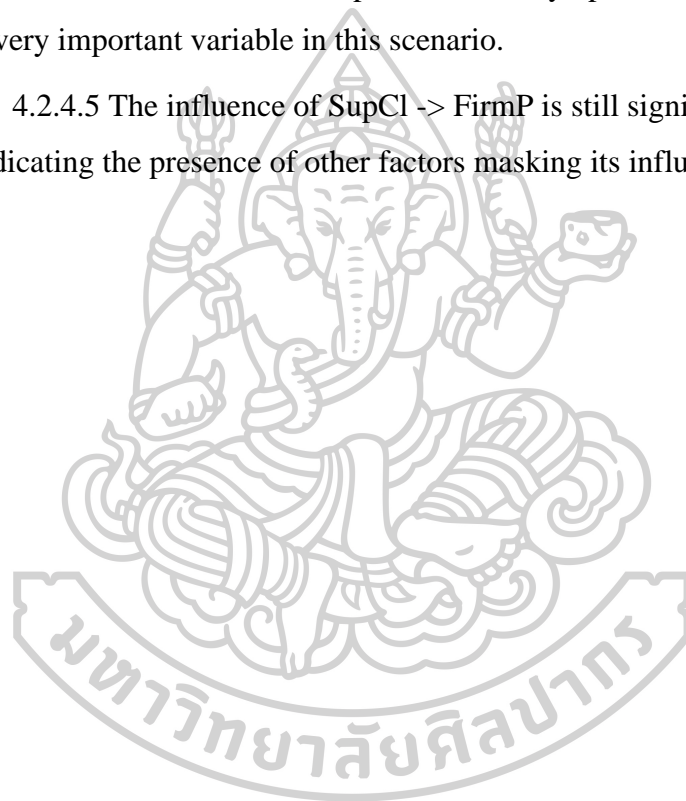
4.2.4 .1 SulCl influence on SupCp is significant at a significant level of 0.01. (beta=0.661, t= 13.46)

4.2.4.2 SupCl influence on FirmP is significant at a significant level of (beta= 0.470, t= 4.722)

4.2.4.3 Direct influence from SupCl->FirmP is significant at a significant (beta=0.315, t=5.172) A decrease in total influence of 0.626 (t=12.251) or 49.7% was observed, indicating that SupCp is a hidden factor with a high influence. Influence along the path of SupCl -> FirmP was greatly decreased.

4.2.4.4 The influence of SupCl -> FirmP is indirectly transmitted through SupCp, which is a significant intermediary variable (beta=0.311, 99% confidence interval covers 0). This means that SupCp transfers the influence of SupCl -> FirmP, and can reduce the total influence of SupCl -> FirmP by up to 49.7 percent. Therefore, SupCp is a very important variable in this scenario.

4.2.4.5 The influence of SupCl -> FirmP is still significant, with a beta of 0.315**, indicating the presence of other factors masking its influence.



CHAPTER 5

CONCLUSIONS

This final chapter will be covers the summary of this study and seeks to propose some recommendations for future studies that can be conducted to expand on this research.

5.1 The Conclusion of Research Objective 1

To study the importance level of supply chain collaboration, supply chain capabilities, and firm performance of the express delivery company The results of this study indicate that there are 10 components of a total three variables, summarized in importance from the perspective of business owners or branch managers as follows:

5.1.1 Supply chain collaboration is high important. The total average score was 4.36 with a standard deviation of 0.698. which indicates a high level of importance. When analyzing the factors, it was found that let's focus on supporting each other by sharing resources to decrease expenses in supply chain management was the most important factor, with a mean score of 4.51, and S.D was 0.518. Following this, to enhance operational efficiency, prioritizing the development of joint personnel was a mean score of 4.48, and S.D. was .526. Lastly, It is important to prioritize working together effectively, with a mean score of 4.08, and S.D. was 0.936.

5.1.2 Supply chain capabilities is high important. The total average score was 4.24 with a standard deviation of 0.793. which indicates a high level of importance. When analyzing the factors, it was found that the organizations have the ability to learn and consistently stay updated on what the customers desire with a mean score of 4.27, and S.D was 0.841. Following this, It's important to focus on one's ability to adapt to change was a mean score of 4.26, and S.D. was .779. Lastly, The company offers various transportation options to meet customer delivery requirements, with a mean score of 4.11, and S.D. was 0.883.

