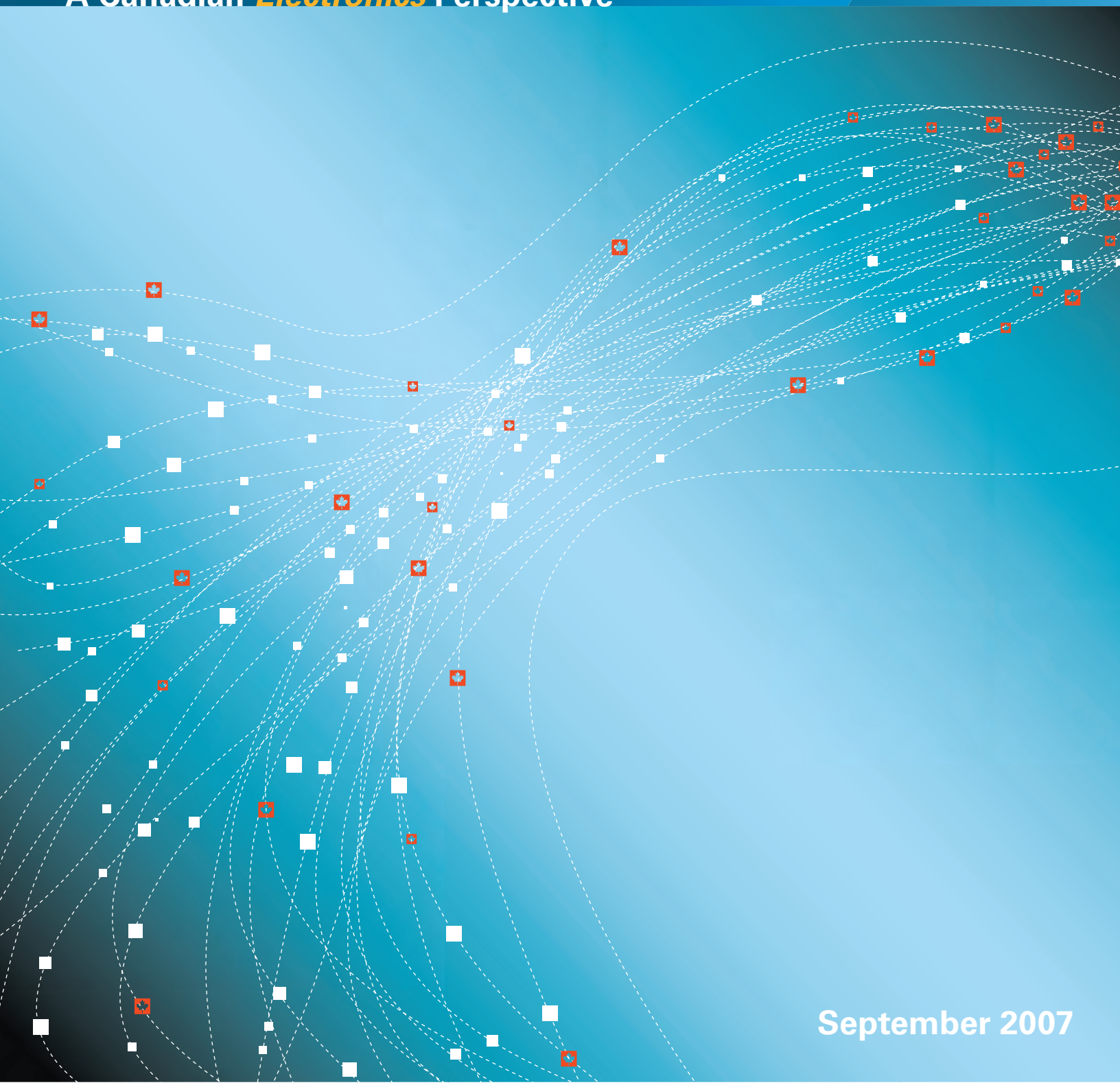
Low Cost Country Sourcing

A Canadian *Electronics* Perspective



September 2007

SCL CAL
Supply Chain & Logistics Association Canada / Association chaîne d'approvisionnement et logistique Canada

Industry Canada Industrie Canada
Canada

Low Cost Country Sourcing:
A Canadian *Electronics* Perspective

This publication is also available electronically on the World Wide Web in HTML format at the following address: ***www.strategis.gc.ca/logistics***

Cat. No. Iu44-46/6-2007E-PDF
ISBN 978-0-662-46510-2

Industry Canada registration number: 60308

Aussi offert en français sous le titre
Approvisionnement mondial :
Perspective *électronique*

Executive Summary

Business Drivers and Linkages

Canadian electronics supply chain managers are now faced with the challenges of efficiently combining low cost, global sourcing and supply chain agility at the same time. Low Cost Country Sourcing (LCCS) is strategically important for 81% of Canadian electronics manufacturers.[1]

