Key Success Factors Identification for Logistics Outsourcing in
Myanmar

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การระบุปัจจัยความสำเร็จสำหรับผู้ให้บริการจัดจ้างขนส่งในพม่า

นายปเย ซอน ฮทูน

Thesis Title	Key Success Factors Identification for Logistics Outsourcing in Myanmar
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Field of Study	Engineering Management
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Accepted by the FACULTY OF ENGINEERING, Chulalongkorn University in Partial Fulfillment of the Requirement for the Master of Engineering

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ปเย ซอน ฮทูน : การระบุปัจจัยความสำเร็จสำหรับผู้ให้บริการจัดจ้างขนส่งในพม่า. (Key Success Factors Identification for Logistics Outsourcing in Myanmar) อ.ที่ปรึกษาหลัก : Asst. Prof. ดร.พิศิษฎ์ จารุมณีโรจน์Ph.D.

วัตถุประสงค์ของการวิจัยนี้ คือการค้นคว้าหาปัจจัยของความสำเร็จที่สำคัญ ที่มีผลกระทบอย่างลึกซึ้งต่อคุณภาพการบริการของ ฟังก์ชั่นการขนส่งเอาท์ซอร์สในภาคการนำเข้า/ส่งออกของธุรกิจการค้าในพม่า และจัดอันดับปัจจัยตามความสำคัญเมื่อมีการจ้างงาน การขนส่ง งานวิจัยนี้ระบุองค์ประกอบที่สำคัญและจำเป็นสำหรับผู้ให้บริการการขนส่งในการแข่งขันเพื่อเพิ่มความพึงพอใจของ ลูกค้าให้สูงขึ้นในเมืองย่างกุ้งประเทศพม่า วิธีการ Fuzzy TOPSIS ใช้เพื่อระบุปัจจัยความสำเร็จที่สำคัญและจัดอันดับตาม ความใกล้เคียงกับทางออกหรือวิธีการที่ดีที่สุด ผลการวิจัยชี้ให้เห็นว่าปัจจัยทางด้านปฏิสัมพันธ์ (Soft Factor) เช่น ผู้เชี่ยวชาญ ด้านโลจิสติกส์ที่มีทักษะสูงและการสร้างความสัมพันธ์ได้รับการจัดอันดับสูงกว่าปัจจัยทางด้านทักษะกา รทำงาน (Hard Factor) เช่น การรวมของห่วงโซ่อุปทานและเทคโนโลยีสารสนเทศในประเทศพม่าที่เป็นประเทศกำลังพัฒนา ซึ่งมีความสมบูรณ์ของตลาดผู้จัดจ้างการขนส่งที่ต่ำ ขอบเขตของการศึกษานี้และสถานการณ์ทางการเมืองที่ไม่เสถียรในระหว่าง การศึกษาทำให้ถูกจำกัดความสามารถในการสรุปผลการวิจัยในภาคส่วนอื่นๆของตลาด งานวิจัยนี้ใช้แนวทาง Fuzzy TOPSIS เพื่อจัดอันดับปัจจัยของความสำเร็จที่สำคัญของการใช้ผู้จัดจ้างด้านการขนส่ง และนอกจากนี้การวิจัยด้วยวิธีการอื่ นๆโดยใช้หลากหลายแง่มุมประกอบการตัดสินใจได้ถูกเปรียบเทียบในการวิจัยในครั้งนี้ด้วย

สาขาวิชา   การจัดการทางวิศวกรรม   ลายมือชื่อนิสิต ....

ปีการศึกษา   2564   ลายมือชื่อ อ.ที่ปรึกษาหลัก ....

6171216721 : MAJOR ENGINEERING MANAGEMENT
KEYWOR   Logistics, Outsourcing, Key Success Factors, Myanmar
D:

Pyae Sone Htoon : Key Success Factors Identification for Logistics Outsourcing in Myanmar. Advisor: Asst. Prof. Dr. PISIT JARUMANEEROJ, Ph.D.

The purpose of this paper is to identify the key success factors that have a profound effect on the service quality of outsourced logistics functions in the import/export sector of trade business in Myanmar and rank them accordingly to their importance when outsourcing logistics functions. The paper states the critical elements required for logistics service providers to compete for high customer satisfaction in Yangon, Myanmar. Fuzzy TOPSIS methodology with triangular fuzzy numbers is used to identify the key success factors and rank them in order of their relative closeness to the ideal solution. The findings suggest that soft factors such as skilled logistic professionals and relationship building are ranked higher than hard factors such as supply chain integration and information technology in the developing country of Myanmar with its low maturity of the logistics outsourcing market. The scope of this study and the unstable political situation during the study constrains the ability to generalise the findings in other sectors of the market. This paper uses the Fuzzy TOPSIS approach to rank the key success factors of logistic outsourcing, and future research with different approaches of multi-criteria decision making may be carried out and compared with this study.

จุฬาลงกรณ์มหาวิทยาลัย

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Field of Study:	Engineering Management	Student's Signature
		....
Academic Year:	2021	Advisor's Signature
		....

ACKNOWLEDGEMENTS

I would like to thank Asst. Prof. Dr. PISIT JARUMANEEROJ, Ph.D and committee members for all the help for this study.

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Chapter 1

1.1 Global Trade & Logistics Outsourcing

International trade is the primary factor in global economic growth. According to the World Trade Statistical Review 2020 by the World Trade Organization, the value of merchandise traded in 2019 is measured at 19.051 trillion US dollars even though there was a decline of 3% compared to 2018. When facilitating that amount of global trade value and volume, supply chain management is crucial in creating and maintaining a strategic competitive advantage. Logistics management is one of the important parts for products to be manufactured and distributed timely on a global scale within supply chain management.

With the high value of merchandise traded globally each year, the global transportation services industry also has a moderate yearly growth. The global transportation services industry was valued at 2,209.6 billion US dollars in 2019 with 2.5% growth from 2018 (Marketline, 2020). Of the total industry value, Asia-pacific accounts for 39.55 per cent. With many logistics service providers in the industry for international trade, third-party logistics companies became popular with trade businesses to outsource logistics management.

According to the 2017 Outsourcing Attitudes Survey results by The Chartered Institute of Logistics and Transport, the main objectives of outsourcing logistics functions are cost reduction, expertise, saving internal resources and being able to focus on core competencies. Outsourcing logistics functions can also improve the responsiveness of the supply chain since processes that require specialist knowledge are handled by experts. When logistics functions are outsourced, there are also some

concerns such as service quality concerns, cost, internal politics, and relationships within the supply chain. The loss of control from the business is also a concern whether it is perceived or actual. Therefore, the right selection of logistics service providers and the contributions of the business outsourcing is necessary to have successful outsourcing of logistics functions in the trading business.

1.2 Economic Background of Myanmar

Myanmar is the largest mainland country of Southeast Asia, neighbouring Thailand and Laos PDR to the east, China to the north and India and Bangladesh to the west. Myanmar is bordered in the south by the Bay of Bengal and the Andaman Sea. Before 1988, the economy of the country was a centrally planned economy. When it collapsed in 1988, a market-oriented economy was adopted with several economic reform measures. Some economic reform measures included granting permission of the private sector in the finance industry, captivating foreign technological and financial investments, development of improved regulations and legal framework, relaxing trade restrictions and investment in infrastructure (Von Hauff 2009). However, foreign investments were not very high due to uncooperative and inconsistent policies, an unstable economy and poor infrastructure as well as economic sanctions from other countries. Foreign investments only increased significantly after the government system changed from military administration to democratic system government in 2010.
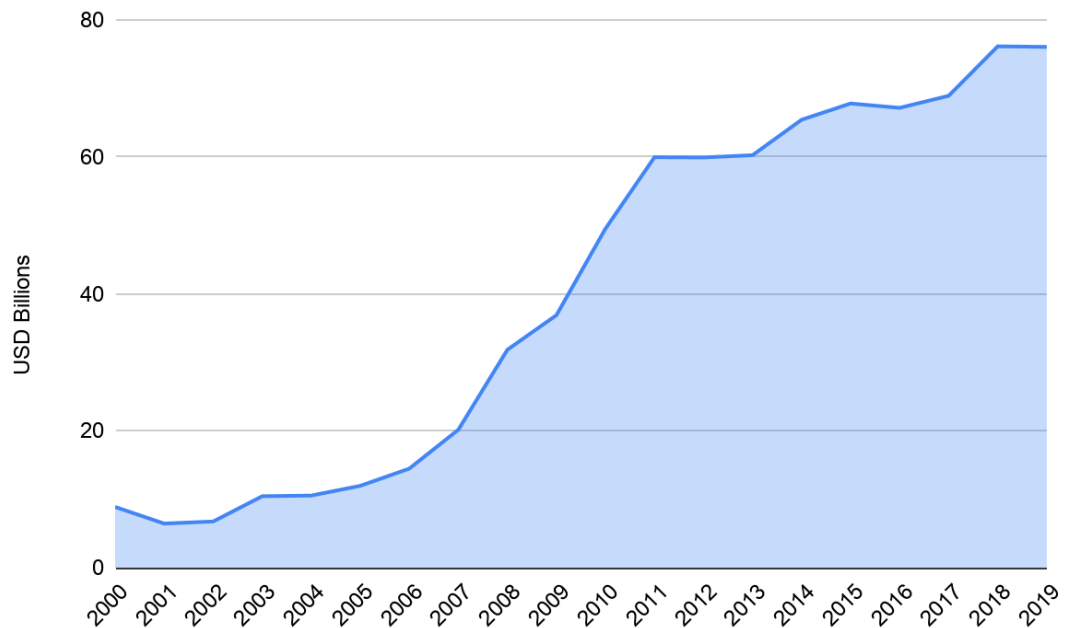
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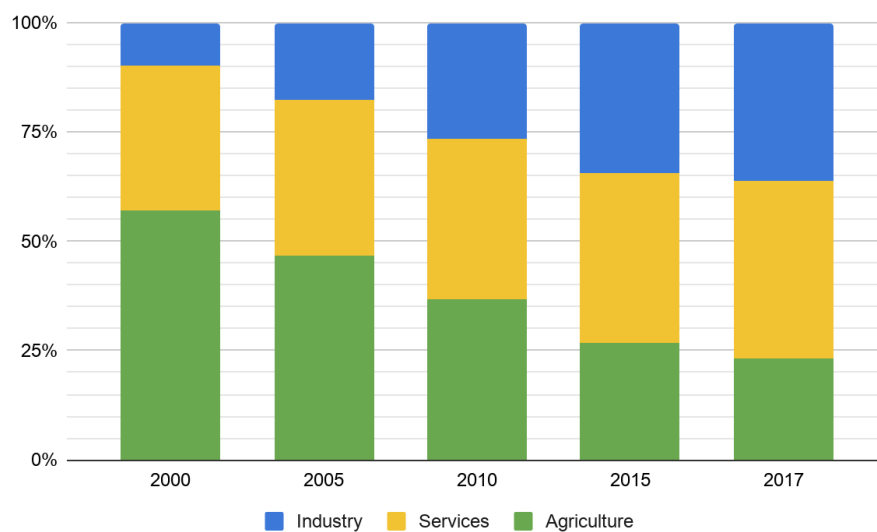
Figure 2: GDP of Myanmar by different sectors (Source: MSIS, 2018)

The country's GDP has increased significantly in the last two decades, from 8.9 billion US dollars in 2000 to 706.09 billion US dollars in 2019. The average real GDP growth rate is about 6.2 per cent annually with the lowest growth rate of 2 per cent in 2020 due to the COVID-19 pandemic. However, the growth rate was expected to

restore to 6 per cent annually from 2021 and forward by the International Monetary Fund. With the change of political situation in the last decade, not only has the GDP increased but also the sector composition of GDP has changed. Under the military administration, the economy relied mostly on agriculture and resource-based industries such as mining, oil, gas and forest. The agriculture sector accounted for more than 55 per cent of the country's GDP in 2000. With the change of government administration, it was estimated in 2017 that about 40 per cent of GDP was originated from the services sector, followed by the industry sector with over 35 per cent and the remaining 24 per cent was from the agriculture sector.
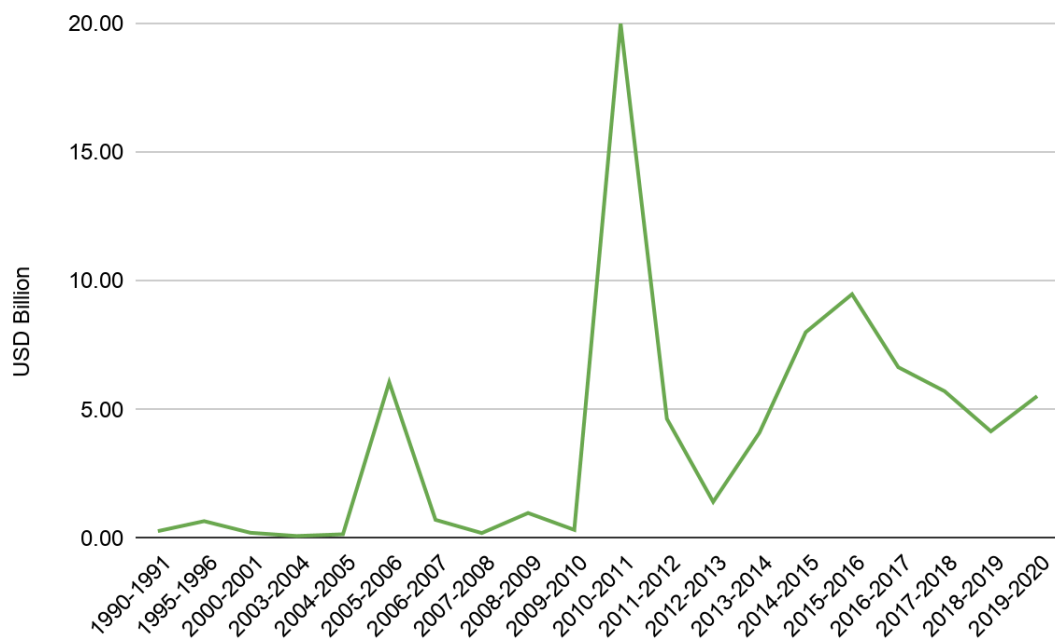
Figure 3: Permitted Foreign Investments by fiscal years (Source: DICA, 2020)

