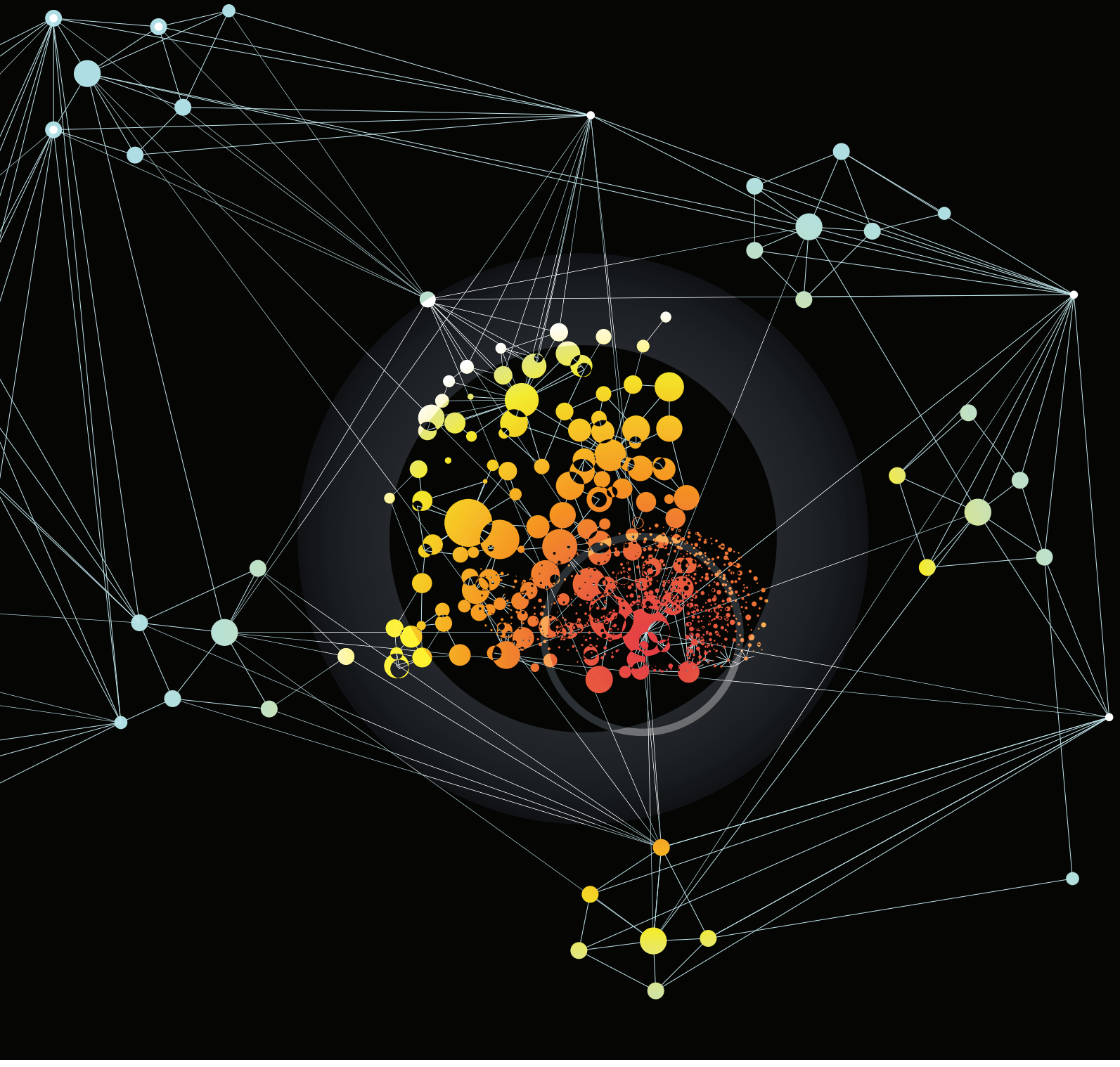
STATE OF LOGISTICS:
THE CANADIAN REPORT 2008



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

Canadian Manufacturers & Exporters
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Industry Canada Industrie Canada
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THE CANADIAN REPORT 2008

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State of Logistics: The Canadian Report 2008

Executive Summary

In today's complex business environment, the extent to which firms are integrated into global value chains and the efficiency and effectiveness of their product distribution and associated services are key determinants of competitiveness. In this context, Supply Chain & Logistics Association Canada (*SCL*) and Canadian Manufacturers and Exporters (CME) partnered with Industry Canada to review this important service business function. By drawing on industry-based intelligence, existing government statistics and on Industry Canada-based economic models and analysis, this industry-government partnership has resulted in the first assessment of the state of Canada's logistics and supply chain environment. This novel analysis is intended to help Canadian supply chain managers and decision-makers understand current and future trends, their competitive position in relation to leading firms within their own sector, and the steps that can be taken to become more competitive.

Logistics / SCM Costs and Global Sourcing

Synchronizing the distribution of goods with supply chain partners around the globe has made logistics and supply chain management (SCM) extremely complex and a strategic issue for decision makers. From 2005 to 2007, total logistics and SCM costs increased by 3% for the Canadian economy. Of the three main distribution sub-sectors, logistics costs increased by close to 22% in retail, while manufacturers and wholesalers kept their cost increases within a 1% range.[1] Most of the logistics costs increase in retail was attributed to inventory carrying costs (an increase of more than 35% in inventory levels) related to the shift of sourcing from North America to low-cost countries such as China.[2]

By 2011, the container volume from China to Canada is expected to grow by an additional 57%. A 35% increase in volume from Canada to China is also expected.[9] The increased inventory levels in sectors such as retail, combined with the need to enhance supply chain agility in sectors such as manufacturing, generated more than 60% growth in investment in new distribution facilities in Canada since 2001.[4] In addition to inventory management and global sourcing, energy costs, logistics outsourcing, skills shortages, and technology are the key competitiveness factors for logistics and SCM in Canada.[2]

Energy Costs

Since 2004, energy costs have increasingly become a major cost driver in Canada's total SCM and logistics cost structure for most sectors.[15] Energy costs in truck transportation increased from 21% of gross domestic product (GDP) in 2003 to close to 29% in 2007. Marine and rail transportation were also highly affected by the surge in diesel prices. Energy costs became the second highest operating expense, trailing only labour costs in all transportation-related activities.[1] Consequently, rising energy cost may result in a shift in transportation modes as well as sourcing location.[18]

Logistics / SCM Outsourcing

Compared to Canada, logistics and SCM outsourced activities were 52% higher for U.S. manufacturers, 53% higher for U.S. wholesalers and 54% higher for U.S. retailers, in 2007.[1] In Canada, the logistics service industry had a GDP growth rate of 47% since 1998.[4] Logistics service providers GDP is expected to increase by an additional 40% between 2007 and 2015, reaching 56 billion CAD.[6]

Skills Shortages

Based on current sector employment levels, the total estimated annual demand for employees to fill new logistics and SCM jobs, as well as anticipated vacancies resulting from retirements and turnover, is approximately 86,330 employees annually, or 12.3% over the next three to five years.[13] British Columbia and Alberta were the two provinces that had the highest growth rate in the logistics-trucking workforce, while the Atlantic provinces experienced negative growth during the 2001-2007 period.[14]

Logistics and SCM Technology

In order to respond to the challenges posed by supply chain drivers, Canadian firms are revamping and reprioritizing their SCM technology footprint.[2] In the coming years, SCM innovation by retailers, wholesalers, and manufacturers is expected to be focused on the adoption of internet-based systems for inventory management and organizing delivery to customers and from suppliers.[17]

Final Remarks

In order to benefit from the productivity gains arising through the use of logistics and SCM, individual firms need to develop their own action plans. This exercise can include documenting long-term perspectives and classifying their components into specific action items linked to deliverables, performance indicators, objectives, return on investment, and project time frames.

For some firms, a first roadmap action item could be an internal evaluation of their logistics key performance indicators (KPI) with some participation in associations and networking activities. For others, it could be implementing a pilot project with a customer and a supplier. Examples include radio frequency identification (RFID), green supply-chain management, and just-in-time (JIT) processes. In all cases, a well-documented roadmap allows firms to gain the support of all stakeholders and their involvement in the implementation phases of the firm's logistics and SCM action plan.

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Background

As competition becomes more globally intensive, innovation is moving from a firm level to a supply-chain perspective. Competitive advantages are now being realized when all supply chain players are synchronized and working together.

Canadian manufacturers, retailers, wholesalers, and logistics service providers can benefit from quality and timely information on logistics, SCM trends, and performance indicators. This strategic information can be used to identify best practices, develop benchmarks, justify investments and innovation decisions, monitor industry performance, and become more competitive in global value-chains.

In this context, Supply Chain & Logistics Association Canada (SCL) and Canadian Manufacturers and Exporters (CME) partnered with Industry Canada to undertake the first Canadian State of Logistics Report.

Section I of this report examines the cost trends of Canadian logistics and supply chain management (SCM) and reviews Canadian inventory management practices, the logistics industry, as well as port activities that support these specific functions.

Section II provides an overview and analysis of the drivers that affect the Canadian logistics and SCM world. Key drivers include the impact of global commerce, security within supply chains, increasing energy costs, sustainable development practices, and technology.

Finally, Annexes I-III contain Canada and US supply chain management costs, Canadian sub-sectors' logistics costs, and Canadian supply chain agility performance indicators.

Approach and methodology

This report is based on a collaborative undertaking between SCL's research committee, CME, and Industry Canada's Service Industries and Consumer Products Branch. Together, they identified industry needs and trends in supply chain management. Using industry generated intelligence, and applying unique economic models developed in-house, Industry Canada provided the overall analysis bringing together all components to produce a first state of logistics report for Canada.

Industry Canada economic models used for the analysis draw upon Statistics Canada data from the Census, Labour Force Survey (LFS), GDP and Input-Output tables. For the U.S., Input-Output tables, Census and Bureau of Economic Analysis data were used.

1- The Canadian Logistics Business System

1.1 - Logistics and Supply Chain Management Costs

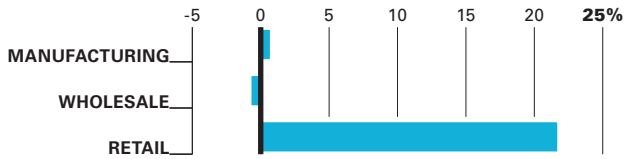
Supply chain management (SCM) encompasses the planning and management of all activities involved in sourcing, procurement, and logistics management. It also includes coordination and collaboration activities with channel partners, which can be suppliers, intermediaries, third-party service providers, or customers. In essence, SCM integrates supply and demand management within and across companies.

