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A Framework for Analysing the TCO of Sourcing from China to Canada

by

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Abstract

This thesis proposes a framework of the total cost of ownership (TCO) of importing consumer goods from China to Canada. It analyses costs and risks along the international supply chain, from supplier searching to the distribution end. Each cost factor and potential risk scattered along the process is analysed based on literature review and secondary data. Forecasts for future changes and suggestions for Canadian companies are also given based on the analysis. An implementation session is performed to demonstrate that the TCO approach is applicable and essential in procurement cost management.

Keywords: Global sourcing; import from China; total cost of ownership

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Chapter 1 Introduction

Nowadays, globalization, which refers to "the growth of the sizes of social systems and the increase in the complexity of intersocietal links (Korotaev, 2013)", has become a day-to-day lifestyle, for both individuals and organizations.

Major web portals are squeezed with news happening all around the world, from North America to Africa, from the world's major countries to small island countries whose name are not recognized by people. Here in Canada, shelves in malls and supermarkets are packed with goods from all over the world. In workplaces, emails are sent to different time zones in different languages. Globalization is like air, it is there, whether you like it or not, you are a part of it.

In the business world, globalization brings Canadian companies competition from all over the world, pushing them to constantly find ways to reduce cost. At the same time, globalization enables Canadian purchasing managers to find suppliers that can help them to survive in this aggressive price war.

Global sourcing has become a prevailing trend in the last decades (Christopher, 2011; Sartor et al. 2014). And experts from academia have also acknowledged the strategic importance of global sourcing (Karjalainen and Salmi, 2013). Meanwhile, today's globally operating companies do not devote enough resources to their cross-border purchasing strategy (Kotabe and Murray, 2004). Most of them have realized that global sourcing brings them lower unit prices, but they still lack a comprehensive view of global sourcing (Kotabe and Murray, 2004).

China has become an important outsourcing destination in the past few decades. After China opened its door in 1978, more and more western companies started to import consumer goods and manufacturing materials from China to take advantage of its cheap labour and other resources.

One interesting news shows how made in China connects China and other parts of the world together.

Before U.S. election day in 2016, Yao Dandan, the owner of a small factory making flags for American retailers, predicted Donald Trump would win. “There were more Trump flags ordered than for Clinton”. Another businessman in this industry texted his friend “There are more orders for Trump flags. Flag makers dare to take Trump flags order without a deposit.” [1]

Importing from a country which is located far away is not an unbearable long journey as it used to be.

Intuitively, purchasing from developing countries with abundant low-cost labour such as China would be an effective way to cut costs since the direct cost is lower than manufacturing in-house or outsourcing locally. But, cost savings may not be as great as expected (Gilley and Rasheed, 2000). Other than the purchasing price and the transportation costs, extra expenses in the purchasing process can be surprisingly high. More uncertainties tend to occur with longer geographical distances. Furthermore, costs incurred within a product’s life cycle, risks that derive from the long distance and different business environment, side effect on innovation may also lead to unexpected expenses.

In the trend of synchronizing globalization and globally sourcing, companies in Canada are also searching for new opportunities. Importing from China is a popular option.

According to Statistics Canada, China is Canada’s second-largest exporter. The top 10 products traveling from China to Canada are consumer goods. It means that many Canadian firms see purchasing from China as an attractive business strategy.

While China remains a popular sourcing destination, a new trend of global sourcing is that firms from western countries are retreating from China. They either choose to go back to their own countries or search for new suppliers in South Asia. China’s export shrank for the first time in 2009. [2]

[1] News on Business Insider (July 20,2018).

[2] National Bureau of Statistics of China; News on YaleGlobal Online (January 14, 2009)

China's GDP growth is slowing down, too. From 2009, China experienced six consecutive years of growth slowdown[3]. Other vital economic indicators such as the Purchasing Managers' Index (PMI) and fixed asset investment (FAI) are not as positive as before[4]. Will China be able to hold its competitive advantages? Will China still be an ideal place to put attention to?

To account for the actual competitiveness of China as an outsourcing destination, we may find a preliminary hint from the total cost of ownership (TCO) theory. The TCO theory is an approach adopted to facilitate calculating all the costs, both direct and indirect, that happen from purchase to consuming.

Previous research suggests that various hidden costs and risks of outsourcing are neglected by purchasing managers. Most importers routinely evaluate potential suppliers based on three factors – price, quality and delivery (Hirakubo and Kublin 1998) while academic literature indicates that other factors are likely as important as these three. So, it is highly possible that purchasing from China is not as cost effective as purchasing managers expected. Estimating all potential costs that may occur and evaluating both the positive and the negative effect of sourcing from China is critical for Canadian importers.

[3] National Bureau of Statistics of China
[4] National Bureau of Statistics of China

Chapter 2 Literature Review

This thesis is related to two streams of literature. The first one is previous research on global sourcing, and the second stream of literature is on the TCO, especially on TCO of importing from China. One important objective of this thesis is to develop a framework which can facilitate to estimate the total cost of importing from China to Canada, so identifying what total cost concept means and cost factors involved are of vital importance.

2.1 Global Sourcing

2.1.1 Definition of Global Sourcing

Global sourcing is an evident trend in supply chain management (Vos et al., 2016), and a lot of research has been done on global sourcing since managers started adopting it as an important business strategy in the 1980s (Trend and Monczka, 2003; Nassimbeni, 2006).

Monczka and Trend (1991) defined the term global sourcing as a strategic decision that includes foreign suppliers as sourcing partners in the overall purchasing strategy. Followed Monczka and Trend's work, Jiang and Tian (2010) defined global sourcing as a centralized procurement strategy for companies which sought suppliers across-border based on their corporate standards. Not only manufacturing process of intermediate goods and consumer goods can be outsourced, but also are service, research and development (R&D), and procurement activities (Carter et al., 2007).

2.1.2 Benefits of Global Sourcing

Many researchers advocated global sourcing as a profitable purchasing strategy. They believed that the process of global sourcing integrated comparative advantage of importers and exporters. Six major benefits listed below are summarized from previous literature.

(i) Lower unit price

Relatively low unit price is the primary reason why companies do global sourcing (e.g. Petersen et al., 2000; Cecere, 2005; Lewin and Volberda, 2011; Steven et al., 2014).

Compared to manufacturers from developed countries, manufacturers from developing countries have better access to cheaper human labour, lower land cost, lower raw material cost, and lower facility cost. Companies from developed countries can take this advantage by using global sourcing strategy and achieve "buying low selling high" objective.

Besides low manufacturing cost, compared to local suppliers, potential suppliers from foreign countries do not have long-lasting business relationships with local buyers, so they sometimes offer significantly lower unit price than local suppliers to compete for contracts (Hamel and Prahalad, 2012). In this sense, whereas global sourcing is a company's self-serving behavior, it increases the competitive dynamics of supply markets. To buyers, this change in the supply market increase buyers' negotiation strength.

(ii) Availability (Cho and Kang, 2001)

With the process of globalization, product differentiation is a disappearing character of the modern market. But distinct customer demand in one market sometimes still results in uniqueness in the availability of the products.

(iii) Access to new technology (e.g. Cho and Kang, 2001; Monczka et al., 2008)

Global sourcing requires the cooperation of entities from different countries. The cross-border collaboration gives importers access to new products and new technologies of the other country, possibly enabling importers to improve their in-house manufacturing process.

(iv) Increase suppling flexibility (Salleh and Mohammad, 2006)

A broader purchase channel increases supply stability and reduces procurement risks. A wider selection of suppliers provides buyers with a better position in bargaining.

(v) Getting to know the local market (e.g. Nassimbeni, 2006; Heuser and Brockwell, 2009)

Sourcing from a different market helps a company to break the barrier to the local market. With in-depth cooperation, a different set of regulations, customer demand, manufacturing process, and business context is no stranger anymore. This strategy lays the foundation for entering the local market in the future.

(vi) For future competence

Facilitating business performance and future global competition is another motivation that encourages companies to engage in global sourcing (Nassimbeni, 2006; Steinle and Schiele, 2008). When global sourcing is not an innovative business strategy anymore, those who do not consider global sourcing easily fall behind their competitors and miss business opportunities.

2.1.3 Risks of Global Sourcing

While multiple pieces of research highlighted the benefits of global sourcing, risks of global sourcing are also the focal point of many research (Horn et al., 2013). This topic was investigated vastly by researchers such as Doig et al. (2001), Robinson et al. (2008) etc.

Mehrjoo and Pasek (2014) defined risk as "the prospect loss as a result of unforeseen or random changes in underlying risk factors". From the literature, the risks of global sourcing are mainly focused on the following aspects.

(i) Actual benefits gained vary in different companies

Firstly, different organizational characteristics of a company render various actual benefits gained from this strategy. According to the study of Cho and Kang (2001), the degree of benefits received from global sourcing strategy is affected by the size of the company, the type of products, the import volume, and the global sourcing experience of

the company. In addition to Cho's research, Antràs and Helpman (2004) pointed out that productivity dispersion and headquarter intensity were two other company characters that affected its outsourcing strategy. Their study showed that the more dispersed producing activities were, the better a company fitted a high level of outsourcing. And headquarter intensity showed an inverse correlation with the level of outsourcing. As a result, not every company will gain the same from global sourcing strategy, and companies have risk of not getting what they expected.

(ii) Hidden costs and risks exist

Despite good fit between a company and its global sourcing strategy, researchers realized that buying from a cheaper country does not necessarily mean a lower total cost. Managers only consider purchasing cost and transportation cost as the main cost factors but costs that seem minor must not be overlooked (Levy, 1995).

As it has been discussed, companies conduct global sourcing strategy usually expect to reduce purchase cost. But with unexpected costs and hidden risks, it is possible that companies do not get what they expected. Horn et al. conducted an analysis of 214 sourcing from China projects in 2013. Their analysis showed that 75% of the projects did not end with expected benefits.

One of the reasons why global sourcing contains more risks than local sourcing is its longer supply chain process. Longer supply chain process holds more complexity, and more cost factors and risks happen along with it.

For example, complexity in global sourcing raises information asymmetry issue, and long geographical distance between suppliers and importers constrains suppliers' ability to monitor a product's quality. Multiple papers argued that when information transaction was not effective, it was difficult and costly for firms to monitor their suppliers (e.g. Whipple and Roh, 2010). Information asymmetry also offers an incentive for suppliers to reduce cost and increase profit by underinvesting in the quality effort (e.g. Eisenhardt, 1989). Steven et al. (2014) verified their hypothesis that offshore sourcing had a strong correlation with product recalls.

Fan (2007) analysed the risks of global sourcing on the cross-department cooperation level. He argued that global sourcing increased procurement risks as it involved multiple managerial activities and was also a long-term, on-going process. More across-departments activities within the company, negotiation and cooperation with suppliers, and deeper strategic influence in the company's future make the process more complicated.

Studies that focused on inventory cost (Callioni et al., 2005), logistics cost (e.g. Zeng and Rossetti, 2003), financial cost (e.g. Carter and Vickery, 1989) also contribute to this topic.

The definition, character and estimation method of these costs and risks will be explained in Chapter 4.

2.2 Total Cost of Ownership

2.2.1 Introduction of TCO

The total cost of ownership (TCO) is a cost management philosophy that provides a comprehensive view on the benefits and risks of global sourcing.

As mentioned in section 2.1, purchasing from a low-cost country does not necessarily mean that the total cost of ownership is low.

As Christopher et al. (2006) identified, "supposedly low-cost off-shore sourcing strategies can end up as high-cost supply chain outcome". Realizing this dilemma, an increasing concern of TCO in academia is emerging. TCO principle has been becoming a key principle in supply management (Hofbauer et al., 2012). Studies in recent years have gained interests in estimating hidden costs that were overlooked before. It is necessary to get to know TCO as a handy tool to forecast the actual outcome of global purchasing.

Compared to other topics in the purchasing field, the research on TCO is not widely addressed but has been emerging fast in recent years (Weber et al., 2010). Initially, TCO literature mainly focused on how outsourcing globally reduced cost, while recently, TCO

literature have been turning into pointing out hidden cost of purchasing from developing countries, such as China (e.g. Song et al., 2007; Holweg et al., 2010).

While TCO is relatively a new concept, as early as the year 1937, Coase already brought up a primary concept called transaction cost economics (TCE). It is the earliest theory that aimed at summarizing all cost factors that could possibly happen during the purchasing or sourcing process. In 1979, Willliamson brought up the transaction cost theory analysis (TCA), trying to account the actual cost of buying overseas. But he neglected some major cost factors such as supplier management cost, country-specific factors and so on. From the 1980s, some researchers started to evaluate suppliers from a total cost point of view (Song et al., 2007).

Monckza and Trecha (1988) are the first researchers who introduced supplier index concept and emphasized that non-performance costs, which refered to costs incurred during supplier deficiencies process, were also important to be concluded in the supplier evaluation process.

In the 1990s, the concept of TCO was first introduced into academic circles (Song et al., 2007). In 1993, Ellram and Siferd defined TCO approach as a method used to evaluate a sourcing decision. This method takes all costs associated with the acquisition, usage, and maintenance of a product into consideration. Phillips and Melnyk (2010) defined TCO as "a holistic view of all costs, including both direct and indirect, involved with an item over the useful life of that item". They divided all these costs into three categories: acquisition costs, ownership costs, and post-ownership costs. Similarly, Helmold and Terry (2017) illustrated that TCO compiled all cost factors from the beginning of the supplier selection process until the end of a product's life cycle.

TCO theory is a powerful tool to evaluate suppliers, evaluate individual cost factors along the supply chain, calculate profits, and modify long-term business strategy. Getting to know all significant cost factors is essential when using TCO approach.

2.2.2 Cost Factors Involved in TCO of Global Sourcing

Holweg et al. (2010) segmented TCO of global sourcing into three categories: static costs, dynamic costs, and hidden costs. Static costs are direct costs that can easily be detected, such as purchase price, fees paid to the freight forwarder, etc. Dynamic costs, in Holweg's definition, are costs caused by unexpected incidents, such as lost sales caused by long lead-time maritime transportation. Hidden costs are not caused by actual supply chain processes, but by a wider business environment, such as changes in political regulations.

With the quoted price, the total static cost can be calculated precisely. Since both dynamic costs and hidden costs are volatile and related to both monetary and non-monetary risks, this thesis proposes to distinguish between static costs and potential risks.

Table 2.1 and Table 2.2 present a framework of overseas sourcing TCO together.

This thesis refers to multiple papers on TCO cost factors to carry out the following table. Academic achievements of four papers (Platts and Song, 2007&2010; Holweg et al., 2010; Saccani et al., 2016) form the skeletons of Table 2.1 and Table 2.2. Papers focusing on a specific cost factor of TCO (e.g. Antràs and Helpman, 2004; Carter et al., 2007; Golini and Kalchschmidt, 2015) contribute to constructing a more comprehensive framework.