Between the period when the country started opening to foreign investment in 1990 to the change of government system in 2010, the annual foreign investment was mostly below half a billion USD with the exception in 2005-2006 fiscal year. The high foreign investment in the 2005-2006 fiscal year was only accounted for due to the

hydropower project investment in the power sector by Thailand with 6.03 billion US dollars (Khine 2008). The foreign investment skyrocketed in 2010 with the change of government system and foreign businesses looking to recover from the 2009 global financial crisis. Economic sanctions from the EU and US were also eased causing foreign investment to reach the peak of nearly 20 billion US dollars in the 2010-2011 fiscal year. Foreign investments dipped in 2012-2013 when the central bank of Myanmar replaced its set currency exchange rate with a managed float regime (Htun et al., 2011). A new foreign investment law was also passed in 2012. The investments from foreign countries picked up in the following years and it has been mostly over 5 billion US dollars annually. The most invested sectors are resource-based sectors such as oil, gas and power sectors, followed by the manufacturing sector due to low labour cost and transport & communication sector. Top accumulated foreign investments by country are Singapore, China, Thailand and Hongkong in order. Investment from Singapore increases significantly after the change of government administration in 2010.

With the increase of foreign investments, the trade value and volume have also increased significantly for Myanmar in the last decade. When the economy changed to a market-oriented economy in 1988, private sectors were permitted to participate in import and export businesses. Trade policies were also relaxed in 2010 to attract foreign investments and increase trade value. Myanmar became involved in several regional economic cooperation in Asia.
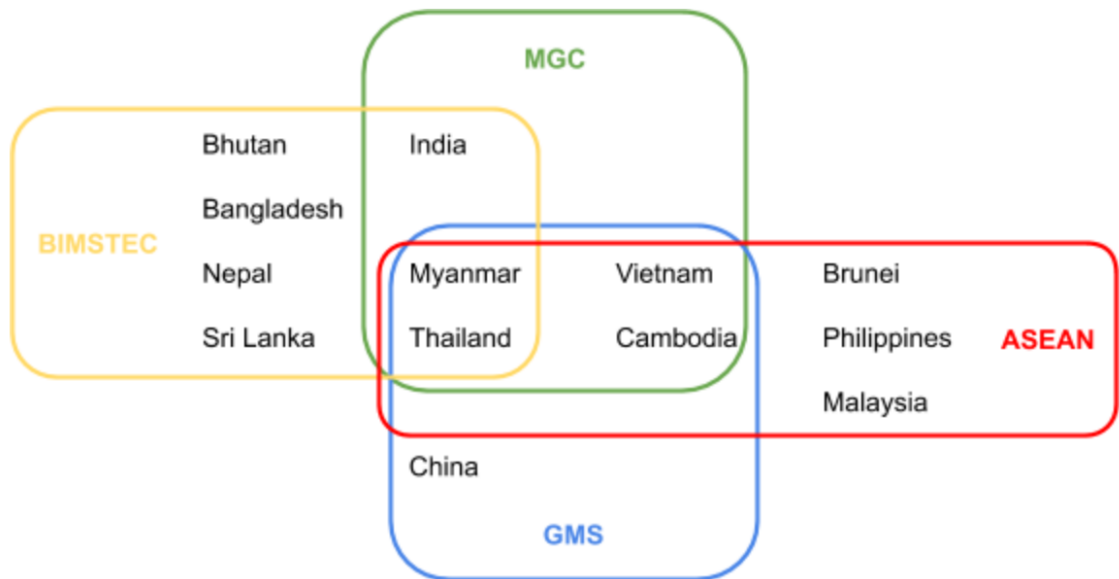
Figure 4: Regional Economic Cooperation with the participation of Myanmar (Htun et al., 2011)

Myanmar has been a member of the Association of Southeast Asian Nations (ASEAN) since 1997. With the objective to implement economic integration initiates, ASEAN members formed the ASEAN Economic Community (AEC) in 2015. AEC became the third-largest economy in Asia and fifth-largest globally with over 3 trillion US dollars of GDP (The ASEAN Secretariat, 2019). With the success of the economy in ASEAN, the region becomes open to trade increasingly. Barriers regarding border trade and tariffs are reduced. The economic success of AEC benefits the economy of Myanmar in recent years. Myanmar is also a member of other sub-regional cooperation. The Greater Mekong Subregion (GMS) includes Myanmar, Thailand, Cambodia, Laos, Vietnam and China. Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) comprises Myanmar, Thailand, Bangladesh, Bhutan, Nepal, Sri Lanka and India. Myanmar, Thailand, Cambodia, Laos, Vietnam and India also formed the Mekong-Ganga Cooperation

(MGC). The regional economic cooperation helps to increase the trade volume of Myanmar by making stronger transport and trade connectivity.
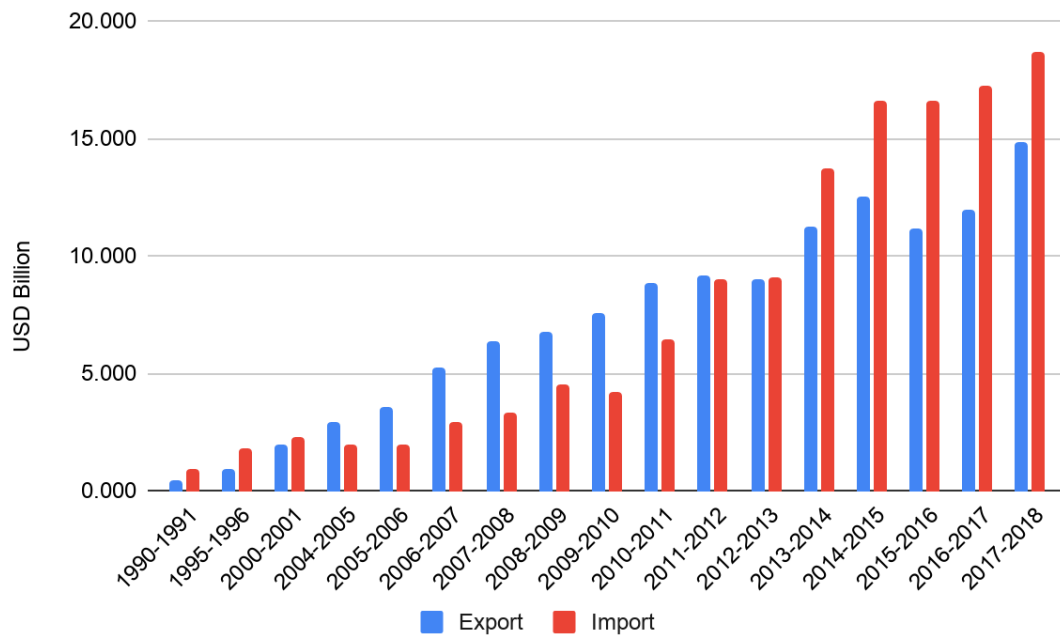
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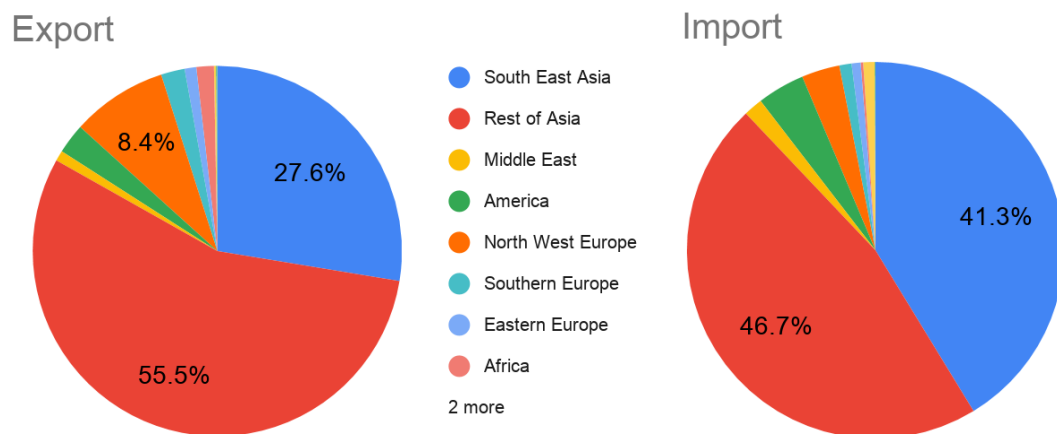
Figure 6: Direction of Export and Import from Myanmar in the fiscal year 2017-2018 (Source: CSO, 2018)

The trade volume of Myanmar increases with the increase of the economy over the last two decades. The trade value of both export and import has increased by nearly

10 times. It was expected to follow the upward trend in the coming years. The majority of the foreign trade of Myanmar is with Asian countries. Of the total exports, 64 per cent is to China, Thailand and Japan. The imports from China, Singapore and Thailand comprise about 62 per cent of the total import in the 2017-2018 fiscal year. Nearly half of the export is manufactured commodities and another 40 per cent is made up of garment, natural gas and agricultural products. The value of import trade is divided almost equally among capital goods, intermediate goods and consumer goods.
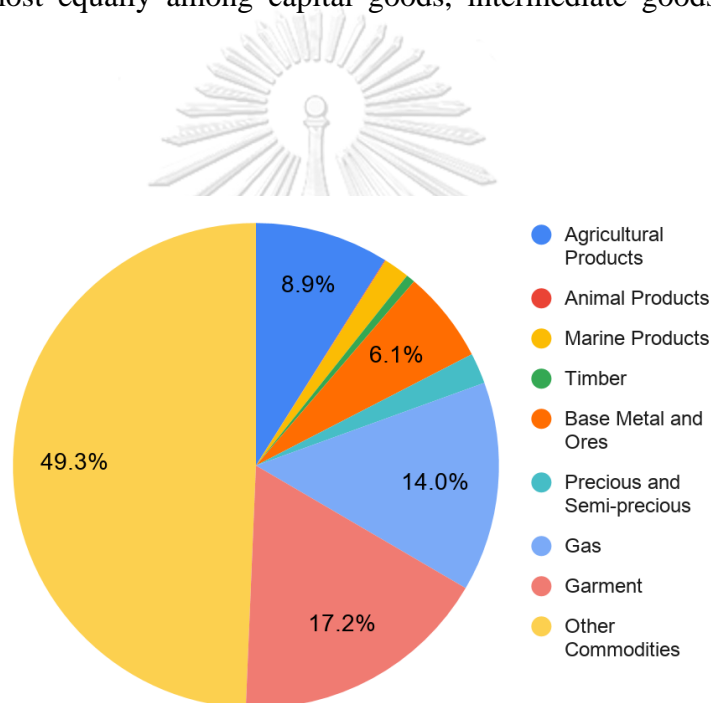
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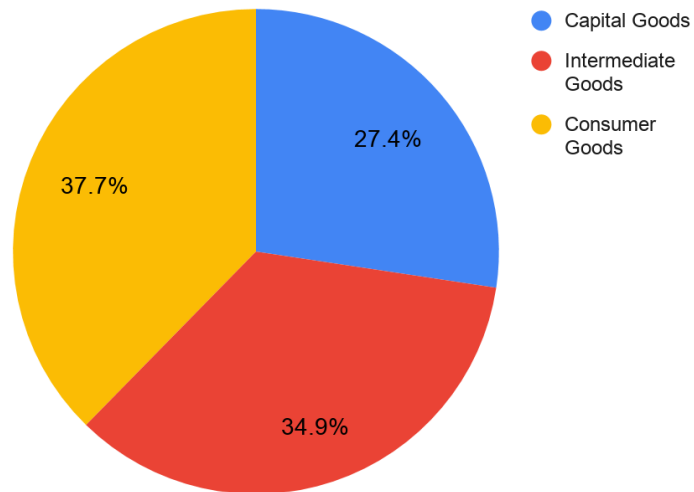
Figure 8: Import by commodity section of 2017-2018 fiscal year (Source: CSO, 2018).