5.1.3 Firm performance is high important. The total average score was 4.42 with a standard deviation of 0.573. which indicates a high level of importance. When analyzing the factors, it was found that the focus is on enhancing the capacity to generate

higher returns on investments, with a mean score of 4.56, and S.D. was 0.509. Following this, Businesses can boost productivity to fulfill the demands of their customers was a mean score of 4.55, and S.D. was .498. Lastly, The focus of the company's operations is to improve customer satisfaction, with a mean score of 4.01, and S.D. was 0.857.

5.2 The Conclusion of Research Objective 2.

To study the impact of supply chain collaboration, and chain capabilities on the firm performance of the express delivery company.

These findings suggest that supply chain collaboration has a direct effect on supply chain capabilities, with the highest value being 0.647 and an R2 value of 0.418. The total influence was also found to be 0.647. Additionally, it was discovered that supply chain collaboration has a direct effect on firm performance, with a value of 0.435 and an R2 value of 0.691, as well as an indirect effect of 0.311 and a total influence of 0.746. Finally, supply chain capabilities were found to have a direct effect on firm performance, with a value of 0.482 and an R2 value of 0.691. The total influence was equal to 0.481. It's important to note that there are correlations among these variables.

5.3 The Conclusion of Research Objective 3

Test the role of supply chain capabilities linking supply chain collaboration with the firm performance of the express delivery company in Kunming. The research result found that supply chain collaboration influence on firm performance is significant at a significant level of (beta= 0.470, t= 4.722)

5.3.1 Direct influence from supply chain collaboration to firm performance is significant at a significant (beta=0.315, t=5.172). A decrease in total influence of 0.626 (t=12.251) or 49.7% was observed, indicating that supply chain capabilities is a hidden factor with a high influence. Influence along the path of supply chain collaboration to firm performance was greatly decreased.

5.3.2. The influence of supply chain collaboration to firm performance is indirectly transmitted through supply chain capabilities, which is a significant intermediary variable (beta=0.311, 99% confidence interval covers 0). This means that

supply chain capabilities transfer the influence of supply chain collaboration firm performance, and can reduce the total influence of supply chain collaboration firm performance by up to 49.7 percent. Therefore, supply chain capabilities are a very important variable in this scenario.

5.3.3 The influence of supply chain collaboration to firm performance is still significant, with a beta of 0.315**, indicating the presence of other factors masking its influence.

5.4 The Research Questions Provide Answers

5.4.1 The collaboration within the supply chain, as well as the capabilities of the supply chain, are at a high level for express delivery companies in Kunming. This applies to every factor involved. It's important to focus on the factors that contribute to firm performance first, followed by supply chain collaboration and supply chain capabilities.

5.4.2 The research examined the impact of supply chain collaboration, supply chain capabilities, and firm performance on express delivery companies in Kunming. The findings revealed that supply chain collaboration has a significant direct effect on supply chain capabilities, with a value of 0.647 being the highest. Additionally, supply chain capabilities have a direct effect on firm performance, with a value of 0.482. Finally, the research found that supply chain collaboration has a direct effect on firm performance, with a value of 0.435. In conclusion, the research highlights the importance of supply chain collaboration and capabilities for enhancing firm performance in the express delivery industry.

5.5 Conclusion

The aim of the study was to examine the relationship between supply chain collaboration and firm performance in Kunming, the People's Republic of China, and to determine the mediating role of supply chain capabilities of express delivery companies. The results showed that all factors are highly important. Firm performance was deemed the most important, with a total average score of 4.42 and a standard deviation of 0.573. Supply chain collaboration was the next most important, with a total

average score of 4.36 and a standard deviation of 0.698. Lastly, supply chain capabilities were also highly important, with a total average score of 4.24 and a standard deviation of 0.793.

Supply chain capabilities play a crucial role in transferring the benefits of supply chain collaboration to firm performance. They can reduce the total impact of supply chain collaboration on firm performance by up to 49.7 percent. Hence, it is essential to consider supply chain capabilities as a vital variable in this scenario.

