Industry Canada Industrie Canada

Logistics and Supply Chain Management (SCM) Cost and Agility Assessment Tool and Case Study

June 2007

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

Canada

This publication is also available electronically on the World Wide Web in HTML format at the following address: http://strategis.ic.gc.ca/epic/internet/indsib-logi.nsf/en/h_pj00353e.html

Cat. No. Iu44-42/2007E-PDF
ISBN 978-0-662-45858-6

Industry Canada registration number: 60232

Aussi offert en français sous le titre *Outil d'analyse des coûts et de l'agilité en logistique et en gestion de la chaîne d'approvisionnement.*

BACKGROUND

In 2005-2006, Industry Canada partnered with the Supply Chain and Logistics Association of Canada (SCL) Research Committee to launch a national logistics and supply chain management (SCM) performance indicators initiative. Six Logistics and SCM Key Performance Indicator (KPI) Analysis reports were released, covering 250 manufacturing, 30 wholesale and 70 retail sectors. These reports can be used as a benchmarking tool for firms and policy makers.

The following document is an extension of the Logistics and SCM KPI Analysis reports. In the course of three steps, this document will guide supply chain managers to determine and evaluate their total logistics and SCM cost and agility.

The first part of this guide provides an assessment toolkit for logistics and SCM cost and agility. This Toolkit defines the three components of logistics and SCM cost; classifies logistics and SCM cost activities categories and their respective components; and presents relative data which allows users to benchmark their logistics and SCM cost and agility against industry averages and other key player (s). The second part of this guide demonstrates a fictive case study for a specific firm in a manufacturing sub-sector, completed with an Excel template to assist Canadian manufactures, wholesalers and retailers in calculating and benchmarking their total logistics and SCM cost and agility.

TABLE OF CONTENT

Toolkit

Fictive Case Study

INTRODUCTION

What are logistics and supply chain management costs and agility?

Measurement of logistics and supply chain management (SCM) key performance indicators (KPI) is an essential part of the agile supply chain concept. Supply chain agility is defined as a measure of how flexible a firm is in response to customer demand. While inventory turns is the main KPI for evaluating supply chain agility, logistics and SCM cost KPI allow firms to evaluate the efficiency of their logistics and SCM operations. The combination of supply chain agility and efficient SCM practices is key to the long term competitiveness and prosperity of Canadian firms in the emerging global supply chain context.

Logistics and SCM costs occur internally within firms, are outsourced to logistics service providers and occur via inventory carrying cost. The sum of these three components will enable firms to evaluate their total logistics and SCM costs and benchmark themselves against their own industry, their U.S. counterparts and other key sectors that share similar logistics and SCM processes.

The mix of internal logistics and SCM cost, outsourced logistics and SCM cost and inventory carrying cost will also allow firms to evaluate their own logistics and SCM cost structure while enabling them to rethink their business model, if deemed necessary.

Who is interested and why are logistics and SCM cost measurement and agility measurement needed?

It is important for a company to understand the nature and the costs of its logistics and SCM operations. Every company measures its costs related to marketing, human resources, research and development, etc. Interestingly, very few know how much their logistics and SCM cost really are. The last decade saw a growth in interest for supply chain agility concepts such as Just-In-Time (JIT), Lean manufacturing and Efficient Consumer Response, all of which, in addition with the globalization of supply chains, brought the importance of logistics and SCM from an operational status, often to a strategic one for the company and its partners. Companies should be able to access that type of information on each industrial sector for comparison purposes. Comparing logistics and SCM costs as percentage of sales and inbound and outbound inventory turns allow companies to benchmark themselves to their sector, their partners and their competitors.

North American (NA) firms that measure logistics and SCM KPI outperformed their industry counterparts. In a two year period, it is estimated that five times more NA firms, that have put in place logistics and SCM KPI corporate wide measurement applications, have achieved a decrease of 15 percent or more in shipment delays compared to firms that do not measure those KPI consistently.

WHAT IS INCLUDED IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT COST MEASURES?

Logistics and SCM cost can be broken down in three separate, but complementary pieces: internal logistics and SCM costs, outsourcing logistics and SCM costs and inventory carrying costs. The proportions of these costs vary widely by sector. For example, in a JIT mode, internal logistics and SCM costs tend to increase, but this is balanced by a reduction in the inventory carrying costs; this happens in volatile sectors, such as upscale clothing, automotive, computers and perishable goods.

Internal Logistics and SCM Costs

Internal logistics and SCM costs encompass all logistics and SCM activities that occur within users firms (manufacturer, wholesaler or retailer). It excludes all outsourced logistics and SCM activities and all production processes.

Outsourcing Logistics and SCM Cost

Outsourcing logistics and SCM costs encompass activities assigned to a logistics and SCM service provider.

Inventory Carrying Cost

Include opportunity costs, shrinkage, insurance and taxes, total obsolescence (for raw materials, work in process (WIP), and finished good inventory), channel obsolescence and field service parts obsolescence. It excludes all distribution cost related to warehousing, which are captured in the internal and outsourced logistics and SCM costs.