Global Sourcing Static Cost Factors		
Cost Factors		**Academic Source**
Setup Costs	Cost of collecting information to search for suppliers	e.g. Saccani et al. (2016)
	Cost of staffs visiting/negotiating with suppliers	e.g. Platts et al. (2007, 2010); Saccani et al. (2016)
	Cost of modifying IT system	Platts et al. (2007, 2010)
Purchasing Costs	Net price	e.g. Platts et al. (2007, 2010); Helmold (2013); Jain et al. (2014)
	Tooling	Helmold (2013)
Administrative costs	Ordering process	e.g. Platts et al. (2007, 2010); Saccani et al. (2016)
	Payment/billing process	e.g. Platts et al. (2007, 2010); Saccani et al. (2016)
Logistics and Inventory Costs	Transportation cost	e.g. Helmold (2013); Vos et al. (2014); Stanczyk and Cataldo (2016)
	Inventory cost	Helmold (2013); Saccani et al. (2016); Meng et al. (2017)
	Tax and import duty	Carter et al., 2007
	Customs clearance cost and port charges	Helmold (2013)
Supplier Management Costs	Supplier training and technical support	e.g. Simatupang et al. (2005); Bitical et al. (2004)
	Supplier cooperation cost	e.g. Simatupang et al. (2005); Bitical et al. (2004)
	Supplier evaluation cost	Steven et al. (2014)
	Sample inspection cost	Steven et al. (2014)
Financial Costs	International payment cost	

Table 2.1 Static Cost factors of global sourcing

In the context of this thesis, according to the references listed in the table, setup costs are defined as costs incurred to get the company ready to cooperate with the new supplier. Purchasing costs are the money paid for buying the product from the supplier and the possible cost for tooling requirement. Administrative costs usually happen along the re-ordering process and the payment process. Logistics and warehouse costs include direct

transportation cost, money paid to the warehouse, tax and duty cost, customs clearance cost and port charges. Supplier management costs are the costs associated with cooperating with the supplier. Financial costs are costs happened due to the international payment.

Detailed explanation and estimation methods of these cost factors will be presented in Chapter 4.

Table 2.2 presents dynamic and hidden risks that can possibly happen along with global sourcing operation.

Global Sourcing Dynamic and Hidden Risks		
Risk Classification		**Source**
Supply Risks	Long lead time risks	e.g. Callioni et al. (2005); Bygballe et al. (2011); Jain et al. (2014)
	Obsolescence	e.g. Gravier and Swartz (2009); Azzi et al. (2012)
Quality Issue	Rejection, return and re-receiving	Platts and Song (2010)
	Loss of profit because of product discrepancies	e.g. Pula and Santabárbara (2011); Li et al. (2016)
Supplier Management risks	Cost resulting from communication barriers and time difference	e.g. Jiang et al. (2009)
Business Environment Risks	Currency fluctuation	Khan and Yurt (2010)
	Intellectual property protection	e.g. Platts and Song (2010)
	Political regulation risks	e.g. Navarro (2009)
Financial Risks	Capital investment	Mehrjoo and Pasek (2014)
Demand Risks	Demand variation	Khan and Yurt (2010)

Table 2.2 Global sourcing dynamic and hidden risks

Compared to sourcing locally, more risks are hidden in global sourcing. Six categories of these risks are found in the previous literature. Each category will be explained in Chapter 4.

While anecdotal studies provide a valuable guidance to assess the TCO of global sourcing, they are not explanatory enough in the context of different scenarios. Further explanations and specific cost factors can be added to better illustrate the TCO of sourcing from China to Canada.

2.2.3 Implementation of TCO

TCO method is rarely applied due to its demanding for time, confidential business data and cooperation (Visani et al., 2016). Meanwhile, some cost factors are very hard to identify or calculate due to the complexity of management cost measurement (Wouters et al., 2005; Visani et al., 2016). With a sample set of 59 global retail and consumer companies, a PwC survey (2008) affirmed that 21% of the interviewed companies did not know what savings to expect from global sourcing, and many of them did not have an effective method to measure and track their total cost of ownership.

Most previous TCO literature used TCO method in case studies.

Degraeve and Roodhooft (1998) introduced a mathematical programming model through TCO philosophy to evaluate potential suppliers and determine order quantities in the case of heating electrodes. Platts and Song (2010) developed a qualitative TCO framework of China sourcing from previous literature and applied the framework to a case study. They carried the case study by interviewing six UK companies with outsourcing from China experience. Their result showed that companies they interviewed generally under-estimated the TCO of sourcing from China. Holweg et al. (2010) constructed a framework for estimating TCO based on the characteristics of cost factors in sourcing operation. They tested their framework with three cases. Their findings showed that global sourcing ventures yield fewer benefits than expected.

2.3 Sourcing from China

2.3.1 Sourcing from China: An Overview

China is the most popular sourcing destination in the world (International Monetary Fund, 2012). Companies, especially those from developed countries, have been searching for their suppliers in China from 2001, the year when China joined WTO (Jia et al., 2007).

Figure 2.1 shows the changing pattern of China's overall export.

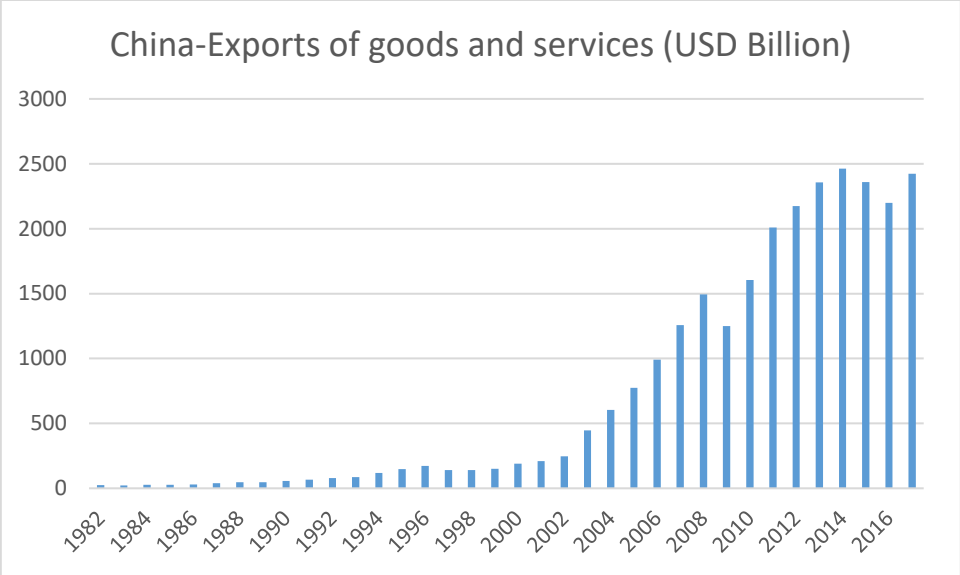

Figure 2.1 China's export of goods and services

Source: World Bank national accounts data

Figure 2.1 shows a significant growth trend of China's export volume. Especially from 2001 to 2014, China's export surged. As we mentioned in Chapter 1, China's export volume decreased in 2009, but it returned to growth in 2010. After 2014, with some fluctuation, overall export remains at a high level. Porter's competitive advantage theory explains China's success in the global market. He believes that competitive strategies are stem from low-cost and product-differentiation.

The primary motivation for a firm to purchase from China is to reduce cost (Trent and Monczka, 2003). In order to illustrate why multinationals turn their attention to China, extant literature focus on how firms gain comparative advantages from a resource-based view (Mahoney and Pandian, 1992; Kotabe and Murray, 2004). They explained how sourcing from China enabled companies to utilize China's unique resources. Low-cost labour has been talked a lot. Besides, decades of exporting experiences elevate Chinese manufacturers' ability to fulfill the demand of western importers. Creative design and new technologies are no longer belong to manufacturers in developed countries exclusively.

But in recent years, we see a different trend emerging. China's southern neighbors are competing with China in the export market.

Figure 2.2 shows exports of goods and services as a percentage of GDP in Canada, China, Mexico ,and Vietnam.

Figure 2.2 Exports of goods and services (% of GDP)

Source: World Bank national accounts data, and OECD National Accounts data files

As we can see from Figure 2.2, if we compare the growth rate of exportation contribution to GDP, export-driven economic development in China is slowing down in recent years. This trend is especially obvious when we compared China's curve with the curve of its neighbor: Vietnam.

2.3.2 A Brief Introduction of Canada-China Business Partnership

Bilateral trade between Canada and China has been boosting in the past two decades. Figure 2.3 shows the changing pattern of the total trade volume between the two countries.

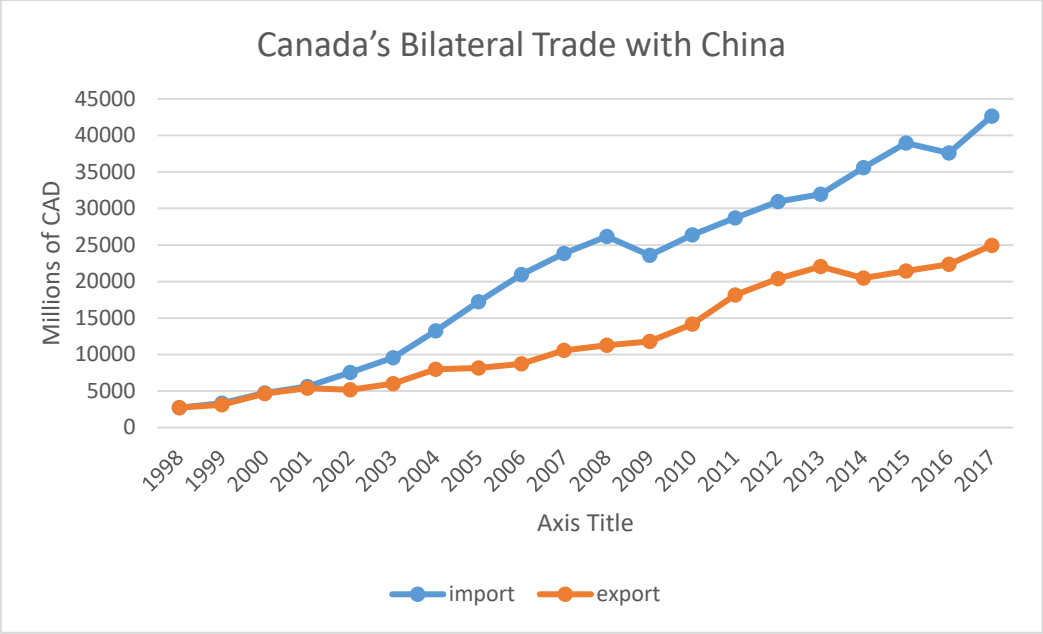

Figure 2.3 Canada's bilateral merchandise trade with China (on the basis of the balance of payments)

Source: Statistics Canada

As we can see from Figure 2.3, Canada's bilateral trade with China keeps growing rapidly, and it is especially true for goods traveling from China to Canada.

In 2017, China was the second most important partner with Canada in merchandise trade domain[5].

So what are the most popular goods involved in this partnership? The following chart shows the top 10 merchandises traded within this partnership.

[5] Statistics Canada, 2018

Canada-China Trade: A Snapshot (2015)			
Top Canadian exports to China	**%**	**Top Canadian imports from China**	**%**
1. Wood pulp	14.2	1. Computer and peripheral equipment	11.4
2. Oilseeds (except soybean)	10.2	2. Broadcasting and wireless communications equipment	7.6
3. Sawmills and wood preservation	5.3	3. Telephone apparatus	3.7
4. Automobile and light-duty motor vehicle manufacturing	5	4. Dolls, toys and games	3.4
5. Soybeans	4.5	5. Women's cut and sew clothing	3.4
6. Animal slaughtering and processing	4.1	6. Audio and video equipment	2.9
7. Starch and vegetable fat and oil manufacturing	3.8	7. Household and institutional furniture	2.6
8. Copper, nickel, lead and zinc ore mining	3.8	8. Footwear	2.4
9. Coal mining	3.4	9. Other plastic products	2.1
10. Basic organic chemical manufacturing	3.1	10. Electrical equipment and components	1.9
Top 10 commodities exports to China as % of total	**57.6**	**Top 10 commodities imports from China as % of total**	**41.4**

Table 2.3 Top 10 merchandise traded between Canada and China

Source: Trade Data Online. Innovation, Science and Economic Development Canada. (2016).

As Table 2.3 shows, top products Canada imports from China are consumer goods (except electrical equipment and components). Most of the products listed are also from labour-intensive industries.

Relatively low manufacturing cost enables Chinese manufactures to provide cheap labour-intensive products, such as apparel, toys, video equipment, etc. for their potential buyers in developed countries. This has been true for the past 20 years. But many researchers claimed that China was becoming expensive and buying from China is not as economically efficient as before (e.g. Fang et al., 2010). And the government of China is also making an endeavor to move the country upwards the value-added curve, labour-intensive export products are losing favorable policies to high-tech products.

Other emerging economies are drawing attention from the importers located in advanced economies. Made in Vietnam, made in Bangladesh, made in India among with made in other Asia-Pacific countries are more easily spotted in the market. And more importers, not only the ones from Canada but those from the U.S. and West European countries, are gradually moving out of China.

As China is still the second largest and fastest growing exporters for Canada, it is critical to understand the real cost and future cost changes of buying from China. The Canadian importers can then rethink their import strategies and take better advantage of the global supply market.

2.4 Consumer Goods

In 1954, Industrial Marketing Committee Review Board defined consumer goods as goods made for the individual's ultimate consumer without further commercial processing.

This thesis is intentionally restricted to consumer goods trade between Canada and China. Three main reasons justify this choice.

First, the trend of global sourcing changed the landscape of international business profoundly, and this change is especially marked in the consumer goods sector (Yu et al., 2008).

In Webster's definition of consumer goods (1978), product complexity is one of the dimensions that differentiate consumer goods from industrial goods. The main aim of this thesis is to analyze TCO of sourcing from China to Canada from a supply chain management perspective, and too many technical and engineering factors need to be taken into consideration if industrial goods are also involved.

Last, most of the top 10 import goods from China are consumer goods. An analysis that focuses on consumer goods is more relavent with Canadian companies.

Chapter 3 Methodology

3.1 Research Questions & Objectives

3.1.1 Research Questions

Although many authors have dug into the concept of global sourcing and TCO, there are voids in this topic.

First, most of the relevant literature analysed TCO for supplier evaluation purpose. They suggested assigning weight to different cost factors while the weight assignment method was subjective and therefore inaccurate (Saccani et al., 2016). The results of weight assignment are often from limited projects, so even when the weight assignment is accurate, the actual cost vary from project to project, from industry to industry, and from country to country. It is tricky for importers to find an applicable reference.

Second, as it is already hard to find TCO literature that can be applied by purchasers from different industries who are considering outsourcing from China, no TCO literature that focuses on Canada-China business specifically has been found. Since the differences in trade policy, tax, transportation, and the exchange rate may invalidate the research result, it may lead to misjudgment if Canadian importers apply those quantitative models that are originally developed for other countries directly.

When context varies, cost factors and their importance vary, too. And each cost factor needs a more detailed explanation, to not only figure out whether sourcing from China is a wise choice but also predict future changes of TCO of sourcing from China.

With the academic voids mentioned above, this thesis addresses two research questions:

RQ1: What are the costs and risks involved in sourcing from China to Canada?

RQ2: How to estimate the TCO of sourcing from China to Canada?