5.6 Provide Responses to Research Inquiries

5.6.1 Entrepreneurs and managers, including branch managers in the express delivery company, place the highest importance on firm performance. This is because firm performance is a key measure of success for service-based businesses. Their focus is on enhancing the capacity to generate higher returns on investments, which is an important component of business performance. Thus, business owners in the express delivery industry need to be more aware of this issue, especially in light of the intensifying competition.

5.6.2 Based on the results of the structural equation analysis, it was found that supply chain capabilities have a direct effect on firm performance, with a value of 0.482 and an R² value of 0.691. Therefore, entrepreneurs and managers, including branch managers in express delivery companies, must prioritize flexibility when sourcing raw materials, focus on consistently learning and staying updated on customer preferences and concentrate on improving their own capabilities. This will help improve overall firm performance. Due to increasing competition, the external environment and customer demands are constantly changing.

5.7 Provide Responses to Research Inquiries

Data collection for this study was conducted over a period of two months and only 235 case responses were received. The study focused solely on the express delivery company, which is just one of several business models within the transportation industry. This limited scope is a significant constraint of this research. To expand on this study, researchers should collect data from all types of transport

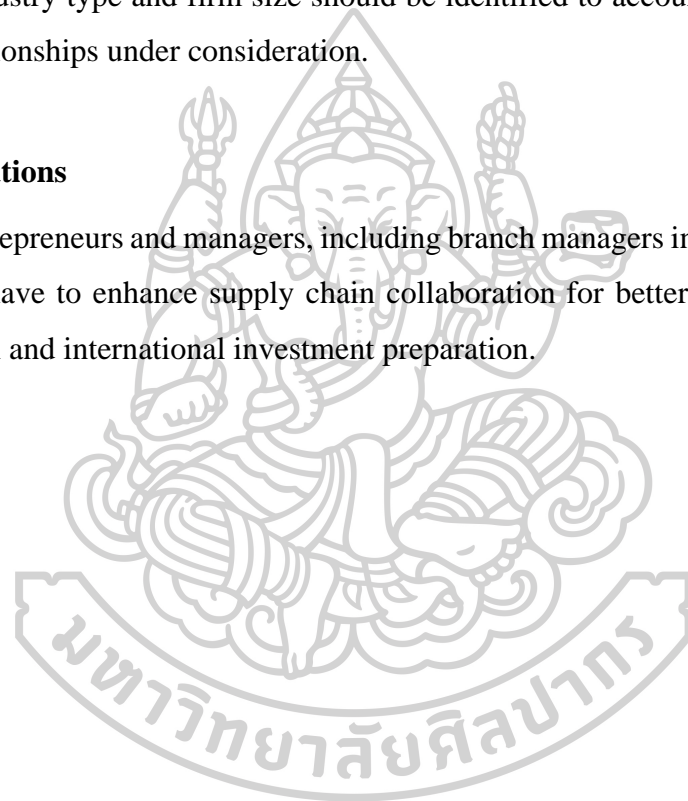
business operators. This would provide a more comprehensive view of the industry as a whole.

5.8 Suggestions for Future Study

For future research, it is recommended to investigate the impact of technology or innovation, cultural aspects, and environmental sustainability on supply chain collaboration and networking capabilities. Additionally, potential control variables such as industry type and firm size should be identified to account for their influence on the relationships under consideration.

5.9 Implications

Entrepreneurs and managers, including branch managers in the express delivery company, have to enhance supply chain collaboration for better performance due to competition and international investment preparation.



