A Decision System to Aid Canadian Exports to Europe

Carolynn I. Barkhouse and James H. Bookbinder
University of Waterloo

Today, many Canadian firms are seeking additional profits through sales to the European Community (EC). Successful market development in Europe will first require good contacts to obtain the best distribution channels. Access to the EC can hence be complicated through lack of knowledge of logistics systems in Europe and in particular countries. Secondly, vast numbers of rules, regulations and laws govern the exportation business. A firm can get bogged down simply from red tape.

A European logistics information system could facilitate expansion to the EC. If properly designed and implemented, such a system could support a user in dealing with the two preceding issues. That system could furnish data on European logistics, and help especially with legal questions and paperwork. This article presents a conceptual model, and the general requirements and capabilities, of such a decision system to aid Canadian exports to Europe.

Many Canadian companies are interested in the European market, and naturally hope to enjoy immense success. To do so, however, will require effective penetration of the logistics environment in that foreign area. Companies small to medium in stature have little chance beyond the domestic sphere, unless they can secure distribution in Europe. Even a larger Canadian firm will require a broader outlook.

Foggin and Foggin[1] present an extensive bibliography on international logistics. Foster[2] has listed “eight ways to be great” in developing a global distribution strategy. Shapiro and Heskett[3] note the sequence of stages through which a firm progresses in multinational logistics management. A number of factors are given which determine whether the international corporation will organize its business strategy around countries (geographic areas) or around particular products. Multinational logistics strategy is also discussed by Glaskowsky et al.[4].

Particularly important for European expansion is knowledge of the various laws and regulations regarding such activities. Both the Canadian and foreign governments have specific requirements which must be carried out prior to such endeavors. A firm planning to enter this market must be fluent in the various intricacies and nuances of these laws, if it wishes to thrive and be profitable.

This problem presents an interesting idea, one that is potentially valuable to companies: the development of a decision system to aid Canadian exports to Europe. That system should provide relevant information on international logistics, including third-party services and European contacts to achieve desired cycle times through particular distribution channels. The system should also report on government regulation and the documents which must be filed with various agencies.

This paper presents a description of such an information system for use by traffic and transportation departments. We begin with a brief history of logistics information systems, and then examine the effects of “Europe 92,” a plan to remove borders for the purposes of goods transportation. Following an overview of the exportation chain from Canada to Europe, we outline our system and detail its various components. The article concludes with future enhancements of this system.
Logistics Information Systems: A Brief History

Logistics Information Systems serve a wide variety of functions in the transportation field. Tyworth, Cavinato and Langley[5] acknowledge that information is central to the control function in traffic management; they present a comprehensive view of system requirements. Langley[6] suggests how logistics can make use of information that is made available through the latest technology, while Introna[7] develops a framework to implement that technology into the logistics area.

Haley and Krishnan[8] propose a systems approach which integrates all aspects of the distribution cycle from marketing to customer service. Burbridge[9] discusses the impact on logistics strategy of a well designed information system. For firms considering a logistics information system, Dröge and Germain[10] outline a procedure for its evaluation.

Although the above suggestions relate to domestic operations, the same concepts can be applied to a system for logistics abroad. For example, Moreira[11] describes a trade network which links home offices with those overseas to quickly transfer information on potential trade opportunities.

Comprehensive, pertinent data that can be rapidly delivered may be crucial in international terms. The description below of our proposed system will concentrate mainly on the relevance of its information, once we have laid the groundwork concerning the impact of Europe 92 on the export process.

Europe 92: Effects and Consequences

The White Paper on Europe 1992 specified a “free transport market without the quantitative restrictions.” One aim was to simplify documentation and facilitate border crossings. A second was the deregulation of transport markets for greater ease of entry, enhanced price competition, and freedom to modify existing routes[12].

This emergence of a single European market has many advantages, but also disadvantages, for Canadian companies [13,14]. Each firm must therefore re-evaluate its logistics strategy, and the resulting effect on service and costs of its current or proposed facilities network[15].

It has been recommended that “the best way to take advantage of Europe 1992 is to have bases in the EC and to reinforce this presence”[16]. Such a presence can be achieved, for example, through joint ventures. Naturally, the procedure below on manufacturing location must be carried out. We will assume that the given firm will choose to export at least some finished goods from Canada.

Regardless of manufacturing location, products must ultimately be delivered to customers. This will require, whether directly or through third-party logistics vendors, the services of Community-based transportation. Road, rail, water and air modes are each undergoing constant evolution due to Europe 92 (see next section).

Other changes which will affect specific industries are outlined in the “1992 Canada-Europe documentation” put out by the Department of External Affairs and International Trade Canada. Companies should consult the respective section for regulations and recommendations on their industry.