3.1.2 Objectives

This thesis aims to develop a conceptual model that can be adopted as a reference when Canadian importers estimate TCO of buying consumer goods from China.

The contribution provided by this paper is in fourfold.

The main contribution of this thesis is to create a framework encompassing all the costs and risks listed in Table 2.1 and Table 2.2 to answer RQ1 and RQ2. It aims to provide Canadian firms with a comprehensive review of TCO and build a framework that can be used to estimate all the costs that happen from supplier selection to distribution. Formulas are provided. Even though may not be accurate, a rough figure of TCO can be instructive.

Second, costs and risks involved in the framework are not confined in Canada-China specific business partnership. Even though the future outlook and estimation of each cost factor are Canada-China specific, the framework itself can be referred to in other international business contexts.

Third, this model shows the cost of each activity. Procedure improvement will be identified.

Forth, this model could be applied to compare the cost of importing and making in-house.

3.2 Secondary Data Analysis

Since the 1990s, secondary data analysis has been gaining popularity as an effective methodology for doing scientific research (Heaton, 2008). Nowadays, it is widely used in medical research, management, sociological studies, etc. (Trinh, 2017).

In Trinh's definition (2017), secondary data analysis is "the use of datasets, which were not collected for the purpose of the scientific hypothesis being tested".

Secondary data refers to data gathered by other parties, someone other than the user (Schutt, 2006; Liu, 2018). Secondary data includes censuses, data collected by government departments, organizational database (McCaston, 2005), interviews conducted for other research purposes, responses in questionnaires, etc. (Heaton, 2008).

Compared with first-hand data, secondary data is readily available (Liu, 2018) and is easy to be adopted to depict changes over time (Lamberg et al., 2009; Chan and McGarey, 2012). Vos et al. (2016) claimed that secondary data was less biased than first-hand data because sometimes authors only opted primary data that supported their results.

The secondary data this thesis refers to are literature on global sourcing and TCO, news, reports, surveys, and case studies.

Relevant news, reports, and surveys are included in this thesis for the purpose of analyzing the current status of Canada-China business relation or understanding future changes of one specific cost factor. For example, news on China's birth control policy is cited to illustrate the pessimistic future of China's labour market.

Secondary data from different databases (e.g. OECD database, World Bank Database, Statistics Canada, etc.) is employed.

Chapter 4 TCO Decomposition

Based on the cost factors and risks that we summarized in Chapter 2, now we are going to develop a framework for Canadian managers to estimate TCO of sourcing from China to Canada. The following sections in Chapter 4 will decompose and analyse each cost factor and also costs associated with the risks. For those which are possible to quantify, estimation formulas are given. For those which we are not able to develop an estimation formula due to their complexity and dynamic feature, we can only remind Canadian managers that these costs still need to be tracked.

Future outlook of these cost factors is forecasted subjectively based on the available secondary data. A comprehensive framework will be summarized at the end of this Chapter.

4.1 Purchasing Costs

In order to distinct purchasing costs with TCO, in this thesis, we define purchasing costs as the sum of net price and the tooling cost.

4.1.1 Net Price

Chaudhry et al. (1993) defined net price as the monetary value that the buyer paid to the supplier in order to acquire a product or service after all other costs are added and all discounts subtracted.

Total net price = unit price × quantity + other costs – discounts

Net price information is directly available from suppliers.

In this formula, other costs (e.g. packing services, delivery service, etc.) and discounts are usually determined by the market, order quantity, negotiation ability of both sides, etc. Due to the complexity of these changeful factors, we hereby only analyse and forecast the change of the required unit price.

Farris et al. (2010) defined unit price as “a direct cost for a single unit of measure of a product sold by manufacturers, wholesalers or retailers”.

Cost-plus pricing is one of the most popular cost-based, price determining strategy that companies use (Guilding et al., 2005). According to cost-plus pricing method, the required unit price is calculated with the following formulas:

Total manufacturing cost = cost of material + cost of labour +overhead

Unit manufacturing cost = $\frac{\text{total manufacturing cost}}{quantity}$

Required unit price = unit manufacturing cost × [(1+desired profit margin) × 100%]

From this calculation, we can see that the unit price is mainly determined by the cost of material, the cost of labour, manufacturer overhead and profit margins. Before analysing these four elements, we would like to show the overall changing trend of manufacturing cost in China.

4.1.1.1 The Changing Trend of Manufacturing Cost in China

Global Manufacturing Cost Index (GMCI) is an index used to evaluate the direct manufacturing cost. Four factors are included in the evaluation: wages, labour productivity, energy cost and exchange rate. The higher the GMCI of a country is, the more expensive to manufacture in this country.

Boston Consulting Group (BCG) published a report on GMCI of 34 countries in December 2018. It set GMCI of U.S. to a benchmark index of 100.

Figure 4.1 shows the GMCI of U.S., Canada, Mexico, India, and China in 2004 and 2018.

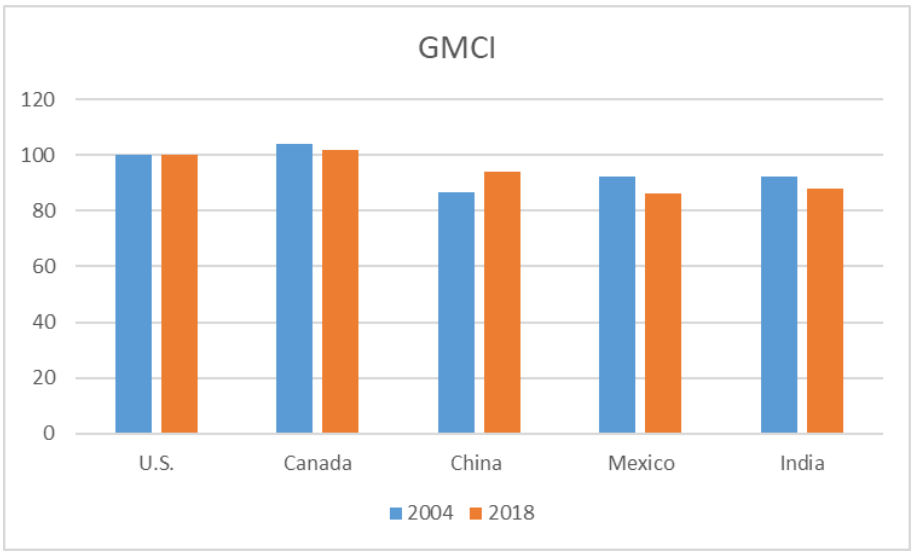

Figure 4.1 Comparing GMCI of U.S., Canada, Mexico, India, and China in 2004 and 2018

Source: BCG Global Manufacturing Cost Index Report 2018

As we can see from Figure 4.1, when the GMCI of U.S. is set to 100, China's GMCI is 94, while Canada, Mexico, and India get 102, 86, and 88, respectively. So compared to developing countries such as Mexico and India, China does not hold competitive advantages in low direct manufacturing cost.

When we do a vertical comparison among these numbers, we also find that the increasing speed of China's direct manufacturing cost is faster than the other four countries.

In 2004, when the U.S. scored 100, China's GMCI was 86.5. In comparison, Canada was 104, Mexico was 92.1 and India was 92.2.

In conclusion, as a critical component of TCO, manufacturing cost in China is increasing with a high growth rate.

4.1.1.2 Material Cost in China

Producer Price Index (PPI) is a set of indexes that measure the average change in whole selling prices received by domestic producers. It compares the whole selling price in the current year with it in the last year. When the PPI is positive, it means the whole selling

price increases compared to the last year. When it is negative, it means the opposite. In this thesis, we find that PPI is a reliable index to reflect the material cost.

The following figure shows the growth rate of China's PPI from 2008 to 2018.

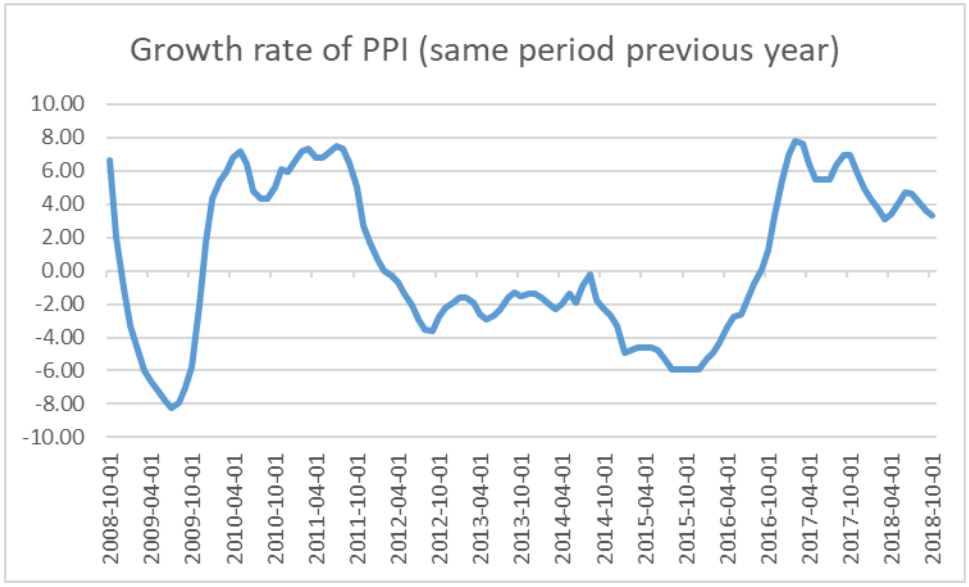

Figure 4.2 Growth rate of PPI in China (2008-2018)

Source: National Bureau of Statistics of China

In this time frame, the material cost in China did not increase very fast. It fluctuates around 0 during last ten years. We interpret this changing pattern as material cost in China does not change much during the past ten years.

From a macro point of view, this changing pattern of PPI in China makes it clear that manufacturing material cost in China generally stays stable.

4.1.1.3 Labour Cost in China

Labour cost is one of the most important cost factors in manufacturing cost (Ostwald and McLaren, 2004). China cannot win its "world factory" position without abundant low-cost labour. But the cost of labour is not and will not stay the same.

Direct manufacturing labour cost = hours spent in production process × labour cost per hour

This section displays the current situation and changes in China's labour market, as well as provides a future outlook of the labour market of China.

(i) Increasing Salary

According to statistical data[6], during 2009-2017, the average salary of Chinese urban labour increased from 18199 RMB to 45761 RMB. The average 12.2% yearly growth rate is not only higher than all of the developed countries but is also higher than most of the developing countries such as South Africa (3.2%) and Brazil (5.7%).

Figure 4.3 depicts the changing patterns of Chinese urban workers' wage and manufacturing workers' wage (in Chinese Yuan).

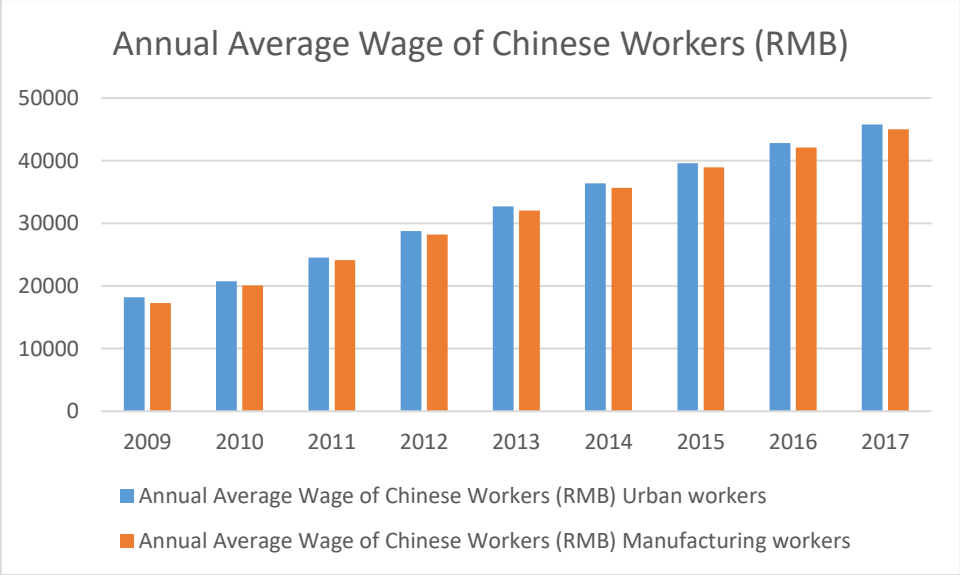

Figure 4.3 Annual average wage of Chinese workers (RMB)

Source: China Statistical Year Book 2018

[6] China Statistical Year Book, 2018

As we can see from Figure 4.3, the annual average wage of Chinese workers, overall and in manufacturing industry specifically, increases steadily.

The labour cost in China also shows a regional imbalance in both the absolute number and increasing rate. For Canadian importers, their business partners in China are mostly located in the coastal area due to more convenient access to ports and industrial clusters. According to data from Human Capital Estimates in China (Li et al., 2014), the coastal areas in China are more urbanized and have averagely higher wages than inland areas. The increasing rate of labour cost in China's coastal areas is also higher than in the inland areas.

(ii) Labour Cost: From a Product Feature Perspective

Product feature, e.g. how advance is the technology contained in it, how much knowledge the manufacturers need to possess to make the product, the number of international standards adopted, etc., is one of the most important factors in determining the labour structure (Verhoogen, 2008). Different labour structures have different changing patterns in labour cost. So when it comes to estimate the future change of labour cost, reviewing product feature is also important.

Lewis turning point (LTP) is the point where an economy transits from unlimited labor supply to limited labor supply (Zhang et al., 2011). It is widely assumed that when the economy first passes the LTP, the cost of unskilled labour will increase more than that of skilled labour (e.g. Zhang et al., 2011). Research shows that the Chinese economy passed LTP around 2002 (Minami et al., 2010; Deqiang Liu, 2015).

Research that observes China's labour cost changes exclusively also proves this speculation. According to Li et al. (2014), unskilled labour with lower education experience has a higher wage growth rate than the skilled labour in China. The reason for this heterogeneous change is that the decrease in the labour supply has mainly come from rural areas. Labours from rural areas typically rush into industries with less strict educational requirements. Firms with higher product quality employ more skilled labour, thus are less affected by the increased labour costs.

Thus, we make this forecasting that labour cost will increase faster in low-quality firms than in high-quality firms because they use a larger proportion of "relatively expensive" labours.

A conclusion of this section is that, to some extent, product feature decides how deep the rising labour cost in China affect the manufacturing cost of it. Which category the product falls into, and technologies and technique involved in the manufacturing process are factors to be considered. Meanwhile, with the development of the innovation ability of China, products featured with advanced technologies are better to stay in China than labour-intensive assembly products.

(iii) Shrinking Labour Force Market

From 1980 to 2013, China's One-Child policy led to a rapid deceleration in the birth rate (Li et al., 2014). As One-Child policy generation started entering the labour force market, less and less new labour will be available. In 2015, the government of China relaxed the birth control policy and claimed that families were allowed to have two children if one parent, rather than both parents as before, was an only-child[7]. The relaxation of the national birth control aims to stabilize the labour force market in China, but the result is not as effective as the government predicted.