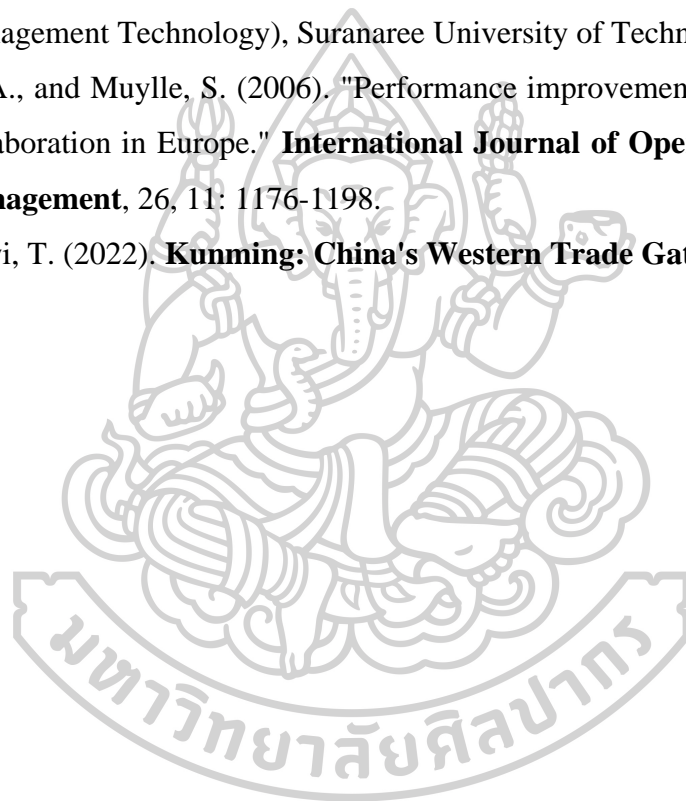
REFERENCES

- Ahmad, M. M., and Dhafr, N. (2002). "Establishing and improving manufacturing performance measures." **Robotics and Computer-Integrated Manufacturing**, 18, 3: 171-176.
- Baah, C., Kwasi Acquah, I. S., and Ofori, D. (2021). "Effect of information sharing in supply chains: understanding the roles of supply chain visibility, agility, collaboration on supply chain performance." **Benchmarking: An International Journal**: 434–455.
- Barratt, M., and Barratt, R. (2011). "Exploring Internal and External Supply Chain Linkages: Evidence from the Field." **Management Faculty Research and Publications**: 1-32. available from [https://epublications.marquette.edu/cgi/viewcontent.cgi?article=1253&context=mgmt_fac&httpsredir=1&referer, https://epublications.marquette.edu/mgmt_fac/254](https://epublications.marquette.edu/cgi/viewcontent.cgi?article=1253&context=mgmt_fac&httpsredir=1&referer=https://epublications.marquette.edu/mgmt_fac/254).
- Basu, G., Jeyasingam, J., Habib, M., Letchmana, U., and Ravindran, R. (2017). "The Impact of Supply Chain Management Practices on the Performance of Private Universities in Malaysia." **International Journal of Supply Chain Management**, 6, 3: 22-35.
- Brusset, X., and Teller, C. (2017). "Supply chain capabilities, risks, and resilience." **International Journal of Production Economics**, 184, 2: 59-68.
- Burt, N. D., Dobler, D. W., and Starling, S. L. (2003). **World Class Supply Management: The Key to Supply Chain Management**. 7th ed. New York: McGraw-Hill.
- Cao, M., and Zhang, Q. (2011). "Supply chain collaboration: Impact on collaborative advantage and firm performance." **Journal of Operations Management**, 29, 3: 163–180.
- Dyer, J. H., and Singh, H. (1998). "The relational view: Cooperative strategy and sources of interorganizational competitive advantage." **The Academy of Management Review**, 23, 4: 660-679.
- Frohlich, M. T., and Westbrook, R. (2001). "Arcs of integration: An international study of supply chain strategies." **Journal of Operations Management**, 19, 2: 185-200.