The reader should know that we have a Canadian perspective. We are probably unaware of subtleties in European logistics apparent to someone there, but frankly, even specialists on the Continent may not share a single, EC view of logistics management[17].

The term “Europe 92” suggests a homogeneous market. This impression is only correct in the macro sense, not at the level of individual countries. Cooper[18] notes that transportation, warehousing and information can all be subject to major contrasts between one EC member and another, e.g. because of differences in culture and the pace of economic development. European logistics services are thus quite segmented, so much so that an expert from one EC country may be unsure of the logistics patterns within another EC member state.

Having made the preceding points, we now turn attention to the steps in exporting to Europe and the operation of our proposed decision system.

Overview of Exportation Chain

We begin with a discussion of manufacturing location.

Manufacturing Location

Consider the strategic importance of whether to manufacture within an EC
country or to export directly from Canada. Obviously, more than costs and lead times are at stake in this site-selection decision, now an international one.

Soderman[19] gives an extensive discussion of issues concerning the location of new factories, based upon significant field studies in the European context. More recently, Conway[20] has noted the importance to global competition of optimal site selection. He points out that what is true in North America is even more striking internationally. Schary[21] feels that location analysis in the global context should be based upon about twice as many factors as the corresponding domestic decision. He lists these parameters and describes their inclusion by Hewlett-Packard in a computer model aimed at developing international distribution strategies.

Allen[22] conducted personal interviews with senior officials (presidents, CEOs) of eight U.S. corporations. Each of these top managers had been involved in the decision to locate an off-shore production facility, and their firms on the average carried out manufacturing in 8-10 other countries. The result of this study is a flow chart on the overall process of the foreign plant location decision. As Allen notes, however, the facility-location question is secondary to the main issue, namely, will the company supply a particular market or not.

Each reference cited in this subsection presents a detailed discussion of the international site-selection decision. The procedures outlined in those four studies could, in any given case, result in deciding to supply the EC entirely from a manufacturing facility(ies) within Europe. In that situation, the information system of the present paper would not be required. Thus, in all that follows, we assume those same procedures suggest the export of particular products from Canada.

International Transportation Modes

Rushton and Oxley[23] enumerate several operational factors which need to be considered in choosing between air and water transportation to Europe. Culture, customer importance and volume-to-weight ratio must be carefully evaluated, along with the attributes of each mode.

Air transport[24] delivers speed in international distribution. This excellent service at a premium price means that air freight generally consists of high-value items that are small but time-sensitive. Marine transportation furnishes cost economies in exchange for larger lead times. Long-haul intermodalism may offer a happy compromise on both service and price. For example, goods from a Vancouver-based firm could go by truck to Toronto, and then by air to England. Naturally, the original water and air shipments were effectively intermodal, since there would need to be a truck or rail connection to or from the port or airport at each end.

Once the merchandise has reached Europe, the choices for distribution across the continent are air, water, road and rail. Button[25] has analyzed the regulatory issues pertaining to goods movement by motor freight within the EC during the 1980’s. Foster[26] comments on the approximate 40% cost advantage (over truck) of container barges on the Rhine and other major waterways. A focused issue of Transportation Research[27] is devoted entirely to European rail systems.

Agencies

Both private and governmental organizations can be involved in the process of exporting to Europe. Each may be responsible for a specific aspect of the chain, furnishing different services and performing unique activities. Listed below are some of the more important participants, about which a firm’s transportation department must be knowledgeable.

- Canadian Embassy
  Most companies do not have the resources necessary to perform the required in-depth study on the viability of expansion into Europe. The Canadian Embassy in the particular EC country will conduct the survey, furnishing to the company all related information concerning the item’s marketability. Permission to distribute Canadian goods abroad must also be obtained from the Embassy.

- Third Party International Logistics Vendor
  For the majority of Canadian firms, the shortest route to the export market is via a third party. Such an intermediary will arrange shipment of goods, prepare any necessary paperwork and contact distribution agents in Europe. Each vendor, however, will have contrasting strengths and
varied levels of operation and support. Careful evaluation is thus required before selection of an intermediary, and indeed when simply considering whether to enlist these services.

Third parties have produced significant cost savings, for example in the case of Gillette[28]. Nevertheless, situations do exist in which a logistics vendor can perform no better than the company itself. Some third-party executives have remarked that contracting logistics services is not for everyone, advising even their clients to maintain an internal logistics specialist to coordinate and monitor the vendor's performance[29]. Our proposed system will aid that specialist.