In 2017, after two years of relaxation, 172.3 million Chinese babies were born with a birth rate of 12.43 ‰. Compared to178.6 million newborn babies in 2016 with a birth rate of 12.95‰[8], the birth rate decreased.

Another consequence that the prevalence of birth control is China's aging problem.

According to the National Bureau of Statistics of China, at the end of the year 2015, elderly adults (aged 65 years or older) account for 10.5% of the total population. This

[7] Communiqué of the Fifth Plenary Session of the 18th CPC Central Committee (2015)
[8] National Bureau of Statistics of China

number was 5.5% in 1990 and was 7% in 2000. And this ratio keeps increasing rapidly. By 2050, the aging rate is predicted to climb to 22.6%.[9]

The aging problem affects the labour market in China in two aspects.

One influence is the shrinking total labour force in the market. The government of China predicts that from around the year 2030, the population of China will decrease. With the rising number of elderly adults and soon to be decreasing population, China's labour market faces a severe challenge.

Another influence is that the young labour force is also affected by the aging problem. More and more young people who come from rural area choose to go back to their hometown to take care of their old parents (Shi and Wan, 2017).

A supply shortage in China's labour market is expected, thus leading to an increase in labour cost.

(iv) Urbanization

The urbanization is a prominent social phenomenon of modern China.

In 1950, as many as 87% of the population in China lived in rural areas, while in the year 2010, 45% of the population already lived in the cities. It is predicted that by 2030, this number will increase to 60%.[10]

Urbanization both promotes the education level of the population and increases living cost (Chen et al., 2013).

People with higher education level and increasing living costs push urban labours to ask for higher salaries. In conclusion, urbanization accelerates the growth rate of salary.

[9] State Council of the People's Republic of China, National Population Development Plan (2017)
[10] Source: National Bureau of Statistics of China

As a conclusion of section 4.1.1.3, we hold a negative outlook for future changes in China's future labour cost, especially in labour-intensive industries where little technology is involved.

4.1.1.4 Overhead Expenses

Overhead expenses are expenses associated with business operations while cannot be linked to producing a product (Bankers et al., 1996). Overhead expenses typically include non-product-specific labour cost and firm fixed cost (office equipment, office supplies, utilities, and rent, etc.).

Due to the complexity of classifying all the costs involved, we assume non-product-specific labour cost has the same changing trend with direct manufacturing labour cost and the firm's fixed cost shares the same increase rate with PPI. This estimation method is not accurate and can only provides a rough forecasting result.

4.1.1.5 Wholesale Profit Margin in China

Based on the data available from the National Bureau of Statistics of China, manufacturers typically keep 15%-20% profit margins.

For example, according to China Daily, a newspaper owned by China State Council Information Office, the gross revenue rate of the clothing manufacturing industry in China normally varies within the range 10%-20%. According to CEIC data, in the textile industry, the average manufacturing profit margin is 10% in 2015. And in electronics assembly, the average manufacturing profit margin is 17.2% from 2013 to 2018.

However with this data, the specific numbers vary under different circumstances.

4.1.1.6 Conclusion

Manufacturing cost affects the unit price to a considerable degree.

From data and analysis in section 4.1.1, we conclude that since the material cost does not vary acutely, labour cost contributes more to the changes of manufacturing cost in China. The labour cost in one product highly depends on the industry and product features.

For importers who are chasing after low-cost labour in low-quality, labour-intensive goods, China is getting expensive at a fast pace. For importers who are in the technology-intensive industry, China is still garnering its competitiveness.

4.1.2 Tooling Cost

Tooling cost is the cost attributes to re-designing and re-engineering production line to manufacture this very kind of product (Esawi and Ashby, 2003). Tooling cost often happens to industrial products.

Tooling cost shouldered by importers is usually determined during the contract negotiation process.

4.2 Setup Costs

In the context of this thesis, setup costs are defined as costs incurred to get the company ready to cooperate with the new supplier. As indicated in Chapter 2, setup costs encompass the information collection cost, the supplier visiting and negotiation cost and the cost of modifying the IT system. Each will now be explained.

4.2.1 Information Collection Cost

For Canadian importers who are planning their first China sourcing project, information is limited. Importers either collect the relevant information themselves or hire an agent (Platts and Song, 2010).

When employees within the company are responsible for information collection, Song et al. (2007) decomposed information collection costs into two elements: people's time cost and business trip expenditure.

Information collection cost = people's time cost + business trip expenditure (e.g. participating trade fair, etc.)

The formulas they developed to estimate these two cost drivers are:

People's time cost = people's wage × time devoted to this project

Business trips expenditure = travel expenditure per trip (including airplane ticket and accommodation) × number of trips

In this thesis, we consider when a company hires a sourcing agent to do the job,

information collection cost = payment to the sourcing agent

4.2.2 Supplier Visiting and Negotiation Cost

Compared to source locally, communication lines are longer when the partnership spans across the borderline, especially when these two countries do not share the same official language, such as Canada and China. When telecommunication is not fully functional for some importers when they evaluate the suppliers and their products, direct site visits to potential suppliers are necessary to get a thorough evaluation.

Since the main cost drivers for supplier visiting and negotiation costs are employees' labour cost and travel expenditure, similarly with the cost structure of information collection costs, we use the following formula to estimate this part of cost.

Supplier visiting and negotiation costs = people's time cost + business trips expenditure

4.2.3 Cost of Modifying IT System

IT system modification cost includes gathering, codifying information and adding a new supplier to internal IT systems (Song et al., 2007).

In Platts and Song's studies (2007, 2010), they found that when a company already had a functional IT system, IT system modification cost was usually considered as overhead cost and was not recorded on a project level. In this case, we estimate IT system modification cost with the following formula:

IT system modification cost = IT engineer wage × time devoted to this project

When the import company does not the required new IT infrastructure, extra IT cost caused by this supplier is considered as IT modification cost.

4.3 Trade Costs

The trade costs are the sum of all costs incurred from the beginning of production to the final consumption except the production cost (Anderson and Wincoop, 2004). The definition given by WTO decomposed trade cost with policy barriers (tariffs and non-tariffs barriers), transportation costs (freight and time costs), communication costs and other information costs, enforcement costs, exchange rate costs, legal and regulatory costs, and local distribution costs.

Figure 4.4 [11] shows to what extent various determinants contribute to the total trade cost.

[11] World Trade Report 2018, based on data from 2014

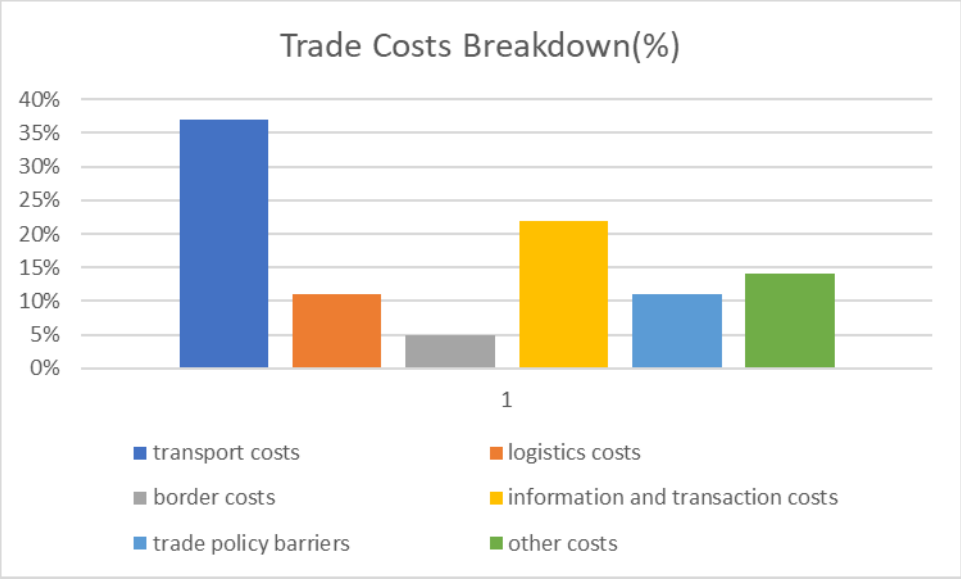

Figure 4.4 Trade costs breakdown

Source: World Trade Report 2008

Xu and Liang (2017) measured China's aggregate export trade cost from 2000 to 2013 using the weighted average method. Their study shows that from 2000 to 2013, Chinese trade cost fell by 16.2% with a continuous downward trend.

Figure 4.5 The changing trend of aggregate trade costs of China

Source: Xu and Liang (2017)

So generally speaking, China's aggregate export trade cost is in favor of Canadian importers who are considering sourcing from China.

Section 4.3 will analyse cost factors contained in trade cost.

4.3.1 Logistics and Warehouse Costs

The long distance between Canada and China and two customs borders result in additional cost compared to buying domestically.

Typical costs associated with long distance and border lines are logistics costs and inventory costs. From previous literature, we concluded that logistics costs involve direct monetary transportation cost, tax and duty cost, customs clearance cost and port charges.

4.3.1.1 Direct Monetary Transportation Cost

McKinnon et al. (2004) segmented transportation process along the consumer goods distribution into 3 parts: transportation from the manufacturing location to the distribution center; transportation from distribution center to retailers' warehouse; transportation from retailers' warehouse to shelves. As we mainly discuss the supplier-buyer relationship in this thesis, we will not talk about the last two parts of the transportation process.

Transportation cost is the main cost driver in overall trade cost, as we can see from Figure 4.4. According to World Trade Report 2018, 37% of overall trade costs is from transportation cost.

Effective transportation distance is one important variable to estimate transportation cost (World Trade Report, 2018).

Maritime transportation is a cost-effective and a popular way to transit goods with low unit value. Table 4.1 shows the top busiest ports and their throughput of the two countries.

	Container Traffic (2015)		Container Traffic (2015)
Port	TEUs (Twenty-Foot Equivalent Units), 000s	Port	TEUs (Twenty-Foot Equivalent Units), 000s
Shanghai	36516	Metro Vancouver	3054
Shenzhen	24142	Montreal	1446
Ningbo-Zhoushan	20636		
Guangzhou Harbor	17323	Halifax	404.682

Table 4.1 China's and Canada's top busiest ports

Source: World Shipping Council

Logistics Explorer is a website that provides basic information about maritime transportation. Table 4.2 provides effective transportation distance between these ports based on the data from this website.

Port Distance (nautical miles)				
Port	Metro Vancouver	Montreal	Halifax	Toronto
Shanghai	5000	11626	10908	11928
Shenzhen	5703	11551	10964	11852
Ningbo-Zhoushan	5041	11673	11020	11974
Guangzhou Harbor	5839	11597	11184	11941

Table 4.2 Canada-China port distance

Source: Logistics Explorer

Due to Toronto Port's proximity to the biggest city in Canada, it is also listed in the Table 4.2.

Except for Metro Vancouver Port, effective transportation distance between any two ports is over 10,000 nautical miles. It is a long distance even in the international business domain.

Researchers in this field detected other potential transportation cost factors besides effective transportation distance. Limao and Venables (2001) made the argument that the poor quality of transport infrastructure could result in extra transportation cost.

A survey conducted by World Bank shows that China ranks No. 26 in international LPI index among 160 countries.[12] While Canada ranks No. 20. Other emerging countries in the Asia Pacific area fall behind. For example, Vietnam ranks No. 39, Malaysia ranks No. 41, India ranks No. 44, and Bangladesh ranks No. 100.

We conclude that the transport infrastructure in China does not hold back its competitiveness in the export market.

The cost of transportation is available from the 3PL company quote.

The price for the ocean shipment depends on the 3PL company, starting location and destination, cargo volumes, etc. Table 4.3 are quotes for a 20'' Full Container Loads (FCL) port-to-port shipment cost. Data in table 4.3 is from Freightos, a website that summarizes and compares freight quotes from different 3PL companies.

Shipping Cost for One 20" FTL (CAD)				
Port	Metro Vancouve	Montreal	Halifax	Toronto
Shanghai	$2,059-$2,486	$4,019-$4,462	$3,228-$3,681	$4,047-$4,467
Shenzhen	$2,492-$4,127	$4,127-$4,742	$4,127-$4,742	$4,127-$4,742
Ningbo-Zhoushan	$2,044-$2,486	$4,016-$4,462	$3,219-$3,551	$3,814-$4,246
Guangzhou	$2,492-$4,127	$4,127-$4,742	$4,127-$4,742	$4,127-$4,742

Table 4.3 Port-to-port shipping cost

Source: Freightos (February 2019)

4.3.1.2 Warehouse Costs

Total inventory carrying costs include warehouse costs, the opportunity cost of inventory investment, obsolescence, and loss of sale due to out-of-stock (e.g. Platts and Song, 2010; Azzi et al., 2012). Warehouse costs are the only costs that categorized into direct sourcing costs, so in this section, we will only talk about obvious and direct inventory cost:

[12] LPI Global Rankings 2018. The LPI is an interactive benchmarking tool which helps to evaluate the condition of a country's trade logistics performance

warehouse costs. Other costs mentioned will be discussed in the long lead time risk section.

Warehouse costs are costs associated with storing goods in warehouses (Azzi et al., 2012). Warehouse costs typically include basic storage cost, handling fees, and value-added service cost (e.g. packing and delivering, re-counting, inspection etc.).

When the importer uses a third-party warehouse, the exact cost information is available from the warehouse.

When the importer storages goods in leasing warehouses, the total cost of leasing warehouse is calculated as (Smith, 2014):

Total warehouse leasing cost = warehouse size in sf × base rental rate + operating expenses (heating costs, payment to warehouse staff, warehouse maintenance cost, etc.)

Batch-level warehouse costs can be estimated by recording warehouse space this batch of goods occupied and the time they are stored in the warehouse.

4.3.2 Tax and Duty13

The tax and duty costs of crossing the Chinese border and the Canadian border are affected by the export and import policies of two countries.

Governments apply tax and tariffs on goods travel across the borderline for two main purposes (e.g. Graham, 2019):

(1) increase revenue

(2) leverage the price of foreign products to protect national products

It is more common for an authority to impose import duties than export duties. Export duty is the tariff that needs to be paid when products are traveling out of a country. When

[13] Information on tax rate, relevant policies and regulations, and terminology explanations in this section is from the websites of the Canada Border Services Agency and China General Administration of Customs

an export duty is imposed, the total cost of a product increases so as the selling price. Since increasing price harms competing advantage, export duty is not widely imposed.

All imports and exports in China are subject to the jurisdiction of the General Administration of Customs (GAC).

(i) Export duty in China

The rate of any taxes and duties are in accordance with the Customs Law of the People's Republic of China. The identification and valuation process of any import/export goods is in accordance with the regulation of WTO.

In China, export duty is applied to some of the export goods. Imposing export duty is a way to increase government revenue. What is more, it is also a tool to accelerate industrial upgrading and protect resources in China. In 2018, 202 products are imposed with export duties in China.

Tariff rate for all the export commodities is available on the website of General Administration of Customs, P.R.China. Among the top 10 products that China export to Canada, no product is obliged to export duty.