- Handfield, R. B., and Nichols, E. L. (2007). **Introduction to Supply Chain Management**. 2nd ed. Upper Saddle River, New Jersey: Prentice Hall.
- Hoegl, M., and Wagner, S. M. (2005). "Buyer-supplier collaboration in product development projects." **Journal of Management**, 31, 4: 530-548.
- Hudnurkar, M., Jakhar, S., and Rathod, U. (2014). "Factors affecting collaboration in the supply chain: A Literature Review." **Procedia-Social and Behavioral Sciences**, 13, 3: 189–202.
- Kalwani, M. U., and Narayanda, N. (1995). "Long-Term Manufacturer-Supplier Relationships: Do They pay off for Supplier Firms." **Journal of Marketing**, 59, 1: 1-16.
- Koçoğlu, I., Zeki İmamoğlu, S., Ince, H., and Keskin, H. (2011). "The effect of supply chain integration on information sharing: Enhancing the supply chain performance." **Procedia - Social and Behavioral Sciences**, 24, 3: 1630-1649. doi:10.1016/j.sbspro.2011.09.016
- Kumar, G., and Banerjee, R. N. (2012). "Collaboration in supply chain: An assessment of hierarchical model using partial least squares (PLS)." **International Journal of Productivity and Performance Management**, 61, 8: 897-918.
- Langley, G. J., Moen, R., Nolan, K. M., Nolan, T. W., Norman, C. L., and Provost, L. P. (2009). **The improvement guide: A practical approach to enhancing organizational performance**. 2nd ed. San Francisco, CA: Jossey-Bass Publishers.
- Leenders, M. R., Fraser, J. P., Flynn, A. E., and Fearon, H. E. (2006). **Purchasing and Supply Management with 50 Supply Chain Cases**. 13th ed. New York: McGraw-Hill.
- Min, S., Roath, A. S., Daugherty, P. J., Genchev, S. E., Chen, H., Arndt, A. D., and Richey, R. G. (2005). "Supply chain collaboration: What's happening?" **The International Journal of Logistics Management**, 16, 2: 237-256.
- Montoya-Torres, J. R., and Ortiz-Vargas, D. A. (2014). "Collaboration and information sharing in dyadic supply chains: A literature review over the period 2000–2012." **Estudios Gerenciales**, 30, 133: 343-354.

- Narasimhan, R., and Kim, S. W. (2002). "Effect of supply chain integration on the relationship between diversification and performance: evidence from Japanese and Korean firms." **Journal of Operations Management**, 20, 3: 303-323.
- Nyaga, G., Whipple, J., and Lynch, D. (2010). "Examining supply chain relationships: do buyer and supplier perspectives on collaborative relationships differ?" **Journal of Operations Management**, 28, 2: 101–114.
- Oh, J., and Rhee, S. K. (2008). "The influence of supplier capabilities and technology uncertainty on manufacturer-supplier collaboration: A study of the Korean automotive industry." **International Journal of Operations & Production Management**, 28, 6: 490-517.
- Overseas Trade Promotion Office in Xiamen. (2023). **Xiamen Releases Action Plan for Promoting Cross-Border Trade Facilitation**. available from https://regional.chinadaily.com.cn/swjen/2023-07/28/c_906572.htm
- Panahifar, F., Byrne, P. J., Salam, M. A., and Heavey, C. (2018). "Supply chain collaboration and firm's performance: The critical role of information sharing and trust." **Journal of Enterprise Information Management**, 31, 3: 358-379. doi:10.1108/JEIM-08-2017-0114
- Rattanamanee, N., and Phasunon, P. (2019). "Response rate in quantitative research." **Journal of Humanities and Social Sciences Thonburi University**, 13, 3: 181-188.
- Samaddar, S., and Kadiyala, S. S. (2006). "An analysis of inter-organizational resource sharing decisions in collaborative knowledge creation." **European Journal of Operational Research**, 170: 192–210.
- Selvaraju, M., Belaya, P., and Sundram, V., P, K. (2017). "Supply chain cost reduction using mitigation & resilient strategies in the Hypermarket retail business." **International Journal Supply Chain Management**, 6, 2: 116-121.
- Seo, Y. J., Dinwoodie, J., and Roe, M. (2015). "Measures of supply chain collaboration in container logistics." **Maritime Economics & Logistics**, 17, 3: 292-314. doi:10.1057/mel.2014.26

- Simatupang, T. M., and Sridharan, R. (2005). "An integrative framework for supply chain collaboration." **The International Journal of Logistics Management**, 16, 2: 257-274.
- The Federation of China Industries. (2023). **Biggest Industries by Revenue in China in 2023**. available from <https://www.ibisworld.com/china/industry-trends/biggest-industries-by-revenue/>
- Traisilanan, S. (2011). "Supply Chain Relationship Between Suppliers and Buyers in Food Industry Nakhon Ratchasima Province." (Master of Management Degree Management Technology), Suranaree University of Technology, Thailand.
- Vereecke, A., and Muylle, S. (2006). "Performance improvement through supply chain collaboration in Europe." **International Journal of Operations & Production Management**, 26, 11: 1176-1198.
- Waitayasewi, T. (2022). **Kunming: China's Western Trade Gateway**.