With high foreign investments and increased export and import trade value, management of the supply chain in the region became even more crucial to create a competitive advantage over increasing competition. With the booming trade economy, there have been many logistics service providers emerging within the country over the last decade.

1.3 Political Situation

After 2010, the country transitioned into a democratic system and the GDP projections and foreign investments, as well as trade volume and values, were increased significantly after the transition. However, during the period of this study, the political situation changed with the military taking over the country from the elected government. The GDP projections are now on the negative side and the foreign investments decreased significantly in the country. The trade volume and value are also affected by several changes to the policies and regulations regarding imports and exports. The effect of the COVID-19 pandemic is multiplied by the unstable political situation. The role of logistics outsourcing became more important with the increasing barriers and challenges to the trade business.

1.4 Problem Statement

Since Myanmar is a developing country, there are many significant barriers regarding international trade.

Table 1: Logistics Performance Index (LPI) of ASEAN countries

ASEAN Rank	Int'l LPI Rank	Country	LPI	Customs	Infrastructure	Int'l shipments	Logistics competence	Tracking & tracing	Timeliness
1	7	Singapore	4.00	3.89	4.06	3.58	4.10	4.08	4.32
2	32	Thailand	3.41	3.14	3.14	3.46	3.41	3.47	3.81
3	39	Vietnam	3.27	2.95	3.01	3.16	3.40	3.45	3.67
4	41	Malaysia	3.22	2.90	3.15	3.35	3.30	3.15	3.46
5	46	Indonesia	3.15	2.67	2.89	3.23	3.10	3.30	3.67
6	60	Philippines	2.90	2.53	2.73	3.29	2.78	3.06	2.98
7	80	Brunei	2.71	2.62	2.46	2.51	2.71	2.75	3.17
8	82	Lao PDR	2.70	2.61	2.44	2.72	2.65	2.91	2.84
9	98	Cambodia	2.58	2.37	2.14	2.79	2.41	2.52	3.16
10	137	Myanmar	2.30	2.17	1.99	2.20	2.28	2.20	2.91

Source: World Bank (2018)

The logistics performance index score indicates that Myanmar is well beneath the average performance globally and regionally. The efficiency of the customs clearance process is low with complex processes and policies, the unpredictability of formalities. The corruption perception index score of 29 out of 100 and ranking 130 globally also indicates some unusual conventions in border control agencies and Customs. Infrastructure regarding logistics such as roads, ports, railroads and information technology is also poor compared to other ASEAN countries. Even

though the government attempted to improve infrastructure between 1988 and 2010, it remained relatively underdeveloped. However, with increased foreign investments and the opening of different special economic zones within the country, the infrastructure of the country was expected to improve (PWC, 2018). Due to the current political situation, the infrastructure improvement is now unknown. The arrangement and selection of shipments are relatively difficult for traders. The quality of logistics service providers and customs brokers are also questionable and inconsistent. Timeliness of the services is also below average with mandatory warehousing, pre-shipment inspection and solicitation of informal payment. LPI score suggests that it is challenging to arrange optimal logistics functions in Myanmar. Therefore, most of the trading businesses in Myanmar outsource their logistics functions to logistics service providers who have experience in the sector. When outsourcing the logistics functions to third-party logistics is also a risk with a low score of logistics competence in LPI, and it can lead to tremendous financial loss.

1.5 Objective & Scope

The objective of the research is to identify key success factors that have a profound effects on the service quality of logistics outsourcing in the Myanmar trade sector and to prioritise them in order of their importance by calculating the relative closeness to the ideal solution with the use of fuzzy TOPSIS multi-criteria decision analysis approach. The key success factors will state the critical elements required for a logistics service provider to compete in Myanmar.

The study will be conducted in Yangon, Myanmar where the major seaports are located with 15 per cent of the country's population. Yangon is the trade and logistics hub of Myanmar, accounting for 85 per cent of the country's trade. The GDP of Yangon accounts for over 20 per cent of the country's GDP (PWC, 2018). The study will cover the companies that are outsourcing logistics functions to service providers for their international trade business both import and export.

The expected benefit of the study is to give an insight to logistics service providers regarding the measurement of outsourced logistics service quality in Myanmar and how it can be improved. The findings from the study will also distinguish the difference in service quality expected in a developing country from the western countries. The identified key success factors can be used as a guideline for service improvement plans of logistics service providers.

Chapter 2

2.1 Literature Review

In this literature review, the publications regarding outsourcing logistics functions will be discussed in thematic order, with companies that are outsourcing their logistics functions, logistics service providers (3PLs) and key success factors of logistics outsourcing. Publications from the perspective of companies that are outsourcing can highlight the reasons for outsourcing, their experience with logistics outsourcing, the expectations and perceived experience from logistics service providers and plans. Conversely, the challenges in the 3PL market, development of services, adapting to external factors and pressures, and prospects can be comprehended from the publications with logistics service providers' perspective. Lastly, success factors from the existing publications will be discussed and they will be referenced in this study where key success factors of logistics outsourcing will be identified according to their priority to the developing market of Myanmar, using the fuzzy TOPSIS method. For the literature review of this study, 'Google Scholar' website and 'University of Warwick, Library' were used. Keywords such as 'logistics outsourcing', 'key success factors', 'critical success factors' and 'TOPSIS' etc., were used for finding publications relating to the topic. The publications were then grouped into two groups; perspective from outsourcing companies and perspective from logistics service providers.

2.1.1 Outsourcing Companies

Many researchers study the companies that are outsourcing logistics functions of the business since the beginning of outsourcing was conceptualized. There have been

numerous publications regarding the outsourcing of logistics functions in recent years since the phenomenon became more common. Between 1996 and 2006, there were 18 publications and between 2007 and 2017, 23 publications and two-thirds of all 41 publications have empirical research nature (Fadile et. al., 2018). Most of the publications were done in the perceptions of companies that are outsourcing and they were researched in North America (Lieb and Bentz, 2005), Mexico (Arroyo et al., 2006), South Africa (Cilliers and Nagel, 1994), Europe (Wilding and Juriado, 2004), Turkey (Aktas et. al., 2011), UAE (Sohail et. al., 2005), China (Hong et. al., 2004), Korea (Kim, 1996), India (Mothilal et. al., 2012), Singapore (Bhatnagar et. al., 1999), Australia (Rahman, 2011). Moreover, there are several annual publications that survey the usage of logistic service providers in North America. In the publications, reasons for the decision to outsource, logistics activities and percentage that are outsourced, and the outsourcing budgets were surveyed. The companies were also asked about the results of logistics outsourcing such as logistic cost, service quality level, internal effects, expectations, perceived service levels and plans for outsourced services to study the evolution of the 3PL industry, expansion of services provided, current dynamics of the industry and the prospects.

The publications indicated the increasing need for outsourcing logistics services and the reactions to outsourcing are mostly positive with good customer satisfaction. There are also some concerns such as the employee morale reaction to the shift of control and power and eventual downsizing (Mitra and Bagchi, 2008). Regarding future outsourcing plans, companies are inclined to outsource more logistics functions of the business, although the renewal rate with existing 3PL is low as companies do not recognise the inconvenience of finding the right outsourcing partner. Businesses

want a broader range of services from the logistics service providers for both their domestic and international operations. Customer satisfaction is particularly high in developed regions such as North America, Europe and Australia. Businesses responded that there are positive impacts on business performance from logistics outsourcing. The main factors leading to outsourcing are cost reduction, avoiding capital investment regarding logistics functions, enhanced operation due to flexibility and the competencies of 3PLs. The main deciding factor for outsourcing was considered cost reduction. However, the cost aspect of outsourcing benefits was found to play a smaller role in Europe with the expertise of 3PL as the main factor (Wilding and Juriado, 2004). The finding was researched more in the study by Akatas et. al. (2011). They found that the factors leading to outsourcing are cyclical. When the economy is slow, the cost reduction is the main reason and when the business is good, other benefits of logistics outsourcing become the main driven factors. It was also found that cost-driven outsourcing can also lead to low customer satisfaction rates.

There are some other contradictions found from studies between western regions and Asia. The customer satisfaction level in Asia is not as high as the one from western regions. Some of the main reasons for low customer satisfaction were the immature market of 3PL and timeliness of the services due to inadequate infrastructures and low availability of multimode capabilities (Hong et. al., 2004). However, businesses intend to outsource more logistics services as the studies in the western countries. Even though businesses from western regions wanted more services from 3PL, such as more supply chain integration and information technology capabilities, the study for India's logistics outsourcing industry reveals that the customer expects soft factors such as more relationship building capabilities and skilled professionals from 3PLs

than hard factors that western business expected (Mothilal et. al., 2012). This indicates that the customer expectations and perceived experience in outsourcing logistics functions are different between western countries and Asian countries, especially developing countries with insufficient infrastructure and multimode transportation options. Apart from Singapore (Bhatnagar et. al., 1999), the publications from the business perspective of outsourcing logistics in the Southeast Asia region are scarce.

2.1.2 Logistics Service Providers

Publications from the perspective of logistics service providers are relatively scarce to those from businesses' perspectives. Of all the 41 logistics outsourcing articles published between 1996 and 2017, over half of the research articles were conducted based on the perspective of businesses that are outsourcing their logistics functions. There was an annual study from the perspective of 3PLs conducted in North America (Lieb and Lieb, 2016) which was concurrent to the annual survey of the customers of logistics service providers. In those studies, CEOs of 3PL companies were asked about their profitability, challenges in the industry, development of services and prospects of the company. In Asia, there are a series of surveys conducted from Indian logistics service providers (Mitra, 2011) in contrast to the studies conducted in North America. There is also a comparative study of logistics service providers between India and North America (Mitra, 2011). Apart from those publications, the studies from the perspectives of logistics service providers are rare, especially those conducted in Asia, where most of the world's manufacturing needs are fulfilled in the global supply chain.

While studies of outsourcing companies reveal the expectations and perceived experience of outsourcing logistics functions, the surveys of logistics providers underline the industry dynamics, operational challenges and pressure of increased expectations. The survey of Indian logistics service providers showed that even though the market in the region was small compared to the North American market, the growth was promising with the increase of manufacturing investments and increased volume of import and export to and from the region. With the upward trend of the regional GDP growth rate, the market is expected to grow. The global logistics service providers also expanded their market presence to fulfil their overseas clients' needs through acquisitions, partnerships and direct investments (Mitra, 2011). The study also indicated the low-profit margin in the developing market as shippers intend to outsource only the commoditized services and keep value-added services in-house. The main challenges for the Indian logistics service providers in the developing market were the lack of trust and awareness from the firms and inadequate communication and physical infrastructure. Inadequate infrastructure such as poor road conditions leads to lower returns of flee vehicle assets, increasing operational costs and reducing efficiency. It is estimated that about 40% of logistics cost is from the cost of transportation (Mothilal et. al., 2012). Other challenges include complex tax laws across the region, insufficient use of information technology with poor visibility in the supply chain, fragmented market and the lack of skilled manpower.

Logistics service providers in developed markets such as North America are now facing different challenges. Even though the surveys indicated that revenue projections are met and most of the service providers said the businesses to be marginally profitable, there are many challenges such as pricing pressure in the

market and unrealistic service expectations set by other businesses such as Amazon. From the study (Lieb & Lieb, 2016), CEOs of logistics service providers estimated their revenues to have slow growth for the coming years. Logistics service providers are broadening their range of services and developing collaboration with customers to increase profitability. The exponential growth of e-commerce business has also affected the industry dynamic. The interest in supporting e-commerce businesses is growing and it is a market opportunity for every logistics service provider. Another challenge is the capacity shortages in the modes of transportation with the increased amount of trade volume globally. The labour problems in the road and maritime transportation, the shortage of truck drivers and the ageing population of truck drivers are also the factors that logistic service providers need to find solutions or alternatives for. The compliance pressure and new regulations are also present in both developing and developed markets. They are also facing talent management challenges such as maintaining skilled professionals. The industry has gone through the consolidation phase with various mergers, acquisitions and partnerships with logistics service providers expanding their global reach. For the prospects of the industry, robotics and big data analytics will play bigger roles as they play in other industries. Exploring greener and more sustainable logistics options is also a trend in the industry.