To estimate this part of the cost, the importers need to look up the export rate,

Export duty = value for duty × rate of duty

(ii) Export rebate in China

To encourage Chinese manufacturers to transform into export-oriented companies, the government of China started to implement export rebates from 1985[14].

Export rebate refers to refunds of indirect taxes paid by exporting enterprises in the production and distribution process.

[14] State Taxation Administration

In November 2018, export rebate tax rate increased for 397 items, including electronic products. Meanwhile, the export tax rebate payment process was also quickening as a strategy to deal with the China-U.S. trade war.[15]

The current export rebate rates for those in the top 10 merchandises transported from China to Canada are listed in Table 4.4.

A report of the Ministry of Finance of the People 's Republic of China implied that both export and import tax rate will be decreasing in the future. After China's accession to the WTO in 2001, the overall average import/export tax rate dropped from 15.6% in 2000 to 9.8% in 2010[16].

Knowing export rebate in China is a tool for importers to bargain with their suppliers.

(iii) Import duty in Canada

Import duty rate in Canada is determined by the rule of country of origin and the category the goods belong to.

The country of origin is determined by the rules of origin (ROO). ROO defines the country of origin as the last country or region where the last substantial transformation took place[17]. A major change of a product's value and a change in the Harmonised System Code (HS Code) are two criteria to verify the country of origin. This thesis only discusses the situation where the country of origin is China.

Then, to determine the taxes and tariffs applied to the imported goods, importers need to identify the correct 10-digit HS Code. The classification is really detailed, so it requires the importers to know their product very well. For example, import taxes are different for normal footwear and waterproof footwear.

[15] Customs Law of the People's Republic of China
[16] China General Administration of Customs
[17] WTO. Technical Information on Rules of Origin.

China does not have any free trade agreement with Canada, hence import duty applies to products from China. According to the Canada Border Services Agency, China is entitled to Most-Favoured-Nation (MFN) Tariff.

Table 4.4 shows the export rebate rate and import rate for top 10 goods imported from China to Canada.

Export Rebate Rate and Import Duty Rate for Top 10 Products Imported from China		
Name of Commodity	Export Rebate Rate	Import Rate
Computer and peripheral equipment	16%	0-6.5%
Broadcasting and wireless communications equipment	16%	0
Telephone apparatus	16%	0
Dolls, toys, and games	16%	8%
Women's cut and sew clothing	13%	0-7%
Audio and video equipment	16%	0
Household and institutional furniture	13% for wooden furniture, and 16% for plastics and metal furniture	0-6%
Footwear	16%	6%
Other plastic products	16%	0-9.5%
Electrical equipment and components	16%	0

Table 4.4 Export rebate rate and import duty rate for top 10 products imported from China

Source: State Administration of Taxation; Canada Border Services Agency

The formulas used to calculate import duties are:

Import duty = value for duty × rate of import duty

Canada imposed 5% goods and services tax (GST) to imported products,

GST tax = (value for duty + import duty) × rate of GST

Duty cost = import duty + GST tax

4.3.3 Customs Clearance Cost and Port Charges

Formalities involved and fees charged at the port are complicated. Import and export corporations usually hire brokers to handle customs clearance procedures.

Customs clearance fees include broker service fees, customs clearance cost, port charges (terminal handling charge, port security charge, document charge, etc.), and extra cost caused by unexpected incidents, such as demurrage (Freightos).

Costs attribute to customs clearance and port charges are available from brokers.

4.4 Administrative Costs

Administrative costs are ongoing operation cost that cannot be easily identified with a specific function, in other words, administrative costs are related to the company as a whole (Filicetti, 2007). Administrative costs incurred in importing typically happen in the purchasing department and financial departments (Song et al., 2007). After sourcing from China, two departments invest working time in placing orders and make the payment related to this order. So we conclude administrative costs are consisted with ordering cost and billing cost.

4.4.1 Ordering Cost

Ordering cost is an on-going cost happens when purchasing department operating an order and re-order process.

As ordering cost is mainly related to labour cost, similar with setup cost, we estimate ordering cost with the following formula:

Ordering cost = purchasing people's wage × time devoted to this project

4.4.2 Billing Cost

Billing cost typically happens in the financial department. We estimate billing cost with the following formula:

Billing cost = financial people's wage × time devoted to this project

4.5 Supplier Management Cost

Supply chain management is a network connected all the links from raw material to product delivered to end customers. In this context, Canadian importers are the focal characters who need to coordinate with different parties. For completing an efficient supply chain and outperform the market, Canadian importers need to identify the importance of suppliers and develop a functional relationship with them.

As we discussed in Chapter 2, constructing a healthy relationship with qualified suppliers is a key component in the success of a company (e.g. Kraljic,1983; Cho and Kang, 2001; Salleh and Mohammad, 2006). So, selecting qualified suppliers, evaluating them properly, and developing an efficient cooperation relationship with them are important in global sourcing.

Global sourcing is about how efficient a company can exploit the competitive and comparative advantages of its supplier (Kotabe and Murray, 2004). As early as in 1983, Kraljic already viewed suppliers as important contributors for developing strategic products. As Bygballe et al. (2012) also pointed out, shorter life cycles of consumer goods and a broader assortment require a growing need to coordinate activities across firm boundaries to reduce obsolescence, inventory cost, and long lead-times.

Von Haartman et al. (2016) verified their hypotheses that global sourcing brings advantages to elevate introduction rate of new products and shorten time-to-market. Persson and Håkansson (2007) also recognized suppliers' significant role in technical development. They believed that suppliers can help with the innovation process by sharing their findings and inspirations gained from the manufacturing process.

In this sense, having a mutually beneficial cooperative relationship with Chinese suppliers is essential for Canadian companies who want to seize opportunities in the current buyer's market.

Establishing a beneficial innovation process requires inputs and outputs from both importers and exporters. It is a reciprocal interdependency relationship.

Mentzer (2001) pointed out common interests, openness, mutual help, clear expectations, leadership, cooperation, trust, benefit sharing, and technology are some main enablers for better collaboration. Simatupang et al. (2005) supplemented factors such as information sharing, decision synchronization, incentive alignment and common perception to this topic. When the buyer is the initiator of innovation activities, it is necessitated for Canadian importers to provide supplier training and technical support to their suppliers, especially when their partners do not hold advanced technologies.

4.5.1 Supplier training and technical cost, supplier cooperation cost, supplier evaluation cost

Compared to sourcing locally, additional business trip expenses are incurred when sourcing globally. When it is necessary, employees in the import company need to travel to China and fulfill their mission of developing new products, improving the production process, on-going evaluation process, etc.

Traveling cost = Travel expenditure each trip × number of trips + people cost

The method to calculate people cost has been presented in the previous section.

Song et al. (2007) found supplier communication cost usually consist with video conference cost, phone call cost and people cost.

Communication cost = video conference cost +phone call cost + people cost

4.5.2 Sample inspection cost

In some cases, a sample inspection procedure is required before mass production. Supplier mails the sample and product engineers are obliged to do sample inspection (Song et al., 2007).

Sample inspection cost = sample mailing cost + people's cost

4.6 International Payment Cost[18]

One of the financial costs involved in Canada-China trade is international financial transaction cost.

In international trade, there are three common payment methods:

PayPal for samples and small orders

The transaction fee of PayPal is 3.9 % of the transaction amount plus a fixed fee based on the currency[19]. When it comes to Chinese Yuan, the fixed fee is 0.3 USD.

Bank Wire Transfer (T/T payment)

For Canadian firms, a wire transfer is the most common payment method in international trade with Asian countries. Between Canadian importers and Chinese suppliers, 30% before the shipment or before the production deposit, and retainage is usually required to be sent when the copy of the bill of lading is available.

Generally, cost varies between 25 USD to 50 USD per transaction[20].

Letter of credit (L/C) payment

[18] Definition, explanation and estimation of international payment in this Chapter refers to *International Settlement* by Shao (2014)
[19] PayPal Canada
[20] TD Bank, RBC, Scotia Bank, BMO, CIBC

Compared to PayPal and T/T payment, L/C payment offers better protection for both sides, while the process is more complex, and fees are higher.

The cost of L/C payment depends on the charging rate of the bank, and credit rating of the importer and exporter. Usually, an L/C transaction costs 0.75% to 1.5% of the total contract price.

Total transaction cost = transaction cost × number of transactions

4.7 Costs Associated with Supply Risks

From what we summarized from previous literature, in the context of this thesis, supply risks typically refer to risks associated with lead time. Supply risks include obsolescence cost, capital investment cost, cost associated with demand risk, and extra warehouse cost. As explained in Chapter 2, a longer supply chain process leads to higher supply risk. For example, long lead time and possibility of supply chain disruption during international transportation often require more buffer inventory in order to respond to demand variation, as a result, companies need to commit more warehouse fees and capital invest for higher levels of inventory (Callioni et al., 2005; Jain et al., 2013). Capital invested in warehouse goods diverges cash flow, resulting in side effect on financial health (Carter and Vickery, 1989). Plus, to make the best of international transportation, companies tend to order a large batch of goods in one order, as a result, obsolescence risk is higher (Helmold, 2013).

As delivery term applied partially determined the risks that the importer shoulders, we will also discuss delivery term in this section.

4.7.1 Lead Time Risk

The time consumed during the transportation process is a risk factor that has extra cost hidden underneath.

The following two figures (Figure 4.6 and Figure 4.7) demonstrate a comparison of general logistics flow before and after sourcing from China.

Before sourcing from China (i.e. buying locally), the process is relatively simple.

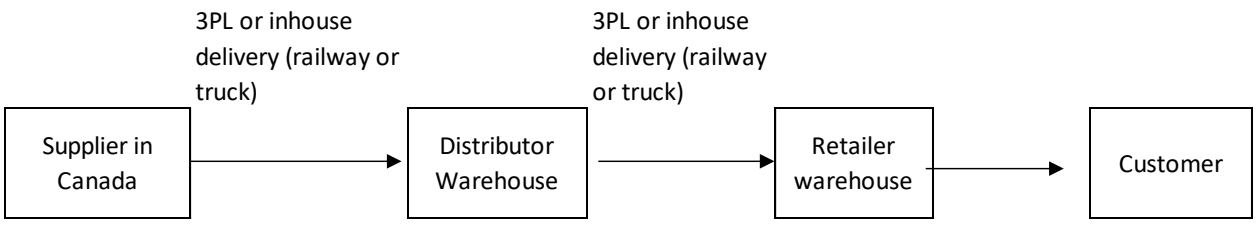

Figure 4.6 Process of buying locally

After sourcing from China, more entities get involved, and the sourcing process becomes more complicated.

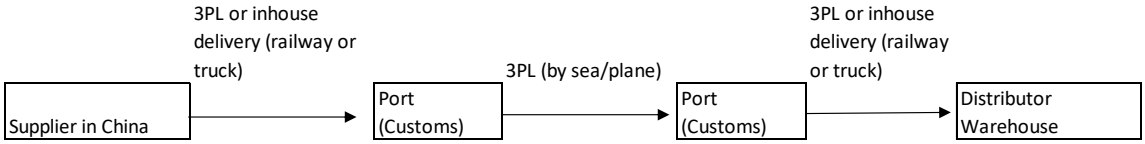

Figure 4.7 Process of buying from China

Source: This figure is drawn based on the information provided by Canada Border Services Agency

The rest of the process is basically the same after the goods enter local warehouses, so that part of the process is omitted.

Lead time risk usually consiste of two parts (Glas and Grajczyk, 2013). One is the overall lead time, i.e. the time needed from placing the order to receiving the goods by the importers. The other risk is the variability of lead time. With the development of just-in-time delivery and inventory management, long delivery time and high variability will interrupt lean supply chain system.

In this thesis, we use marine transportation to illustrate lead time risk of sourcing from China.

Marine transportation is the most common way to transfer bulk goods from one country to another. According to the International Maritime Organization (2012), marine transportation accounts for 90% of all international trade. While cost and lead time of airfreight transportation and road shipment do not vary much between domestic and cross-border procurement (Cachon et al., 2007), marine transportation is the key tracking object in measuring TCO of global sourcing.

The average ocean transportation transit time for importing from China to Canada is around 20 days, not including customs clearance time (Freightos). Comparatively, according to Canadian Trackside Guide 2018, the transit time is about 5 days from Vancouver to Montreal by railway and 2 days from Halifax to Montreal.

So compared to source locally, overall lead time of sourcing from China is much longer.

With increased transportation time and prolonged distance, risk along the logistics process also increased.

Unlike truck transportation or railway transportation within Canada, marine transportation from China to Canada involves multiple entities. Besides the exporter and the importer, a standard container shipping needs cooperation between shipper, forwarders, hauliers, terminal operators, and shipping companies (Chang and Xu, 2014). The long distance between two countries as well as the complexity gives rise to the transportation disruption risks in international marine transportation.

After a comprehensive literature review of possible risks and costs of marine transportation, the following table summarizes the main risks involved.

Risks in marine transportation		
Risks	Explanation	Source
Administrative errors	Documentation, booking and invoicing errors.	Drewry (2009); Tseng et al. (2012)
Customs clearance	Queuing at customs; errors in customs regulatory compliance.	Kopacz et al. (2001); Drewry (2009)
Security risks	Piracy, theft, terrorism.	Fu et al. (2010)
Unexpected inccident	Strikes and transportation congestions	Neumann (2006); Drewry (2009)
Uncapable operators	Cargo loss or damage; service schedule's unreliability may cause delays	Talley (1996); Notteboom (2006)
Inefficiency	Poor cargo space booking; empty return voyages	Neumann (2006); Song et al. (2005)
Natural character of marine transportation environment	Delays and damages caused by poor weather condition on the ocean	Neumann (2006); Kopacz et al. (2001)
Lack of flexibily	Less alternative marine transportation liners are available than truck or railway transportation	Qi and Song (2012)
Inaccurate information	Information delay, information incompleteness; technical breakdown on the ocean.	Qi and Zhang (2008), Husdal and Bråthen (2010)

Table 4.5 Risks in marine transportation

With the existence of these potential risks, we conclude that lead time variability of sourcing from China is higher than sourcing locally.

4.7.1.1 Obsolescence cost

As we have pointed out, long lead time and high direct transportation cost make it more economical to transport in large batches in global sourcing, while large batches often mean high obsolescence risk (Mehrjoo and Pasek, 2014).

Obsolescence cost is defined as the loss of value of a product due to the arrival of new and better products, and obsolescence happens when merchandise in inventory starts losing its saleable value (Mehrjoo and Pasek, 2014).

With too little inventory, business runs the risk of stock-out and losing potential profit. But possessing a high level of inventory increases obsolescence risk. As mentioned, extra order is not uncommon in global sourcing. A study of Masters (1991) confirmed that the lot size makes a big difference in obsolescence cost. Masters' study showed that obsolescence cost caused by extra order can increase total cost by 5% - 40% more than optimal. Achieving optimal order size in global sourcing is trickier than buying locally due to the longer lead time and the higher risk of transportation disruption.

The perishability of consumer goods is usually attributed to seasonality, fashion, technology progress, governmental regulations, environmental effects, and competition (Mehrjoo and Pasek, 2014). Long lead time prolongs the supply pipeline, thus increasing the obsolescence risk.