What inventory carrying costs do not consist of:

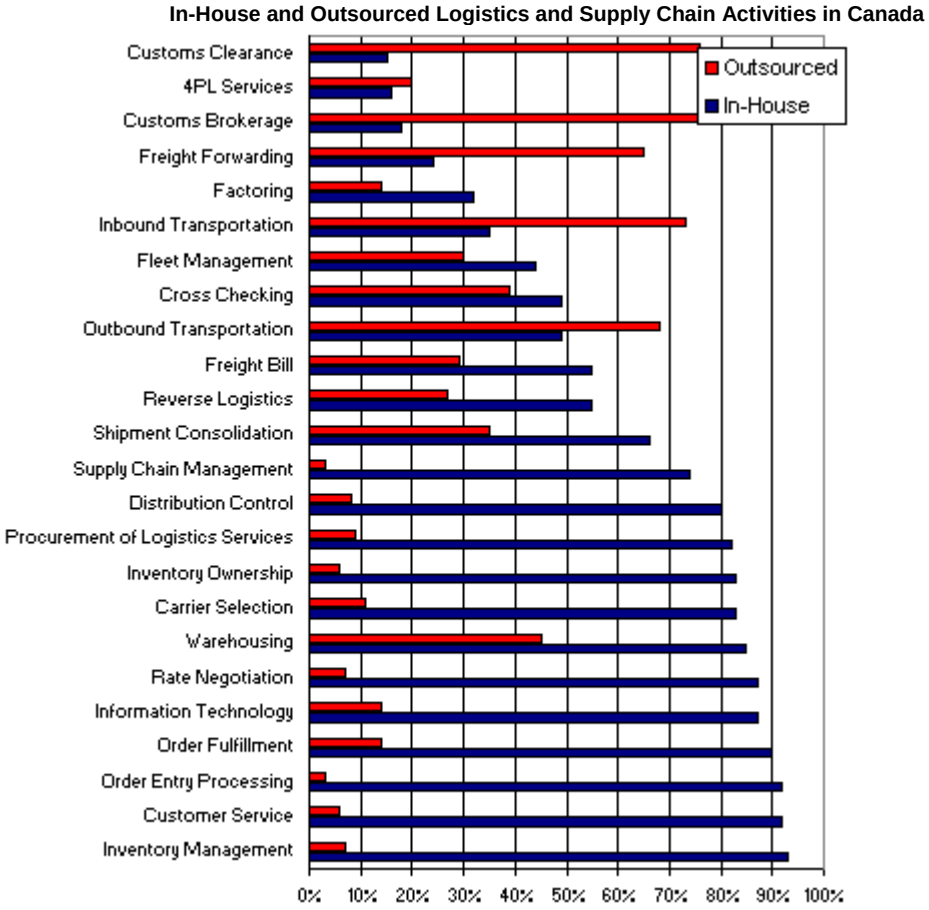
- all the necessary handling of the goods and/or materials
- the depreciation of warehousing assets

TOTAL LOGISTICS & SCM COSTS =

INTERNAL LOGISTICS & SCM COSTS + OUTSOURCING LOGISTICS & SCM COSTS + INVENTORY CARRYING COSTS

1.1 Evaluate your own logistics and SCM cost structure by separating logistics and SCM costs that occurred internally within your firm, outsourced to logistics and SCM service provider(s) and occurred via inventory carrying cost.

An example of the activities that are outsourced and/or done inside a company is displayed in the chart below. (Appendix 1 shows a long description of in-house and outsourced supply chain activities in Canada)



As can be seen, outsourcing differs largely according to the type of activity. Certain activities are largely outsourced, such as Customs Clearance or Customs Brokerage, and others are mainly done in-house, such as Inventory Management and Customer Service.

1.2 Calculate your inventory turns. Inventory turns is calculated by dividing the sales by the average level of inventory. 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 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. In manufacturing, it is important to distinguish between inbound (raw materials) inventory turns ratios and outbound (finished goods) inventory turns ratios. In wholesale and retail, inventory only include the total inventory of goods to be sold.

***Please download the *Logistics and SCM Cost and agility Assessment Template* under *Analysis and Industry Profiles* from the following website:**
http://strategis.ic.gc.ca/epic/internet/indsib-logi.nsf/en/h_pj00003e.html

(This Excel template contains three worksheets; each worksheet corresponds to each step illustrated in this Toolkit. By completing the cells highlighted in red, the Template will automatically calculate your inventory turns, inventory carrying cost, total logistics and SCM cost and state the differences between the performance of your company and your sector average.)

1.3 Calculate your inventory carrying cost. Inventory carrying cost is one of the main elements comprising a company's total logistics and SCM costs. These costs consist of the following:

1. *Opportunity Cost*: The opportunity costs of holding inventory. This should be based on your company's own cost of capital standards using the following formula. Calculation: Cost of Capital * 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 cost of insuring inventories and taxes associated with the holding of inventory.