On time delivery, short lead time fulfillment, predictability, variable demand and customized orders/products capability are key supply chain agility factors for more than 92% of Canadian electronics manufacturers. The main drivers for LCCS implementation are based on gaining cost advantages and responding to customer pressures.[1]

Origin and Type of Products Sourced

For Canadian electronics manufacturers China is the most important low cost location for sourcing goods, with all the companies surveyed sourcing from China. Canadian electronics manufacturers are mainly sourcing intermediate goods (76% of all LCC sourced products) from LCCs and attempt to postpone final product customization until the goods reach their final market.[1]

Key Performance Indicators (KPI)

The minimum lead time for electronics products sourced from China is approximately 3 times that of products sourced from North America (NA). More than 82% of electronics manufacturers achieve on-time shipments (more than 90% of the time) of NA products but only 9% achieve on-time shipments for LCCS products.[1]

Since initiating LCCS, a majority of electronics manufacturers increased their lead time, inventory level, logistics cost and Total Landed Cost (TLC) while decreasing the quality of the goods.

Best in Class Analysis

The best practices of electronics manufacturers who decreased their TLC include establishing secondary source(s) in less risky regions/countries, using air transportation mode and having dedicated resources/team on global sourcing.

Ninety three percent of electronics manufacturers who are able to achieve LCC on-time shipments more than 75% of the time engage in planning forecasting and demand planning compared to 27% of electronics manufacturers who achieve LCC on-time shipments less than 75% of the time.[1]

Table of Contents

Background

Canadian electronics manufacturers are facing increasing pressures to reduce costs and to engage in globalization and as a result, low cost country sourcing (LCCS) is quickly emerging as a business trend in many sectors. The liberalization of trade restrictions have facilitated a surge in the number of suppliers sourcing goods from countries where labor, material, manufacturing and operating costs are significantly lower than in the more developed economies. A shift to LCCS has a great impact on supply chains globally, particularly for manufacturers and retailers who are pressing suppliers to match prices from low cost countries such as China.

LCCS and international logistics increases complexity in many aspects of the supply chain; it becomes a multi-party process fraught with greater unpredictability in quality, lead times, costs and risks.

Canadian electronics manufacturers need quality information on the best practices and future trends on LCCS in order to build more points of agility into their logistics networks.

Industry Canada has partnered with the Supply Chain & Logistics Association of Canada (SCL) Research Committee to initiate research on global sourcing as an added component of the supply chain and logistics key performance indicators (KPI) initiative.

Based on the 2007 Canadian LCCS Survey conducted by SCL, the data of this research aims to provide Canadian supply chain managers with the latest KPI, best practices and future trends on LCCS and supply chain agility. The analysis allows manufacturers to better understand the current trends and to benchmark certain KPI of LCCS within their own specific sector. This report also identifies industry perspectives, issues and drivers regarding LCCS and supply chain agility enable policy makers to more effectively develop policies that respond to current and future industry needs.

More than 400 industry contributors representing over 950 business locations, including 81 Canadian electronics supply chain players, participated in this research. The analysis includes provincial/regional, firm-size, and sector and supply chain specific representation.

Section I of this report analyzes the strategic importance and the main business drivers of LCCS. Section II then examines the origins and type of products sourced from LCCS. A summary of key performance indicators with the key results from LCCS is provided in Section III. The final section discusses the LCCS best-in-class practices.

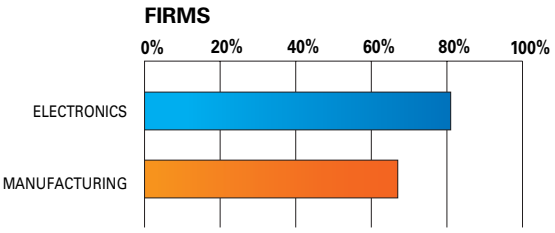
I- Strategic Importance and Business Drivers

Business Drivers

Establishing a flexible and scalable global production network with suppliers is a key element in achieving lower costs, responsiveness to market and enhanced flexibility. The process of incorporating Low Cost Country Sourcing (LCCS) goods into the supply chain is strategically important for 81% of Canadian electronics manufacturers compared to 67% for Canadian manufacturers.[1]

As the world's electronics markets continue to grow, an extensive global network of manufacturing facilities serves the outsourcing needs of both multinational and regional original equipment manufacturers (OEM). Companies are now turning to outsourcing partnerships to fill new niches and to take advantage of opportunities in the growing local markets.[2]