Logistics management is the part of SCM that plans, implements, and controls the product and information flow between the point of origin and the point of consumption in order to meet customer requirements.

From 2005 to 2007, total logistics and SCM costs for the Canadian economy increased by 3%. Of the three main distribution sub-sectors, logistics costs increased by close to 22% in retail, while manufacturers and wholesalers kept their cost within a ±1% range (Figure 1).[1] Most of the logistics cost increase in retail was attributed to inventory carrying costs (a rise of more than 35% in inventory levels). The increased use of low-cost country sourcing and the unpredictability/ variability of that specific supply chain for Canadian retailers resulted in a sharp increase in their inventory levels and transportation costs.[2] Compared to the U.S., total SCM and logistics costs were 12% higher for Canadian manufacturers, 18% higher for Canadian wholesalers and 30% higher for Canadian retailers in 2007.[1]

Figure 1

2005-2007 LOGISTICS AND SCM COST GROWTH[1]



Logistics and SCM costs

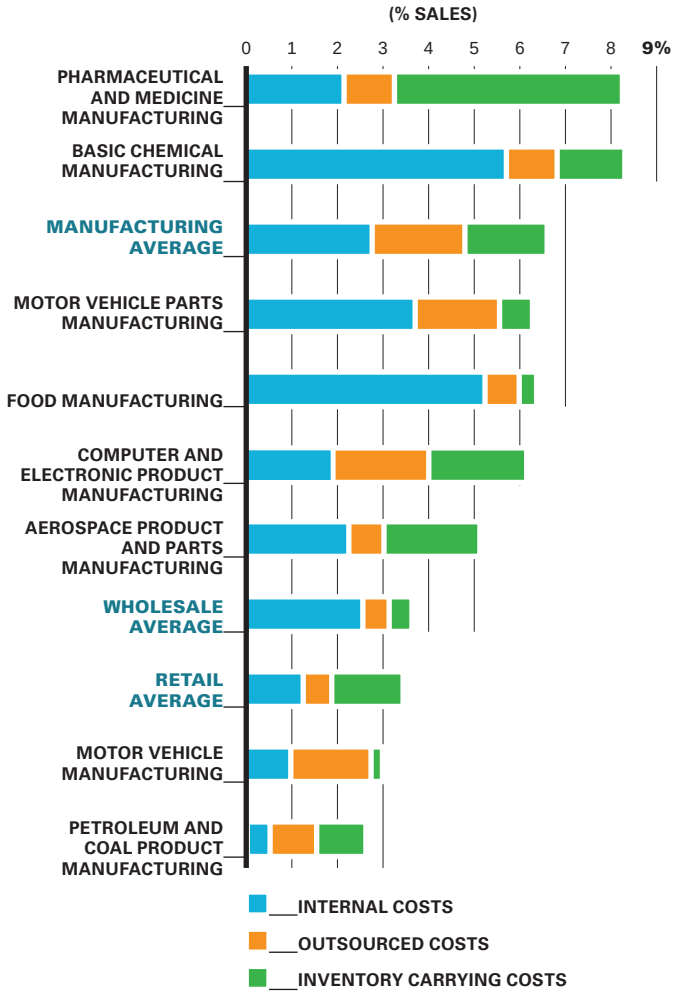
Logistics and SCM costs can be separated into three main categories: those occurring internally within firms, those through outsourcing to logistics service providers, and those through inventory carrying costs. Internal SCM and logistics costs encompass all logistics activities that occur within a firm, excluding all outsourced logistics activities and all production processes. Outsourcing costs encompass activities assigned to a logistics service provider.

Inventory carrying costs consist of opportunity costs (costs of holding inventory), shrinkage (costs associated with breakage, pilferage and deterioration of inventories), total obsolescence of inbound goods and finished goods inventory, and channel obsolescence (all material that goes obsolete while in a distribution channel).[3]

When observing different sectors within Canada, it is notable that inventory carrying costs constituted the highest total SCM and logistics cost for retailers; whereas for manufacturers, internal costs were the highest (Figure 2). The differences in the total SCM and logistics cost breakdowns are explained by the different business models. For example, manufacturers often sell their goods in the form of Delivered Duty Paid (DDP), where the cost of transportation to the final customer is already included in the price of the good.[2] Canadian manufacturing was the sector with the highest logistics and SCM costs, at 6.5% of sales in 2007. Close behind were wholesalers and retailers, each at close to 3.5% of sales.[1]

Figure 2

2007 KEY SECTOR TOTAL SCM AND LOGISTICS COSTS BREAKDOWN[1]



There is a wide range of cost variability within sub-sectors in manufacturing. The highest percentage of total SCM and logistics costs in 2007 was in the pharmaceutical and medicine sector, followed by the motor vehicle body and trailer sector. The petroleum and coal products sector had the lowest percentage of total SCM and logistics costs of all the key sub-sectors. Most logistics and SCM activity in the petroleum and coal supply chains occurred with supply chain partners, such as basic chemical manufacturers, which had 213% more logistics and SCM costs.[1]

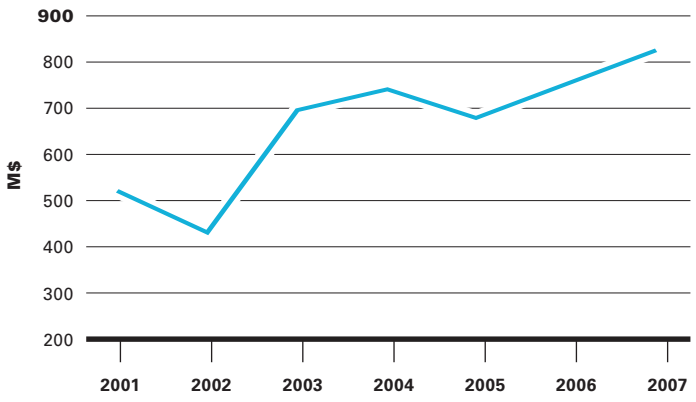
In sub-sectors where there are low inventory turns, such as pharmaceutical and medicine manufacturing, SCM and logistics costs were mainly attributable to inventory carrying costs. For most of the key sub-sectors, internal costs made up the largest portion of the firm's total SCM and logistics costs, with the highest percentage in the electrical equipment and food manufacturing sub-sectors.[2]

1.2 - Inventory Management

Investment in new distribution facilities in Canada increased by more than 60% from 2001-2007 (Figure 3).[4] This coincides with the rising complexity of inventory management with supply chain partners from around the globe. Over the 2001-2007 period, Canadian organizations outsourced and off-shored some of their production and services to low-cost countries. At the same time, global customers drove product demand and service levels by simultaneously requesting complex customized products and lower prices, thereby creating price/margin pressures.

Figure 3

INVESTMENT IN DISTRIBUTION FACILITIES IN CANADA[4]



In order to respond to these challenges, firms are making strategic investments in advanced deconsolidation facilities. In these facilities, large shipments (e.g. railcar lots) are broken down into smaller lots for ease of delivery, as well as into consolidation arrangements, where a variety of smaller shipments are combined into one larger shipment for economy of transport. Firms are also adopting complex cross-docking practices to load materials from incoming semi-trailer trucks or rail cars to outbound trailers or rail cars, with little or no storage in between. This may be done to change the type of conveyance, sort materials intended for different destinations, or combine material from different points of origin.[2]

In terms of inventory management performance, inventory turns (IT) is the main KPI used by the industry. Operationally, total IT is measured as total output divided by the average level of inventory for a given period. In other words, IT show how many times a year that the average inventory for a firm changes or is sold.[5]

Manufacturers, retailers, and wholesalers have adopted different inventory management strategies. Manufacturers are moving towards mass customization, focusing on supply chain agility and just-in-time delivery, while wholesalers and retailers are focusing more on sourcing from low-cost countries.

Mass Customization

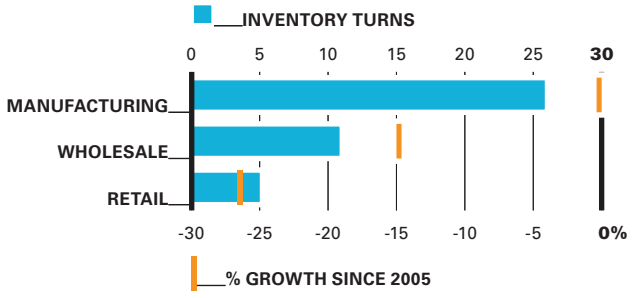
Mass customization is a system that combines the low unit costs of mass production processes with the flexibility of individual customization. Firms applying this method of manufacturing may also utilize a different system for dealing with their inbound goods. Depending on various factors and supply chain capabilities, it may result in significant performance variations.[2]

For these reasons, Canadian manufacturers' finished goods IT remained unchanged from 2005 to 2007. Concurrently, wholesalers' and retailers' finished goods IT decreased by 15% and 27% respectively over the same time frame (Figure 4). It is also noteworthy that manufacturers' IT were 2.6 times higher than wholesalers and 5.2 times higher than retailers in 2007.[1]

When compared with the U.S., Canada had supply chain agility gaps in manufacturing inbound goods IT (24%), wholesale IT (10%), and retail IT (29%) in 2007. Canada showed only a slight advantage in the manufacturing finished goods IT at 3%.[1]

Figure 4

2007 CANADA FINISHED GOODS INVENTORY ANALYSIS[1]



While having high IT ratios can appear to be a good thing at first glance, it is important to understand that it could also lead to a retailer displaying empty store shelves. Without appropriate planning and the help of processes and technologies such as supply chain synchronization systems, a retailer focusing solely on increasing IT will often face challenges with its in-stock position.