2.1.3 Key Success Factors

From the publications, it can be found that there are similar key success factors for logistics service providers but there are some variations depending on the region and maturity of the market. In the study of the Indian 3PL industry (Mothilal et. al., 2012), there are six key success factors mentioned; a range of services offered, industry focusing, the relation between 3PL and its customers, investment in information

technology, management of skilled logistics professionals and supply chain integration service. In the study, the effect of those key success factors on performance measures was also observed. It was found that the increased offering of services can affect positively revenue growth. However, it will not increase the profitability of the logistics service provider due to increased operational costs that accompany the new services offered. The reason for logistics service providers expanding their breadth of services with no significant positive profit growth is that focusing on only one industry can obstruct the profit growth (Mothilal et. al., 2012). The economies of scale need to be considered. Management of skilled logistics professionals and the relationship building between 3PLs, and shippers are both key success factors that have a positive impact on profit growth, regardless of the region and the market maturity. They are also important factors in the timeliness of the services and customer satisfaction. With their experiences and skills, professionals can enhance the logistics service provider's capabilities to sustain and improve customer service. In India, the soft skills of the 3PLs such as staff development and relationship building are more important for both financial and operational measures than hard skills such as investment in information technology and supply chain integration (Mothilal et. al., 2012). The following table is the list of success factors from literature reviews.

Table 2: Success Factors considered in publications

Success Factors	Author	Region of Study
Geographical reach	Mitra and Bagchi (2008)	North America
Skilled logistics professionals	Lieb and Lieb (2016)	North America
	Mothilal et. al. (2012)	India
	Wilding and Juriado (2004)	Europe
A wide range of services offered	Lieb and Lieb (2016)	North America
	Mothilal et. al. (2012)	India
Information technology systems	Lieb and Lieb (2016)	North America
	Mothilal et. al. (2012)	India
Supply Chain Integration	Mothilal et. al. (2012)	India
	Mitra and Bagchi (2008)	North America
Relationship building	Lieb and Lieb (2016)	North America
	Mothilal et. al. (2012)	India
Industry focus logistics	Mitra and Bagchi (2008)	North America
	Wu and Chou (2007)	Europe
Quality of fixed assets	Wu and Chou (2007)	Europe
Competitive Pricing	Rahman (2011)	Australia
	Aktas et. al. (2011)	Turkey

There are several success factors researched in the publications regarding outsourcing logistics services throughout the years. Most of the research was conducted in developed countries with mature 3PL markets, such as North America and Europe. The study of the China market when it was in the developing stage (Hong et. al., 2004) showed that different expectations from shippers can be seen when compared with other developed markets. The challenge of inadequate communication and

physical infrastructures are also needed to be considered when key success factors are to be identified. Most of the publications that can be found are about North American, European and Indian markets and research conducted in Asia, especially in the South-East Asian region are scarce. Moreover, most of the studies were conducted with empirical research methods with surveys. In this study, key success factors of outsourcing logistics functions in Myanmar will be identified using the fuzzy TOPSIS method, developed by Hwang and Yoon (1981). The fuzzy TOPSIS method has been used to identify key success factors in other industries such as the construction industry, airline industry and manufacturing industry by many researchers. According to Kim et. al. (1997), TOPSIS provides a logic according to the rationale of human choice, a scalable value for both best and worst alternatives simultaneously, and the computation process is simple and can be programmed into a spreadsheet. However, the traditional TOPSIS method requires exact numeric values for calculation and human judgements cannot be represented with crisp numbers. Therefore, the fuzzy TOPSIS method introduced by Zadeh (1965) will be used in this study. The fuzzy TOPSIS method is suitable for approximate reasoning and the logic allows decision making with uncertain information and estimated values. With this method, the critical success factors can be identified in order of their importance to the developing market with technological advancements already available in other markets.

Chapter 3

3.1 Methodology Overview

The following process is the methodology overview for this study.

3.1.1 Success Factors Selection

A few success factors from the existing publications will be selected for the basis of the survey. There will be a face-to-face interview with companies that are outsourcing the logistics functions so that factors that are important to the shippers and their expectations for the logistics service providers are included in the survey.

3.1.2 Survey

After selecting success factors based on literature review and the interview, the survey will be constructed using the success factors with the options to choose from linguistics evaluation scales. The surveys will be sent out to shippers and outsourcing companies in the import/export sector of trade businesses in Yangon, Myanmar.

3.1.3 Fuzzy TOPSIS Methodology

There are several methods and approaches to rank the key success factors. Multicriteria decision analysis (MCDA) methods are widely used in various fields of management and engineering for problems containing multiple conflicting objectives. In this study, the fuzzy TOPSIS (Technique for Order Preference by Similarity to Ideal Situation) method of MCDA will be used to rank the key success factors in order of their importance. Once the surveys are collected, the data will be calculated using the fuzzy TOPSIS method for analysis. The advantages of fuzzy TOPSIS are:

(1) It can represent the rationale of linguistic scale logically.

(2) It can present values accounting for both positive and negative ideal solutions.

(3) It has a simple computation process.

(4) It measures all alternatives compared to the ideal solutions.

The following are steps of the fuzzy TOPSIS approach that will be used in this study.

Step 1

Collect the survey data with 5-point linguistics evaluation scales. Surveys must ask only to choose one scale for a given question to best to represent their preferences. Linguistics evaluation scales will be converted into triangular fuzzy numbers.

Step 2

Following fuzzy decision matrix will be evaluated.

$$D = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1j} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2j} & \cdots & x_{2n} \\ \cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\ x_{i1} & x_{i2} & \cdots & x_{ij} & \cdots & x_{in} \\ \cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\ x_{m1} & x_{m2} & \cdots & x_{mj} & \cdots & x_{mn} \end{bmatrix}$$

where $x_{ij}\left((a_{ij}, b_{ij}, c_{ij})\right)$ is a fuzzy number respective to the linguistic evaluate scales chosen for ith key success factor by jth survey respondent.

$i = 1,2,3, \ldots, m$ are the key success factors.

$j = 1,2,3, \ldots, n$ are the number of survey respondents.

Step 3

The weight of the decision matrix will be neutralised and fuzzy un-weighted matrix
(R) will be generated.

$$R = \left[r_{ij}\right]_{m \times n}$$

$$r_{ij} = \left(\frac{a_{ij}}{c_j^*}, \frac{b_{ij}}{c_j^*}, \frac{c_{ij}}{c_j^*}\right)$$

where $c_j^* = \max_i c$

Step 4

The weighted normalized decision matrix will be calculated

$$V = \left[v_{ij}\right]_{m \times n}$$

$$v_{ij} = r_{ij} \times w_j$$

where w_j = the given weight to each survey respondent. Since each survey respondent
will be considered as having the same weight for this study, $w_j = (1,1,1)$

Step 5

A positive ideal solution and a negative ideal solution will be determined for the
success factors.

$$A^* = \{v_1^*, v_2^*, \dots, v_n^*\}$$

$$A^* = \{v_1^-, v_2^-, \dots, v_n^-\}$$

In this study, the positive and the negative ideal solutions of Chen (1997) will be used.

$$v_i^* = (1,1,1)$$

$$v_i^- = (0,0,0)$$

Step 6

The total distances of each success factor from the positive and the negative ideal solution will be calculated.

$$D_i^* = \frac{\sum_{j=1}^{n} d(v_{ij} - v_i^*)}{n}$$

$$D_i^- = \frac{\sum_{j=1}^{n} d(v_{ij} - v_i^-)}{n}$$

$d(v_{ij} - v_i^*)$ and $d(v_{ij} - v_i^-)$ are the distances between two fuzzy numbers and it can be calculated at

$$d(A1 - A2) = \sqrt{\frac{1}{3}[(a_2 - a_1)^2 + (b_2 - b_1)^2 + (c_2 - c)^2]}$$

Step 7

The relative closeness of each success factor to the ideal solution will be calculated.

$$C_i = D_i^- / (D_i^* + D_i^-)$$

3.1.4 Analysis Method of Results

Once the relative closeness of each success factor is calculated, the success factors will be ordered in terms of their values of relative closeness to the ideal solution. With the priority list of preference success factors order, the results can be analysed and evaluated.

Sensitivity analysis of the method will also be carried out with different weightage applied to the survey respondents. The weightages will be determined depending on their years of experience in the field and the size of their organisation. With sensitivity analysis results, the uncertainty of the fuzzy TOPSIS approach in this study can be tested and the findings of this study can be compared with different experimental results.

All the calculations will be done using Microsoft Office Excel with formula functions.

Chapter 1: Study logistics outsourcing, global trade and economic background of Myanmar to get an overview of the importance of logistics outsourcing, economic conditions and the need for logistics outsourcing in Myanmar.

Chapter 2: Explore previous publications and studies done on logistics outsourcing and logistics service providers to review the industry dynamics in developing and developed markets from the perspectives of both shippers and logistics service providers.

3.1.1) Conduct interviews with shippers to select success factors in the Myanmar market.

3.1.2) Based on interview, select success factors from literature reviews then construct surveys with linguistics evaluation scales for shippers and send out the surveys

3.1.3) Collect the results and evaluate using the fuzzy TOPSIS method.

3.1.4) Prioritise the success factors in order of preference by both shippers and logistics service providers.

Chapter 4: Evaluate results in terms of priority and the reason for the priority order in Myanmar. Compare and contrast the results with existing literature on whether the different markets have similar success factors or the existence of contractions in different markets.

Chapter 5: Conclusion

Figure 9: Overview of Research Methodology

3.2 Data Analysis

3.2.1 Interview with Experts

Three experts from Myanmar trade business companies were invited and interviewed to discuss the key success factors regarding logistics outsourcing. They are experts in the import/export sector with at least a minimum of 10-year experience, and the following backgrounds.

(1) Supply Chain Manager of a beverage manufacturing company: the manager of the supply chain and procurement department responsible for developing procurement and import/export plans for raw materials and products, supplier management, and developing supply chain strategies.

(2) Export Manager of a dairy product manufacturing company: the manager of the export department responsible for foreign export of dairy products, selection of third-party logistics providers and developing export and shipping strategies.

(3) Supply Chain Manager of a pharmaceuticals and consumer goods company: the manager of the supply chain department responsible for import and distribution strategies of products, and member of the tender committee for logistics providers.

During the interview with experts, their roles and responsibilities of the positions were discussed first, followed by the business nature of their organisations. Common trade destinations and points of origins for their trade operations were also asked. Logistics operations of the businesses were also discussed with which operations were outsourced and which operations were kept in-house. The experts mentioned the challenges of import/export operations and logistics outsourcing in Myanmar and

during the political situation. The criteria to consider when selecting suppliers for logistics outsourcing were also discussed. Then, key success factors of logistics outsourcing from the literature review were discussed and the selection of key success factors for this study was made. Experts suggested a few factors and are grouped into the key success factors from the literature review. The criteria for survey participants were also discussed regarding the position in the organisations, responsibilities and the s of experience. The experts agree with the use of the fuzzy TOPSIS approach for ranking the key success factors of logistics outsourcing in this study. The linguistic scales for the survey and their corresponding fuzzy numbers were also determined during the interview and the weightage of the survey participants were agreed to set the same for those with over 7 years of experience.

3.2.2 Key Success Factors Selection

During the interview, the experts were presented with the key success factors of logistics outsourcing from the literature review. Each key success factor was discussed and determined whether to include it in this study or not.

The following are the selected key success factors in random order for the survey and the reasonings from the experts for selection.

(1) *Quality of Fixed Assets (QFA)*: The quality of assets available for logistics providers such as containers and refrigeration units are especially important for products with specific temperature and conditions requirements during import and export operations. Trucks are also vital in the transport of products from ports to warehouses. Outsourcing companies usually carried out on-site inspections of assets before shipments. This factor is especially necessary for

products such as dairy products, marine products and pharmaceuticals and therefore selected for this study.

(2) *Competitive Pricing (CP):* Most important objectives of logistics outsourcing are to focus on core competencies and to reduce the cost of operations. Like other countries' markets, pricing pressure is also present in the Myanmar logistics outsourcing market. However, it is not as high and competitive as other markets, and the pricing is usually justified by the level of service offered. Pricing may involve other types of costs such as insurance, transit charges and port handling charges. Experts suggested the selection of this factor because it cannot be neglected and all the decision-makers of logistics outsourcing regardless of the industry will put this into consideration when selecting logistics providers.

(3) *Industry Focus Logistics (IFL)*: Industry focus knowledge and capabilities are necessary when transporting frozen products, marine products, livestock and chemicals. For trade businesses, logistics providers need to have experience, knowledge and capabilities to avoid wastage of resources such as time and cost. Most of the manufacturing companies in Myanmar imports chemicals for raw ingredients and factory cleaning needs. Therefore, the factor is also important in determining the service quality of logistics service providers.

(4) *Skilled Logistics Professionals (SLP)*: When selecting logistics service providers, the capabilities of employees from providers is important. They can help in reducing unnecessary wastage of time and cost such as detention time, on-port and off-port charges by utilising optimal shipping routes. Employees also need to be highly knowledgeable in different customs regulations and

policies of different countries. This factor is important for retaining customers from a third-party logistics provider's point of view.