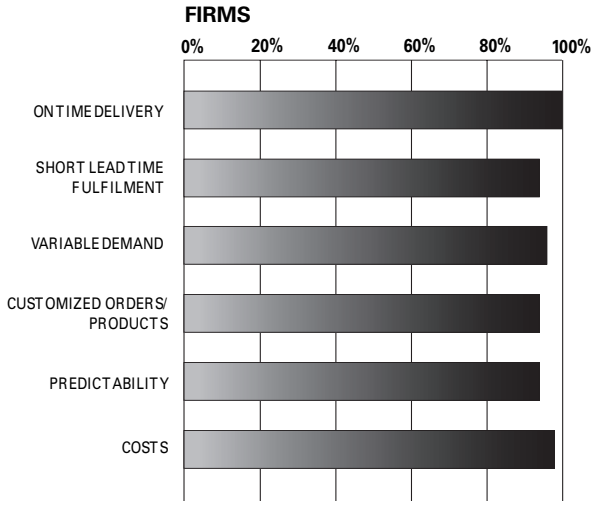
Strategic importance of LCCS



There are operational and strategic supply chain management priorities associated with global sourcing that must be met in order for Canadian electronics manufacturers to compete with low cost countries (such as China and Mexico). Supply chain agility is an operational strategy focused on improving velocity and flexibility in the supply chain; many Canadian electronics manufacturers are operating in Just-In-Time (JIT) and mass customization mode.

On-time delivery, short lead time fulfillment, predictability, variable demand, customized orders/products capability, predictability and costs are also key supply chain agility factors. All of these drivers are strategically important for more than 92% of Canadian electronics manufacturers. Canadian electronics supply chain managers are now faced with the challenges of efficiently combining low cost, global sourcing and supply chain agility at the same time.[1]

Importance of supply chain agility drivers in electronics manufacturing



The life cycle of commoditized, consumer product electronics are generally quite short as technology is continuously advancing. Therefore having LCC on-time delivery to reduce the cost of obsolesces is particularly important in this sector. As well, tightly integrated supply chains are needed for low cost strategies and inventory control and management as both are driven by the high level of competitive cost pressures in consumer electronics. [2]

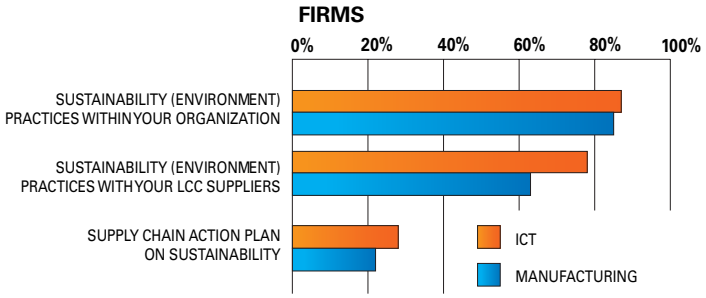
In the aerospace and defense electronics sub sector, meeting the critical delivery timelines and ensuring a high level of quality is vital. Electronic components used in this sub sector are usually manufactured in

low volume and require complex assemblies. Quality certifications and product stewardship increases the complexity of LCCS as it often requires product tracing capabilities.[2]

Electronics in pharmaceutical and medical devices must comply with federal and international medical standards and practices; therefore, some of the components may require specific local customization. In addition, predictability and short lead time fulfillment may be a main focus for this sector as medical or lab equipments may need to be tested and delivered to its customers within a certain timeframe.[2]

Industrial sustainability is another important factor for LCCS. Around 90% of Canadian electronics manufacturers rate this aspect as important for their own firms and 80% rate it as important for their LCC suppliers.[1]

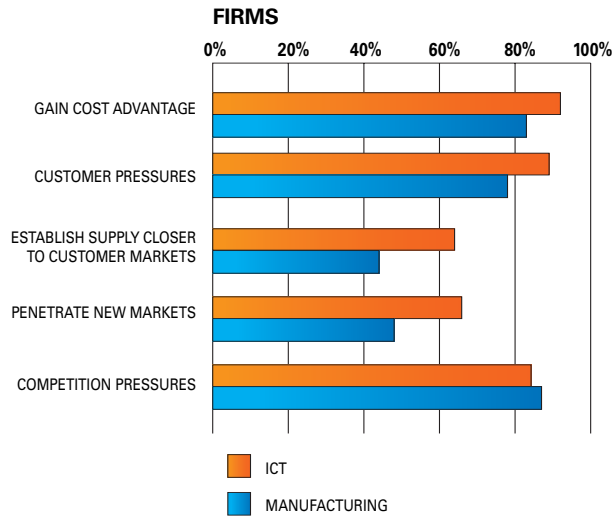
Importance of LCCS environment sustainability practices and supply chain action in the Canadian ICT sector



Environmental sustainability is of high importance as environmental directives have been adopted by the European Union (EU) as a means to contribute in the protection of human health through environmentally sound recovery and disposal of electrical and electronic equipment. Although such directives are put in place to impact the design and manufacturing of electrical and electronic products, only 28% of Canadian electronics manufacturers have in place a LCC supply chain action plan on sustainability.[2]