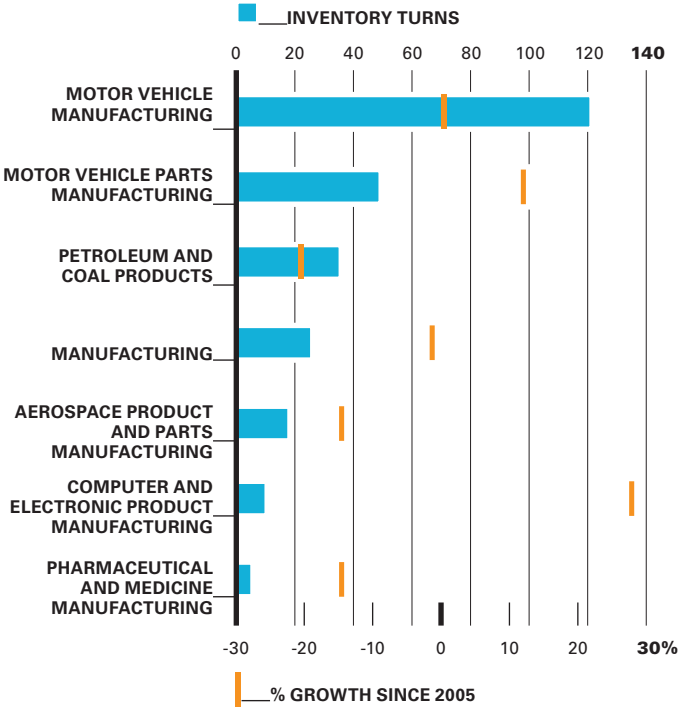
In manufacturing, it is also important to distinguish between inbound goods ratios (the inventory of products coming from suppliers), finished goods ratios (the inventory of products ready to be shipped), and unfilled orders ratios (the inventory of products that meet the criteria of the order, but have not been executed by the receiver).

Inbound goods can be sourced domestically or from foreign countries. Sourcing from foreign countries is more complex and often includes low-cost countries.

While the motor vehicle manufacturing sub-sector had the highest IT ratio of inbound goods in 2007, the computer and electronic product manufacturing sub-sector saw the highest growth rate since 2005 (Figure 5). The small growth in motor vehicle manufacturing may be due to the fact that this sector embraced JIT processes before most sectors.[5]

Figure 5

2007 CANADIAN INVENTORY TURNS (INBOUND) ANALYSIS[1]



Other sectors such as petroleum and coal products saw a decline of more than 20% in their inbound IT.[1] The increased complexity of sourcing inbound goods, combined with a scarcity in human resources in those sectors, may explain some of that decline.[2]

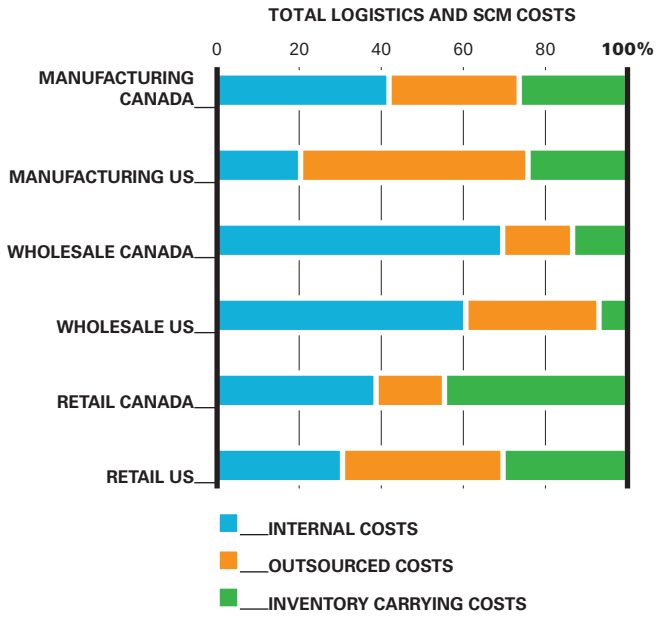
1.3 - The Logistics Service Industry

1.3.1 - Outsourcing Trends

The percentage of outsourcing costs in a firm's total SCM and logistics costs structure varies across different sectors depending on the business model that each operates under. The differences in Canadian and U.S. business models are reflected in the SCM and logistics costs breakdowns. Compared to Canada, outsourced activities were 52% higher for U.S. manufacturers, 53% higher for U.S. wholesalers, and 54% higher for U.S. retailers, in 2007 (Figure 6).[1]

Figure 6

2007 CANADIAN AND US SCM AND LOGISTICS COSTS BUSINESS MODEL[1]



1.3.2 - Canadian Logistics Service Providers

Logistics and SCM outsourcing is provided by the Canadian logistics service industry, which had an overall GDP growth rate of 47% since 1998[4]. The Canadian logistics service sector can be divided into three sub-sectors:

- Asset-Based Transportation Services
- Asset-Based Non-Transportation Services
- Non-Asset-Based Logistics Services

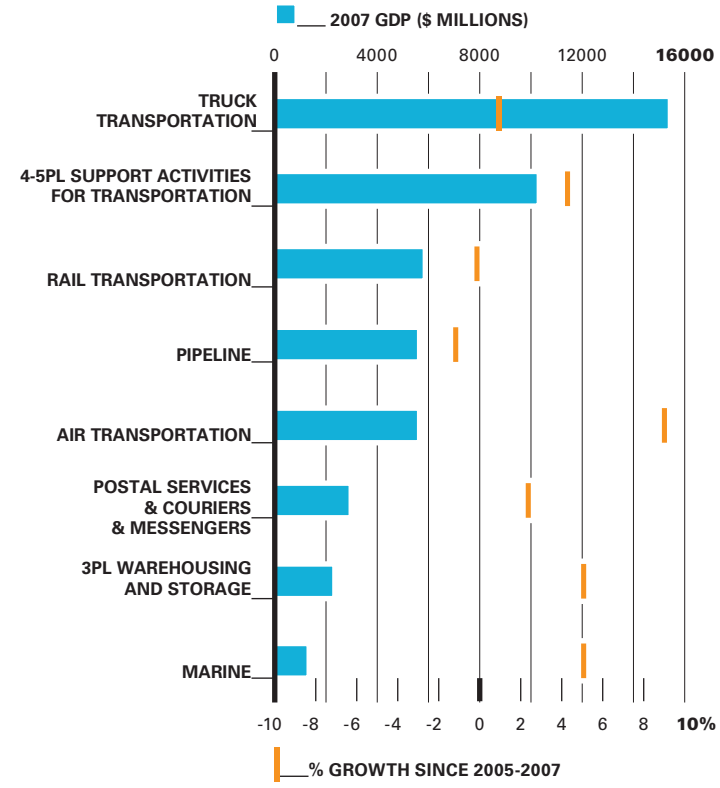
The asset-based transportation services sub-sector is made up of transportation service providers focusing on the

transport of goods only. This includes trucking, rail, and marine transportation. Trucking was the principal sub-sector, accounting for over $14 billion of GDP in 2007, with over 72,000 service providers in Canada.[4]

The asset-based non-transportation services sub-sector consists of third party logistics (3PL) service providers (storage and warehousing) that carry out physical logistics operations and manage systems to track shipments on behalf of the customer. This sector grew by more than 4% between 2005 and 2007 (Figure 7).[4] Value-added 3PL companies provide additional services including managing complex operational handling (co-manufacturing and co-packing/labelling), managing administrative operations (billing and ordering), managing information management systems (tracking and tracing), custom broker services, international freight forwarding, and providing logistics and SCM consulting services.

Figure 7

GDP OF CANADIAN LOGISTICS SERVICE SECTORS[6]



The non-asset based logistics services companies (support activities) are characterized by the near absence of their own physical logistics facilities. Companies integrate the services of different subcontracting companies (transport, storage, operations, etc) and then proceed to coordinate and control them through the management of the associated information flows.

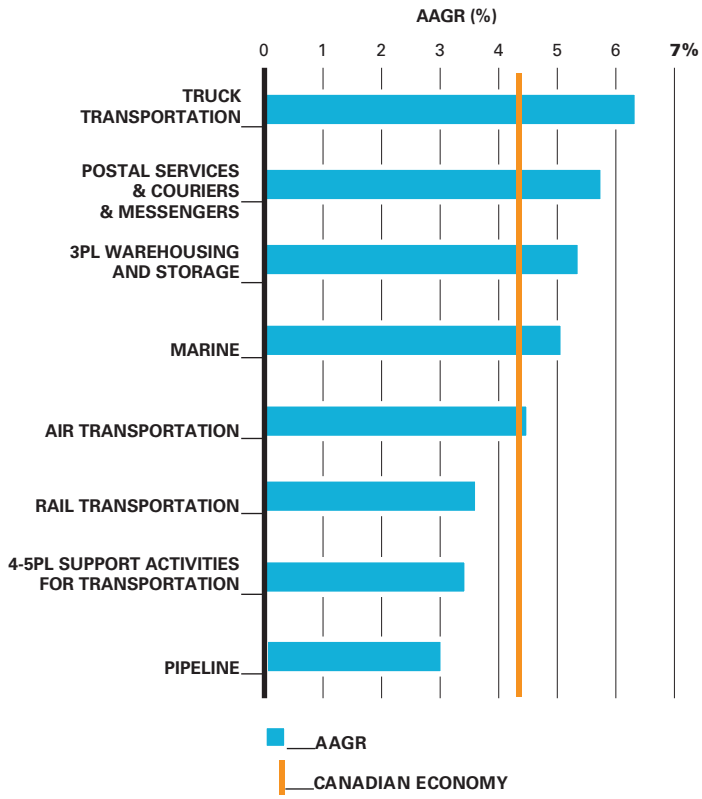
Players in this sub-sector include firms offering services in 4PL (virtual 3PL), management consulting in supply chain and logistics, fleet management, supply chain and logistics information systems, shipment consolidation, carrier selection and logistics procurement services, rate negotiation, inventory management applications, distribution control, freight forwarding and customs clearance, and brokerage.