4. *Total Obsolescence for Raw Material, WIP, and Finished Goods Inventory*: Inventory reserves taken due to obsolescence and scrap and includes products exceeding the 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 those inventory kept at location outside the four walls of the manufacturing plant i.e., distribution center or warehouse.

The *inventory carrying cost rate* is applied on the average annual inventory in order to estimate the cost of having inventory for a specific firm or industry. To determine your inventory carrying cost, sum up all six components and state the total cost as a percentage of your annual average inventory. The average industry accepted and used rate is estimated at 20 percent.

STEP 2 – CLASSIFY LOGISTICS AND SUPPLY CHAIN MANAGEMENT COST ACTIVITIES CATEGORIES

IN-HOUSE AND OUTSOURCED LOGISTICS AND SCM COST ACTIVITIES CATEGORIES

There are in total nine in-house and outsourced logistics and SCM cost activities. Each logistics and SCM cost activity contains six cost components. Individual firms can evaluate their logistics and SCM cost by adding their respective logistics and SCM cost activities and their components as stated in the table below.

In-House and Outsourced Logistics and SCM Cost Activities
Inbound and outbound transportation
Transportation management
Warehousing and materials handling
Inventory management
Logistics and SCM network design
Supply/demand planning
Management of third party logistics and SCM services providers
Custom brokerage/freight forwarding
Sourcing and procurement processes (excluding purchase of goods cost)

In-House and Outsourced Logistics and SCM Cost Components of Activities
Logistics and SCM infrastructure depreciation and other depreciation cost
Transport equipment depreciation and other related cost
Logistics and SCM technology investment depreciation
Logistics and SCM overhead (management) cost
Logistics and SCM wages cost
Training cost related to logistics and SCM occupation

2.1 Classify your in-house and outsourced logistics and SCM cost to their respective cost activities. Logistics and SCM cost activities can be categorized into the following sections (each cost activity is described on the following pages):

- Inbound and outbound transportation
- Transportation management
- Warehousing and materials handling
- Inventory management
- Logistics and SCM network design
- Supply/demand planning
- Management of third party logistics and SCM services providers
- Custom brokerage/freight forwarding
- Sourcing and procurement processes (excluding purchase of goods cost)

2.2 Assign all costs, under each logistics and SCM cost activities, to their respective components. Each logistics and SCM cost activity contains the following six components:

- Logistics and SCM infrastructure depreciation and other depreciation cost
- Transport equipment depreciation and other related cost
- Logistics and SCM technology investment depreciation
- Logistics and SCM overhead cost
- Logistics and SCM wages cost, and
- Training cost related to logistics and SCM occupation

Inbound and Outbound Transportation Cost

Inbound and outbound transportation is the range of activities involved in the movement of goods from points of production to final points of sale and consumption.[1] Some examples of inbound and outbound transportation cost include:

1. Logistics and SCM infrastructure depreciation and other related costs, for example snow removal and security devices.
2. Transportation equipment, for instance the five basic means of transporting products: air, motor carrier, train, marine, or pipeline; as well as every aspect of vehicle maintenance including fuel costing and oil change.
3. Technology investment depreciation, such as inboard technology and application service provider (GSP system).
4. Logistics and SCM overhead cost. This can be computed as a percentage of total fixed logistics and SCM cost. The average industry rate is estimated at 5 percent; however this figure may vary depending on the cost structure of the firm.
5. Labor, wages and salaries for drivers and contracts to service providers.
6. Training cost include driver licensing, security training and basic traceability training.

Inbound and outbound transportation cost	Internal logistics and SCM cost	External logistics and SCM cost
Logistics and SCM infrastructure depreciation and other related cost	- snow removal - security devices - gate/fence - pavement	- NA
Transport equipment depreciation and other related cost	- trucks/other vehicles - fuel costing and oil change - MRO on transport equipment	- contracts with transportation firms
Logistics and SCM technology investment depreciation	- inboard technology (paid system)	- application service provider, GPS tracking system (service paid every period)
Logistics and SCM overhead cost	- percentage of total logistics and SCM cost	- NA
Logistics and SCM wages cost	- drivers	- contractors - agents
Training cost related to logistics and SCM occupation	- security training - driver licensing - basic traceability training	- NA

Transportation Management Cost

Transportation management is the integration of transportation planning and execution in order to run a more efficient transportation network. Managing transportation is inclusive of managing shipping units; shipment scheduling through inbound, outbound and intra-company shipments, load planning and optimization; carries or mode selection; maintenance of vehicles and fuel; labor planning and building, as well as documentation management (especially when international shipping is involved). Some examples of transportation management cost include:

1. Logistics and SCM infrastructure and related depreciation, which includes office space, office furniture, office supplies, and Maintenance, Repair and Operations (MRO). External cost in this category includes contracts with transportation brokers.
2. Technology investment depreciation falls into two categories, hardware for instance computer workstations and business application systems, such as customer database and tracking system on application service provider.
3. Logistics and SCM overhead cost. This can be computed as a percentage of total fixed logistics and SCM cost. The average industry rate is estimated at 5 percent; however this figure may vary depending on the cost structure of the firm.
4. Logistics and SCM wages cost include salaries for transportation manager and SCM consultants.
5. Specialized training and continuous learning activities.