(5) *Relationship Building (RB)*: With a better relationship between 3PLs and outsourcing companies, a better understanding of customers' needs can be gained and 3PLs will be able to suggest solutions and provide an additional range of services for the customers' needs. Experts mentioned that shippers from Myanmar put the relationships and recommendations from other companies into consideration when selecting providers to outsource logistics operations. Therefore, it is included in this study.

(6) *Information Technology (IT)*: In the logistics market of western countries, technological advancements are widely used in the logistics operations such as finding the optimal route, RFID technology for tracking and easier loading and unloading. Information technology is necessary for customer satisfaction and profitability in western countries. However, in the Myanmar market, the technology and infrastructure are still below when compared with other countries. Experts suggested that selecting this factor for the study will be interesting for future research as the technology advance and the dynamic of the information technology role in the market can be compared.

(7) *Wide Range of Services (WRS)*: A range of value-added services such as repairs, assembly, packaging, repackaging, quality control and onboard couriers were not widely outsourced according to the experts. Mainly used services from third-party logistics providers' range of services are government-related services such as customs handling and import/export certificates registration. Even though some companies have in-house

employees for those services, the experts said that the availability of service from the 3PLs is also considered.

(8) *Geographical Reach (GR)*: For this factor, two out of the three experts agree that it is not highly considered factors for them since the points of origins and destinations of their import/export needs are reachable by most of the 3PLs in Myanmar and their needs are fairly unchanged. However, for one of the experts, geographical reach to uncommon destinations when compared to all of Myanmar exports (Figure 6) such as the middle east and America is highly important due to the company's market. Therefore, the factor is included in the study to determine the ranking among other factors.

(9) Supply Chain Integration (SCI): To achieve better productivity, services from 3PLs such as warehousing, distribution and inventory tracking services are integrated into the operations of businesses. With supply chain integration, information, communication and products can flow seamlessly through operations such as planning, production and distribution. One of the companies where the experts are from, utilise supply chain integration in their business. However, it is not highly utilised by other companies in Myanmar. Similar to the information technology factor, it is included in this study to determine the dynamic of supply chain integration and can be compared by future research.

Table 3: Selection of Key Success Factors

Success Factors	Author	Region of Study	Experts
Geographical reach	Mitra and Bagchi (2008)	North America	Selected
Skilled logistics professionals	Lieb and Lieb (2016) Mothilal et. al. (2012) Wilding and Juriado (2004)	North America India Europe	Selected
A wide range of services offered	Lieb and Lieb (2016) Mothilal et. al. (2012)	North America India	Selected
Information technology systems	Lieb and Lieb (2016) Mothilal et. al. (2012)	North America India	Selected
Supply Chain Integration	Mothilal et. al. (2012) Mitra and Bagchi (2008)	India North America	Selected
Relationship building	Lieb and Lieb (2016) Mothilal et. al. (2012)	North America India	Selected
Industry focus logistics	Mitra and Bagchi (2008) Wu and Chou (2007)	North America Europe	Selected
Quality of fixed assets	Wu and Chou (2007)	Europe	Selected
Competitive Pricing	Rahman (2011) Aktas et. al. (2011)	Australia Turkey	Selected

The experts selected 9 key success factors for logistics outsourcing in the Myanmar trade business and they also suggested including a brief explanation of each key success factor in the survey so that a better and clear understanding can be obtained by the participants. A five-point linguistics scale and its corresponding fuzzy numbers are also determined during the interview.

During the interview, the experts also suggested a few new factors. However, through the discussion, the experts agree to group them into the existing key success factors. For the grouping criteria, the success factors that are related to each other or fall under other success factors, were grouped to form one success factor. For example, shipment tracking is grouped under information technology since it requires information technology systems to achieve real-time tracking systems. The selection of shipment refrigeration units before exporting frozen products also fall under the quality of fixed assets success factor. One of the services the experts mentioned that is widely outsourced in Myanmar is the governmental processes. This service was grouped with a wide range of services, and it is mentioned in the brief explanation of the survey to give the survey participants a better understanding.

3.2.3 Survey

A total of 9 key success factors were selected from the literature review as well as from the interview with experienced logistic professionals from Myanmar and are constructed into the survey. The surveys were distributed to procurement managers and logistics PICs of 20 selected companies with outsourced logistics functions in the import/export sections via both hard copy mail and email. After 3 weeks, the surveys were collected and there are twelve responses out of 20 surveys with a response rate of 60 per cent. The characteristics of the respondents are shown in Appendix 3. All twelve respondents are from Yangon, Myanmar, which is the trade and logistics hub of Myanmar with major seaports. The decision-makers of the survey were informed with a brief explanation of each key success factor in the first part of the survey and were asked to evaluate the importance of each key success factor based on a five-point linguistics evaluation scale. All respondents are experts in the logistics field

with at least 7 years of experience in the field. Since the survey is fairly simple with a brief explanation of each key success factor and respondents are based in Yangon with experience in logistics outsourcing as well as in import/export factors, twelve respondents were deemed to be valid for the scope of this study.

Table 4: Evaluations of Each Key Success Factors from the Respondents

	j1	j2	j3	j4	j5	j6	j7	j8	j9	j10	j11	j12
QFA	M	H	M	H	H	VH	M	M	M	VH	VH	M
CP	H	H	M	M	H	H	H	H	VH	H	M	VH
IFL	M	H	L	L	M	VH	VL	M	M	H	VH	VL
SLP	VH	VH	H	VH	H	H	M	H	H	VH	VH	H
RB	VH	H	H	M	H	M	H	H	H	M	H	M
IT	L	VH	L	VL	VH	M	L	L	L	M	M	VL
WRS	M	VH	L	VH	VH	L	M	M	H	H	M	L
GR	M	H	M	H	H	L	VH	M	VL	H	M	L
SCI	L	H	L	M	H	VL	M	H	M	H	M	L

VL – Very Low   L – Low   M – Medium   H – High   VH – Very High

    3.2.4 Data Processing

The proposed Fuzzy TOPSIS methodology was applied to identify the key success factors of logistics outsourcing in Myanmar. The participants of the survey were asked to evaluate each key success factor of logistics outsourcing by a five-point linguistics scale of very low, low, medium, high, very high, according to their importance in logistics outsourcing. After the survey responses were collected, every response from the respondents was unique and there were no two responses that have a similar evaluation for all the 9 key success factors. To reflect the data objectively in this study, triangular fuzzy numbers were used, which can both uphold the taking

value intervals as well as can emphasise the different values within the intervals (Fu and Zhou, 2017). The data obtained for the twelve respondents for each key success factor were converted into triangular fuzzy numbers which are determined during the interview with experts. The triangular fuzzy numbers for the linguistic scales are in table 5. The evaluations of each key success factor from the respondents with corresponding fuzzy numbers can be seen in table 6.

Table 5: Triangular Fuzzy Number of Linguistic Scales

Linguistic Scales	Fuzzy Numbers
Very Low - VL	1,1,3
Low - L	1,3,5
Medium - M	3,5,7
High - H	5,7,9
Very High - VH	7,9,9

Table 6: Triangular Fuzzy Numbers corresponding to the Evaluation from Respondents

	j1	j2	j3	j4	j5	j6	j7	j8	j9	j10	j11	j12
QFA	3,5,7	5,7,9	3,5,7	5,7,9	5,7,9	7,9,9	3,5,7	3,5,7	3,5,7	7,9,9	7,9,9	3,5,7
CP	5,7,9	5,7,9	3,5,7	3,5,7	5,7,9	5,7,9	5,7,9	5,7,9	7,9,9	5,7,9	3,5,7	7,9,9
IFL	3,5,7	5,7,9	1,3,5	1,3,5	3,5,7	7,9,9	1,1,3	3,5,7	3,5,7	5,7,9	7,9,9	1,1,3
SLP	7,9,9	7,9,9	5,7,9	7,9,9	5,7,9	5,7,9	3,5,7	5,7,9	5,7,9	7,9,9	7,9,9	5,7,9
RB	7,9,9	5,7,9	5,7,9	3,5,7	5,7,9	3,5,7	5,7,9	5,7,9	5,7,9	3,5,7	5,7,9	3,5,7
IT	1,3,5	7,9,9	1,3,5	1,1,3	7,9,9	3,5,7	1,3,5	1,3,5	1,3,5	3,5,7	3,5,7	1,1,3
WRS	3,5,7	7,9,9	1,3,5	7,9,9	7,9,9	1,3,5	3,5,7	3,5,7	5,7,9	5,7,9	3,5,7	1,3,5
GR	3,5,7	5,7,9	3,5,7	5,7,9	5,7,9	1,3,5	7,9,9	3,5,7	1,1,3	5,7,9	3,5,7	1,3,5
SCI	1,3,5	5,7,9	1,3,5	3,5,7	5,7,9	1,1,3	3,5,7	5,7,9	3,5,7	5,7,9	3,5,7	1,3,5

From table 6, fuzzy decision matrix D can be determined with fuzzy numbers respective to the linguistic evaluation scales. From the fuzzy decision matrix, it can be seen that c_j^* for each respondent is 9.

$$D = \begin{bmatrix} 3,5,7 & 5,7,9 & 3,5,7 & 5,7,9 & 5,7,9 & 7,9,9 & 3,5,7 & 3,5,7 & 3,5,7 & 7,9,9 & 7,9,9 & 3,5,7 \\ 5,7,9 & 5,7,9 & 3,5,7 & 3,5,7 & 5,7,9 & 5,7,9 & 5,7,9 & 5,7,9 & 7,9,9 & 5,7,9 & 3,5,7 & 7,9,9 \\ 3,5,7 & 5,7,9 & 1,3,5 & 1,3,5 & 3,5,7 & 7,9,9 & 1,1,3 & 3,5,7 & 3,5,7 & 5,7,9 & 7,9,9 & 1,1,3 \\ 7,9,9 & 7,9,9 & 5,7,9 & 7,9,9 & 5,7,9 & 5,7,9 & 3,5,7 & 5,7,9 & 5,7,9 & 7,9,9 & 7,9,9 & 5,7,9 \\ 7,9,9 & 5,7,9 & 5,7,9 & 3,5,7 & 5,7,9 & 3,5,7 & 5,7,9 & 5,7,9 & 5,7,9 & 3,5,7 & 5,7,9 & 3,5,7 \\ 1,3,5 & 7,9,9 & 1,3,5 & 1,1,3 & 7,9,9 & 3,5,7 & 1,3,5 & 1,3,5 & 1,3,5 & 3,5,7 & 3,5,7 & 1,1,3 \\ 3,5,7 & 7,9,9 & 1,3,5 & 7,9,9 & 7,9,9 & 1,3,5 & 3,5,7 & 3,5,7 & 5,7,9 & 5,7,9 & 3,5,7 & 1,3,5 \\ 3,5,7 & 5,7,9 & 3,5,7 & 5,7,9 & 5,7,9 & 1,3,5 & 7,9,9 & 3,5,7 & 1,1,3 & 5,7,9 & 3,5,7 & 1,3,5 \\ 1,3,5 & 5,7,9 & 1,3,5 & 3,5,7 & 5,7,9 & 1,1,3 & 3,5,7 & 5,7,9 & 3,5,7 & 5,7,9 & 3,5,7 & 1,3,5 \end{bmatrix}$$

The neutralised fuzzy un-weighted number for each fuzzy number is calculated with $c_j^* = 9$ for each key success factor from each respondent.

$$r_{11} = \left(\frac{a_{11}}{c_1^*}, \frac{b_{11}}{c_1^*}, \frac{c_{11}}{c_1^*}\right) = \left(\frac{3}{9}, \frac{5}{9}, \frac{7}{9}\right) = (0.33, 0.56, 0.78)$$

With above neutralised fuzzy un-weighted numbers were obtained and neutralised fuzzy un-weighted matrix (R) is generated. In this study, all the respondents are considered as having the same weight since all of them have a considerable amount of experience in the field. Therefore, $w_j = (1,1,1)$. Weighted normalised fuzzy number for each key success factor is calculated as follows.

$$v_{11} = r_{11} \times w_1 = (a_{11}, b_{11}, c_{11}) \times (1,1,1) = (0.33, 0.56, 0.78) \times (1,1,1) = (0.33, 0.56, 0.78)$$

From the calculation, data normalisation was done, and the weight normalised decision matrix is obtained (table 7).

Since the weight of the participants are all the same and $w_j = (1,1,1)$, the weighted normalised fuzzy decision matrix is the same as neutralised fuzzy un-weight decision matrix. For sensitivity analysis, different weights for the survey participants will be used to calculate the weighted normalised fuzzy numbers. The process is explained in the sensitivity analysis section (section 4.2).