The 5PL is an emerging sub-sector which include logistics service providers who plan, organize, and implement logistics solutions on behalf of a contracting party (mainly information systems) by exploiting the appropriate technologies (conceptual level).[2] The 4-5PL sub-sectors contributed more than $10 billion to the Canadian economy and grew by more than 4% between 2005 and 2007.[4]

Logistics service providers GDP is expected to increase by an additional 40% between 2007 and 2015, reaching 56 billion CAD. The highest growth is forecasted to be in trucking, followed by the 3PL warehousing and storage sub-sector. The pipeline industry is expected to have the lowest growth during this period (Figure 8).[6]

Figure 8

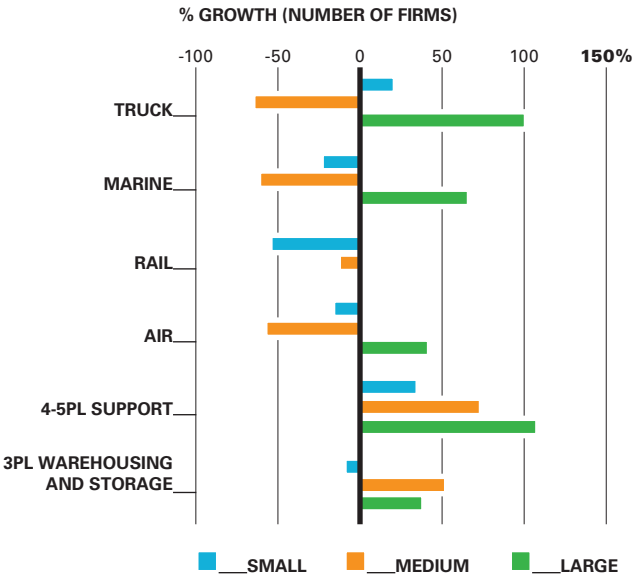
CANADIAN LOGISTICS INDUSTRY 2007 - 2015 ANNUAL AVERAGE GROWTH RATE (AAGR)[6]



Consolidations, mergers, and acquisitions have been extremely common in the Canadian logistics and SCM sector in the last few years. Although small firms (defined as those with less than $25M in revenue) accounted for most of the service providers in the various sub-sectors, large firms (those with at least $250M in revenue) have generally seen the highest percentage growth since 1998. The number of large firms in the trucking sub-sector grew by more than five times that of small firms, while the number of mid-sized firms (those with $25M to 250M in revenue) decreased by 60% from 1998 to 2007 (Figure 9). Other asset-based transportation services, with the exception of rail, also experienced the greatest growth in large firms and a major decrease in mid-sized firms.[7]

Figure 9

GROWTH OF NUMBER OF CANADIAN LOGISTICS SERVICE PROVIDERS 1998-2007[7]



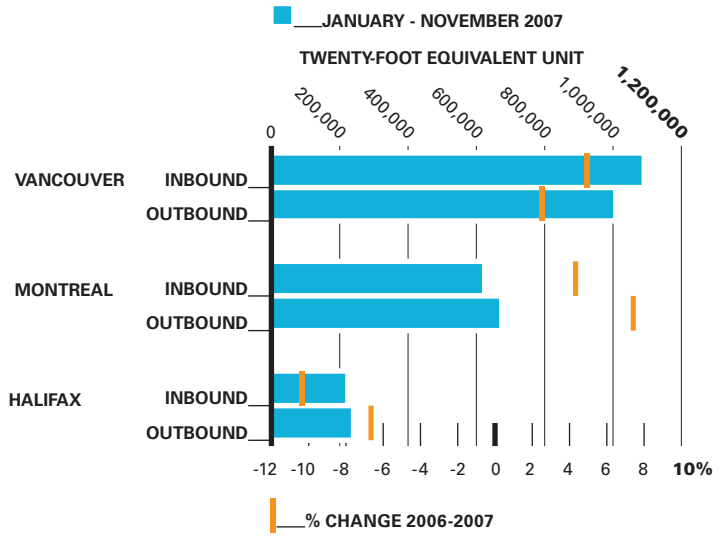
Since 1998, the 4-5PL support activities sub-sector grew substantially (33% for small firms, 67% for mid-sized firms and 103% for large firms). This can be partly attributed to the emerging market for value-added consulting services that is being addressed through the provision of global solutions to new customers. Mid-sized firms in the 3PL market also expanded by 50%, while a 35% expansion was observed in the same period for large firms.[7]

1.3.3 - Canadian Ports Activity

In 2007, the most important port for inbound and outbound container volume was in Vancouver, with a growth rate of 5.2% for inbound and 3% for outbound in 2006-2007 (Figure 10).[8]

Figure 10

INBOUND/OUTBOUND - CUMULATIVE CONTAINERIZED TRAFFIC PER PORT[8]



The Port of Montreal was the second largest in volume with a growth rate of 4.6% for inbound and 7.7% for outbound in 2006-2007. The Port of Halifax was the smallest in terms of container volume and the only one that had a negative growth rate of 10.4% for inbound and 6.3% for outbound, in 2006-2007.[8]

The arrival of the first container ship on October 31, 2007 at the recently-completed Prince Rupert Container Terminal, marked the opening of a new Asia-North America express trade corridor. The weekly service moved 16,703 Twenty-Foot Equivalent Units (TEU) through the facility for the two months of operation in 2007. Capacity was initially 500,000 TEU and is expected to reach 4 million TEU by 2015.[8]

2 - Business Drivers

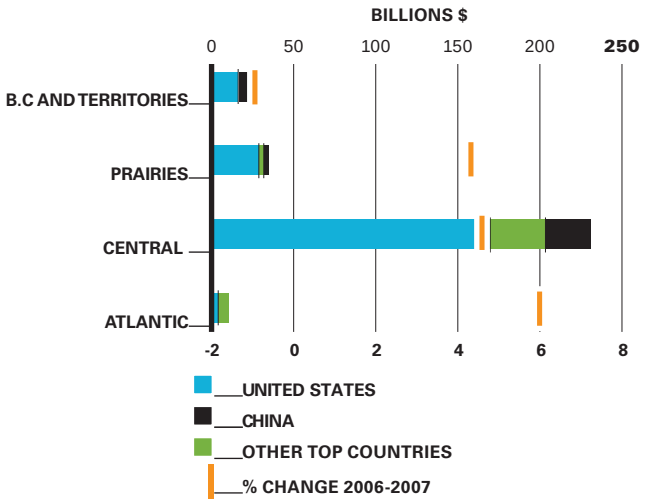
2.1 - Global Commerce

Global sourcing and integrated global value chains have made supply chain management extremely complex in the past few years. In 2007, Canadian goods exports amounted to $450.3 billion while Canadian goods imports totalled $406.7 billion.

Looking at trade from a regional perspective, most imports in 2007 went to Central Canada (Ontario and Quebec). While the U.S. was still dominant in most regions, with the exception of the Atlantic provinces, China continued to increase its market share rapidly in Central Canada and British Columbia.

Figure 11

VALUE OF REGIONAL IMPORTS FROM TOP 5 COUNTRIES 2007 JAN - 2007 DEC[10]

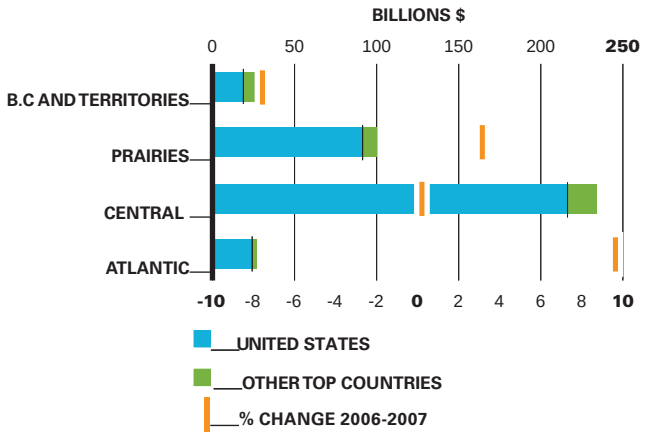


Between 2006 and 2007, the Atlantic Provinces had the highest import growth, with a rate of 5.6%, followed by Central Canada (4.4%), the Prairies (4.25%), and British Columbia and the Territories (-1%) (Figure 11).[10]

Although Central Canada was the dominant exporter in 2007, the Prairies also performed strongly (Figure 12). The type of export goods also varied widely by region (Central Canada focusing on automotive, the Prairies on oil and gas products). Between 2006 and 2007, the Atlantic Provinces also had the highest export growth, with a rate of 9.7%, followed by the Prairies (3.4%), Central Canada (0.2%), and British Columbia and the Territories (-8%).[10]

Figure 12

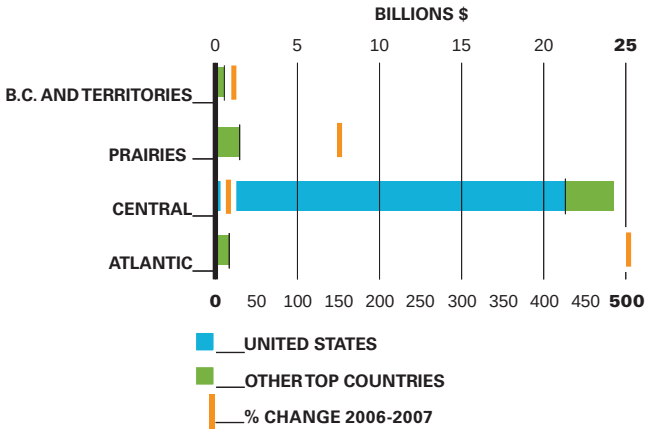
VALUE OF REGIONAL EXPORTS TO TOP 5 COUNTRIES 2007 JAN - 2007 DEC.[10]



The final category of trade practices is re-exports, defined as the export of goods that have entered the country and are leaving in the same condition as when they were first imported. In 2007, most re-exports transited through Central Canada to the U.S. (Figure 13).[10]

Figure 13

VALUE OF REGIONAL RE-EXPORTS TO TOP 5 COUNTRIES 2007 JAN - 2007 DEC.[10]

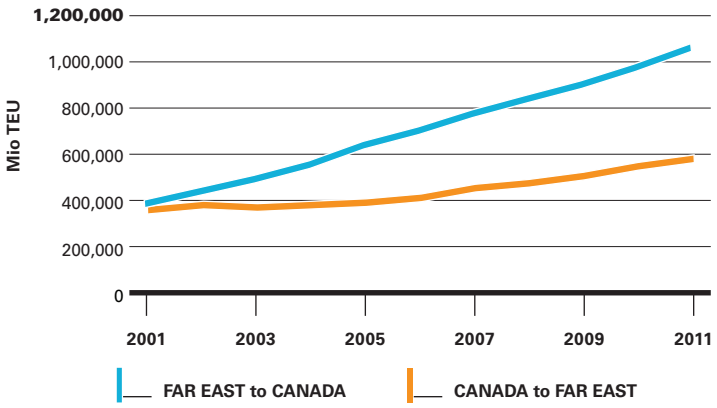


Most re-exported products consist of industrial goods such as machinery and electronics/telecommunications equipment. Re-exporting was the trade activity experiencing the highest growth in all the regions of Canada. Between 2006 and 2007, growth in Atlantic Canada was over 500%; the Prairies, 148%; British Columbia and the Territories, 17%; and Central Canada, 9%.[10]