Transportation management cost	Internal logistics and SCM cost	External logistics and SCM cost
Logistics and SCM infrastructure depreciation and other related cost	- office space - office furniture - maintenance, repair and operations	- contracts with transportation brokers
Transport equipment depreciation and other related cost	- NA	- NA
Logistics and SCM technology investment depreciation	- transportation management system - computer equipment and server (hardware) - customer database and supplier database	- tracking system on application service provider
Logistics and SCM overhead cost	- percentage of total logistics and SCM cost	- NA
Logistics and SCM wages cost	- transportation manager - analysts	- logistics and SCM consultant
Training cost related to logistics and SCM occupation	- technical training - continuous learning activities	- NA

Warehousing and Materials Handling Cost

Warehousing is the process of storing goods within a storage facility. Materials handling involves the loading, moving, and unloading of materials. There are hundreds of different ways of handling materials that are generally classified according to the type of equipment used.[2] Some examples of warehousing and materials handling cost include:

1. Logistics and SCM infrastructure depreciation, for instance labelling and wrapping machines, and contracts to third party logistics services providers.
2. Transport equipment depreciation, for example forklifts and automated equipments.
3. Technology investment depreciation includes technology installed to facilitate functions of a distribution centre, for example infra-red labelling and tracking system.
4. Logistics and SCM overhead cost. This can be computed as a percentage of total fixed logistics and SCM cost. The average industry rate is estimated at 5 percent; however this figure may vary depending on the cost structure of the firm.
5. Wages and salaries for material handlers and warehouse operatives.
6. Basic principle training cost and continuous learning activities related to warehousing and material handling.

Warehousing and materials handling cost	Internal logistics and SCM cost	External logistics and SCM cost
Logistics and SCM infrastructure depreciation and other related cost	- labelling and wrapping machines - distribution centers - converging belts	- contracts to third party logistics and SCM services providers
Transport equipment depreciation and other related cost	- forklifts - electronic equipments - fuel costing - charger (batteries)	- lease of forklifts
Logistics and SCM technology investment depreciation	- infra-red labelling - tracking system - voice recognition system	- NA
Logistics and SCM overhead cost	- percentage of total logistics and SCM cost	- NA
Logistics and SCM wages cost	- warehouse operatives - material handlers	- NA
Training cost related to logistics and SCM occupation	- basic principle training and continuous learning activities	- NA

Inventory Management Cost

Inventory management is the process of managing the timing and the quantities of goods to be ordered and stocked, so that demands can be met satisfactorily and economically. It is a systematic management of the balance on hand of inventory items, involving the supply, storage, distribution, and recording of items.[3] Some examples of inventory management cost include:

1. Logistics and SCM infrastructure, which includes office space, office furniture and MRO.
2. Logistics and SCM technology investment depreciation, for example access to third party logistics and SCM warehouse management system via internet.
3. Logistics and SCM overhead cost. This can be computed as a percentage of total fixed logistics and SCM cost. The average industry rate is estimated at 5 percent; however this figure may vary depending on the cost structure of the firm.
4. Salaries, wages for inventory management managers and analysts as well as external consultants.
5. Training cost related to inventory management such as attending specialized courses.

Inventory management cost	Internal logistics and SCM cost	External logistics and SCM cost
Logistics and SCM infrastructure depreciation and other related cost	- office space - office furniture - maintenance, repair and operations	- contracts to third party logistics and SCM services providers
Transport equipment depreciation and other related cost	- NA	- NA
Logistics and SCM technology investment depreciation	- computer workstations - accounting software - warehouse management system - warehouse optimization simulation tools	- access to third party logistics and SCM warehouse management system via internet
Logistics and SCM overhead cost	- percentage of total logistics and SCM cost	- NA
Logistics and SCM wages cost	- inventory management analysts	- logistics and SCM consultant
Training cost related to logistics and SCM occupation	- attending specialized courses on inventory management	- NA

Logistics and SCM Network Design Cost

Logistics and SCM network design is an important strategic decision that companies must make to ensure that required raw materials and components can be distributed efficiently from their suppliers to their manufacturing plants and warehouses, and the final products to their customers. It is concerned with the determination of the number and location of warehouses and production plants, allocation of customer demand points to warehouses, and allocation of warehouses to production plants.[4] Some examples of logistics and SCM network design cost include:

1. Logistics and SCM infrastructure, which includes office space, office furniture and MRO.
2. Technology investment depreciation, such as logistics and SCM network optimization systems and access to inter-model modelization systems.
3. Logistics and SCM overhead cost. This can be computed as a percentage of total fixed logistics and SCM cost. The average industry rate is estimated at 5 percent; however this figure may vary depending on the cost structure of the firm.
4. Logistics and SCM wages cost, for example salary for operational research analysts.
5. Training and seminars on logistics and SCM net work design.