Table 7: Weight Normalised Decision Matrix of Key Success Factors

	j1	j2	j3	j4	j5	j6	j7	j8	j9	j10	j11	j12
QFA	0.33,0.56,0.78	0.56,0.78,1.00	0.33,0.56,0.78	0.56,0.78,1.00	0.56,0.78,1.00	0.78,1.00,1.00	0.33,0.56,0.78	0.33,0.56,0.78	0.33,0.56,0.78	0.78,1.00,1.00	0.78,1.00,1.00	0.33,0.56,0.78
CP	0.56,0.78,1.00	0.56,0.78,1.00	0.33,0.56,0.78	0.33,0.56,0.78	0.56,0.78,1.00	0.56,0.78,1.00	0.56,0.78,1.00	0.56,0.78,1.00	0.78,1.00,1.00	0.56,0.78,1.00	0.33,0.56,0.78	0.78,1.00,1.00
IFL	0.33,0.56,0.78	0.56,0.78,1.00	0.11,0.33,0.56	0.11,0.33,0.56	0.33,0.56,0.78	0.78,1.00,1.00	0.11,0.11,0.33	0.33,0.56,0.78	0.33,0.56,0.78	0.56,0.78,1.00	0.78,1.00,1.00	0.11,0.11,0.33
SLP	0.78,1.00,1.00	0.78,1.00,1.00	0.56,0.78,1.00	0.78,1.00,1.00	0.56,0.78,1.00	0.56,0.78,1.00	0.33,0.56,0.78	0.56,0.78,1.00	0.56,0.78,1.00	0.78,1.00,1.00	0.78,1.00,1.00	0.56,0.78,1.00
RB	0.78,1.00,1.00	0.56,0.78,1.00	0.56,0.78,1.00	0.33,0.56,0.78	0.56,0.78,1.00	0.33,0.56,0.78	0.56,0.78,1.00	0.56,0.78,1.00	0.56,0.78,1.00	0.33,0.56,0.78	0.56,0.78,1.00	0.33,0.56,0.78
IT	0.11,0.33,0.56	0.78,1.00,1.00	0.11,0.33,0.56	0.11,0.11,0.33	0.78,1.00,1.00	0.33,0.56,0.78	0.11,0.33,0.56	0.11,0.33,0.56	0.11,0.33,0.56	0.33,0.56,0.78	0.33,0.56,0.78	0.11,0.11,0.33
WRS	0.33,0.56,0.78	0.78,1.00,1.00	0.11,0.33,0.56	0.78,1.00,1.00	0.78,1.00,1.00	0.11,0.33,0.56	0.33,0.56,0.78	0.33,0.56,0.78	0.56,0.78,1.00	0.56,0.78,1.00	0.33,0.56,0.78	0.11,0.33,0.56
GR	0.33,0.56,0.78	0.56,0.78,1.00	0.33,0.56,0.78	0.56,0.78,1.00	0.56,0.78,1.00	0.11,0.33,0.56	0.78,1.00,1.00	0.33,0.56,0.78	0.11,0.11,0.33	0.56,0.78,1.00	0.33,0.56,0.78	0.11,0.33,0.56
SCI	0.11,0.33,0.56	0.56,0.78,1.00	0.11,0.33,0.56	0.33,0.56,0.78	0.56,0.78,1.00	0.11,0.11,0.33	0.33,0.56,0.78	0.56,0.78,1.00	0.33,0.56,0.78	0.56,0.78,1.00	0.33,0.56,0.78	0.11,0.33,0.56

From the weighted normalised matrix of key success factors, the distances from positive and negative ideal solutions were calculated for each key success factor using the positive and negative ideal solutions of Chen (1997) as mentioned in the methodology.

$$A^* = \{v_1^*, v_2^*, \dots, v_n^*\}$$

$$A^- = \{v_1^-, v_2^-, \dots, v_n^-\}$$

$$v_j^* = (1,1,1)$$

$$v_j^- = (0,0,0)$$

$$A^* = \{1,1,1 \quad 1,1,1 \quad 1,1,1 \quad 1,1,1 \quad 1,1,1 \quad 1,1,1 \quad 1,1,1 \quad 1,1,1 \quad 1,1,1 \quad 1,1,1 \quad 1,1,1 \quad 1,1,1\}$$

$$A^- = \{0,0,0 \quad 0,0,0 \quad 0,0,0 \quad 0,0,0 \quad 0,0,0 \quad 0,0,0 \quad 0,0,0 \quad 0,0,0 \quad 0,0,0 \quad 0,0,0 \quad 0,0,0 \quad 0,0,0\}$$

The distance between 2 fuzzy numbers is calculated with the following formula.

$$d(A1 - A2) = \sqrt{\frac{1}{3}[(a_2 - a_1)^2 + (b_2 - b_1)^2 + (c_2 - c)^2]}$$

$$v_{11} = (0.33, 0.56, 0.78)$$

$$d(v_{11} - v_1^*) = \sqrt{\frac{1}{3}[(1 - 0.33)^2 + (1 - 5.6)^2 + (1 - 0.78)^2} = \sqrt{\frac{1}{3}[0.45 + 0.19 + 0.05]}$$

$$= \sqrt{0.23} = 0.48$$

$$d(v_{11} - v_1^-) = \sqrt{\frac{1}{3}[(0 - 0.33)^2 + (0 - 5.6)^2 + (0 - 0.78)^2} = \sqrt{\frac{1}{3}[0.11 + 0.31 + 0.61]}$$

$$= \sqrt{0.34} = 0.58$$

The distances between fuzzy numbers from v_j^* and v_j^- are shown in table 8 and table 9.

Table 8: Distances of fuzzy numbers from v_j^*

	j1	j2	j3	j4	j5	j6	j7	j8	j9	j10	j11	j12
QFA	0.48	0.29	0.48	0.29	0.29	0.13	0.48	0.48	0.48	0.13	0.13	0.48
CP	0.29	0.29	0.48	0.48	0.29	0.29	0.29	0.29	0.13	0.29	0.48	0.13
IFL	0.48	0.29	0.69	0.69	0.48	0.13	0.82	0.48	0.48	0.29	0.13	0.82
SLP	0.13	0.13	0.29	0.13	0.29	0.29	0.48	0.29	0.29	0.13	0.13	0.29
RB	0.13	0.29	0.29	0.48	0.29	0.48	0.29	0.29	0.29	0.48	0.29	0.48
IT	0.69	0.13	0.69	0.82	0.13	0.48	0.69	0.69	0.69	0.48	0.48	0.82
WRS	0.48	0.13	0.69	0.13	0.13	0.69	0.48	0.48	0.29	0.29	0.48	0.69
GR	0.48	0.29	0.48	0.29	0.29	0.69	0.13	0.48	0.82	0.29	0.48	0.69
SCI	0.69	0.29	0.69	0.48	0.29	0.82	0.48	0.29	0.48	0.29	0.48	0.69

Table 9: Distances of fuzzy numbers from v_j^-

	j1	j2	j3	j4	j5	j6	j7	j8	j9	j10	j11	j12
QFA	0.58	0.80	0.58	0.80	0.80	0.93	0.58	0.58	0.58	0.93	0.93	0.58
CP	0.80	0.80	0.58	0.58	0.80	0.80	0.80	0.80	0.93	0.80	0.58	0.93
IFL	0.58	0.80	0.38	0.38	0.58	0.93	0.21	0.58	0.58	0.80	0.93	0.21
SLP	0.93	0.93	0.80	0.93	0.80	0.80	0.58	0.80	0.80	0.93	0.93	0.80
RB	0.93	0.80	0.80	0.58	0.80	0.58	0.80	0.80	0.80	0.58	0.80	0.58
IT	0.38	0.93	0.38	0.21	0.93	0.58	0.38	0.38	0.38	0.58	0.58	0.21
WRS	0.58	0.93	0.38	0.93	0.93	0.38	0.58	0.58	0.80	0.80	0.58	0.38
GR	0.58	0.80	0.58	0.80	0.80	0.38	0.93	0.58	0.21	0.80	0.58	0.38
SCI	0.38	0.80	0.38	0.58	0.80	0.21	0.58	0.80	0.58	0.80	0.58	0.38

From the distances of fuzzy numbers, the total distances of each success factors were calculated, and the results are shown in table 10 and table 11.

$$D_1^* = \frac{\sum_{j=1}^{12} d(v_{ij} - v_i^*)}{12} = \frac{0.48 + 0.29 + 0.48 + 0.29 + 0.29 + 0.13 + 0.48 + 0.48 + 0.48 + 0.13 + 0.13 + 0.48}{12} = 0.344$$

$$D_1^- = \frac{\sum_{j=1}^{12} d(v_{ij} - v_i^-)}{12} = \frac{0.58 + 0.80 + 0.58 + 0.80 + 0.80 + 0.93 + 0.58 + 0.58 + 0.58 + 0.93 + 0.93 + 0.58}{12} = 0.725$$

Table 10: Distances from the positive ideal solution of each key success factor

		Distance from the Positive Ideal Solution
Quality of Fixed Assets	**QFA**	0.344
Competitive Pricing	**CP**	0.309
Industry Focus Logistics	**IFL**	0.481
Skilled Logistics Professionals	**SLP**	0.237
Relationship Building	**RB**	0.338
Information Technology	**IT**	0.566
Wide Range of Services	**WRS**	0.413
Geographical Reach	**GR**	0.450
Supply Chain Integration	**SCI**	0.497

Table 11: Distances from the negative ideal solution of each key success factor

		Distance from the Negative Ideal Solution
Quality of Fixed Assets	**QFA**	0.725
Competitive Pricing	**CP**	0.767
Industry Focus Logistics	**IFL**	0.582
Skilled Logistics Professionals	**SLP**	0.836
Relationship Building	**RB**	0.738
Information Technology	**IT**	0.495
Wide Range of Services	**WRS**	0.656
Geographical Reach	**GR**	0.620
Supply Chain Integration	**SCI**	0.574

The relative closeness of each key success factor to the ideal solution was calculated from the distances from the positive and the negative ideal solutions of each key success factor, using the following formula.

$$C_1 = D_1^- / (D_1^* + D_1^-) = \frac{0.725}{0.344 + 0.725} = 0.678$$

Table 12: The relative closeness of each key success factor to the ideal solution

		Relative Closeness to the Ideal Solution
Quality of Fixed Assets	**QFA**	0.678
Competitive Pricing	**CP**	0.713
Industry Focus Logistics	**IFL**	0.547
Skilled Logistics Professionals	**SLP**	0.779
Relationship Building	**RB**	0.686
Information Technology	**IT**	0.466
Wide Range of Services	**WRS**	0.614
Geographical Reach	**GR**	0.579
Supply Chain Integration	**SCI**	0.536

The key success factors were then ranked according to their similarity to the ideal solution. The results are shown in Table 12. According to the results, the ranking of key success factors will be:

$$SLP > CP > RB > QFA > WRS > GR > IFL > SCI > IT$$

The ranking suggests that soft factors such as skilled logistics professionals and relationship building are more focused when selecting third-party logistic providers in Myanmar, whereas supply chain integration and information technology rank lowest. The data analysis results are also in line with the differences of key success factors between western and eastern markets, mentioned in the literature review section.

Table 13: Rankings of Key Success Factors

Key Success Factors		Relative Closeness	Rank
Skilled Logistics Professionals	**SLP**	0.779	1
Competitive Pricing	**CP**	0.713	2
Relationship Building	**RB**	0.686	3
Quality of Fixed Assets	**QFA**	0.678	4
Wide Range of Services	**WRS**	0.614	5
Geographical Reach	**GR**	0.579	6
Industry Focus Logistics	**IFL**	0.547	7
Supply Chain Integration	**SCI**	0.536	8
Information Technology	**IT**	0.466	9

Chapter 4

4.1 Discussion

The analysis findings show that outsourcing companies in Myanmar pay great attention and consideration to soft factors of the third-party logistics providers' capabilities more than other technological factors such as supply chain integration and information technology. These findings also support the publication by Mothilal et. al. (2012), which stated that customers in the Asian region expect soft factors from the 3PLs than hard factors that western customers expected. The maturity of the logistics outsourcing market of Myanmar is still very young. Together with the maturity and the country being still underdeveloped with insufficient infrastructure, the customers may not want to expect much of hard and technological factors from the third-party logistics providers. Therefore, the customer expectations in Myanmar are very different from those in western countries.

The ranking of key success factors suggests that skilled logistics professionals from 3PLs ranked highly with being number one in the list. Due to the unstable political situation and often changing regulations regarding imports and exports in Myanmar, the employees of third-party logistics providers need to be highly skilled in logistics as well as have up to date knowledge on the regulations. Being able to provide highly skilled logistics professionals is a very important competitive advantage for 3PLs since other hard factors such as supply chain integration and information technology are considered by customers as least important and are difficult to differentiate from other competitors due to the country's infrastructures and market maturity. Without skilled logistics professionals, resources are susceptible to wastage due to unnecessary

time and cost during logistics operations and they are the most important factor in achieving most of the supply chain objectives (Van Hoek et. al., 2002). The wastage can also affect the downstream operations until the products reach their respective markets. Since it is a soft factor, it cannot be easily measured, and inexperienced outsourcing companies might not know the resources are being wasted. This is also because the market maturity in Myanmar is still underdeveloped, and the regulations are often changing with the political situation. To assure that there is a continuous improvement of that key success factors and to be able to identify and reduce wastage during operations, 3PL providers must keep up with the up-to-date knowledge and regulations, and outsourcing companies have to utilise the relationship building with 3PLs, which is one of the top 3 ranking key success factors of logistic outsourcing in Myanmar.