From 2002 to 2007, container volume from the Far East (including China) to Canada increased by 130% (Figure 14). Inbound volume to Canada from countries such as China was 2.15 times greater than outbound volume in 2007. By 2011, volume from China to Canada is expected to grow by an additional 57%. In the same period, Canada is expected to increase its volume to China by 35%.[9]

Figure 14

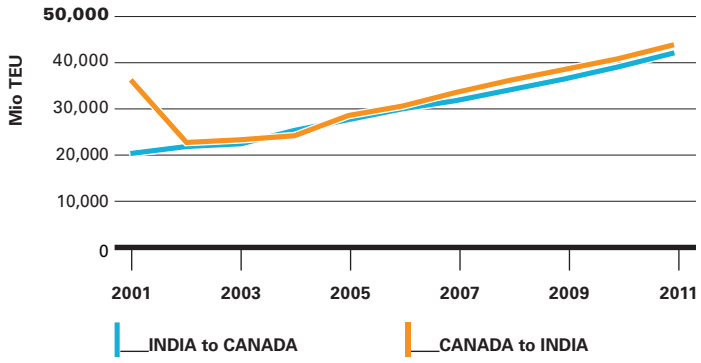
FAR EAST– CANADA CONTAINER VOLUMES IN MILLION TEU[9]



India is also a growing market in terms of inbound and outbound container volume. From 2007 to 2011, inbound container volume from India is expected to grow by 62% while the outbound growth rate is expected to be 52% (Figure 15). It is important to note that China's inbound and outbound container volumes to Canada are forecasted to be close to 10 times greater than the Canada–India volume by 2011.[9]

Figure 15

INDIA - CANADA CONTAINER VOLUMES IN MILLION TEU[9]



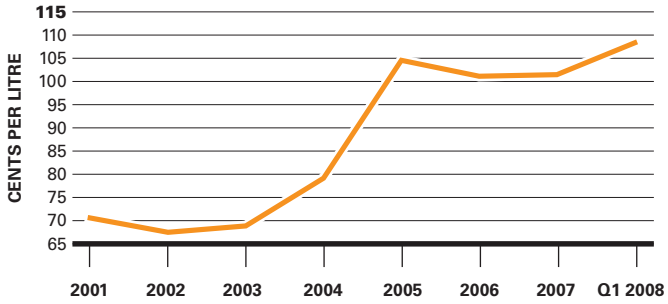
2.2 - Energy Costs

Since 2004, energy costs have increasingly become a major cost driver in Canada's total SCM and logistics costs structure in most sectors. An upward trend in diesel costs not only has a large impact for firms that manage their logistics in-house through the use of private fleets, but it also drives up costs for firms that outsource their logistics activities. To deal with a higher cost structure, the logistics service providers often choose to pass on a portion of this cost increase to their customers, commonly in the form of fuel surcharges.[2]

Overall, the annual average price of diesel in Canada was relatively unchanged from 2001 to 2003 (Figure 16). However, a rapid rise in the average price of diesel took place in 2004, driven mainly by the aftermath of the hurricane season that year and geopolitical uncertainties in crude oil markets.[2]

Figure 16

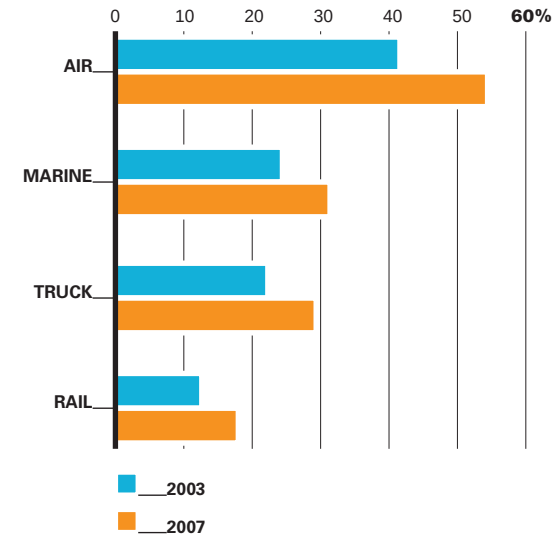
AVERAGE ANNUAL DIESEL RETAIL PRICES IN CANADA[15]



Energy costs in truck transportation went from 21% of GDP in 2003 to close to 29% in 2007 (Figure 17). Air and marine transportation were also highly affected by the surge in diesel prices. Energy costs became the second highest operating expense, trailing only labour costs.[1] Consequently, rising energy cost may result in a shift in transportation modes as well as sourcing location.[18]

Figure 17

ENERGY COST AS PERCENTAGE OF LOGISTICS SERVICE SECTORS GDP[1]



2.3 - Security

As business activities become more global and trade continues to flow between countries, it becomes more important to develop measures that protect countries and facilitate trade. Recently, Canadians have read or heard about incidents such as the global withdrawal of some non-steroidal anti-inflammatories (cox-2s), high levels of lead found in imported children's toys, and food recalls that crossed national borders. These events, changing consumer expectations, new technologies, and the increasing complexity of global supply chains are major drivers behind governmental initiatives to modernize regulatory and security tools.

Overall, the global trade environment is increasingly complex and the number of products and producers is vast and growing. Globalization of trade flows has resulted in expanded supply chains, often crossing multiple borders. As a result, many products manufactured in one country are made from parts and ingredients that have been produced elsewhere – and many products used by Canadians are imported. The volume

of imports has increased substantially in the past ten years, with products coming from a wide variety of countries, not all of which have similar safety standards. At the same time, in today's environment of global supply chains, it is often difficult to differentiate between imported and domestic products.

Legislation introduced in the Thirty-Ninth Parliament proposed to enhance the government's ability to act quickly to protect the public when a problem occurs. Provisions included the authority to require the removal of unsafe consumer and health products from store shelves and the enhanced capacity to oversee food product recalls. Fines and penalties are also proposed to increase deterrence and reflect current economic realities. Finally, there is increasing consumer demand for broader, more accessible, consumer-friendly, and credible product information.

In a North American context, Canadian companies shipping to and/or importing from the U.S. may also need to enhance their security programs to meet the requirements of the Free and Secure Trade (FAST) and Customs-Trade Partnership Against Terrorism (C-TPAT) programs. FAST is a joint Canada–United States initiative involving the Canada Border Services Agency and U.S. Customs and Border Protection. C-TPAT is a U.S. program similar to the Canadian program. Although FAST and C-TPAT are voluntary programs, some business opportunities are being limited to firms that are certified with FAST or C-TPAT.

These programs support moving pre-approved eligible goods across the border quickly and verifying trade compliance away from the border. It is a commercial process offered to pre-approved importers, carriers, and registered drivers. Shipments for approved companies, transported by approved carriers using registered drivers, will be cleared into either country with greater speed and certainty and at a reduced cost of compliance.

These supply chain security programs, which are based on sound risk management techniques, focus on greater speed and certainty at the border and on decreasing the cost of compliance through a number of means: reducing the information requirements for customs/border clearance, eliminating the need for importers to transmit data for each transaction, dedicating lanes for clearances, reducing the rate of border examinations, verifying trade compliance away from the border, and streamlining accounting and payment processes for all goods imported by approved importers (in Canada only).[12]

2.4 - Skills Shortages

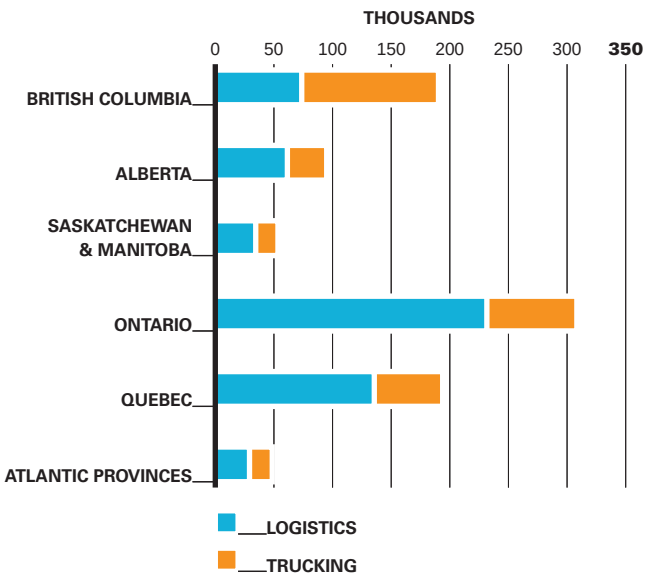
Overall, the Canadian logistics and SCM workforce in all sectors of the economy is expected to grow annually by approximately 1.7% as a result of new job creation over the coming years. Additional supply chain sector employees will also be required to fill existing positions that are predicted to become vacant as a result of retirements and turnover.[13]

Considering the current sector population and its demographics, the total annual demand for employees to fill new logistics and SCM jobs, as well as anticipated vacancies is estimated at approximately 86,330 employees annually, or 12.3% over the next three to five years.[13]

In 2007, there were 590,000 logisticians and more than 239,000 truck drivers in Canada. When looking at provincial logistics and SCM workforces, Quebec and Ontario had the most logisticians and truck drivers. These two provinces accounted for more than 60% of the total Canadian logistics workforce (Figure 18).[14]

Figure 18

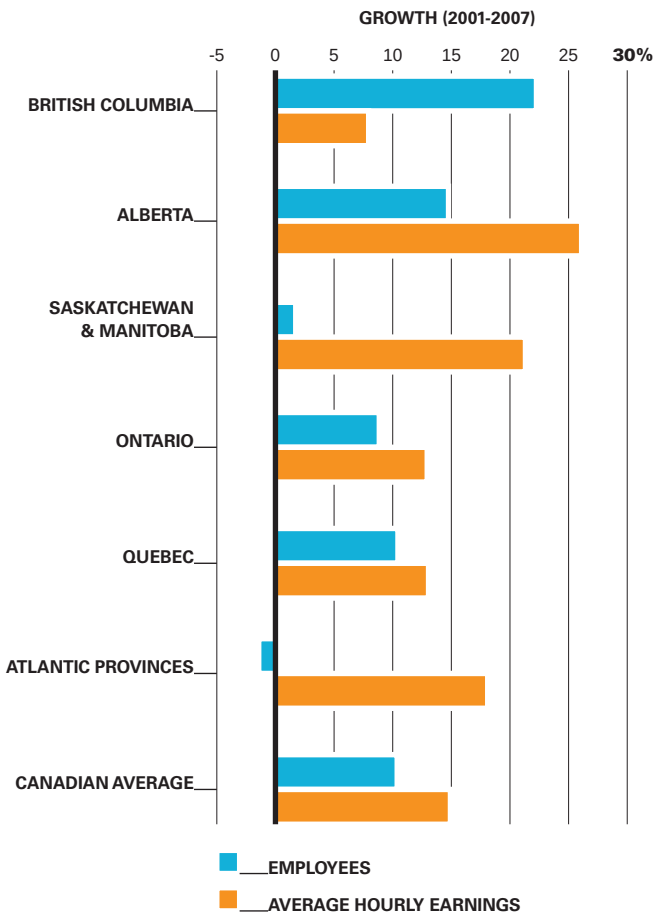
2007 CANADIAN LOGISTICS AND TRUCKING EMPLOYEES[14]