Gaining cost advantage (91%) and customer pressures (89%) are key LCCS drivers.[1] State-of-the-art product and process technologies can have a major impact on cost savings in the electronics sector. Because of the added pressure from global suppliers, local suppliers are more inclined to investigate or invest in new products and processes and integrative supply chain management technologies in order to compete with the LCC suppliers.[3]

Key drivers of LCCS implementation

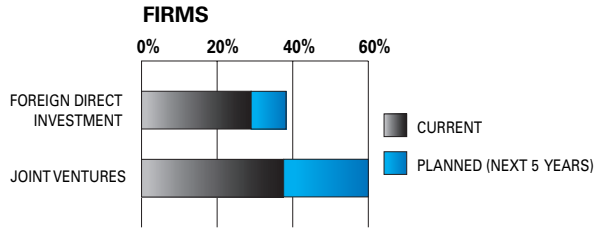


Drivers such as establishing supply closer to customer markets and penetrating new markets is of much greater importance in the electronics industry than general manufacturing.[1] There are forecasts that Chinese shoppers will generate 25% of global consumer electronics consumption by the end of this decade which are causing acceleration in the manufacturers and retailers' moves into localization in this growing market. The local focus of electronic goods is an important business strategy for firms to take advantage of the individual maturing markets as there is a strong demand for locally tailored products.[3]

Business Linkages

Of the Canadian electronics manufacturers, 91% are sourcing from traditional market transactions (import and/or export of good and services with known specifications) directly from LCC suppliers. Thirty eight percent are opting for strategic alliances / joint ventures (JV) 28% are investing in facilities located in LCCS through foreign direct investment (FDI). Sixty percent of firms plan to engage in JV in the next 5 years.[1]

LCCS business linkages



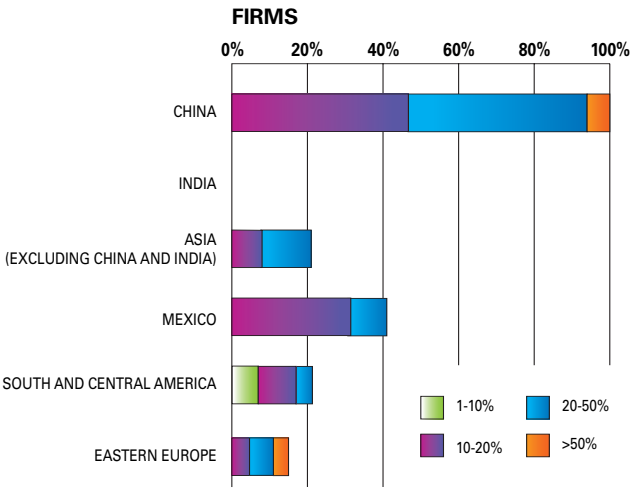
Large electronics manufacturing firms For example, are investing in industrial parks which are self-contained facilities that co-locate manufacturing and logistics operations with suppliers in low-cost regions. Such a strategy is based on the goal of minimizing logistics costs throughout the supply chain and production cycle time by co-locating a number of suppliers in one low-cost location.[2]

II- Origin and Type of Product Sourced

China is the main location of LCCS of goods as most Canadian electronics manufacturers are sourcing from that country. Taiwan, which is included in the China category, has a growing consumer market for electronic goods. Because of local content requirements and restrictions on the degree of foreign ownership, most firms in Taiwan are joint ventures. It is through the participation in these joint ventures that local firms in Taiwan were able to observe and learn new technologies and internalize new production processes to adapt to the changing electronics industry.[4]

The market for electronic components of automotive parts in China is largely driven by China's growing automotive industry as a result of a shift in the foreign vendor's production capacity as well as local vendors' fast growth. Besides the low cost factor, the just-in-time (JIT) delivery advantages are also key drivers of LCCS as the automotive sub sector boasts the highest inventory turns of all sectors.[2]

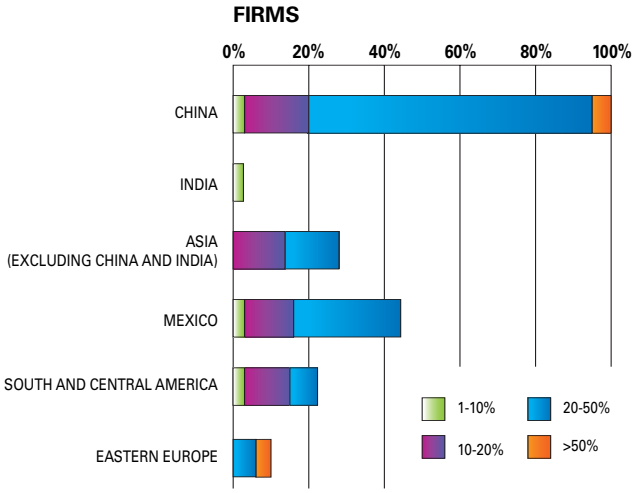
Location of LCCS electronic manufacturing (current, as % of total sourcing)