Questionnaire

Research Title

Impacts of Supply Chain Collaboration and Firm Performance: The Mediating Role of Supply Chain Capabilities of Express Delivery Companies in Kunming, the People's Republic of China

This questionnaire is divided into three parts, which are as follows:

Part 1. Demography

Part 2. To study the important level of supply chain collaboration, supply chain capabilities, and firm performance of express delivery companies in Kunming, the People's Republic of China.

Part 3. Suggestions about supply chain collaboration, supply chain capabilities, and firm performance of express delivery companies

Please respond to all items

Researcher

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Instruction: Please tick (✓) in the that represents the fact.

Part 1: Demography of owners' or branch managers of express delivery companies

1. Gender 1. Males 2. Females

2. Age 1. 30 Years or under 2. 31 – 40 Years
3. 41 – 50 Years 4. 51 – 60 Years
5. 60 Years or older

3. Status

1. Single 2. Merrit
3. Separated 4. Divorce

4. Education

1. Below Bachelor Degree
2. Bachelor's Degree
3. Master's Degree
4. Doctoral Degree
5. Other (Please specify).....

5. Position

1. Owner
2. Branch Manager

6. Investment in a business

1. Individual investors
2. Individual investors and family offices
3. Individual investors and corporate investors
4. Individual investors, corporate Investors, and financial institution
5. Individual investors and financial institution
6. Other (Please specify).....

7. Number of employees

1. Fewer than 1,000
2. 1,001-2,000
3. 2,001-3000
4. 3001 or More

8. Age of the company

- | | |
|---|---|
| 1. <input type="checkbox"/> Less than 5 years | 2. <input type="checkbox"/> 5-10 Years |
| 3. <input type="checkbox"/> 11-15 Years | 4. <input type="checkbox"/> 16-20 Years |
| 5. <input type="checkbox"/> 21 Years or More | |

9. Enterprises

- | | |
|---|--|
| 1. <input type="checkbox"/> Sto Express | 2. <input type="checkbox"/> Yto Express |
| 3. <input type="checkbox"/> Zto Express | 4. <input type="checkbox"/> Yunda Express |
| 5. <input type="checkbox"/> Rabbit Express | 6. <input type="checkbox"/> Deppon Express |
| 7. <input type="checkbox"/> Sf Express | 8. <input type="checkbox"/> Jd.com Express |
| 9. <input type="checkbox"/> Deppon Logistics, | |

10. Size of construction enterprises

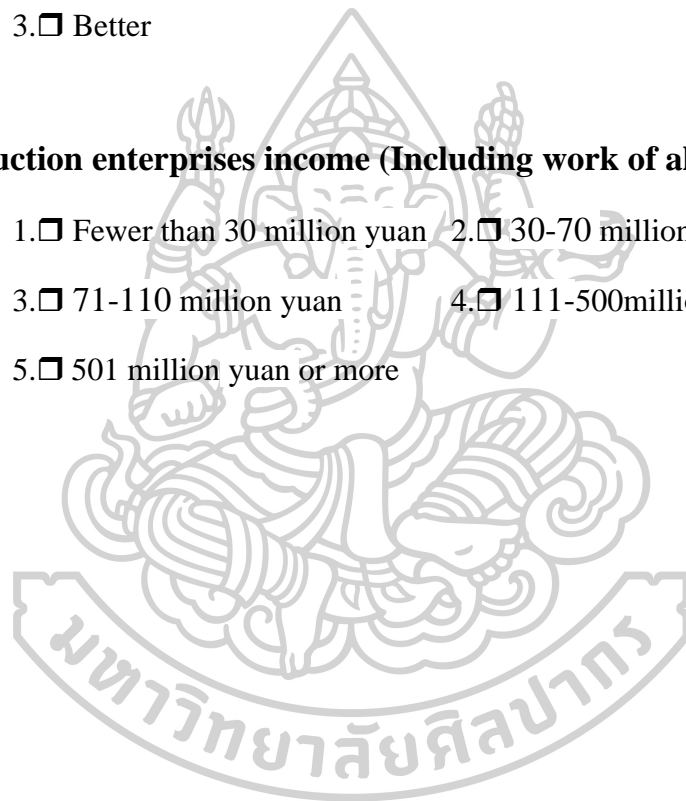
- | | |
|---|--|
| 1. <input type="checkbox"/> Large-sized | 2. <input type="checkbox"/> Medium-sized |
| 3. <input type="checkbox"/> Small-sized | 4. <input type="checkbox"/> Mini-sized |