- Financial, Legal and Customs

It is necessary that a financial institution (e.g. a bank) verify the buyer's credit rating; a notarized certificate of origin must accompany the merchandise overseas. That verification and certificate, together, permit acceptance of responsibility for transportation of the goods. Finally, at the country of entry, the Canadian exporter will generally require a customshouse broker to handle all shipment clearances and payment of duties or tariffs.

A firm opting to ship direct, without the services of a third-party global logistics vendor, will require information on other agencies such as European distributors. That firm may well benefit from our proposed system.

ELIS Specification

Our decision system to aid Canadian exports to Europe will be denoted by ELIS, for European Logistics Information System. It is a conceptual framework to help transportation departments prepare for successful entry into the EC. The modules which make up ELIS (Figure 1) will be described now, except for "Scenario Processing" (a pseudo-simulation module), to which we devote the entire next section.

General Overview

ELIS is intended for use by companies interested in or currently exporting to Europe. It is designed to furnish accurate and current data on all aspects relevant to exportation, including the various agencies. Performance measurements are also provided.

ELIS is menu driven, facilitating access to the various modules. Each is self-contained, without sacrificing overall system consistency and integration. The following sub-sections present more detailed descriptions of all but the final module.

Agency Information

Successful entry into the European market requires the establishment of good contacts. To select the agency most appropriate, a record on each of them (see previous section) must be available for analysis. It would be desirable to have a synopsis of each organization's services relating to exports: necessary documents, information requirements, responsibilities and fees.

Information Concerning Vendors

This sub-module is devoted to third-party international logistics vendors, the primary contact source for the majority of companies utilizing ELIS. General data maintained here would include:

1. Services offered. These comprise air and ocean freight, consolidation, warehousing, consular formalities and translators.
2. Countries served. Lack of service to the firm's country of choice will automatically eliminate a third party from further consideration.
3. Goods handled. Certain vendors may be unable to accommodate dangerous or perishable goods.
4. European contacts. This information, such as access to distribution networks, may be difficult to obtain initially. Such knowledge is more likely to become available as time progresses.
5. Specialization. Certain vendors may have particular expertise in a given mode of transportation, European country or the handling of specific goods.
6. Performance measures. These would include cycle times, customer service reputation, safety records, figures on damage-and-loss, and fees. Some of this information, too, may be difficult to obtain at the outset. However, previous experience and opinions from other organizations can be included, if available. Again, further data can be gathered through personal experience.

Dictionary

Logistics personnel involved in exporting goods to Europe must be proficient...
in the terms, technical jargon and symbols required for various documents and packaging. This dictionary provides a brief description of those terms and symbols, giving a visual representation (if a graphics terminal is available) and a summary of their use. To be included are:

1. Incoterms. Incoterms are a set of international rules for the interpretation of trade terms (as adopted by the International Chamber of Commerce) which appear on foreign trade contracts. In these interpretations are the various responsibilities and duties of the buyer and seller, respectively.

2. IMDG Code Warning Labels. Such notices, when appropriate, must be printed on packaging before transportation. Examples include symbols denoting corrosive, explosive and radioactive.

3. IATA Restricted Articles Regulations. All goods which are to be shipped by air, and which are deemed hazardous, must be thus labeled. Symbols for handling are also mandatory.

4. Caution marks. These marks are for general cargo.

Legal Requirements

This module summarizes the many national or international regulations which must be respected. A synopsis of related acts or a detailed outline of particular orders can be obtained here. Examples of such regulations are as follows:

1. The General Agreement on Tariffs and Trade (GATT) is a set of rules for international trade conduct. Since Canada has ratified this treaty, Canadian companies must conform to its requirements. Its regulations generally also apply to the European country in question.

2. Exports are monitored by the Export Control List and the Area Control List, two provisions under the Export and Import Permits Act. These lists, respectively, pertain to goods that are explicitly controlled and countries that are specifically monitored.

3. A Certificate of Origin must be issued by a lawyer for each shipment going abroad, verifying that the load is of North American origin.

Logistical Information

Parameters relating to service, such as lead times, cycle times and delivery times, are of prime importance to a transportation department. Values which specifically concern exportation include average delivery times by air and marine, to various airports and ports of call, and proposed delay times. ELIS provides the means and variances, or ranges, of those key quantities. Estimates would be based on previous experience and on the claims of the logistics vendors.

Documentation

As is often the case in business, a firm must complete a great deal of paper work before and during exportation. The Canadian government requests an application for permission to export goods. Logistics vendors require forms such as a bill of lading and certificate of origin. Although easy enough to fill out manually, an automated procedure is much more efficient and less error prone. Accuracy is essential because many foreign consulates will not accept documents which contain erasures or mistakes.