Logistics network design cost	Internal logistics and SCM cost	External logistics and SCM cost
Logistics and SCM infrastructure depreciation and other related cost	- office space - office furniture - maintenance, repair and operations	- NA
Transport equipment depreciation and other related cost	- NA	- NA
Logistics and SCM technology investment depreciation	- computer workstations - logistics and SCM network optimization systems	- access to inter-model modelization systems
Logistics and SCM overhead cost	- percentage of total logistics and SCM cost	- NA
Logistics and SCM wages cost	- operational research analyst	- logistics and SCM network design consultant
Training cost related to logistics and SCM occupation	- specific training on net work design - seminars	- NA

Supply/Demand Planning Cost

Supply and demand planning capabilities enable companies to maximize the return on assets and ensure a profitable match of supply and demand. This plan generates all the orders needed to fulfill a given customer's order situation or forecasted requirements.[5] Some examples of supply and demand planning cost include:

1. Logistics and SCM infrastructure, which includes office space, office furniture and MRO.
2. Technology investment depreciation, for example Collaborative Planning Forecasting and Replenishment (CPFR) application (internal) and access to customers CPFR applications (external).
3. Logistics and SCM overhead cost. This can be computed as a percentage of total fixed logistics and SCM cost. The average industry rate is estimated at 5 percent; however this figure may vary depending on the cost structure of the firm.
4. Logistics and SCM wages cost, for instance salary for logistics analyst and logistics consultant.
5. Specific training and seminars on supply/demand planning.

Supply/demand planning cost	Internal logistics and SCM cost	External logistics and SCM cost
Logistics and SCM infrastructure depreciation and other related cost	- office space - office furniture - maintenance, repair and operations	- NA
Transport equipment depreciation and other related cost	- NA	- NA
Logistics and SCM technology investment depreciation	- computer workstations (hardware) - Collaborative Planning Forecasting and Replenishment (CPFR) application	- access to customers CPFR applications
Logistics and SCM overhead cost	- percentage of total logistics and SCM cost	- NA
Logistics and SCM wages cost	- logistics and SCM analyst	- logistics and SCM consultant
Training cost related to logistics and SCM occupation	- specific training on supply/demand planning - seminars	- NA

Management of Third Party Logistics and SCM Services Providers Cost

To manage services provided by third party logistics and SCM service providers which include standard third party logistics provider, service developer, customer adapter, and customer developer. Some examples of management of third party logistics and SCM services providers cost include:

1. Logistics and SCM infrastructure, which includes office space, office furniture and MRO.
2. Technology investment depreciation, for instance access to third party logistics and SCM system via internet.
3. Logistics and SCM overhead cost. This can be computed as a percentage of total fixed logistics and SCM cost. The average industry rate is estimated at 5 percent; however this figure may vary depending on the cost structure of the firm.
4. Logistics and SCM wages cost for logistics analysts.
5. Specific training on third party logistics and SCM services providers.

Management of third party logistics and SCM services providers cost	Internal logistics and SCM cost	External logistics and SCM cost
Logistics and SCM infrastructure depreciation and other related cost	- office space - office furniture - maintenance, repair and operations	- NA
Transport equipment depreciation and other related cost	- NA	- NA
Logistics and SCM technology investment depreciation	- NA	- access to third party logistics and SCM system via internet
Logistics and SCM overhead cost	- percentage of total logistics and SCM cost	- NA
Logistics and SCM wages cost	- logistics and SCM analyst	- NA
Training cost related to logistics and SCM occupation	- specific training on third party logistics and SCM services providers - seminars	- NA

Custom Brokerage/Freight Forwarding Cost

Custom brokering is the 'clearing' of goods through customs barriers for customers and suppliers. It involves the preparation of documents and/or electronic submissions, the calculation (and usually the payment) on behalf of the client for taxes, duties and excises, and facilitating communication between the importer/exporter and governmental authorities. Freight forwarding involves dispatch of shipments via common carriers and books or otherwise arranges space for those shipments.[6] Some examples of custom brokerage/freight forwarding cost include:

1. Logistics and SCM infrastructure, which includes office space, office furniture, MRO, and service contracts for custom brokerage/freight forwarding firms.
2. Technology investment depreciation, such as web electronic data interchange (EDI) system and trade management system.
3. Logistics and SCM overhead cost. This can be computed as a percentage of total fixed logistics and SCM cost. The average industry rate is estimated at 5 percent; however this figure may vary depending on the cost structure of the firm.
4. Logistics and SCM wages cost for logistics and SCM analysts and manager.
5. Specific training and seminars on custom brokerage/freight forwarding.