Mexico is another major LCCS location for Canadian electronics manufacturers with more than 40% of electronics manufacturers sourcing from that country.[1] Domestic sourcing remains high as there are strict local content rules and the firms in Mexico are usually small or medium-sized specialized in the production of specific parts.[4] On the other hand, India is a major player in the sourcing of the services functions but is only a marginal source of LCCS electronic goods.[1]

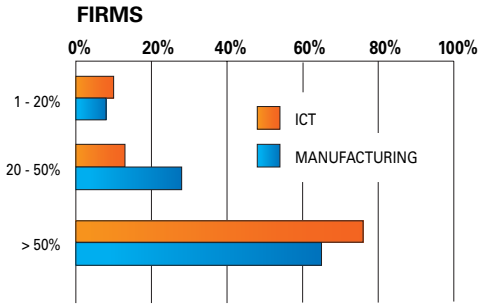
Looking ahead in the next five years, China is expected to maintain and increase its dominance as the top location of LCCS of electronics manufacturing. It is expected that China will become more integrated into the global economy and gradually adapt to international business practices and continue to draw global investors.[3] The electronics industry in Mexico is expected to expand its production capacity to adapt to the increasing customer demands of the developing automotive and aerospace sector clusters.[1]

Location of LCCS electronic manufacturing
(next 5 years, as % of total sourcing)



Canadian electronics manufacturers import products from LCC that qualify as intermediate goods (goods that would enter into the production) or as finished goods that complement their product line. Seventy six percent of Canadian electronics manufacturers source more than 50% of LCC products that qualify as intermediate goods compared to 62% in manufacturing.[1]

Product sourced that qualify as intermediate goods
(as % of total sourcing)



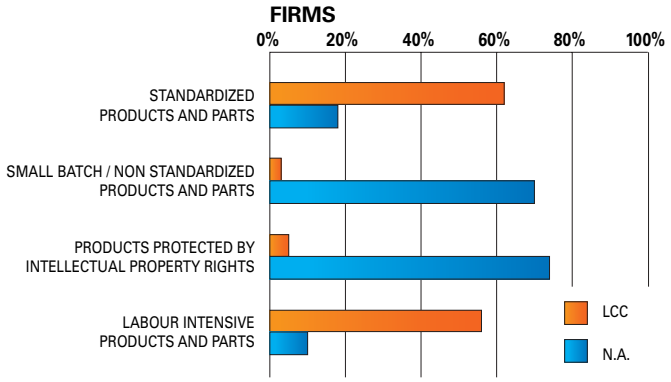
Industrial equipments and components often require specific product customization; therefore firms may choose to postpone the final product customization until further in the manufacturing process or to be completed locally.[3] There are also companies that pursue the made-to-order approach where the product is configured to the final customers' orders while reducing the inventory levels of the final goods.

The electronic products and components that have numerous demand variations should be sourced closer to the final market as it is difficult to forecast the mix of products that will be demanded. Unpredictability is an important factor because extended lead times associated with LCCS often mean increased risks and costs.

The type of product sourced from NA and LCC also differs widely. Standardized products and parts and labor intensive products and parts are the mainly sourced from LCC.[1] For example, China has a year on

year growth of 40% in electric components and in cast metal parts that require environmentally hazardous casting and a large amount of manual labour.6

Type of products sourced from N.A and LCC for electronic manufacturing



All of the operations involved in delivering customer satisfaction are driven by effectively adjusting plans to deliver low-cost, high quality products and meeting time-to-market requirements. Products protected by intellectual property and small batch/non standardized products and parts are mainly sourced from NA as it remains a challenge to protect related trade secrets and product designs in LCC. On the other hand, products with high labour content are likely to be sourced from LCC to take advantage of the lower labour rates.[1] Seventy percent of electronics manufacturers source small batch/non-standardized products and parts and 74% source products protected by intellectual property rights from NA while only a small percentage sourced these products from LCC.[1] Besides the challenges associated with protecting product designs and related trade secrets in LCC, it can also be that some of the specific components need to be manufactured close to the local market for local customization and quality control purposes.[3]

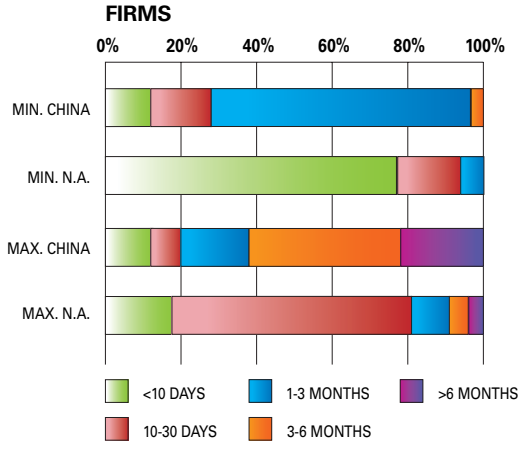
III- Key Performance Indicators (KPI)

An increasing number of Canadian electronics manufacturers are planning to integrate global production processes into their business. Due to the associated costs and risks of LCCS, KPI serves as a valuable measure in determining which activity is of strategic importance and in evaluating the performance of such specific functions.