British Columbia and Alberta are the two provinces that had the highest growth rate in the logistics workforce, while the Atlantic Provinces experienced negative growth during the 2001-2007 period (Figure 19).[14]

Figure 19

LOGISTICS WORKFORCE AND AVERAGE HOURLY EARNINGS GROWTH[14]



Average hourly earnings of logistics employees also varied widely by region. Alberta had the highest rate in 2007 at $19.49/hour, while the Atlantic Provinces were at $14.78/hour. In terms of salary growth from 2001 to 2007, Alberta had the highest average wage increase while British Columbia was at the low end.[14]

2.5-Sustainable Development

With the combined impact of increased energy costs and the emergence of concerns about global warming, many Canadian firms are introducing a supply chain sustainability scorecard as part of company-wide environmental programs. Drivers of "green" supply chain initiatives in organizations include risk mitigation, regulatory compliance, cost savings, productivity improvement, increased revenue, good corporate citizenship, better relationships with suppliers, pressures from customers and consumers, process innovation, and product differentiation.

New measures introduced by firms are intended to spur collaboration among suppliers, target corporations' measures, and reduce the environmental footprint of their product shipping process. Part of the process may include an assessment of the company's providers based on sustainable business practices.

Leading Canadian firms intend to assess their performance based on criteria such as:

- Use of environmentally friendly energy sources
- Reduction of harmful air emissions
- Water conservation or processing
- Waste reduction
- Product or packaging recycling
- Ecosystem and land or ocean biodiversity preservation/ natural resource conservation
- Reduced packaging/increased use of biodegradable packaging
- Green procurement practices (e.g., selecting suppliers based on their sustainability practices)[2]

2.6 - Technology

In order to respond to the challenges posed by supply chain drivers, Canadian firms are revamping and reprioritizing their SCM technology footprints. In the coming years, SCM innovation by retailers, wholesalers, and manufacturers is expected to be focused on the adoption of internet-based systems for inventory management and organizing delivery to customers and from suppliers.[17]

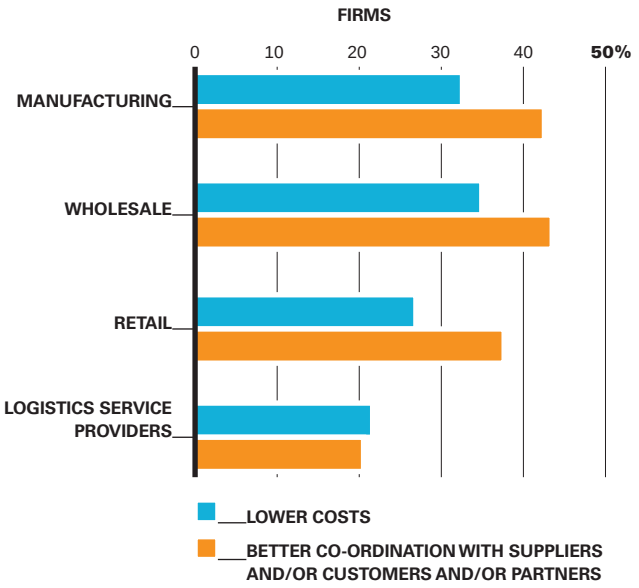
Supply chain innovations and drivers vary widely by sector. Pharmaceutical and chemical manufacturers are pushing for item-level traceability and supply chain visibility in order to better respond to governmental requirements such as anti-terrorism acts and food and drug regulations, as well as corporate responsibility issues such as product recall and public safety. The aerospace sector mainly emphasizes total supply chain quality ratios such as Six Sigma processes and other quality standards such as ISO standards, with less emphasis on costs. Retailers focus on reducing out of stocks and increasing visibility with their suppliers from low-cost countries. Transportation service providers also have a different focus on reducing operational costs and maximizing energy consumption with the aim of minimizing their environmental footprint.[16]

In terms of the perceived benefits of conducting business over the internet, Canadian manufacturers, wholesalers, and retailers prioritized better co-ordination with suppliers and/or customers,

over lowering costs. It is also important to note that these three sectors perceived more benefits from these practices both in terms of costs and co-ordination than do logistics service providers (Figure 20).[17]

Figure 20

PERCEIVED BENEFITS OF CONDUCTING BUSINESS OVER THE INTERNET [17]



3 - Final Remarks

In order to benefit from the productivity of logistics and SCM, individual firms must develop their own action plans. The final step in a business case is to make recommendations and develop a roadmap for implementing the proposed action plan. The roadmap exercise consists of documenting the long-term vision and classifying its components into specific action items linked to deliverables, performance indicators, objectives, return on investment, and project time frame.

For some firms, a first roadmap action item could be an internal evaluation of their logistics KPI with some participation in associations and networking activities. For others, it could be implementing a pilot project with a customer and a supplier. Examples include RFID, green supply-chain management, and JiT. In all cases, a well-documented roadmap allows firms to gain the support of all stakeholders and their involvement in the implementation phases of the firm's logistics and SCM action plan.

Annex I- Canada and US Supply Chain Management Costs

	CANADA				US			
(% of sales)	Internal Costs	Outsourced Costs	Inventory Carrying Costs	Total Logistics & SCM Costs	Internal Costs	Outsourced Costs	Inventory Carrying Costs	Total Logistics & SCM Costs
Total Manufacturing	2.68%	2.10%	1.71%	6.49%	1.20%	3.20%	1.37%	5.77%
Total Wholesale	2.45%	0.59%	0.50%	3.54%	1.90%	0.90%	0.20%	3.00%
Total Retail	1.22%	0.65%	1.50%	3.37%	0.80%	1.00%	0.80%	2.60%

Annex II- Canadian Manufacturing Subsectors' Logistics Costs

Canadian Manufacturing Subsectors

(% of sales)	Internal Costs	Outsourced Costs	Inventory Carrying Costs	Total Logistics Costs
Animal food manufacturing	3.56%	6.64%	1.31%	11.51%
Sugar and confectionery product manufacturing	2.45%	2.16%	1.79%	6.40%
Fruit and vegetable preserving and specialty food manufacturing	3.34%	1.09%	2.71%	7.14%
Dairy product manufacturing	3.26%	3.50%	1.31%	8.07%
Meat product manufacturing	2.18%	1.19%	0.93%	4.31%
Seafood product preparation and packaging	3.48%	2.02%	2.26%	7.76%
All other food manufacturing	5.16%	0.69%	0.37%	6.22%
Tobacco manufacturing	5.19%	1.04%	6.41%	12.63%
Clothing manufacturing	2.30%	0.17%	3.72%	6.20%
Wood product manufacturing	4.92%	0.22%	3.15%	8.29%
Pulp, paper and paperboard mills	3.19%	5.24%	1.99%	10.42%
Converted paper product manufacturing	4.03%	0.67%	1.75%	6.45%
Printing and related support activities	3.10%	3.19%	0.77%	7.06%

Canadian Manufacturing Subsectors (cont'd)

(% of sales)	Internal Costs	Outsourced Costs	Inventory Carrying Costs	Total Logistics Costs
Basic chemical manufacturing	5.55%	1.10%	1.49%	8.14%
Resin, synthetic rubber, and artificial and synthetic fibres and filaments manufacturing	0.62%	1.86%	1.07%	3.55%
Pesticide, fertilizer and other agricultural chemical manufacturing	0.12%	18.67%	8.43%	27.21%
Pharmaceutical and medicine manufacturing	2.12%	1.06%	5.00%	8.18%
Other chemical product manufacturing	3.12%	2.76%	4.03%	9.91%
Petroleum and coal products	0.5%	1%	1.1%	2.60%
Plastic product manufacturing	3.51%	0.41%	2.22%	6.14%
Rubber product manufacturing	3.87%	0.55%	1.28%	5.71%
Cement and concrete product manufacturing	0.12%	1.16%	1.60%	2.88%
Other non-metallic mineral product manufacturing	6.17%	3.59%	2.52%	12.28%
Primary metal manufacturing	1.00%	0.90%	1.98%	3.88%
Fabricated metal product manufacturing	3.24%	0.19%	1.95%	5.39%
Machinery manufacturing	2.25%	0.08%	2.29%	4.61%
Computer and peripheral equipment manufacturing	1.89%	2.32%	1.87%	6.08%
Household appliance manufacturing	0.03%	1.39%	2.13%	3.55%
Electrical equipment manufacturing	7.62%	0.46%	3.52%	11.61%
Motor vehicle manufacturing	0.98%	1.69%	0.26%	2.93%

Canadian Manufacturing Subsectors (cont'd)

(% of sales)	Internal Costs	Outsourced Costs	Inventory Carrying Costs	Total Logistics Costs
Motor vehicle body and trailer manufacturing	2.82%	1.84%	2.14%	6.80%
Motor vehicle parts manufacturing	3.66%	1.84%	0.74%	6.25%
Aerospace product and parts manufacturing	2.17%	0.78%	2.09%	5.04%
Railroad rolling stock manufacturing	2.65%	0.85%	0.63%	4.12%
Ship and boat building	4.37%	1.41%	0.73%	6.51%
Other transportation equipment manufacturing	1.19%	1.23%	1.94%	4.36%
Furniture and related product manufacturing	4.40%	0.11%	1.76%	6.27%

Annex III - Canadian Supply Chain Agility Performance Indicators

2007 Supply Chain Agility Performance Indicators

Inbound Goods 2007 Inventory Turns
Finished Goods 2007 Inventory Turns
(Numbers between brackets represent North American Industry Classification System codes for Canada)