The second-highest ranked key success factor is competitive pricing. One of the major objectives of logistics outsourcing in every company of every market is cost-saving objective when compared to in house logistics operations. Therefore, it is no surprise that this key success factor is highly ranked when considering outsourcing logistics operations. Even though the competitive pricing factor is highly ranked, the pricing pressure in the Myanmar market is not high when compared to those in western countries. This is because the logistics outsourcing market is still yet to mature and developed in Myanmar. 3PL providers can help the shippers in cost-saving by reducing waste during operations by skilled logistics professionals. Another important key success factor is the relationship building between the outsourcing companies and 3PLs. With this factor, outsourcing companies can share their logistics requirements effectively and 3PLs can suggest solutions with a better understanding of logistics

requirements by customers and provide a broader range of services required. For building and maintaining customer relationships, being able to provide skilled logistics professionals is also vital (Murphy and Poist 2007). With better relationship building, mutual trust can be gained, which is also important because recommendations between shippers are taken into consideration highly in a market such as Myanmar with its maturity. Another key success factor that closely came in fourth is the quality of fixed assets. This is more important when shipments have certain specific temperature and condition requirements during logistics operations, such as dairy products, vaccines and medications as well as chemicals. Some outsourcing companies will carry out routine inspections of fixed assets to ensure quality. The resulted values for relationship building and quality of fixed assets are quite similar. Therefore, they may interchange depending on the nature of the companies. However, the soft factor, relationship building, is generally considered more thoroughly when doing business in the general Asian market, especially in Myanmar. This factor is also related to the top ranking factor, skilled logistics professionals. Therefore, it is deemed more important when compared to other success factors; a slight different in quality of fixed assets will be differentiated by the relationship building quality of 3PLs.

A wide range of services and geographical reach are ranked as fifth and sixth key success factors respectively. The range of value-added services such as assembly, repairs, packaging and repackaging does not have a high demand in the Myanmar market. However, other services such as customs handling and import/export government certifications are widely provided in Myanmar. 3PLs can provide convenience in complex processes with often changing regulations. Therefore, it is

ranked in the top half of the key success factors. Another factor following a wide range of services is the geographical reach. The most common shipping destinations and points of origins for trade businesses in Myanmar are China and Southeast Asian countries (Figure 6). Geographical reach for those countries is also common among logistics providers. Moreover, most shippers have had the same destinations and points of origin for a long period. Therefore, geographical reach is not ranked highly among other key success factors. The factors following are industry focus logistics and supply chain integration. Most of the export from Myanmar are marine products (Figure 7) and most of them require specific conditions for logistic operations regarding the temperature and condition of the vessels. However, the condition required is not highly specific. Therefore, industry focus logistics is ranked in the middle of key success factors ranking. Supply chain integration with 3PL companies when outsourcing can achieve superior performance (Frohlich and Westbrook 2001). Most of the trade businesses do not require supply chain integration apart from international enterprises in the consumer goods production sector, which are looking for ways to improve performance and productivity. Local manufacturers are not utilising supply chain integration in Myanmar yet. This justifies the ranking of the supply chain integration factor from the data analysis result.

The lowest ranking key success factor is information technology. The ranking is expected since Myanmar is a developing country with limited infrastructure. Technology advancement is behind most countries in the world and most customers are not familiar with new technology in the logistics field yet. Regarding tracking the shipments, companies are generally satisfied with a manual tracking number and the use of RFID is not widely available yet. Therefore, the information technology of a

3PL is not highly taken into consideration when selecting providers for logistics outsourcing. However, according to Stank et. al. (1999), investing in information technology can improve the service quality and profitability of logistics firms. Therefore, it cannot be neglected in the long term. The ranking of key success factors is similar to those in Asia countries by prioritising on soft factors and it might be the same in this decade due to political situations and the rate of advancement of information technology, and the rate of market maturity in the country. Just like the case in top half of the ranking, the resulted values of industry focus logistics and supply chain integration are similar. Industry focus logistics is ranked higher because supply chain integration requires the proficiency in industry focus logistics and the reverse is not usually taken into account when considering to outsource logistics operations.

From the results, soft factors such as skilled logistics professionals and relationship building are ranked higher among other success factors, showing that the market in Myanmar also considers soft factors more important than the hard factors, unlike the western countries. With these key success factors, it shows the necessary information and features required by 3PL companies to gain competitive advantages in the logistics outsourcing market of Myanmar. The key success factors will address the competitive forces and set expectations of employees' behaviours within the company in the Myanmar market. It will also help with decision making for organisational structures, markets and plans. The key success factors from this study can be implemented into the strategic planning of 3PL companies to gain a competitive advantage in the Myanmar market. The companies that are outsourcing the logistics

functions can also use the success factors to evaluate the potential supplies according to the importance of the key success factors in the Myanmar market.

With the resulted rankings of the success factors, logistics service providers can implement them in their development and strategic plannings to gain competitive advantage in developing markets such as Myanmar's. The results give insight on which areas are to be developed and focused for in similar logistics outsourcing markets. With the results, the outsourcing companies and companies willing to outsource will also achieve idea of what to expect from the 3PLs in this market.

4.2 Sensitivity Analysis

The sensitivity analysis can provide a new point of view in the ranking of logistics outsourcing key success factors by changing the weight of each respondent based on their year of experience or the size of their organisation. It can show the different rankings and expectations depending on the year of experience and the size of organisation. In this study, the sensitivity analysis is carried out by processing 2 sets of experiments, each containing a 4-time experiment.

For each set of the experiment, the respondents are divided into 3 groups (Low, Medium, High) depending on their years of experience (E) or sizes of their organisation (O), and the following experiments are carried out with different weightages.

(1) Set the triangular fuzzy weights of the respondent as follows.

(Regular – E1, O1)

$$w_{low} = (0.0,0.1,0.3), w_{medium} = (0.3,0.5,0.7), w_{high} = (0.7,0.9,1)$$

(2) Set the triangular fuzzy weights of the respondent as follows.

(Focus on High – E2, O2)

$$w_{low} = (0.0,0.1,0.3), w_{medium} = (0.0,0.1,0.3), w_{high} = (0.7,0.9,1)$$

(3) Set the triangular fuzzy weights of the respondent as follows.

(Focus on Medium – E3, O3)

$$w_{low} = (0.0,0.1,0.3), w_{medium} = (0.7,0.9,1), w_{high} = (0.0,0.1,0.3)$$

(4) Set the triangular fuzzy weights of the respondent as follows.

(Focus on Low – E4, O4)

$$w_{low} = (0.7,0.9,1), w_{medium} = (0.0,0.1,0.3), w_{high} = (0.0,0.1,0.3)$$

The two sets of experiments are carried out and the key success factors are ranked with a fuzzy TOPSIS approach for each experiment. The results are shown in Appendix 4.

From the sensitivity analysis, the factor of skilled logistics professionals maintains the number one ranking in 7 out of 8 experiments (87.5%) and it is consistent with the ranking of this experiment. Moreover, the top three key success factors of this study remain to be the top three factors 23 out of 24 times in the sensitivity analysis (95.8%). For the middle three key success factors of this study, their stability is 21 out of 24 (87.5%) and for the last three key success factors, 22 out of 24 (91.7%). For the information technology factor, it remains the lowest ranking for 6 out of 8 experiments (75%).

It can also be seen that with the higher years of experience, the success factor of relationship building overtakes the competitive pricing factor as the second-highest-ranking factor. As for the information technology factor, it can be seen that the ranking is slightly higher in respondents with lower years of experience. It suggests that younger people are putting the importance of information technology slightly higher. For large organisations, competitive pricing is the highest-ranking factor. For small and medium organisations, it is ranked at number three for the success factors rankings with skilled logistics professionals ranking number one. Form the sensitivity analysis, it can be seen that large organisations considered competitive pricing more. However, the factor of skilled logistics professionals is still ranked high among the success factors for logistics outsourcing for all sizes of organisations.

The reason for skilled logistics professionals remains top-ranking key success factor in almost all the experiments is that the capabilities of skilled logistics professionals affect almost all of the other factors such as competitive pricing, relationship building, a wide range of services, industry focus logistics and the effectiveness of supply chain integrations. It is therefore the most important factor to achieve customer satisfaction and 3PLs in the Myanmar market should focus on this factor to gain a competitive advantage among the relatively immature market of Myanmar logistics outsourcing.
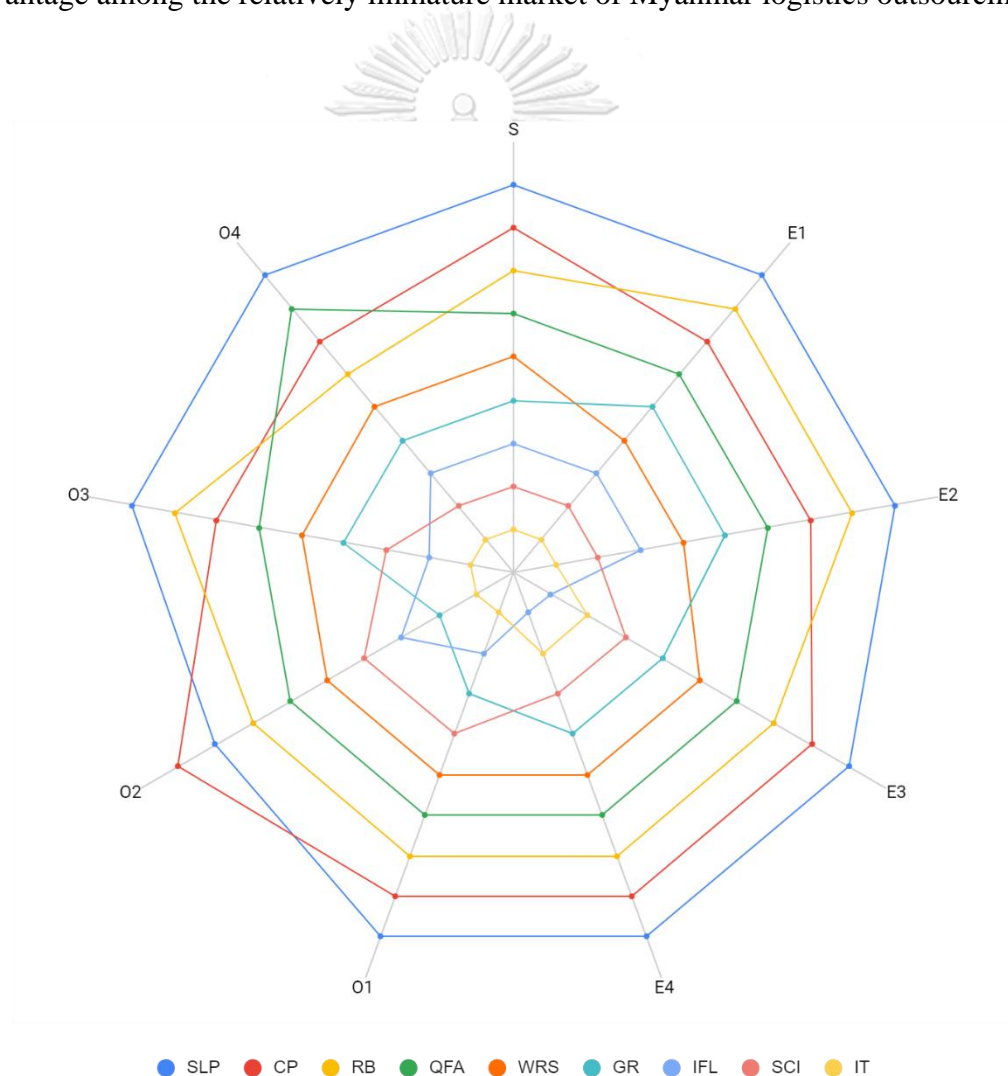

Figure 10: Rankings from Sensitivity Analysis Results and this Study (S).

Chapter 5

5.1 Conclusion

With the low logistics performance index (LPI) score of Myanmar, it is challenging to optimise logistics operations. The unstable political situation also affects the trade business with often changing policies and regulations. Most of the trading businesses in Myanmar are outsourcing their logistics operations to 3PL due to many significant barriers and challenges regarding international trade. The key success factors for logistics outsourcing in Myanmar are identified and ranked in this study to examine the customer expectations of the service quality and to get a better understanding of the importance of these key success factors in developing countries and immature markets of logistics outsourcing. The findings from this study can be applied in the service quality measurement of logistics service providers and can be used as a guideline for service improvement plans. The key success factors state critical elements that are required for 3PLs to compete in the Myanmar market. This study is carried out from the perspective of outsourcing companies, similar to most of the publications done in the perceptions of companies that are outsourcing and the geographical region of the research is similar to the study by Mothilal et.al., (2012), which is done in India, another Asia country with then still maturing market. In this study, key success factors obtained from the literature review and interviews with logistics experts in Myanmar are identified and ranked using the fuzzy TOPSIS method, which is different from other approaches in the research papers mentioned in the literature review. The fuzzy TOPSIS approach has been used to rank critical success factors in other fields, but not in the field of logistics outsourcing.