Custom brokerage/ freight forwarding cost	Internal logistics and SCM cost	External logistics and SCM cost
Logistics and SCM infrastructure depreciation and other related cost	- office space - office furniture - maintenance, repair and operations	- service contracts for custom brokerage/freight forwarding firms
Transport equipment depreciation and other related cost	- NA	- NA
Logistics and SCM technology investment depreciation	- computer workstations - electronic data interchange (EDI) system - trade management system	- web EDI and other related electronic firms
Logistics and SCM overhead cost	- percentage of total logistics and SCM cost	- NA
Logistics and SCM wages cost	- logistics and SCM analyst	- NA
Training cost related to logistics and SCM occupation	- specific training on custom brokerage/freight forwarding - seminars	- NA

Sourcing/Procurement Processes (Excluding Purchases of Goods Cost) Cost

Corporate sourcing divisions of companies coordinate the procurement and distribution of materials, parts, equipment, and supplies for the organization.[7] Procurement is the business functions of procurement planning, purchasing, inventory control, traffic, receiving, incoming inspection and salvage operation.[8] Some examples of Sourcing/procurement processes (excluding purchases of goods cost) cost include:

1. Logistics and SCM infrastructure, which includes office space, office furniture, MRO, and third party logistics and SCM operations.
2. Technology investment depreciation, for example customer relationship management (internal) and access to electronic market place (external).
3. Logistics and SCM overhead cost. This can be computed as a percentage of total fixed logistics and SCM cost. The average industry rate is estimated at 5 percent; however this figure may vary depending on the cost structure of the firm.
4. Logistics and SCM wages cost, for instance salary for procurement sourcing analyst and transactional clerks.
5. Specific training and seminars on souring and procurement processes.

Sourcing/procurement processes (excluding purchases of goods cost) cost	Internal logistics and SCM cost	External logistics and SCM cost
Logistics and SCM infrastructure depreciation and other related cost	- office space - office furniture - maintenance, repair and operations	- third party logistics and SCM operations (related to transaction to customer and supplier)
Transport equipment depreciation and other related cost	- NA	- NA
Logistics and SCM technology investment depreciation	- computer workstations - procurement systems (invoicing and purchase order processing) - Customer Relationship Management (CRM) application	- access to electronic market place
Logistics and SCM overhead cost	- percentage of total logistics and SCM cost	- NA
Logistics and SCM wages cost	- procurement sourcing analyst - transactional clerks	- NA
Training cost related to logistics and SCM occupation	- training on souring and procurement processes - specific business process into training	- NA

STEP 3 - BENCHMARK YOUR LOGISTICS AND SCM COST AND AGILITY AGAINST INDUSTRY AVERAGES AND OTHER KEY PLAYERS

3.1 Compare your inventory turns (from step 1) against your own industry to analyze whether the average carrying cost estimated and supply chain agility level reflect your business, or that your business has particular characteristics that result in a significantly different percentage.

In order to complete this step, you need to download one of the following *Logistics and Supply Chain Management (SCM) Key Performance Indicators (KPI) Analysis* reports. Together they represent 250 manufacturing, 30 wholesale and 70 retail sectors in total. Choose the one that best represents the supply chain your company belongs to.

- Manufacturing Perspective
  http://strategis.ic.gc.ca/epic/internet/indsib-logi.nsf/en/h_pj00220e.html

- Retail and Consumer Product Goods (CPG) Supply Chain Perspective
  http://strategis.ic.gc.ca/epic/internet/indsib-logi.nsf/en/h_pj00195e.html

- Pharmaceutical Sector Supply Chain Perspective
  http://strategis.ic.gc.ca/epic/internet/indsib-logi.nsf/en/h_pj00282e.html

- Aerospace Sector Supply Chain Perspective
  http://strategis.ic.gc.ca/epic/internet/indsib-logi.nsf/en/h_pj00250e.html

- Automotive Sector Supply Chain Perspective
  http://strategis.ic.gc.ca/epic/internet/indsib-logi.nsf/en/h_pj00312e.html

Please click on *Annex III – Inventory Management Data*, and *Annex IV- Cost Data* from your sector report to collect respective data needed for your comparison.

3.2 Aggregate your inventory carrying cost (from step 1), total internal logistics and SCM costs and total external logistics and SCM external costs (from step 2) to create your total logistics and SCM cost. This measurement allows you to benchmark your business model in terms of operating activities to your sector, partners, competitors, as well as other key industries that share similar logistics and SCM processes. Please refer to the information you've used from step 3.1 for this comparison as well.

FICTIVE CASE STUDY

The purpose of this fictive case study is to provide a practical example of how to determine a firm's total logistics and SCM cost and agility by following the three steps demonstrated previously in this document.

COMPANY PROFILE:

SideKic is a Canadian chocolate and confectionery manufacturer. The company offers chocolate, candy and snack products in the form of bar goods, boxed items and bagged items. These products are sold throughout North America and exported overseas. SideKic sells its products primarily to wholesale distributors, mass merchandisers, chain grocery stores, vending companies and through food brokers and retail sales merchandisers. Its main production facility is located in Toronto, Ontario.