Fast technological innovation is one of the elements that speed up the process of obsolescence. New product release pushes old products out of the market.

Unexpected incidents may also cause changes in market. Children may suddenly become obsessed with a new kind of toy when a new cartoon is released; buyers may require a large batch of new flags, signs, or clothes in a short notice because of political movements, as the case described in the introduction part.

When commodity devaluation happens, part of money paid for its procurement and other related cost is sunk.

Electronic components are one of the most easily obsolescent products. High turnover of the technology and design weed out the old products from the market pretty quickly. As we can see from the chart in Chapter 2, five out of 10 products imported from China are electronic products.

Obsolescence cost can be estimated by evaluating the total value of unsold product and lost profit due to clearance sales.

4.7.1.2 Capital Investment Cost

As we discussed earlier, companies which import from China tend to hold a higher level of inventory compared to companies which buy locally due to the long lead time. Higher level of inventory induces higher capital investment cost.

Capital cost is typically viewed as opportunity cost and estimated by the capital tied up by extra inventory (Song et al., 2010). Thus, the inventory level has a direct impact on capital cost.

Capital cost is often estimated by the following equation (Song et al., 2007):

Capital cost = (current average monetary value of inventory – previous inventory value) × capital cost rate

Capital cost rate is the opportunity cost of investing capital into inventory. If reliable historical data is available, it can be assumed as the rate of return on capital.

4.7.1.3 Cost Associated with Demand Risk

Fluctuations in customer demand increase detrimental risks to a distributor (Nooraie and Parast, 2014). Long delivery time of sourcing from China reduces a company's capability to deal with demand fluctuation.

When the inventory is not enough for customer demand, the distributor either books emergency purchase to meet the demand or gives up potential profit (Chen and Seshadri, 2006). In this case, the possible cost induced is:

Expedited shipping cost

Or

Loss of sale

When the importer decides to keep inventory at a high level to meet customer demand, total inventory cost increases. Meanwhile, obsolescence cost is more likely to happen. Because when the importer has more products on hand, it is more likely to have unsold products left in the warehouse in the end, or products are sold at salvage prices to reduce profit loss. In this case, cost caused by demand risk equals to:

inventory carrying cost+ obsolescence cost

These two elements have been discussed.

4.7.1.4 Extra Warehousing Cost

What needs to be noticed is that, keeping track of the extra storage time that importing takes than locally sourcing takes is essential for estimating extra warehouse cost that sourcing from China brings. Extra storage time can be caused by the larger batch of order and early delivery.

The formula used to calculate warehousing cost is the same as in section 4.3.

4.7.1.5 Loss of Sale and Expediting Cost

When late delivery causes stock-out, long lead time risk translates into stock-out induced profit loss. We find a formula that can be used to calculate stock-out cost from the Next Level Purchasing Association (NLPA) website. They proposed, with historical data from the sales department, stock-out cost of a product was estimated as:

Stock-out cost = profit per unit × average units sold per day × stock-out days

When companies are not willing to bear stock-out risk, either for monetary profit or high level customer service, they sometimes pay for expediting cost. Air transport is the latest

transportation method (Viera Kyseľová, 2012). Compared to marine transportation, air transportation is faster and safer. It is usually used for high-value goods or in emergency circumstances. In this case, we think

Expediting cost = air transportation-related cost

4.7.1.6 Insurance Cost

Buying insurance is one way to avoid suffering from great losses. Without insurance, no compensation is paid by the forwarder when the cargo is damaged during transportation.

According to measures of the Customs of the People's Republic of China for the assessment and determination of duty-paid value of import and export goods, when the actual insurance fees cannot be identified, China Customs use the following equation:

Insurance fee = (declared value + transportation fee) × 3‰

In this thesis, we adopt the same equation to estimate insurance cost.

4.7.2 Delivery Terms

The shipping Incoterms rules, i.e. International Commercial Terms, are eleven pre-defined commercial terms published by the International Chamber of Commerce (ICC). The eighth version, Incoterms 2010, is being used currently. The Incoterms rule is a tool to clarify risks and costs along the logistics process.

We include as many as costs and risks in our framework, but the incoterm in the contract may eliminates some of them.

For example, Free on Board (FOB) term places all the risks and costs up to the point the goods are all set on the vessel to the seller. In this case, the buyer is not responsible for port charges.

Ex Works (EXW) term attributes all the risks and costs of bringing the goods to the destination to the importer. In this case, as the buyer, it is critical to understand all the possible costs and risks.

Appendix 1 is an allocation of costs to buyers/sellers according to Incoterms 2010.

4.8 Costs Associated with Quality Issue Risks

The direct cost attribute to quality issue risks include rejection and return unqualified products, re-receiving imported goods, defective material disposition and loss of brand reputation. Extra time may also cause loss of local market (Song et al., 2010). Even though cost associated with quality issue also happens when a company source locally, this part of cost is higher when source internationally (Steven et al., 2014).

4.8.1 Rejection, Return, and Re-receiving Cost

The research of Steven et al. (2014) verifies a positive correlation between global sourcing activities and quality recalls.

When severe quality discrepancies happen, importers sometimes reject, return, and re-receive the products. We anticipate this part of the cost to be the sum of all the additional costs that happened along the re-ordering process and lost profit owning to late deliveries.

4.8.2 Product Discrepancies Cost

Product discrepancy cost is the profit loss, both actual and expected, due to unqualified products (Helmold, 2013).

It is not rare that product discrepancies harm a company's profit.

From 2013 till present, 19 automakers in the U.S. which outsource from a Japanese airbag manufacturer called Takata have been recalling vehicles assembled with unqualified

airbags. According to the National Highway Traffic Safety Administration, more than 42 million vehicles will be impacted. Automakers include Audi, BMW, Honda, GM, etc. are affected by this biggest recall in auto history. Takata is currently protected by bankruptcy protection, so automakers shoulder the recall cost. Till 2017, Honda spent 5 billion USD for its airbag recall, and GM estimated 320 million USD direct cost caused by airbag recall (FOX Business, 2017). Reputational damage is more enduring than direct financial cost and it is hard to calculate.

Besides direct cost, unqualified goods received by customers hurt the reputation and future development of a business. When a quality crisis happens, the name printed on the label is the first one injured. This risk is not easy to quantify.

De Mast (2006) provided a formula to estimate product discrepancies costs.

Unqualified product cost = rework cost + loss of sales + potential loss of market share

We think it is fair to add compensation to the customers to this formula. So,

unqualified product cost = rework cost + loss of sales + potential loss of market share + compensation to the customer

According to De Mast (2006), rework cost consists of material cost and labour cost. Material cost can be counted based on procurement cost, and labour cost can be counted by the same formula we used before, the product of people's wage and time consumed.

The incurred cost and potential loss of sales can refer to the statistics report from the sales department.

4.9 Supplier Management Costs

Handfield and Nichols (2004) emphasized the importance of communication between the two parties in global sourcing. They identified that information sharing system, mutual trust, efficient communication, and personal relationships are important "human factors"

in international business. But with language and cultural barriers, it requires effort to establish such efficient communication with Chinese suppliers.

Even though English has been a world language for a long time, language barriers still exist while doing business with Chinese exporters. According to an English Proficiency Index survey conducted by Education First (EF), an international education company, China ranks No. 47 of 88 countries or regions. In this sense, the Canada-China business partnership still faces challenges in communication.

Great disparity of office hours is another potential cost factor.

Canada and China are located in different time zone. 12 to 13 hours time difference means more communication barriers, and overtime pay. Real-time communication is harder to realize compared to communicating with local suppliers.

Supplier management risks are hard to quantify. Tracking cost due to misunderstanding and payment to employee overtime enables managers to record a part of costs caused by supplier management risks, but potential costs and missed opportunities are tricky to evaluate. For example, when the manufacturer discovers a potential improvement of one product during production process, the importer possibly misses this improvement opportunity with an unsound information sharing system. The actual economic losses are not easy to calculate, but worth managers attention.

4.10 Costs Associated with Business Environment Risks

Business environment risks are often related to regulations and economic changes. (Khan and Yurt, 2010). For example, regulations on natural environment protection increase TCO. Meng et al. (2018) examined the effect of environmental cost, carbon tax (CT) more specifically, in a firm's outsourcing decision. Their research showed that environmental cost affected both manufacturer's and government's preferences on production regimes substantially, thus affected the direct cost of a product.

The following part presents some administrative and regulatory barriers that may increase the risk of doing business with Chinese companies.

4.10.1 Exchange Rate Cost

It is widely recognized that one currency appreciates when this country's economic growth, productivity, foreign exchange surplus, foreign investment, political stability, and interest rate are positive (e.g. Menkhoff et al., 2016).

Future changes of the exchange rate between two currencies are not easy to predict. Previous research held quite different opinions about the nominal and actual valuation of Chinese Yuan (RMB). Some concluded that Chinese Yuan was fairly priced (e.g. Tatom, 2007) while some thought Chinese Yuan was completely undervalued (e.g. Morrison et al., 2009). We can also notice that rarely any papers suggest that Chinese Yuan is overvalued. One speculation from this limited information is that Chinese Yuan will appreciate in the long term, which gives a negative future outlook for Canadian importers.

Song and Platts' method (2010) of estimating the exchange rate fluctuation cost is to set the first month of sourcing as the basis and calculate gain and loss for every month following.

For example, we assume company A buys 150,000 RMB of goods every month from China. We use the monthly average exchange rate to calculate potential loss. Table 4.6 is the monthly average CAD-RMB exchange rate in 2018. Figures in the table are how much 1 Canadian dollar is valued in RMB.

Exchange Rate CAD:RMB 2018											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5.11	4.93	4.87	4.93	4.95	5.04	5.24	5.24	5.32	5.3	5.23	5.04

Table 4.6 CAD-RMB exchange rate

Source: Bank of China

Scenario 1: when exchange rate is set to 5.11 for the whole year

Total net price = (150,000×12)/5.11 = 352,250.49 CAD

Scenario 2: when exchange rate risks are considered

Total net price =
150,000/5.11+150,000/4.93+150,000/4.87+150,000/4.93+150,000/4.95+150,000/5.04+
150,000/5.24+150,000/5.24+150,000/5.32+150,000/5.3+150,000/5.23+150,000/5.04

=353,263.8 CAD

The total exchange rate loss = 353,263.8 - 352,250.49 = 1,013.31 CAD

4.10.2 Intellectual Property Protection Cost

Another challenge that needs to be discussed as a cost factor is the intellectual property protection cost.

World Intellectual Property Organization (WIPO) defined intellectual property (IP) as properties that include intangible creations of a person or company, such as patents, trademarks, industrial designs, etc.

Based on IP Index Rank 2018[21] , China ranks No. 25 among 50 countries with a total overall score of 19.08/40. The report states that the key areas of weakness are: (1) Level of IP infringement remains high (2) Interpretation of IP laws can be fragmented and out of sync with international standards (3) Ability to secure adequate remedies for infringement remains a challenge in many cases (4) Barriers to market access and commercialization of IP (5) Insufficient legal safeguards, particularly for trade secrets, remain an obstacle. Schotter and Teagarden (2014) also pointed out that IP protection environment in China is severe.

By comparison, Canada ranks No. 18 with a score of 26.50/40.

[21] Global Innovation Center, 2018

One of the benefits of global sourcing is to achieve innovation by combining the technical strength of two countries, but poor IP protection throws the cooperative relation high risks.

The formula we developed to estimate IP costs is as follows:

IP protection cost = cost of registering IP rights in China + cost incurred when IP rights are infringed

Hu (2016) indicated that when IP rights are infringed,

IP infringement cost = IP infringement litigation cost + lost profit from IP infringement – compensation from the IP intruder

And two formulas can be used to estimate lost profit from IP infringement:

Lost profit from IP infringement = reduced sales of the products caused by IP infringement

or

Lost profit from IP infringement = infringer's profit from selling the infringing products

4.10.3 Cost Associated with Political Regulation Risks

Political regulation risks are risks induced by political decisions, changing conditions, and events (Matthee, 2011). Political regulation risks are hard to predict. In this thesis, we conclude that three political regulation risks that will affect TCO of sourcing from China to Canada: manufacturing environment and the lack of FTAs.

4.10.3.1 Manufacturing Environment in China

Industrial upgrading in China during the past few years increases manufacturing cost in labour-intensive industries.

China is in the middle of a transition period. Policy makers in China have been pivoting their attention from export-oriented, primary industrial processing to innovation-led processing, in other words, from the bottom of the smiling curve to two ends of the curve.

The Chinese government announced multiple policy initiatives to stimulate industrial upgrading. For example, China's Five-Year Plans are guidelines pointing out the development direction in a five-year time frame. The 13th Five-Year Plan, which was launched in 2015, proposed that over the period from 2016 to 2020, China aims at achieving five goals, which are (1) transits into a high-value-added economy (2) less disparity among regions (3) green development (4) opening up (5) inclusive development. Two long-term national economic development plans, "Made in China 2025" and "Internet Plus", aim at promoting information and communication technologies, research and development (R&D), and green manufacturing industrial sectors.

One of the effects of this reconstruction is its negative influence on traditional manufacturing industry. The overall resources are limited, and with preferential treatment of high-value-added sectors, traditional industries now enjoy less privilege from a political level than before, compared with when China just started its export-oriented industrial readjustment.

The government of China is tightening its regulation on the environment, which causes additional cost for traditional manufacturing companies. The global market also urges Chinese manufacturers to comply with stricter international standards.

From 2005 to 2015, the share of GDP of secondary industry in China decreased by 6.4% while the tertiary industry increased by 9.1%[22].

Foreign direct investment (FDI) is another indispensable driver of China's industrial upgrading process.

[22] CEIC database

In 1979, China announced its openness policy and lifted its prohibition on FDI. Since then, FDI inflow to China has been increasing. FDI was initially attracted by cheaper labour cost and lax health, safety, and environmental laws in China (Navarro, 2010).

A sharp increase of FDI occurred in the year 1992 when China reaffirmed its policies of openness (Whalley and Xian, 2009). Figure 4.8 shows the changing pattern of China's inward FDI from 1983 to 2017 (the earlier data is not available).