Lead Time Variability

Lead time is defined as the amount of time between the placing of an order and the receipt of the ordered goods at the final destination. It is one of the main factors that drive inventory levels and safety stock; therefore, firms are constantly seeking ways to control and to decrease the amount of time required for order transmittal, order processing, order preparation and transportation.[4] Furthermore, long and uncertain lead times caused by LCCS can become a source of disruption for businesses. For example, when experiencing large variability in lead time, firms that choose to carry excess inventory as a way to counter and to protect themselves from uncertainty may also be increasing its inventory carrying costs.

Electonics supply chain lead time for North America and China

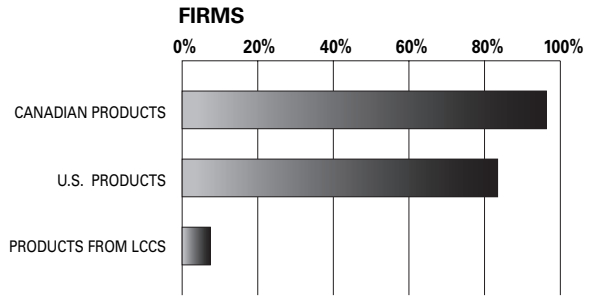


As one of the top sourcing countries for Canada, China's average lead time serves as an important comparison with that of NA's. The minimum lead time for electronics products sourced from China is approximately 3 times that of NA. In terms of lead time variability, electronics products sourced from China generally have a maximum lead time ranging from 1 to more than 6 months, while for NA sourced product, the range is generally 10 to 30 days.[1] High variability of lead time creates a high degree of unpredictability that is not desirable for the optimization of order fulfillment and for cost control purposes.

On-time Delivery

When engaged in LCCS, only 9% of the Canadian electronics manufacturers have been able to achieve greater than 90% on-time shipments for products sourced from LCC. This is a big contrast to over 94% of Canadian electronics manufacturers who achieved 90% on-time shipments for products sourced from Canada.[1]

On-time delivery of shipments for electronic manufacturing



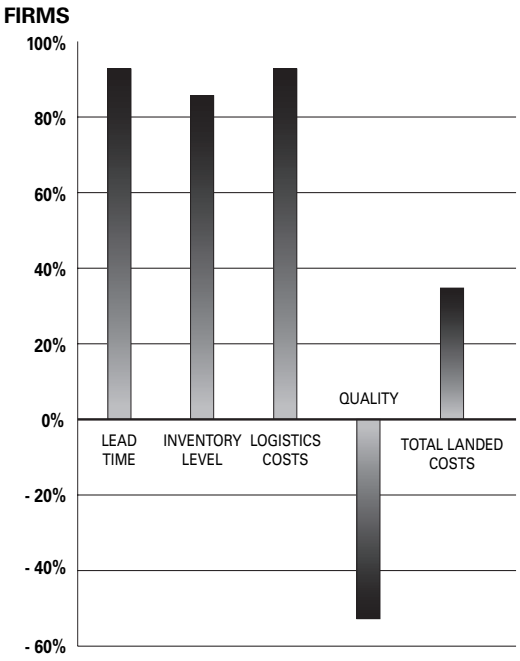
While on-time delivery of shipments allow firms to plan for production, warehousing and other scheduling of activities, the predictability also allows for firms to engage in Just-in-Time (JIT) practices. The JIT principles are based on manufacturers producing exactly what is needed at the time it is needed. As opposed to the "Just-in-Case" method, firms are able to keep their inventory levels at a minimum which in turn drives down warehousing costs and increases their supply chain agility and flexibility.[9]

The speed and flexibility with which supply chain activities can be accomplished is often measured by inventory turns (a measure of how many times per year the average inventory for a firm changes, or is sold). On-time delivery impacts the accurate measurement of the firms' inventory turn as achieving agility begins with the predictable physical flow of goods, from the point of supply to the shipment of the final destination.[9]

Performance Variation

Since initiating LCCS, a majority of Canadian electronics manufacturers substantially increased their lead time (91%), inventory level (85%), and logistics costs (91%) while decreasing their quality of goods (58%). Although 39% of electronics manufacturers have increased their TLC, it is below the overall manufacturing average of 50%.[1] In a sector that is rapidly growing and improving with technology, LCC suppliers increasingly have the ability to establish themselves as leading suppliers.