Manufacturing [31-33]	23	27
Non-durable goods industries	26	24
Food manufacturing [311]	34	24
Animal food manufacturing [3111]	19	61
Animal food manufacturing [31111]	19	61
Grain and oilseed milling [3112]	18	21
Flour milling and malt manufacturing [31121]	11	20
Starch and vegetable fat and oil manufacturing [31122]	23	28
Breakfast cereal manufacturing [31123]	18	12
Sugar and confectionery product manufacturing [3113]	25	20
Sugar manufacturing [31131]	33	60
Chocolate and confectionery manufacturing from cacao beans [31132]	16	20
Confectionery manufacturing from purchased chocolate [31133]	21	9
Non-chocolate confectionery manufacturing [31134]	36	22
Fruit and vegetable preserving and specialty food manufacturing [3114]	22	11
Dairy product manufacturing [3115]	51	21
Meat product manufacturing [3116]	82	31
Animal slaughtering and processing [31161]	82	31
Animal (except poultry) slaughtering [311611]	157	40
Rendering and meat processing from carcasses [311614]	30	30
Poultry processing [311615]	178	22

Seafood product preparation and packaging [3117]	35	12
Bakeries and tortilla manufacturing [3118]	39	50
Bread and bakery product manufacturing [31181]	53	72
Cookie, cracker and pasta manufacturing [31182]	24	29
Cookie and cracker manufacturing [311821]	17	34
Flour mixes and dough manufacturing from purchased flour [311822]	28	24
Dry pasta manufacturing [311823]	35	31
Tortilla manufacturing [31183]	N/A	N/A
Other food manufacturing [3119]	23	31
Snack food manufacturing [31191]	48	36
Coffee and tea manufacturing [31192]	12	117
Flavouring syrup and concentrate manufacturing [31193]	6	N/A
Seasoning and dressing manufacturing [31194]	15	N/A
All other food manufacturing [31199]	39	29
Beverage and tobacco product manufacturing [312]	25	13
Beverage manufacturing [3121]	31	18
Soft drink and ice manufacturing [31211]	38	28
Breweries [31212]	59	35
Wineries [31213]	6	4
Distilleries [31214]	30	9
Tobacco manufacturing [3122]	10	4
Textile mills [313]	17	13
Fibre, yarn and thread mills [3131]	15	9
Fabric mills [3132]	18	13
Broad-woven fabric mills [31321]	34	12
Narrow fabric mills and Schiffli machine embroidery [31322]	12	11
Nonwoven fabric mills [31323]	10	19
Knit fabric mills [31324]	11	11
Textile and fabric finishing and fabric coating [3133]	17	23
Textile and fabric finishing [31331]	20	29
Fabric coating [31332]	13	16
Textile product mills [314]	14	17
Textile furnishings mills [3141]	12	13
Carpet and rug mills [31411]	15	12
Curtain and linen mills [31412]	9	15
Other textile product mills [3149]	16	24
Textile bag and canvas mills [31491]	14	27
All other textile product mills [31499]	18	23
Clothing manufacturing [315]	17	8
Clothing knitting mills [3151]	12	4
Hosiery and sock mills [31511]	13	4
Other clothing knitting mills [31519]	11	4
Cut and sew clothing manufacturing [3152]	18	9
Cut and sew clothing contracting [31521]	19	24
Men's and boys' cut and sew clothing manufacturing [31522]	16	9
Men's and boys' cut and sew underwear and nightwear manufacturing [315221]	110	N/A
Men's and boys' cut and sew suit, coat and overcoat manufacturing [315222]	18	12
Men's and boys' cut and sew shirt manufacturing [315226]	18	15

Men's and boys' cut and sew trouser, slack and jean manufacturing [315227]	14	9
Other men's and boys' cut and sew clothing manufacturing [315229]	13	5
Women's and girls' cut and sew clothing manufacturing [31523]	23	8
Women's and girls' cut and sew lingerie, loungewear and nightwear manufacturing [315231]	22	8
Women's and girls' cut and sew dress manufacturing [315233]	41	13
Women's and girls' cut and sew suit, coat, tailored jacket and skirt manufacturing [315234]	12	9
Other women's and girls' cut and sew clothing manufacturing [315239]	19	5
Other cut and sew clothing manufacturing [31529]	10	10
Clothing accessories and other clothing manufacturing [3159]	10	10
Leather and allied product manufacturing [316]	10	9
Leather and hide tanning and finishing [3161]	9	27
Footwear manufacturing [3162]	11	6
Other leather and allied product manufacturing [3169]	9	17
Paper manufacturing [322]	21	22
Pulp, paper and paperboard mills [3221]	20	22
Pulp mills [32211]	15	17
Paper mills [32212]	22	26
Paper (except newsprint) mills [322121]	26	34
Newsprint mills [322122]	20	21
Paperboard mills [32213]	29	20
Converted paper product manufacturing [3222]	23	23
Paperboard container manufacturing [32221]	25	27
Corrugated and solid fibre box manufacturing [322211]	25	46
Folding paperboard box manufacturing [322212]	31	15
Other paperboard container manufacturing [322219]	15	15
Paper bag and coated and treated paper manufacturing [32222]	18	26
Stationery product manufacturing [32223]	22	18
Other converted paper product manufacturing [32229]	29	15
Sanitary paper product manufacturing [322291]	35	15
All other converted paper product manufacturing [322299]	19	16
Printing and related support activities [323]	43	92
Printing and related support activities [3231]	43	92
Printing [32311]	43	85
Commercial screen printing [323113]	201	N/A
Quick printing [323114]	32	4057
Digital printing [323115]	55	N/A
Manifold business forms printing [323116]	51	28
Other printing [323119]	41	113
Support activities for printing [32312]	37	N/A
Petroleum and coal products manufacturing [324]	37	39
Petroleum and coal products manufacturing [3241]	37	39
Petroleum refineries [32411]	41	41
Asphalt paving, roofing and saturated materials manufacturing [32412]	13	13

Other petroleum and coal products manufacturing [32419]	13	30
Chemical manufacturing [325]	19	20
Basic chemical manufacturing [3251]	27	29
Petrochemical manufacturing [32511]	31	48
Industrial gas manufacturing [32512]	199	135
Synthetic dye and pigment manufacturing [32513] 0]	11	9
Other basic inorganic chemical manufacturing [32518]	21	22
Other basic organic chemical manufacturing [32519]	22	15
Resin, synthetic rubber, and artificial and synthetic fibres and filaments manufacturing [3252]	74	31
Resin and synthetic rubber manufacturing [32521]	82	34
Artificial and synthetic fibres and filaments manufacturing [32522]	29	13
Pesticide, fertilizer and other agricultural chemical manufacturing [3253]	34	21
Fertilizer manufacturing [32531]	29	22
Pesticide and other agricultural chemical manufacturing [32532]	74	18
Pharmaceutical and medicine manufacturing [3254]	6	10
Paint, coating and adhesive manufacturing [3255]	12	16
Paint and coating manufacturing [32551]	10	17
Adhesive manufacturing [32552]	19	14
Soap, cleaning compound and toilet preparation manufacturing [3256]	11	16
Soap and cleaning compound manufacturing [32561]	14	18
Toilet preparation manufacturing [32562]	9	14
Other chemical product manufacturing [3259]	23	21
Printing ink manufacturing [32591]	14	22
Explosives manufacturing [32592]	22	27
All other chemical product manufacturing [32599]	25	21
Plastics and rubber products manufacturing [326]	22	22
Plastic product manufacturing [3261]	21	19
Plastics packaging materials and unlaminated film and sheet manufacturing [32611]	21	20
Plastics pipe, pipe fitting, and unlaminated profile shape manufacturing [32612]	26	9
Laminated plastics plate, sheet (except packaging), and shape manufacturing [32613]	21	29
Polystyrene foam product manufacturing [32614]	10	18
Urethane and other foam product (except polystyrene) manufacturing [32615]	20	160
Plastic bottle manufacturing [32616]	16	29
Other plastic product manufacturing [32619]	21	22
Plastic plumbing fixture manufacturing [326191]	22	26
Motor vehicle plastic parts manufacturing [326193]	31	75
All other plastic product manufacturing [326198]	18	16
Rubber product manufacturing [3262]	28	37
Tire manufacturing [32621]	38	77
Rubber and plastic hose and belting manufacturing [32622]	30	30
Other rubber product manufacturing [32629]	22	28
Durable goods industries	21	30

Wood product manufacturing [321]	10	14
Sawmills and wood preservation [3211]	8	10
Sawmills and wood preservation [32111]	8	10
Sawmills (except shingle and shake mills) [321111]	8	10
Shingle and shake mills [321112]	21	8
Wood preservation [321114]	16	9
Veneer, plywood and engineered wood product manufacturing [3212]	14	21
Veneer, plywood and engineered wood product manufacturing [32121]	14	21
Hardwood veneer and plywood mills [321211]	12	8
Softwood veneer and plywood mills [321212]	20	31
Structural wood product manufacturing [321215]	18	21
Particle board and fibreboard mills [321216]	31	22
Waferboard mills [321217]	7	35
Other wood product manufacturing [3219]	13	21
Millwork [32191]	14	17
Wood window and door manufacturing [321911]	15	36
Other millwork [321919]	13	13
Wood container and pallet manufacturing [32192]	13	56
All other wood product manufacturing [32199]	12	30
Non-metallic mineral product manufacturing [327]	19	17
Clay product and refractory manufacturing [3271]	11	6
Glass and glass product manufacturing [3272]	23	13
Glass and glass product manufacturing [32721]	23	13
Glass manufacturing [327214]	29	7
Glass product manufacturing from purchased glass [327215]	20	35
Cement and concrete product manufacturing [3273]	22	19
Cement manufacturing [32731]	12	23
Ready-mix concrete manufacturing [32732]	26	85
Concrete pipe, brick and block manufacturing [32733]	28	4
Other concrete product manufacturing [32739]	43	16
Lime and gypsum product manufacturing [3274]	16	39
Other non-metallic mineral product manufacturing [3279]	13	16
Abrasive product manufacturing [32791]	9	14
All other non-metallic mineral product manufacturing [32799]	14	17
Primary metal manufacturing [331]	23	21
Iron and steel mills and ferro-alloy manufacturing [3311]	14	17
Iron and steel mills and ferro-alloy manufacturing [33111]	14	17
Steel product manufacturing from purchased steel [3312]	14	8
Iron and steel pipes and tubes manufacturing from purchased steel [33121]	17	8
Rolling and drawing of purchased steel [33122]	9	13
Cold-rolled steel shape manufacturing [331221]	9	10
Steel wire drawing [331222]	8	14
Alumina and aluminum production and processing [3313]	20	66
Alumina and aluminum production and processing [33131]	20	66