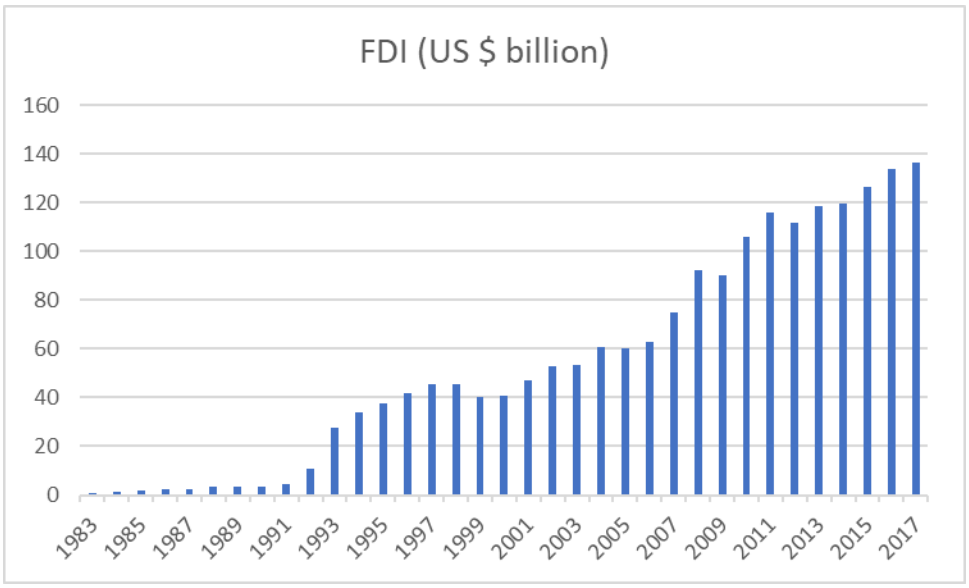

Figure 4.8 China's inward FDI (1983-2017)

Source: Yearly report of Ministry of Commerce of the People's Republic of China

As Figure 4.8 shows inward FDI of China is still increasing. In 2018, China was ranked the world's second largest FDI recipient after the U.S. [23]What worth to be noticed here is that the changing pattern of the composition of total FDI. According to KPMG yearly China outlook 2018, manufacturing share of total FDI has been decreasing for the past six consecutive years. Foreign investments are shifting to high-tech manufacturing, such as health care.

[23] 2018 World Investment Report, UNCTAD

Costs accompanied by changing manufacturing environment in China is hard to quantify, but we have enough information to conclude that potential changes are not favorable for labour-intensive industries. High-tech products manufacturers have a brighter future outlook than manufacturers in labour-intensive industries.

4.10.3.2 FTAs in Canada and China

A free trade agreement (FTA) is a treaty between two or more countries to facilitate trade and eliminate trade barriers (International Trade Administration). FTA with China could be beneficial for Canadian importers as the total cost would be lower with eliminated tariffs.

Keeping an eye on the potential FTA is important to understand where the opportunities and challenges may launch.

Up to the year 2018, China has 14 FTAs (Table 4.7). Canada is not one of them.

Partner	First Signed	Phasing in of Agreement
ASEAN	2002	investment
Hong Kong	2003	single undertaking
Macau	2003	single undertaking
Chile	2005	goods, service
Pakistan	2006	goods, service
New Zealand	2008	single undertaking
Singapore	2008	single undertaking
Peru	2009	single undertaking
Costa Rica	2010	single undertaking
Switzerland	2013	single undertaking
Iceland	2013	single undertaking
South Korea	2015	single undertaking
Australia	2015	single undertaking
Georgia	2017	single undertaking

Table 4.7 China's FTAs

Source: China's Ministry of Commerce

According to the information from Government of Canada website, currently, Canada has FTAs with the European Union and 16 other countries. No emerging country in Asia has FTA with Canada.

Canada's FTA with other countries may also affect its relationship with China.

In October 2018, Canada signed the new U.S.-Mexico-Canada Agreement (USMCA). One clause in USMCA that may affect Canada-China partnership is that it allows any of the three countries to withdraw from the deal on six-month notice if one of the partners enters into a free trade agreement with a non-market economy[24]. And the U.S. Department of Commerce constantly argues for China's status as a non-market economy[25]. While in the old North American Free Trade Agreement (NAFTA), the statement concerning the same issue agreed that future free trade with "non-market" countries did not infringe Canadian sovereignty[26]. Having the U.S. as the most important business partner, favorable trade policy and agreement may hard to achieve between Canada and China in the near future.

In December 2017, Li Ke-Qiang, Chinese Premier, rejected Canada's overture on a closer economic partnership. Presumably, favorable conditions for Canadian importers who source from China will not be realized for the foreseeable future.

When preferential tax exists, import duty is waved. So we estimate the cost of lack of preferential tax roughly as equals to import duty paid to the customs.

4.11 Summary

The framework of TCO of sourcing from China to Canada in this thesis is summarized below.

[24] Office of the United States Trade Representative
[25] U.S. Department of Commerce press (2019), China's Status as a Nonmarket Economy (NME)
[26] Office of the United States Trade Representative

The future outlook is also given. It is subjective estimation of future changes of sourcing form China based on analysis of these cost drivers in this Chapter.

Cost Factors	Estimation	Future Outlook
Purchasing Price		
Net price	Unit Price × quantity + other costs – discounts	Negative
Tooling	Negotiation with the supplier	Neutral
Setup Costs		
Information collection cost	People's time cost + business trip expenditure or Payment to the sourcing agent	Neutral
Supplier visiting and negotiation cost	People's time cost + business trip expenditure	Neutral
Cost of modifying IT system	IT engineer wage × time devoted to this project	Neutral
Trade Costs		Positive
Transportation cost	3PL quote	Neutral
Inventory cost		
Warehouse cost	Warehouse size in sf × base rental rate + operating expenses	Neutral
Tax and duty	Duty paid to China customs + duty paid to Canada customs	Positive

Customs clearance cost and port charges	Broker quote	Neutral
Administrative Costs		
Ordering cost	Purchasing people's wage × time devoted to this project	Neutral
Billing cost	Financial people's wage × time devoted to this project	Neutral
Supplier Management Costs		
Supplier-related cost	People's time cost + business trip expenditure	Neutral
Sample inspection cost	Sample mailing cost + people's cost	Neutral
International payment cost	Transaction cost × number of transactions	Neutral

Risks	Estimation	Future Outlook
Supply Risks		Neutral
Lead time risks		
Extra Warehouse cost	Warehouse size in sf × base rental rate + operating expenses	
Obsolescence	The total value of unsold product and cost due to the clearance sale	
Capital costs	(Current average monetary value of inventory – previous inventory value) × capital cost rate	

Demand Risk	Expedited shipping cost + loss of sale + extra inventory cost+ obsolescence cost	
Loss of sale	Profit per unit × average units sold per day × stock-out days	Neutral
Expediting cost	Air transportation cost	Neutral
Insurance cost	(Declared value + transportation fee) × 3‰	Neutral
Quality Issue Risks		Positive
Rejection Return and Re-receiving	All the additional costs happened along the re-ordering process and lost profit due to late deliveries	
Product Discrepancies Costs	Rework cost + Loss of sales + Potential loss of market share + Compensation to the customer	
Supplier Management Risks	Hard to quantify	Neutral
Business Environment Risk		Negative
Exchange Rate Risks	Compare cost with the base exchange rate and actual exchange rate	Negative
Intellectual Property Protection	IP protection costs + IP infringement cost	Negative
Political Regulation Risks		Depends on the industry

Chapter 5 Implementation

5.1 Objective

The main objective of this thesis is proposing a TCO framework of sourcing consumer goods from China to Canada. A fundamental premise is that costs which are easily overlooked can sum up to a considerable number.

To verify that premise, as well as illustrate the practicality and importance of the framework in Chapter 4, we are going to do an illustration in this Chapter.

The objective of Chapter 5 is to compare the usual way of estimating the costs and the TCO approach when a firm evaluating new outsource strategy.

5.2 Context Setting

The background of the illustration is set within the apparel industry.

Regarding the supplier end, this illustration refers to a case study from Liu and Xing's thesis *Garment Industry Analysis in China - Case Study on Yichang Richart Factory Limited (2010).* The apparel manufacturing factory they documented, Yichang Richart Factory Limited (hereinafter referred to as Factory Y), is an export-oriented apparel manufacturer located in Yichang City, Hubei province. It is the first-tier supplier for famous international brands such as H&M, Levi's, etc.

Regarding the importer end, this illustration set the fictitious import Company M as a Montreal based, apparel company.

In this illustration, after supplier evaluation, Company M decided to order 15,000 pairs of male short jeans from Factory Y on January 1, 2017. The quantity of this order is consistent with order quantity in the case study, and this order is assumed to be enough for 4 months summer sales.

The Incoterm adopted in the illustration is FOB.

Payment is transited through T/T.

Customs clearance cost is contained in brokers' fees.

We assume one unexpected customs examination occuring at Canada customs.

In the same context and dataset, two sets of cost are compared.

As discussed in the literature review, low purchasing price in less developed countries is the primary reason why firms choose to source globally (e.g. Petersen et al., 2000; Cecere, 2005; Lewin and Volberda, 2011; Steven et al., 2014). In this illustration, we depict the first circumstance as where only purchasing cost, transportation cost, and import duty and tax are taken into consideration. We classify these costs into the evident direct cost. The second circumstance is where other semi-evident or hidden costs in the framework are counted.

What needed to be clarified here is that it is almost impossible to obtain an accurate estimation for each cost. The actual cost highly depends on the characteristics of the very company, such as its industrial sector, company scale, operation system, and its financial system. With the limitation of data, and different business operation procedures of different companies, the following estimation is partially built on assumptions, which are made based on secondary data.

5.3 Cost Estimation

5.3.1 Evident Direct Cost

In section 5.3.1, only purchasing cost, transportation cost and import duty and tax will be added up to estimate the cost of this order.

Total Net Price

According to Chapter 4,

Required unit price = unit manufacturing cost × [(1+desired profit margin) × 100%]

Due to the limitation of data, we assume that the cost structure of manufacturing these short jeans is the same in 2017 as in 2009.

In Chapter 4, we concluded that material cost, labour cost, and overhead cost are three cost drivers that contribute to total manufacturing cost. In Chapter 4, we also suggested forecasting material cost with PPI, forecasting labour cost with salary variation and forecasting overhead cost with both PPI and labour cost. The estimation in this Chapter follows the same logic as in Chapter 4.

The cost structure of manufacturing a pair of male short jeans is in Table 5.1. The manufacturing cost in 2017 is estimated.

Manufacturing cost of Male Short Jeans in Factory Y		
Manufacturing Cost Factor	Price (RMB) (2009)	Estimation Price (RMB) (2017)
Material		
Fabrics	18.17	
Accessory	12.36	
Total	30.53	32.12
Direct Labor Cost		
Cloth Manufacturing	7.97	
Garment Wash	1.8	
Total	9.77	25.16
Indirect Labor Cost		
Executive Salary	1.11	2.86
Firm Fixed Cost	2.32	2.44
Total Manufacturing Cost	¥ 43.73	¥ 62.58

Table 5.1 Cost structure of male short jeans in Factory Y

Source: Liu and Xing (2010)

The adjusting process is as follows:

In Hubei Province, the average annual wage in the apparel manufacturing industry is 14503 RMB in 2009 and 37348 RMB in 2017.[27] The total growth rate during these 8 years is 157.52%.[28] We assume the growth rate is the same in Factory Y, so the direct labour cost for one pair of jeans in 2017 is rounding up to 25.16 RMB[29], and overhead labour cost is rounding up to 2.86 RMB[30].

According to the National Bureau of Statistics of China, PPI grows by 5.2% from 2009 to 2017. We assume the growth rate of material cost in Factory Y is the same with PPI in China, so the material cost in 2017 is 32.12 RMB.[31] To simplify the case, we assume the firm fixed cost also increase proportionally with PPI. Firm fixed cost for Factory Y in 2017 is 2.44 RMB.[32]. We can estimate that for Factory Y, the total manufacturing cost for a pair of male short jeans in 2017 is 62.58 RMB.

According to data collected in Chapter 4, the gross revenue rate of the clothing manufacturing industry in China normally vary within the range 10%-20%. Here we set the gross revenue rate in Factory Y to 15%. Hereby we get the required unit price is 71.97 RMB[33] in 2017.

The order quantity is set to 15,000, the same as the order quantity in the case study.

We assume there are no other costs and discounts involved.

When currency fluctuation risk is not considered, we use the exchange on 1st January 2017 to convert the total net price into Canadian dollars.

On 1st January 2017, the value of 1 Chinese Yuan (RMB) equals to 0.1930 Canadian dollar[34].

[27] China Statistical Year Book 2018
[28] Overall growth rate = (37348-14503)/14503
[29] Direct labour cost = 9.77 × (1+157.52%)
[30] Overhead labour cost = 1.11 × (1+157.52%)
[31] Material cost 2017 = 30.53 × (1+5.2%)
[32] Firm fixed cost 2017 = 2.32 × (1+5.2%)
[33] Required unit price = 62.58 × (1+15%)
[34] Bank of Canada

The total net price of 15,000 pairs of short jeans in 2017 is

Total net price in RMB = unit price × quantity

= 71.97 × 15,000

= 1,079,550 RMB

Total net price in CAD = 1,079,550 × 0.1930

= 208,353.15 CAD

Tooling Cost

From Liu and Xing's interview, we can see that Factory Y has already had a ready-made clothes production line. Unlike specialized intermediate industrial products, male short jeans do not need extra tooling cost.

Tooling cost is 0.

Total Purchasing Price

Total purchasing price = total net price + tooling cost

= 208,353.15 + 0

= 208,353.15 CAD

Transportation Cost

According to logistics quote website Freightos, the total transportation cost for one 20-foot container from Yichang to Montreal varies between 3,344 USD and 3,696 USD, and the transit lead time is 24-29 days. In this illustration, we assume all the products fit into

a 20-foot container and we set the direct monetary transportation cost to 3,520 USD (4,643.94 CAD[35]). The transit lead time is set to 26.5 days.

Tax and Import Duty

Under FOB incoterm, Company M is not responsible for export duty.

For import duty, jeans imported from China are subjected to 7% import rate and 5% GST on customs value[36]. Here we assume the customs value for duty in both scenarios equals to purchasing price, which is 208,353.15 CAD.

Customs duty = value for duty × rate of duty

= 208,353.15 × 7%

= 14,584.72 CAD

Value for tax = value for duty + customs duty

= 208,353.15 + 14,584.72

= 222,937.87 CAD

CST tax = value for tax × 5% GST

= 222,937.87 × 5%

= 11,146.89 CAD (GST)

Total of duty and tax payable = 14,584.72 + 11,146.89

= 25,731.61 CAD

[35] Exchange rate is set to 1 USD = 1.3193 CAD, source: Bank of Canada
[36] State Administration of Taxation; Canada Border Services Agency

The total estimated evident direct cost

= purchasing price + transportation direct monetary cost + import duty cost

= 208,353.15 + 4643.94 + 25,731.61

= 238,728.70 CAD

5.3.2 Indirect Cost

Besides cost factors from section 5.3.1, easily overlooked costs and risks are estimated in section 5.3.2.

This estimation uses the average or median cost if the data varies within a range. One unexpected cost that could happen is set into the context, simply for testing the efficacy of TCO.

Costs in section 5.3.2 are segmented into one-time cost, annual supplier-related costs, and order-related costs. Setup cost only happens for one time when the importers start the global sourcing strategy and cooperate with the supplier. Annual supplier-related costs are costs caused by building a supplier-buyer relationship with Factory Y within one year timeframe. Order-related costs are extra costs caused by this order, compared to source locally. Compared to source locally, when no extra cost happens, we set the number to 0, but it does not mean that actual cost is 0 CAD.

Due to the limitation of data, in order to prioritize the feasibility of the illustration, the estimation procedure does not follow the same order of Chapter 4, and some of the cost is not estimated according to the formula in the framework. But the estimation method behind the estimation process is the same as the framework development process.