Industry sector: Manufacturing
Manufacturing sector: Chocolate and confectionery manufacturing
2006 Net sales: $100 M (CDN)

Inventory Turns

To find out how fast SideKic turns its inventory, we can use the following formula:

$$\textbf{Inventory Turns} = \frac{\textbf{Current Year's Net Sales}}{\textbf{The Average Level of Inventory}}$$

The net sales figure is $ 100,000,000. The average inventory value for raw material is $4,031,000 and the average inventory value for finished goods is $6,199,000.

By plug the numbers into the formula,

Raw Material:

$$\text{Inventory turns} = \frac{\text{Current year's net sales} = \$100,000,000}{\text{The average level of inventory on hand} = \$4,031,000}$$

Inventory turns for raw material is 24.8, which means SideKic sold its raw material 24.8 times during the year.

Finished Goods:

$$\text{Inventory turns} = \frac{\text{Current year's net sales} = \$100,000,000}{\text{The average level of inventory on hand} = \$6,199,000}$$

Inventory turns for finished goods is 16.1, which means SideKic sold its finished goods 16.1 times during the year.

Inventory Carrying Cost

For the purpose of benchmarking, it is required that all firms must use 20 percent as their inventory carrying cost rate. By apply the 20 percent rate to raw material and finished goods, SideKic's inventory carrying costs are determined as shown in Table 1.

1. INVENTORY CARRYING COST				
SideKic	Average Inventory level (K$)	Carrying cost factor	Inventory carrying cost	% of sales
Raw material	4,031	20%	**806**	0.81%
Finished goods	6,199	20%	**1,240**	1.24%
Total	10,230	20%	**2,046**	2.05%

STEP 2 – LOGISTICS AND SUPPLY CHAIN MANAGEMENT COST ACTIVITIES CATEGORIES

Table 2 illustrates Sidekick's in-house and outsourced logistics and SCM cost activities, along with costs signed to their relevant components.

2. LOGISTICS AND SUPPLY CHAIN MANAGEMENT COST ACTIVITIES CATEGORIES																				
SideKic	Logistics & SCM infrastructure depreciation and other depreciation cost				Transport equipment depreciation and other related cost				Logistics & SCM technology investment depreciation				Logistic & SCM overhead cost		Logistics & SCM wages cost				Training cost related to logistics & SCM occupation	
(K$)	Internal		External		Internal		External		Internal		External		Internal		Internal		External		Internal	
Inbound and outbound transportation	Loading dock, Security devices, Railway ramp	20	NA	NA	Refrigerated carriers, Trucks, Other vehicles	150	Contracts with transportation firms	400	State-of-the-art logistics & SCM system for modern transportation	15	GPS tracking system	10	5%	58	Truck drivers	350	Contractors	150	Security training, driver licensing	10
Transportation management	Office space, MRO	15	Contracts with transportation brokers	20	NA	NA	NA	NA	TMS software, Computer equipment	10	Logistics & SCM tracking and tracing system	5	5%	10	Transportation managers, analysts	100	Transportation management consultant	40	Technical training, Continuous learning activities	5
Warehousing and materials handling	Distribution centre (labeling machines, converging belts)	400	Contracts to 3PL & SCM services providers	200	Forklifts, electronic equipments	65	Leases of forklifts	45	Material storage, Material handling systems	20	NA	4	5%	87	Warehouse operatives, Material handlers	900	NA	NA	Basic principle training and continuous learning activities	10
Inventory management	Office space, MRO	20	Contracts to 3PL & SCM services providers	20	NA	NA	NA	NA	Warehouse optimization simulation tools, RFID system	10	Access to 3PL & SCM warehouse management	4	5%	7	Warehouse management analyst	60	Inventory control consultant	20	Courses on inventory management	3
Logistics & SCM network design	Office space, MRO	20	NA	NA	NA	NA	NA	NA	Logistics & SCM network optimization systems	5	Access to inter-model modelization systems	5	5%	4	Network design teams	35	logistics & SCM network analysis services	15	Training on logistics & SCM net work design	3
Supply/demand planning	Office space, MRO	15	NA	NA	NA	NA	NA	NA	CPFR application	5	Access to customers CPFR applications	5	5%	4	Supply and demand analyst	35	Market analyst(s)	15	Training on supply and demand planning	5
Management of 3PL & SCM services providers	Office space, MRO	10	NA	NA	NA	NA	NA	NA	NA	NA	Access to 3PL & SCM system via internet	6	5%	2	Logistics & SCM analyst	20	NA	NA	Training on 3PL & SCM services providers	1
Custom brokerage/freight forwarding	Office space, MRO	5	Contracts for custom brokerage and freight forwarding firms	40	NA	NA	NA	NA	EDI system, Trade management system	10	Web EDI and other related electronic firms	5	5%	4	Freight cost analyst	15	Shipping consultants, Freight forwarders	5	Training on custom brokerage and freight forwarding	2
Sourcing and procurement processes (excluding purchase of goods cost)	Office space, MRO	60	Contracts to 3PL & SCM services providers	15	NA	NA	NA	NA	CRM application, Procurement systems	30	Access to electronic market place	15	5%	33	Procurement sourcing analysts, Transactional clerks	300	Procurement consultant	200	Training on souring and procurement processes	6
Total		565		295		215		445		105		59		210		1815		445		45
Total internal logistics and SCM costs:						**2,955**														
Total external logistics and SCM cost:						**1,244**														