Primary production of alumina and aluminum [331313]	15	82
Aluminum rolling, drawing, extruding and alloying [331317]	48	47
Non-ferrous metal (except aluminum) production and processing [3314]	51	23
Non-ferrous metal (except aluminum) smelting and refining [33141]	51	22
Copper rolling, drawing, extruding and alloying [33142]	98	41
Non-ferrous metal (except copper and aluminum) rolling, drawing, extruding and alloying [33149]	26	17
Foundries [3315]	31	32
Ferrous metal foundries [33151]	24	23
Iron foundries [331511]	27	17
Steel foundries [331514]	19	103
Non-ferrous metal foundries [33152]	37	42
Fabricated metal product manufacturing [332]	17	27
Forging and stamping [3321]	17	49
Forging and stamping [33211]	17	49
Cutlery and hand tool manufacturing [3322]	24	15
Architectural and structural metals manufacturing [3323]	12	34
Plate work and fabricated structural product manufacturing [33231]	14	49
Prefabricated metal building and component manufacturing [332311]	9	54
Concrete reinforcing bar manufacturing [332314]	4	37
Other plate work and fabricated structural product manufacturing [332319]	16	49
Ornamental and architectural metal products manufacturing [33232]]	10	23
Metal window and door manufacturing [332321]	11	24
Other ornamental and architectural metal products manufacturing [332329]	9	23
Boiler, tank and shipping container manufacturing [3324]	21	22
Power boiler and heat exchanger manufacturing [33241]	47	83
Metal tank (heavy gauge) manufacturing [33242]	12	20
Metal can, box and other metal container (light gauge) manufacturing [33243]	24	14
Hardware manufacturing [3325]	24	42
Spring and wire product manufacturing [3326]	19	17
Machine shops, turned product, and screw, nut and bolt manufacturing [3327]	33	50
Coating, engraving, heat treating and allied activities [3328]	42	30
Other fabricated metal product manufacturing [3329]	14	12
Machinery manufacturing [333]	15	21
Agricultural, construction and mining machinery manufacturing [3331]	12	14
Agricultural implement manufacturing [33311]	10	10
Construction machinery manufacturing [33312]	10	27
Mining and oil and gas field machinery manufacturing [33313]	19	14
Industrial machinery manufacturing [3332]	18	26
Sawmill and woodworking machinery manufacturing [33321]	9	12
Rubber and plastics industry machinery manufacturing [33322]	25	22
Other industrial machinery manufacturing [33329]	19	51

Commercial and service industry machinery manufacturing [3333]	25	43
Commercial and service industry machinery manufacturing [33331]	25	43
Ventilation, heating, air-conditioning and commercial refrigeration equipment manufacturing [3334]	11	16
Ventilation, heating, air-conditioning and commercial refrigeration equipment manufacturing [33341]	11	16
Metalworking machinery manufacturing [3335]	26	17
Metalworking machinery manufacturing [33351]	26	17
Engine, turbine and power transmission equipment manufacturing [3336]	19	56
Engine, turbine and power transmission equipment manufacturing [33361]	19	56
Other general-purpose machinery manufacturing [3339]	14	24
Pump and compressor manufacturing [33391]	9	12
Material handling equipment manufacturing [33392]	15	54
All other general-purpose machinery manufacturing [33399]	25	24
Computer and electronic product manufacturing [334]	10	37
Computer and peripheral equipment manufacturing [3341]	20	81
Computer and peripheral equipment manufacturing [33411]	20	81
Communications equipment manufacturing [3342]	8	24
Telephone apparatus manufacturing [33421]	8	16
Radio and television broadcasting and wireless communications equipment manufacturing [33422]	7	42
Other communications equipment manufacturing [33429]	9	36
Audio and video equipment manufacturing [3343]	10	16
Audio and video equipment manufacturing [33431]	10	16
Semiconductor and other electronic component manufacturing [3344]	7	51
Semiconductor and other electronic component manufacturing [33441]	7	51
Navigational, measuring, medical and control instruments manufacturing [3345]	16	48
Navigational, measuring, medical and control instruments manufacturing [33451]	16	48
Manufacturing and reproducing magnetic and optical media [3346]	54	44
Manufacturing and reproducing magnetic and optical media [33461]	54	44
Electrical equipment, appliance and component manufacturing [335]	20	33
Electric lighting equipment manufacturing [3351]	11	31
Electric lamp bulb and parts manufacturing [33511]	27	213
Lighting fixture manufacturing [33512]	9	23
Household appliance manufacturing [3352]	15	29
Small electrical appliance manufacturing [33521]	7	26
Major appliance manufacturing [33522]	17	29
Electrical equipment manufacturing [3353]	20	52
Electrical equipment manufacturing [33531]	20	52
Power, distribution and specialty transformers manufacturing [335311]	20	115
Motor and generator manufacturing [335312]	15	91

Switchgear and switchboard, and relay and industrial control apparatus manufacturing [335315]	28	29
Other electrical equipment and component manufacturing [3359]	28	25
Battery manufacturing [33591]	15	14
Communication and energy wire and cable manufacturing [33592]	39	23
Wiring device manufacturing [33593]	34	28
All other electrical equipment and component manufacturing [33599]	14	52
Transportation equipment manufacturing [336]	43	77
Motor vehicle manufacturing [3361]	120	607
Automobile and light-duty motor vehicle manufacturing [33611]	158	648
Heavy-duty truck manufacturing [33612]	30	335
Motor vehicle body and trailer manufacturing [3362]	21	28
Motor vehicle body and trailer manufacturing [33621]	21	28
Motor vehicle body manufacturing [336211]	35	33
Truck trailer manufacturing [336212]	13	30
Motor home, travel trailer and camper manufacturing [336215]	19	16
Motor vehicle parts manufacturing [3363]	49	73
Motor vehicle gasoline engine and engine parts manufacturing [33631]	97	65
Motor vehicle electrical and electronic equipment manufacturing [33632]	20	31
Motor vehicle steering and suspension components (except spring) manufacturing [33633]	59	110
Motor vehicle brake system manufacturing [33634]	27	19
Motor vehicle transmission and power train parts manufacturing [33635]	29	122
Motor vehicle seating and interior trim manufacturing [33636]	66	162
Motor vehicle metal stamping [33637]	69	87
Other motor vehicle parts manufacturing [33639]	40	60
Aerospace product and parts manufacturing [3364]	14	28
Aerospace product and parts manufacturing [33641]	14	28
Railroad rolling stock manufacturing [3365]	38	36
Railroad rolling stock manufacturing [33651]	38	36
Ship and boat building [3366]	37	0
Ship and boat building [33661]	37	0
Ship building and repairing [336611]	97	0
Boat building [336612]	25	9
Other transportation equipment manufacturing [3369]	11	0
Other transportation equipment manufacturing [33699]	11	0
Furniture and related product manufacturing [337]	20	32
Household and institutional furniture and kitchen cabinet manufacturing [3371]	21	28
Wood kitchen cabinet and counter top manufacturing [33711]	26	43
Household and institutional furniture manufacturing [33712]	19	24
Upholstered household furniture manufacturing [337121]	12	25
Other wood household furniture manufacturing [337123]	20	22

Household furniture (except wood and upholstered) manufacturing [337126]	18	16
Institutional furniture manufacturing [337127]	35	46
Office furniture (including fixtures) manufacturing [3372]	21	33
Office furniture (including fixtures) manufacturing [33721]	21	33
Other furniture-related product manufacturing [3379]	14	70
Mattress manufacturing [33791]	19	63
Blind and shade manufacturing [33792]	8	110
Miscellaneous manufacturing [339]	16	29
Medical equipment and supplies manufacturing [3391]	18	42
Other miscellaneous manufacturing [3399]	15	26
Jewellery and silverware manufacturing [33991]	19	27
Sporting and athletic goods manufacturing [33992]	12	11
Doll, toy and game manufacturing [33993]	13	4
Office supplies (except paper) manufacturing [33994]	18	30
Sign manufacturing [33995]	30	125

Annex IV- Definitions

Forecast: An estimate of future demand. A forecast can be determined by mathematical means using historical data; it can be created subjectively by using estimates from informal sources; or it can represent a combination of both techniques.

Intermodal Transport: Use of two or more different carrier modes in the through movement of a shipment.

Inventory carrying costs: One of the elements comprising a company's total supply chain-management costs. These costs consist of the following :

1) **Opportunity costs:** The opportunity costs of holding inventory. This should be based on a company`s own cost of capital standards using the following formula. Calculation: Costs of Capital x Average Net Value of Inventory

2) **Shrinkage:** The costs associated with breakage, pilferage, and deterioration of inventories. Usually pertains to the loss of material through handling damage, theft, or neglect.

3) **Insurance and taxes:** The costs of insuring inventories and taxes associated with the holding of inventory.

4) **Total obsolescence for inbound goods, WIP, and finished goods inventory:** Inventory reserves taken due to obsolescence and scrap and includes products exceeding their shelf life; i.e., spoils, and is no good for use in its original purpose (do not include reserves taken for Field Service Parts).

5) **Channel obsolescence:** Aging allowances paid to channel partners, provisions for buy-back agreements, etc. Includes all material that goes obsolete while in a distribution channel. Usually, a distributor will demand a refund on material that goes bad (shelf life) or is no longer needed because of changing needs.

6) **Field service parts obsolescence:** Reserves taken due to obsolescence and scrap. Field service parts are inventory kept at location outside the four walls of the manufacturing plant; i.e., distribution centre or warehouse.

Inventory carrying costs rate: The inventory carrying costs rate is applied on average annual inventory in order to estimate the costs of having inventory in a specific firm or industry. The average industry accepted and used rate is estimated at 20 per cent.

Inventory turns: The costs 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 measured as total output 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.

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 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.

Outsourcing: Corporate decision to assign activities previously performed internally to a third-party (for example, a Logistics Service Provider). Initially, the shippers (manufacturing or commercial companies) outsourced transport, and then progressively did the same for more value-added logistics services (Co-packing, for example).

Six Sigma quality: A term used generally to indicate that a process is well controlled; i.e., tolerance limits are ±6 sigma (3.4 defects per million events) from the centre line in a control chart.

Supply chain management (SCM) collaboration: Approach to managing and synchronizing all of the processes enabling one or more customer/supplier systems to take into account and respond to expectations of the end customers (from the supplier of the supplier to the customer of the customer). This approach is designed to increase the value created for the customer and improve the economic performance of the participating companies.

Warehouse management system (WMS): Computer application and component of SCE packages with the goal of managing and optimizing warehouse operations.

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