Canadian electronic manufacturing performance variation since initiating LCCS



Total landed cost is the combination of all costs associated with making and delivering cross-border shipments, including the actual costs of all the goods, transportation cost, insurance and freight, custom duties and preferential rates, taxes, tariffs and any additional charges caused by depreciation and goods becoming obsolete.[5] An important factor in the lead time fulfillment in LCCS is the management of duties and tariffs with harmonized system (HS) codes as it is very complex process with a major cost component. It is through total landed cost analysis that firms are able to identify and analyze their landed cost variance as a way to improve international competitiveness.

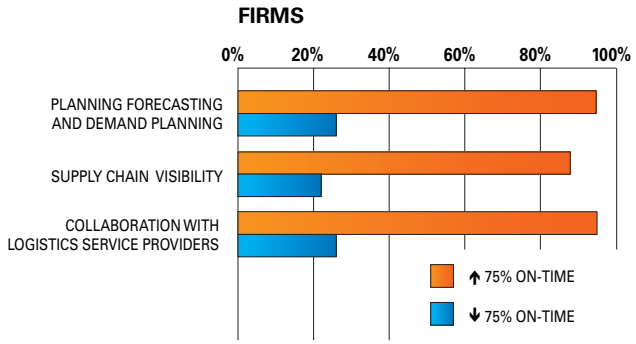
It is also important to carefully manage the financial supply chain. Payment terms, cost of capital, inflation rates, exchange rates, etc. across several different economies all have the potential to dramatically impact the TLC or the total supply chain performance.

IV- Best in Class Analysis

Due to increasing inventory costs, globalization of supply chains and challenges around satisfying dynamic customer demand in a volatile market, it is becoming more important for firms to integrate (by demand forecasting and planning with suppliers) their LCCS activities to ensure supply chain agility.

Of electronics manufacturers who are able to achieve LCC on-time shipments more than 75% of the time, 93% of them are engaged in planning forecasting and demand planning with LCCS suppliers, compared to 27% who achieve less than 75% on-time shipments.[1]

Electonic supply chain best-in-class LCCS on-time shipments



Through demand planning and forecasting with LCCS suppliers, there is better control of response time and therefore an improvement in its fulfillment performance. This planning supports the coordination of the point-of-sale, replenishment, and statistical modeling required to arrive at consensus forecasts and promotional plans, while suppliers have access to production plans and use demand and inventory signals to optimize their replenishment effort.[7]

Supply chain visibility with LCCS suppliers is another best practice used to facilitate on-time shipments.

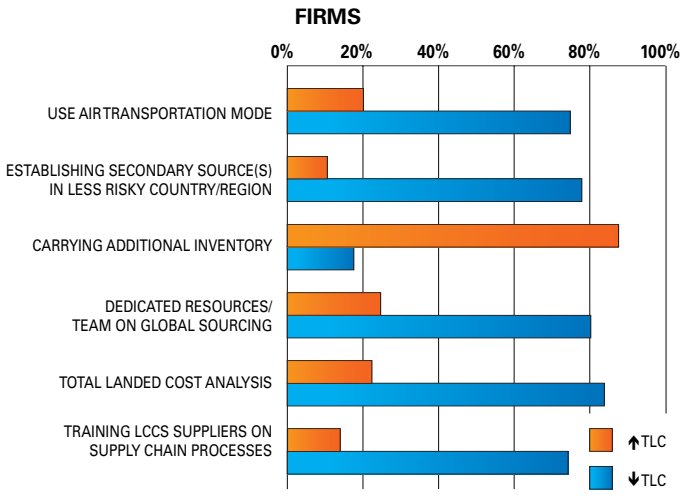
Visibility systems track the progress of the shipments through the gathering of information from multiple internal and external sources; therefore, an integrated information technology (IT) system is often required. An effective supply chain visibility program is not just for the purpose of cost and quality control but also for risk management and to ensure continuity of supply.

Pressures to improve operational performance, reduce inventory and shorten lead order cycle times drive firms to seek ways to decrease their lead time variability, actively manage shipments around bottlenecks, reroute or reallocate shipments in transit and use consolidation strategies to lower freight costs.[6] Firms that are able to implement a lean strategy rely on application and information frameworks to monitor actual customer demand and production throughput relative to each day's plan and then trigger re-planning processes as required[8]. Of electronics manufacturers who are able to achieve on-time shipments more than 75% of the time, 89% of them have a supply chain visibility system in place with LCCS suppliers while 23% who achieve less than 75% on-time have supply chain visibility with LCCS suppliers.[1]

Ninety three percent of electronics manufacturers who are able to achieve on-time shipments more than 75% of the time collaborate with their logistics provider, compared to 27% who collaborate with their logistics provider and achieve less than 75% on-time shipments.[1] This is an indication that this process of collaboration between buyers, sellers and carriers in strategic planning, forecasting and replenishment, and physical execution is of great strategic importance[9].