The findings of this study suggest that the factor for skilled logistics professionals is ranked highly among the key success factors. Customers of logistics outsourcing except 3PLs to provide more skilled logistics professionals and this factor can also help to increase customer satisfaction and help other factors to perform better. The factor of competitive pricing is ranked second highest since one of the main objectives of logistics outsourcing is cost saving. Quality of fixed assets, a wide range of services and the geographical reach of 3PLs are ranked in the middle of the list. The Supply chain integration factor is ranked in the bottom third of the list since most trade businesses in Myanmar are yet to utilise supply chain integration, apart from international manufacturing companies. The soft factors are ranked higher than other hard factors according to the data analysis, with information technology ranked the lowest. This is due to Myanmar being a developing country and the maturity of the market is still young. The technological advancement in Myanmar is still below average with inadequate infrastructure to support it. The sensitivity analysis for the methodology of this study shows results of similar rankings. There are a few changes in the ranking depending on the years of experience and the size of the organisation of the participants. However, the soft factors are still ranked higher than the hard factors for the Myanmar market.

The results support the study by Mothilal et.al., (2012), stating that customers of logistics outsourcing in the Asia market expect soft factors such as skilled logistics professionals and relationship building capabilities more than hard factors that western customers expected such as information technology. This study provides insight into outsourced logistics service quality expectations in the Myanmar market and in what areas the service quality can be improved. From the third-party logistics

providers' point of view, by focusing on and improving highly ranked soft factors, they can gain a competitive advantage in the Myanmar market. The findings can also be implemented in the service improvement plans of logistics service providers.

5.2 Limitations and Future Research

This study is not free from limitations. The ability to generalise findings of this study for all logistics outsourcing markets other than trade import and export is constrained by the sample size and study region. The political situation happening in the country since 2021 also affect the study since the GDP projections are significantly reduced and the trade businesses of the country are greatly affected. There are several regulation changes regarding import and export, which also affect the customer expectation and the need for skilled logistics professionals. Future research should focus on both sides of logistics outsourcing, the outsourcing companies and third-party logistics providers. Future research may also involve different sectors of the logistics outsourcing market such as distribution within the country in addition to the trade business. Other approaches of Multi-Criteria Decision Analysis for ranking of the factors may be used in future research and compare the findings with the results of the fuzzy TOPSIS approach of this study.

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Appendix

Appendix 1: Discussion Topics of Interview with Experts

1. Role and responsibilities in the organisations

2. Business nature and products of the organisations

3. Trade destinations and points of origin for the organisations

4. Logistics operations that are outsourced and operations that are kept in-house

5. Challenges of import/export operations and logistics outsourcing

6. Supplier selection criteria for logistics outsourcing

7. Key success factors of logistics outsourcing from the literature review

8. Selection of key success factors to be included in the study

9. Fuzzy TOPSIS approach to identify and rank key success factors

10. Determining linguistic scales and their corresponding fuzzy numbers

11. Determining the weightage of survey participants

Appendix 2: Survey

Participant Information Leaflet (Survey)

Dear Mr./Ms.

Please see the attached questionnaire to collect information on identifying the key success factors for logistics outsourcing in Myanmar. Before this research project, it is important to understand why and how this survey is to be carried out and what components will be included. Please take a few minutes to read through the following information. If there are any questions regarding the survey, please feel free to contact me to have further information.

Before filling in the questionnaire, I would briefly introduce myself. My name is Pyae Sone Htoon, a Master student in Chulalongkorn University, Thailand and University of Warwick, United Kingdom. The provisional title of my research is **Key Success Factors Identification for Logistics Outsourcing in Myanmar**.

The purpose of this survey is to identify the key success factors for logistics outsourcing in Myanmar. The results can be applied in supplier selection processes for logistics outsourcing for shippers as well as improving performances of third party logistics companies.

The survey will be constructed using the success factors with option to choose from 5-point linguistics evaluation scales. Once the surveys are collected, the data will be calculated using the fuzzy TOPSIS method for analysis to identify the success factors in order of their importance.

Participation in this survey is fully voluntary with an assurance that no negative consequence would arise from the refusal of your participation. If you decide to start the questionnaires, you can stop at any time.

The survey responses provided by you will be used for this research purpose only. Moreover, any personal information provided is kept strictly confidential and will not be used for other research.

During the research project, we will analyse all the data collected from the survey. The research will be submitted to the University's examination for evaluation, and we might publish our findings in an academic journal.

This research has been ethically approved by the Overseas Programmes Courses Office, Warwick Manufacturing Group, United Kingdom.

I appreciate that you would spend some time answering this questionnaire, and I look forward to your survey responses.

Yours sincerely,

Pyae Sone Htoon

Department of Regional Centre for Manufacturing Systems Engineering

Chulalongkorn University, Thailand, and University of Warwick, United Kingdom

E-mail: ps.htoon@gmail.com

Project Title: **Key Success Factors Identification for Logistics Outsourcing in Myanmar**

Position in the Company: [_____]

Company Business: ☐ Import ☐ Export

Size of the Company (Number of Employee):

☐ Micro (1-10)   ☐ Small (<100)   ☐ Medium (<250)

☐ Large (<1000)   ☐ Enterprise (>1000)

What are the general product types of your trade business?

[_____]

How long have you been working in the industry?

[_____]

Please read the following summarised explanations of each success factor to get a clear understanding.

1. *Quality of fixed assets*

    The quality of assets available from the 3PLs such as ships, trucks and containers are considered when selecting a 3PL service provider, especially with products that require specific temperature and conditions during transport.

2. *Competitive Pricing*

    The pricings of the transportation from the point of origin to the destinations are highly considered when comparing between 3PL service providers. There can also be other types of cost such as insurance, port handling and transit charges.

3. *Industry Focus Logistics*

    Some logistics needs require industry focused knowledge and capabilities such as transportation of frozen products, chemicals and livestocks etc. When outsourcing

logistics operations, those industry focused capabilities are crucial in selecting 3PL providers.

4. *Skilled Logistics Professionals*

The employees of the 3PL selected need to be highly skilled in logistics such as knowledge of different customs regulations and policies of different countries. Skilled professionals can also find ways to reduce unnecessary time and cost during the operations.

5. *Relationship Building*

Relationships between 3PL companies and the shippers are also important. With optimised relationships, 3PLs can get a better understanding of shippers' logistics requirements and suggest solutions. Recommendations from other shippers may also be considered during the 3PL selection process.

6. *Information Technology*

With advanced technologies available nowadays, shippers prefer the advanced technologies to be integrated in logistics operations such as real-time tracking, RFIDs for easier loading and unloading.

7. *Wide Range of Services*

Apart from transportation, other value added services are also important, such as assembly, repairs, packaging/repackaging, on board couriers for urgent and sensitive shipments, customs handling, import/export certifications, quality control and handling of return shipments. Without those services, shippers may need in-house employees to carry out the processes.

8. *Geographical Reach*

Geographical reach of 3PLs is important for shippers that frequently have multiple points of origin and destinations.

9. *Supply Chain Integration*

Warehousing, distribution and inventory tracking services from 3PLs can be integrated into the shipper's supply chains. Products, information and communication can be exchanged seamlessly throughout all operations such as planning, production and distribution stages of shippers' businesses.

Please check (✓) the boxes depending on the importance of factors when considering a 3PL for outsourcing logistics functions.

Please check (✓) only one box for one factor.

VL - Very Low   **L** - Low   **M** - Medium   **H** - High   **VH** - Very High

		VL	L	M	H	VH
1	Quality of fixed assets	☐	☐	☐	☐	☐
2	Competitive pricing	☐	☐	☐	☐	☐
3	Industry focus logistics	☐	☐	☐	☐	☐
4	Skilled logistics professionals	☐	☐	☐	☐	☐
5	Relationship building	☐	☐	☐	☐	☐
6	Information Technology	☐	☐	☐	☐	☐
7	Wide range of services	☐	☐	☐	☐	☐
8	Geographical reach	☐	☐	☐	☐	☐
9	Supply Chain Integration	☐	☐	☐	☐	☐

Date:

Appendix 3: Survey Data

Participants		Position	Nature of Business	Size of Organisation	Year of Experience
Participant 1	j1	Procurement Manager	Raw Materials Imports (Confectionary)	Medium	Over 10 years
Participant 2	j2	Supply Manager	Electronics Imports	Medium	Over 7 years
Participant 3	j3	Supply Chain Manager	Textile Imports / Exports	Small	Over 10 years
Participant 4	j4	Supply Manager	Health Supplements Imports	Small	Over 8 years
Participant 5	j5	Procurement Manager	Raw Materials Imports (Confectionary)	Medium	Over 7 years
Participant 6	j6	Export Manager	Marine Products Exports	Small	Over 10 years
Participant 7	j7	Procurement Manager	Consumer Goods Imports	Medium	Over 10 years
Participant 8	j8	Logistics Manager	Raw Materials Imports (Alcoholic Beverages)	Large	Over 10 years
Participant 9	j9	Import/Export Manager	Garments Imports / Exports	Large	Over 8 years
Participant 10	j10	Import Manager	Cleaning products Imports	Small	Over 8 years
Participant 11	j11	Supply Chain Manager	Consumer Goods Imports	Medium	Over 8 years
Participant 12	j12	Supply Manager	Pharmaceuticals Imports	Small	Over 7 years

Appendix 4: Sensitivity Analysis Results

			SLP	CP	RB	QFA	WRS	GR	IFL	SCI	IT
This Study	Same Weight (S)	C_i	0.779	0.713	0.686	0.678	0.614	0.579	0.547	0.536	0.466
		Rank	1	2	3	4	5	6	7	8	9
Years of experience (E)	Regular (E1)	C_i	0.471	0.438	0.440	0.416	0.361	0.368	0.348	0.328	0.277
		Rank	1	3	2	4	6	5	7	8	9
	Focus on High (E2)	C_i	0.374	0.360	0.365	0.327	0.275	0.302	0.273	0.256	0.226
		Rank	1	3	2	4	6	5	7	8	9
	Focus on Medium (E3)	C_i	0.302	0.296	0.274	0.269	0.262	0.242	0.214	0.236	0.226
		Rank	1	2	3	4	5	6	9	7	8
	Focus on Low (E4)	C_i	0.302	0.296	0.274	0.269	0.262	0.242	0.214	0.236	0.226
		Rank	1	2	3	4	5	6	9	7	8
Size of Organisation (O)	Regular (O1)	C_i	0.367	0.358	0.356	0.318	0.316	0.283	0.279	0.294	0.245
		Rank	1	2	3	4	5	7	8	6	9
	Focus on Large (O2)	C_i	0.253	0.254	0.243	0.215	0.215	0.179	0.191	0.205	0.153
		Rank	2	1	3	4	5	8	7	6	9
	Focus on Medium (O3)	C_i	0.390	0.360	0.376	0.349	0.335	0.335	0.296	0.299	0.287
		Rank	1	3	2	4	5	6	8	7	9
	Focus on Small (O4)	C_i	0.393	0.357	0.324	0.357	0.294	0.293	0.273	0.256	0.219
		Rank	1	3	4	2	5	6	7	8	9

Appendix 5: Ethical Approval Confirmation

M Gmail   Pyae Sone Htoon <ps.htoon@gmail.com>

Fwd: Ethical Approval Confirmation (Overseas Programmes)
1 message

Chula Systems Engineering CUSE <cuse.chula@gmail.com>   28 February 2022 at 08:00
To: Pyae Sone Htoon <ps.htoon@gmail.com>

Dear Pyae,

The Ethical approval should use this page attached in your dissertation.

Best regards,

Banlang Tapsen
CUSE Academic Coordinator

---------- Forwarded message ---------
From: <wmg-overseas@warwick.ac.uk>
Date: Fri, 29 Jan 2021 at 22:27
Subject: Ethical Approval Confirmation (Overseas Programmes)
To: <Pyae.Htoon@warwick.ac.uk>
Cc: <pisit.ja@chula.ac.th>, <cuse.chula@gmail.com>

WARWICK
THE UNIVERSITY OF WARWICK

Ethical Approval Confirmation

Dear Mr Htoon,

Warwick ID Number: 1740789

Thank you for submitting your Supervisor's Delegated Approval form to the Overseas Programmes Course Office for the project: Key Success Factors Identifation for Logistics Outsourcing in Myamar.

Your reference number is REGO-2021-WMGOS-0021.

You now have the appropriate approval in place to begin your study.

Please ensure you insert a copy of this email into the appendices of your project.

Best Wishes

Mengjiao Han
WMG Overseas Programmes Course Office
wmg-overseas@warwick.ac.uk
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