Supplier Management Cost

Supplier-related Cost

Supplier-related cost includes on-going travel expense for supplier-buyer cooperation, communication cost, supplier training and support cost, on-going supplier evaluation cost, etc.

According to AMR Research company, on average, companies in the U.S. spend 500 USD-800 USD to maintain a healthy cooperative relationship with one supplier. [37] We select 650 USD (around 857.55 CAD) [38]as the annual cost for maintaining the partnership with Factory Y.

Supplier-related Cost = 857.55 CAD

Sample Inspection Cost

The production line in Factory Y is well established. Sample jeans are easily available before the contract is signed. So we assume this procedure has been done during the supplier evaluation process, and no extra sample inspection cost happens.

Sample inspection cost = 0

Setup Cost

Setup cost is one-time cost happening before cooperation begins. It includes information collection cost, supplier visiting, and negotiation cost, and IT System modification cost. Cost mainly attributes to extra people's time cost.

A survey made by Song et al. (2007) shows that the proportion of supplier management cost and setup cost is 13:63. The industry they dived into was industrial products manufacturing industry, but since both the supplier management cost and setup cost are

[37] Mickey North Rizza (2009), An Economic Dream: Supplier Information Technology's Massive Cost-Saving Opportunity

[38] Exchange rate is set to 1 USD = 1.3193 CAD
Source: Bank of Canada, exchange rate 1 January 2017

mainly related to labour cost, in this illustration, we assume the proportion of supplier management cost and setup cost is the same as in Song et al.'s survey. With pre-assumed 857.55 CAD supplier management cost, our total set up cost equals to 4155.82 CAD.

Administrative Cost

In Song et al.' case, while international ordering and billing cost increase, the frequency decrease. Overall the amount of time consumed during administration procedure remains the same.

Similarly, we set the extra administrative cost to 0.

Exchange Rate Risks

In this illustration, this order was placed on January 1, 2017.

After 36 days[39] manufacturing lead time, on February 5, 2017, 30% purchase price is paid.

30% payment in RMB = 1,079,550 × 30%

= 323,865 RMB

On February 5, 2017, the value of 1 RMB : 1 CAD = 0.1909[40]

30% payment in CAD = 323,865 RMB × 0.1909

= 61,825.83 CAD

When the shipment arrived (March 12[41]), 70% purchase price is paid.

[39] See *Long Lead Time Risk* section

[40] Bank of Canada

[41] See *Long Lead Time Risk* section

70% payment in RMB = 1,079,550 × 70%

= 755,685 RMB

On March 18, 2017, the value of 1 RMB : 1 CAD is 0.1932.

70% payment in CAD = 750,015 RMB × 0.1932

= 145,998.34 CAD

Purchasing Cost (CAD)	2017
30% Before Shipment	61,825.83
70% Shipment Arrived	145,998.34
Total	207,824.17

Table 5.2 Purchasing cost in CAD

In section 5.3.1, we calculated the purchasing price with the exchange rate on 1st January 2017. The total purchasing price is 208,353.15 CAD. Extra cost caused by sourcing from China is:

Actual payment – estimated payment = 207,824.17- 208,353.15

= -528.98 CAD

IP Protection

The apparel manufacturing process involves little high-edge technology, and rarely male short jeans are part of a high street brand's core competence. So the monetary risk of IP Protection is set to 0.

Political Regulation Risks

As far as we can see, there is no political regulation risk involved.

Political regulation risks cost is set to 0.

Customs Clearance Cost and Port Charges

Brokerage fees in Canada for High-Value shipment (shipments that are valued equal or more than 2500 CAD) is about 1.25%[42] of the shipment value. Here we estimate the brokerage fees are 207,824.17× 1.25% = 2,597.80 CAD

Insurance

From Chapter 4,

Insurance fee = (declared value + transportation fee) × 3‰

In this case, Insurance Fee = (207,824.17+ 4258) × 3‰

= 636.25 CAD

Long Lead Time Risk

Lead time is a critical issue in the fashion industry (Choi and Cai, 2018). In the apparel industry, lead time refers to the time it takes from placing an order to receiving it (Li, 2000).

Islam (2012) developed an equation to calculate total lead time in the apparel industry:

[42] Argo customs quote

Total lead time = information lead time (i.e. time needed to process orders) + manufacturing lead time + shipping time for importing fabrics and accessories + shipping time for exporting final product.

The average information lead-time in the apparel industry is 5-7 days (Nuruzzaman and Haque, 2009), here we set the information lead time to 6 days.

Due to China's industrial cluster shipping time for importing fabrics and accessories is set to 0.

The average production lead time in China is 30 days (Nuruzzaman and Haque, 2009).

So, manufacturing lead time in Factory Y = 6 + 0 + 30

= 36 days

The average time to clear export through customs in China is 7.6 days (World Bank, Enterprise Surveys). We assume the average time for customs clearance in Canada is also 7.6 days.

Logistics lead time of sourcing form Factory Y = 26.5 (transportation time) + 7.6 + 7.6

= 40.7 days

Long lead time itself does not cause extra cost directly. But as Chapter 4 indicated, long lead time increases inventory carrying cost such as warehouse cost, capital investment cost, obsolescence cost, and cost associated with demand risk. Due to the lack of flexibility and long lead time, companies in the apparel industry which source globally tend to hold a high level of inventory (Lowson, 2003). When the level of inventory is elevated, the inventory carrying cost increase with it.

With the absence of justified data, in this illustration, we are not able to estimate the extra inventory carrying cost except obsolescence cost. But one thing we are sure of is the inventory carrying cost in this case is greater than in the case of source locally.

Obsolescence Cost

High-street fashion industry deals with short life cycles, high fluctuate customer demand and high level of competition. So obsolescence is a big challenge in this industry, so as with short jeans.

According to a report made by Dell company in 2012, in the fashion retail business, clothes lose 100% of their value when they are in stock for 12 months. If we do not consider the inventory cost due to obsolescence, the obsolescence cost for sourcing from China and sourcing locally are the total cost of the jeans left in the warehouse at the end of the season. So we assume that obsolescence costs are the same in both sourcing locally and sourcing globally.

We set the extra obsolescence cost to 0.

Customs Inspection Fee

Canada Customs has the right to examine all imported goods. Cargo owner is responsible for the inspection fee. With different incoterms, importers sometimes are entitled to pay the customs inspection fee. Under FOB incoterm, Canadian importer is responsible for customs inspection fee when goods cross the Canadian border.

Canadian International Freight Forwarders Association (CIFFA) gathered data from its member firms in August 2017. Across all international ports in Canada, the average examination cost is 2,964.55 CAD. With a sample size of 15 containers, the average examination cost at Montreal Port is 2,395.25 CAD. In this case, we will use 2,395.25 CAD as examination fees.

Quality Issue

With a sample of 18 companies, Song and Platts (2010) did a survey on the TCO of sourcing from China. Their survey found that an average of 3.25% of purchasing cost lost due to quality issues, including rejection, returning and re-receiving cost, discrepancies, scrap and loss of sales due to quality.

We adopt this rate in our estimation.

Cost caused by quality issue = Purchasing cost × 3.25%

= 207,824.17× 3.25%

= 6754.29 CAD

Loss of Sale and Expediting

As we already assumed, 15,000 pairs of jeans are sufficient, so no stock-out related cost happens.

Cost caused by loss of sale and expediting is set to 0.

International payment cost

According to secondary data in section 4.6, we assume Canadian importer need to pay 37.5 CAD per T/T payment.

Total international payment cost = cost per transit × times of the transit

= 37.5 × 2

= 75 CAD

5.4 Conclusion and Limitations

5.4.1 Conclusion

This chapter estimates the cost for Company M of importing 15,000 pair of male short jeans from Factory Y. In circumstance 1, cost is estimated when only purchasing cost, transportation cost and import duty are taken into consideration. In circumstance 2, we estimate the cost by referring to the TCO framework we developed in Chapter 4.

Table 5.3 summarized the total direct evident cost in circumstance 1.

Evident Direct Cost	
Procurement Cost	$208,353.15
Transportation Cost	$4,643.94
Duty and Tax Cost	$25,731.61
Total	**$238,728.70**

Table 5.3 Estimation of total evident direct cost

In circumstance 2, there are four categories of cost besides evident direct cost: one-time setup cost, supplier-related cost, order-related cost, and unquantified cost.

We estimate that the one-time setup cost proximately equals to 4155.82 CAD.

The annual cost that attributes to the supplier, Factory Y, is 857.55 CAD.

Circumstance 2 Annual Cost of Factory Y	
Supplier Management Cost	$857.55
Administration Cost	$0.00
Total	**$857.55**

Table 5.4 Annual cost of having Factory Y as a supplier

857.55 CAD is the annual cost due to adding Factory Y as Company M's new supplier.

Compared to sourcing locally, extra indirect costs related to this order is 11,929.61 CAD.

Circumstance 2 Extra Cost for the Order in Chapter 5	
Tooling	$0.00
Sample Inspection Cost	$0.00
Exchange Rate Risk	-$528.98
IP Protection	$0.00
Political Regulation Risks	$0.00
Customs Clearance Cost and Port Charges	$2,597.80
Insurance Fee	$636.25
Customs Inspection Fee	$2,395.25
Obsolescence Cost	$0.00
International Transaction Cost	$75.00
Loss of Sale and Expediting	$0.00
Quality Issue	$6,754.29
Total	**$11,929.61**

Table 5.5 Extra cost of placing this order compared to source locally

The total inventory carrying cost is not given due to the lack of data.

In conclusion, compared to the usual estimation method, for cooperating with Factory Y, 4155.82 CAD setup cost, 857.55 CAD annual partnership maintaining cost, 11,929.61 CAD order-specific cost, plus inventory carrying cost are overlooked if we do not adopt the TCO philosophy and only consider direct evident cost.

These numbers do not represent the worst situation. The estimation is made when some potential risks, including regulation changing risk, cost caused by communication barriers, supply disruption, customs demurrage and detention cost are avoided.

This comparison provides an insight that only considering evident direct cost factors is not enough, and the TCO approach is necessary when evaluating outsourcing strategy. And the framework developed in this thesis is applicable and practical.

5.4.2 Limitations

This illustration is a rough estimation based on multiple sources of secondary data. Even though all the estimations are backed up with secondary data and rational assumptions, lack of accuracy is a limitation.

Due to the limitation of data and the complexity of analysis, the comparison between sourcing locally and sourcing from China is not made. Some costs, such as insurance cost, quality associated cost, etc., can also happen when source locally.

Chapter 6 Conclusions

Efficient and effective supply chain management provides competitive advantages to a company. And a good purchasing strategy plays a critical role in the success of a good supply chain management strategy.

Global sourcing, an outsourcing solution that motivates procurement activities to span across geographical boundaries, improves a company's purchasing ability. Sourcing from a less developed country assists a company to leverage global resources such as low-cost labour, lax manufacturing regulations, and cheap raw materials. Meanwhile, risks and easily overlooked cost factors in global sourcing are disadvantages of this strategy. For example, long delivery lead time, extra administrative and business travel costs, inflation in the destination country, etc., all together increase the total cost.

In this thesis, we discussed the concept of TCO, a procurement cost management philosophy that helps practitioners to gain a whole picture of the actual cost of outsourcing. With a thorough literature review, we proposed a framework of TCO of sourcing from China to Canada.

Sourcing consumer goods from China to Canada was chosen for this research. Following the TCO framework developed in this thesis, the cost factors involved in this international business process were identified and analysed based on secondary data.

An implementation session was carried out in the end to compare two circumstances related to this thesis.

The analysis in Chapter 4 and the implementation section in Chapter 5 convincingly demonstrated that this TCO framework was important and instructive for Canadian importers to do cost estimation and management in China-sourcing.

This thesis fulfilled its objective of answering two research questions.

As for RQ 1, *What are the costs and risks involved in sourcing from China to Canada?* , the framework we developed listed all the costs and risks involved.

As for RQ2: *How to estimate the TCO of sourcing from China to Canada?* , formulas given can be used to estimate the TCO.

6.1 Implications for Canadian Importers

The first implication for Canadian importers is the importance of TCO. Only considering net price, transportation cost, and tax is not enough to do the cost estimation.

Also, purchasing strategy is a holistic and complicated process. Costs happen beyond purchasing department. Implementing the TCO framework into a strategy requires coordination and support from all departments in a company. Historical data from the sales department, HR department, etc. is needed to perform this TCO framework. Identifying and understanding each cost factor is the first step to better manage the cost happening along the process.

Given the analysis of cost factors of sourcing from China to Canada, this thesis also suggests that in addition to supplier evaluation, analysing products features is essential. For example, from the manufacturing cost perspective, in China, the labour cost of high-tech products increases at a slower pace than that of labour-intensive products. From a business environment perspective, applicable political regulations based on the characteristics of a product affect its import TCO in both short-term and long-term.

6.2 Limitations and Future Research

Academically, this thesis contributes to developing theoretical knowledge of TCO of sourcing from China to Canada. The framework constructed and tested is mainly based on the literature view and secondary data analysis. Due to data limitation, the following research is limited in practicability and accuracy findings.

First, micro-level data is still lacking.

This thesis discussed the TCO of sourcing from China to Canada on a macro-level. It is designed for imported consumer goods in general and is not able to provide industry-specific instructions. Cost structures in different industries vary. Obviously, the weight of each cost factor in the clothing industry is not the same as in the electronic products industry. Even within the same industry, different companies have different ways to do business.

Therefore, within this research domain, further research focusing on a specific industry is expected to be done.

Second, data adopted in Chapter 5 is being open to being criticized, which we already covered in section 5.4.2.

Finally, some of the cost factors are troublesome or impossible to be quantified. Analysis regarding these cost factors was done with qualitative data analysis method in this thesis. A deeper investigation of these factors should be carried.

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Appendix 1

TERM	EXW	FCA	FAS	FOB	CFR	CIF	CPT	CIP	DAF	DES	DEQ	DDU	DDP
	Ex-Works	Free Carrier	Free Alongside Ship	Free On-Board Vessel	Cost & Freight	Cost Insurance & Freight	Carriage Paid to	Carriage & Insurance Paid To	Delivery At Frontier	Delivered Ex-Ship	Delivered Ex-Quay, Duty Unpaid	Delivered Duty Unpaid	Delivered Duty Paid
	WhoPays	WhoPays	WhoPays	WhoPays	WhoPays	WhoPays	WhoPays	WhoPays	WhoPays	WhoPays	WhoPays	WhoPays	WhoPays
Warehouse storage at point of origin	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller
Warehouse labor at point of origin	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller
Export packing	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller
Loading at point of origin	Buyer	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller
Inland freight	Buyer	Buyer	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller
Port receiving charges	Buyer	Buyer	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller
Forwarders fee	Buyer	Buyer	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller
Loading on ocean carrier	Buyer	Buyer	Buyer	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller
Ocean/Air freight charges	Buyer	Buyer	Buyer	Buyer	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller	Seller
Charges at foreign Port/Airport	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Seller	Seller	Seller	Buyer	Seller	Seller	Seller
Customs, Duties & Taxes abroad	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Seller
Delivery charges to final destination	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Buyer	Seller	Seller

Source: International Chamber of Commerce