The best practices of Canadian electronics manufacturers who are able to decrease their TLC are similar across the various sectors. As lead time variability and on-time shipments are an area of concern for LCCS, 76% of electronics manufacturers who decreased their TLC are engaged in the practice of establishing secondary source(s) in less risky regions/countries (having a supply base in North America), compared to 11% who increased their TLC.[1]

Canadian Electonic supply chain LCCS
Total landed cost analysis



In the electronics sector where there are high value and time-sensitive components, it is important to have the capability to use air transportation mode as a method to decrease the uncertainty of LCCS. Furthermore, electronics components typically have a short lifecycle and high obsolescence costs. This form of transportation does not add the same value for all sectors of electronics; for the consumer product goods sector, it serves less significance as they deal mainly with standardized and low value per item goods.

A common practice that electronics manufacturers choose to engage in is to carry additional inventory. However, only 17% of them who decreased their TLC are carrying more inventory compared to 86% who increased their TLC.[1] This is emphasized by the fact that increasing inventory levels increases carrying costs which ultimately has a negative impact on TLC.

Regardless of the size of the manufacturers or of the different sectors, having dedicated resources/team on global sourcing is an important and consistent factor in decreasing TLC. It ensures that there is specialized focus on key issues related to global sourcing. Seventy nine percent of electronics manufacturers who are able to decrease their TLC have dedicated resources/team on global sourcing compared to 29% who increased their TLC.[1]

The top three factors associated with the best in class of on-time shipments and the ability to decrease TLC are planning forecasting and demand planning with LCCS suppliers, establishing secondary source(s) in less risky country/region; and, having dedicated resources/team on global sourcing. When electronics manufacturers are engaged in these three practices, they are likely to achieve more than 75% LCC on-time shipments as well as a decrease of their TLC.[1]

Definitions

Consumer product goods (CPG): Consumable goods such as food and beverages, footwear and apparel, tobacco, and cleaning products. In general, CPGs are things that get used up and have to be replaced frequently, in contrast to items that people usually keep for a long time, such as cars and furniture.

Foreign Direct Investment (FDI): Foreign direct investment is investment of foreign assets into domestic structures, equipment, and organizations. It does not include foreign investment into the stock markets.

Harmonized System (HS) codes: An international method of classifying products for trading purposes. This classification is used by customs officials around the world to determine the duties, taxes and regulations that apply to the product.

Inventory Turns: The cost of goods sold divided by the average level of inventory on hand. This ratio measures how many times a company`s inventory has been sold during a period of time. Operationally, inventory turns are measures as total throughput divided by average level of inventory for a given period; how many times a year the average inventory for a firm changes, or is sold.

Joint Venture (JV): A contractual agreement joining together two or more parties for the purpose of executing a particular business undertaking. All parties agree to share in the profits and losses of the enterprise.

Just-in-Time (JIT): Lean Manufacturing model developed initially by the engineer Taiichi Ohno at Toyota which consists of monitoring and controlling the production system to eliminate all sources of waste, in particular related to intermediate stocks and poor quality. Production is thus equal to demand at all stages of the process.

Key Performance Indicators (KPI): A measure which is of strategic importance to a company or department. For example, a supply chain flexibility metric is Supplier-On-time Delivery Performance which indicates the percentage of orders that are fulfilled on or before the original requested date.

Lead Time: Quantitative indicator measuring the time difference between stimulus and response. This indicator can be applied to different levels of the logistics process, for example to measure the actual time taken between the placing of an order and the delivery of a product.

Low cost country sourcing (LCCS): Relocation of upstream parts of the value chain to regions with comparatively lower price levels.

Original Equipment Manufacturer (OEM): A producer that provides a product to its customers, who proceed to modify or bundle it before distributing it to their customers.

Total Landed Cost (TLC): All costs associated with making and delivering cross-border shipments, including actual costs of all the goods, inventory carrying cost, product quality cost, transportation cost, insurance and freight, custom duties and preferential rates, taxes, tariffs and additional charges.

Vendor Managed Inventory (VMI): A process in which a supplier generates orders for its distributor based on demand information sent by the distributor. But increasingly, Vendor Managed Inventory is providing the benefits of smoother demand, increased sales, lower inventories and reduced costs to other industries.

References

[1] Canadian Low Cost Country Sourcing Survey, Supply Chain and Logistics Association, 2007

[2] Flextronics .com, 2007

[3] Logistics Perspectives on Low Cost Country Sourcing, January 2007

[4] Foreign Investment and Global Geography of Production: Mexican Consumer Electronics Industry, 1999

[5] Aberdeen Access, Global Logistics Costing Helps Shippers Steer Profitable Course, April 2003

[6] Aberdeen Access, You Can't Plan What You Can't See, November 2002

[7] Aberdeen Access, The Supply Chain Visibility Roadmap, November 2006

[8] Aberdeen Access, Manufacturing Planning Accuracy Bolstered by Multiple Players, October 2005

[9] Accenture, Supply Chain Integration: Are Logistics Service Providers Getting it Right?

[10] Industry Canada, Logistics and SCM KPI Analysis, November 2006