11. Past construction enterprises performance

1. Reduce
2. Fixed
3. Better

12. construction enterprises income (Including work of all systems)

- | | |
|--|---|
| 1. <input type="checkbox"/> Fewer than 30 million yuan | 2. <input type="checkbox"/> 30-70 million yuan |
| 3. <input type="checkbox"/> 71-110 million yuan | 4. <input type="checkbox"/> 111-500million yuan |
| 5. <input type="checkbox"/> 501 million yuan or more | |



Part 2. To study the important level of supply chain collaboration, supply chain capabilities, and firm performance of express delivery companies in Kunming, the People's Republic of China.

Instruction: Please tick (✓) in the columns that represent the fact.

Question	Level of important				
	5 Very High	4 High	3 Moderate	2 Low	1 Very Low
Supply Chain Collaboration					
1. It is important to prioritize working together effectively.					
2. Collaborating with others leads to the formation of long-term and environmentally friendly business alliances.					
3. The organization's goals align with those of its joint partners.					
4. It is important to prioritize investments based on the agreement in order to achieve mutual benefits.					
5. Electronic systems can support sending information within and between organizations.					
6. Organizations exchange knowledge to establish collaborative partnerships.					
7. Let's work together to reduce risk by establishing joint cooperation.					
8. It is important to prioritize working together to effectively manage resources for optimal operational benefits.					

Question	Level of important				
	5 Very High	4 High	3 Moderate	2 Low	1 Very Low
9. Let's focus on supporting each other by sharing resources to decrease expenses in supply chain management.					
10. To enhance operational efficiency, prioritize the development of joint personnel.					
Supply Chain Capabilities					
1. It is important to prioritize flexibility when it comes to sourcing raw materials.					
2. There is a focus on being flexible when it comes to adjusting work based on orders.					
3. It's important to focus on one's ability to adapt to change.					
4. Businesses can utilize forecasting to predict various factors that may have an impact.					
5. It is important to focus on spreading out risks across the entire supply chain of the business.					
6. Organizations have the ability to learn and consistently stay updated on what the customers desire.					
7. The company can assess its capacity to acquire raw materials and equipment as per customer needs.					

Question	Level of important				
	5 Very High	4 High	3 Moderate	2 Low	1 Very Low
8. The company is capable of accurately recording information and managing the placement of raw materials in the warehouse.					
9. The company offers various transportation options to meet customer delivery requirements.					
10. The company efficiently improves operations by actively listening to customer feedback across all channels.					
Firm Performance					
1. The Company emphasizes the importance of understanding information flow in order to improve supply chain management effectiveness.					
2. It is important to prioritize the flexibility of cash flow.					
3. The focus is on enhancing the capacity to generate higher returns on investments.					
4. Our focus should be on developing innovative strategies that lead to a competitive advantage for the organization.					
5. The focus of the company's operations is to improve customer satisfaction.					

Question	Level of important				
	5 Very High	4 High	3 Moderate	2 Low	1 Very Low
6. Businesses can boost productivity to fulfill the demands of their customers.					
7. Focus on the capability to efficiently manage the delivery of products and services within designated time frames.					
8. It is important to focus inventory costs and product turnover rates that are suitable.					
9. Efficient time management reduces waste resources and solves problems					
10. The business emphasizes long-term profitability.					

Part 3 Suggestions about supply chain collaboration, supply chain capabilities, and firm performance of express delivery companies in Kunming

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VITA

NAME

Chunmei LI