Inventory Turns and Agility

The average inventory turns for *chocolate and confectionery manufacturing* sector is 47 for raw material and 34 for finished goods. Therefore, SideKic's turn rate is lower than the sector for both raw materials and finished goods. Table 3 shows the percentage difference between SideKic's inventory turns and sector inventory turns ratio.

3. INVENTORY TURNS				
SideKic	Average Inventory level (K$)	Inventory turns	Sector average	Agility difference
Raw material	4,031	**24.8**	47.2	**-47.44%**
Finished goods	6,199	**16.1**	33.6	**-51.99%**

SideKic has significantly lower inventory turns than the sector average; this translates into a high inventory carrying cost as inventory turns velocity is on of the key factors in determining inventory carrying costs. Inventory turns is the main KPI for evaluating supply chain agility, therefore the company operates a less agile supply chain than the sector average.

SideKic should focus on increasing inventory turns and becoming more efficient with respect to logistics processes since it would greatly help in decreasing inventory carrying costs, thus costs in general as well as establishing a more agile supply chain.

Total Logistics and Supply Chain Management Cost

The formula used to calculate total logistics and SCM cost is the following:

$$\textbf{Total Logistics \& SCM Costs} = \frac{}{\textbf{Internal Logistics \& SCM Costs + Outsourcing Logistics \& SCM Costs + Inventory Carrying Costs}}$$

In Sidekick's case:

Total Logistics & SCM Cost = 2,954,000 + 1,244,000 + 2,046,000 = **$6,245,000**

The next step is to benchmark SideKic's internal logistics and SCM costs, outsourcing logistics and SCM costs and inventory carrying cost against its sector, and competitors. Table 4 states the difference between SideKic's total logistics cost in terms of percentage of sales and percentage of total logistics and SCM cost to the *Sugar and Confectionery Products* sector average.

4. TOTAL LOGISTICS AND SUPPLY MANAGEMENT COST					
SideKic	SideKic (K$)	SideKic (% of Sales)	Sector average (% of Sales)	Difference in (% of Sales)	Difference in % of logistics & SCM cost
Total Internal Logistics & SCM Costs	2,954	**2.95%**	1.99%	**0.96%**	**48.49%**
Total External Logistics & SCM Costs	1,244	**1.24%**	1.59%	**-0.35%**	**-21.76%**
Inventory Carrying Cost	2,046	**2.05%**	1.51%	**0.54%**	**35.50%**
Total Logistics & SCM Cost	6,245	**6.24%**	5.09%	**1.15%**	**22.69%**

APPENDIX 1: IN-HOUSE AND OUTSOURCED
LOGISTICS AND SUPPLY CHAIN ACTIVITIES IN CANADA (LONG DESCRIPTION)

	In-House	Outsourced
Inventory Management	93%	7%
Customer Service	92%	6%
Order Entry Processing	92%	3%
Order Fulfillment	90%	14%
Information Technology	87%	14%
Rate Negotiation	87%	7%
Warehousing	85%	45%
Carrier Selection	83%	11%
Inventory Ownership	83%	6%
Procurement of Logistics Services	82%	9%
Distribution Control	80%	8%
Supply Chain Management	74%	3%
Shipment Consolidation	66%	35%
Reverse Logistics	55%	27%
Freight Bill	55%	29%
Outbound Transportation	49%	68%
Cross Checking	49%	39%
Fleet Management	44%	30%
Inbound Transportation	35%	73%
Factoring	32%	14%
Freight Forwarding	24%	65%
Customs Brokerage	18%	78%
4PL Services	16%	20%
Customs Clearance	15%	76%

REFERENCES

[1] The Geography of Transport Systems – Logistics, Dr. Jean-Paul Rodrigue and Dr. Markus Hesse, December 2006

[2] McGraw Hill Professional Encyclopedia of Science and Technology, 10th Edition

[3] McGraw Hill Professional Encyclopedia of Science and Technology, 10th Edition

[4] New Models in Logistics Network Design and Implications for 3PL Companies, Cheong Lee Fong, Michelle, 2005 Nanyang Technological University

[5] Demand and Supply Planning - Business Scenario, SAP AG, 2007

6 Wikipedia, the free encyclopedia, January 2007

[7] Wikipedia, the free encyclopedia, January 2007

[8] Wikipedia, the free encyclopedia, February 2007