The majority of vendors will complete all necessary forms on behalf of their client. Nevertheless, it may be prudent and more efficient for the company itself to them fill out as much as possible ahead of time. The documentation module will aid in this regard, such as by listing the documents required, furnishing instructions on how to fill them out, and showing examples of the completed forms.

Scenario Processing

Many transport departments select their vendors, routes, modes of shipment and destinations based on personal experience or maybe luck of the draw. This offers a significant area for potential improvement and cost savings. If logistics professionals had access to a computer program which would analyze various alternatives, they could make their decisions on a more objective and, hopefully, more cost-efficient basis. This module provides such a simulation to evaluate a sequence of events relating to exportation to Europe.

The user will furnish the initial data for the simulation. This data would include:

1. Initial location of shipment. Manufacturing plants located at home or abroad can thus be accommodated.

2. City destination. This incorporates either a single destination, leaving distribution throughout the Community to the consignee, or multiple destinations to the end users across the Continent.

3. Item to be shipped. The size of a shipment, in weight and dimension, and any special storage requirements, such as refrigeration, are included here.
4. Third-party vendor (optional). A Yes/No question determining if such services should be engaged, or at least considered.

Scenario-processing will then pass through the following stages.

**Phase I: Control Lists**

ELIS will consult the Export Controls List for the product and the Area Controls List for the city of destination. Any required labeling, handling or packaging of the product will be reported.

**Phase II: Transit Route Selection**

Given the origin, destination and use of vendor, ELIS will determine the appropriate distribution route, beginning with drop-off at the point of origin, including the mode of overseas shipment, and final delivery from the line-haul destination to the end customer. Included in this would be recommended agencies, such as forwarders, bankers and European distribution companies. With the mode of transportation chosen, ELIS will then make suggestions for containerization and for stacking and storage, in an attempt to optimize space utilization and decrease in-transit damage.

**Phase III: Expected Performance**

Based on the above route and agencies, ELIS will report on the logistical parameters anticipated, as mentioned in the previous section. This is provided as an aid in determining any precautions or specific actions. Finally, ELIS will calculate total expected cost. This could then be compared to a cost limit or other tolerances that the user may specify.

**Phase IV: Post-Analysis**

This phase allows the client to suggest another routing or agency that he/she deems satisfactory. For example, the user may wish to determine the impacts on a scenario of a different overseas carrier. This capability permits inclusion of any particular knowledge on the part of the user which could not have been included in the data set for that scenario.

Once run, the scenarios and respective results can be stored for comparison and evaluation at a later date. This will allow the most appropriate route to be selected.

**Conclusions and Future Enhancements**

Europe 92 and the associated ramifications are important because they constitute changes in the type of information that a company should consider. ELIS attempts to address those issues concerning export to Europe, in terms of the logical organization of this information. Companies of course make export-related decisions now. Hopefully, our ELIS system would be sufficiently friendly to facilitate this process, and naturally to put the required information (Figure 1) closer to a user's fingertips.

No software could be expected to be all things to all people, in light of the millions of possible combinations for commodity x origin x destination. For ELIS to be helpful, it should not only handle an exporter's typical needs (as discussed in this article), but also be capable of customization to deal with particular requirements of a given user. The model should eventually have some logic so that, when appropriate, the user would be led to seek outside expertise.

Although our discussion has been from a Canadian point of view, much of the information furnished by ELIS of course concerns the destination, rather than the point of origin of the goods. The basic system design of Figure 1 should thus apply to exports to Europe from elsewhere in North America, or from other continents.

In writing this article, we had originally planned to have a numerical example which showed the costs of various container routings by truck or rail in Europe, following arrival there by air or marine. The best land routing within the EC would simply show what could be done by a firm acting on its own account. Rather, the purpose of ELIS is to help decide whether that firm should use a third party, and if so, which one. We were unable to obtain appropriate data for such an example. For this reason, the present paper has dealt with a conceptual model throughout.

To conclude, we note that several potential improvements or system enhancements could be made. While inclusion in ELIS might take some time, their mention now would not be amiss.

Electronic Data Interchange (EDI) is a fast growing technological phenomenon which ELIS should not ignore. Computer-to-computer transmission of data will reduce errors, and of course lower costs through improved efficiency. Use of EDI between companies and trade organizations, such as logistics vendors and customs, is already growing in popularity.

In the future, it would be possible to enhance ELIS to include import information.
Although ELIS concerns itself with European export, it could be extended, as say GLIS, to include other destinations, such as the Far East and Australia. This would require a new module on customs regulations involving clearance, duties and import procedures. Additional data pertaining to Canadian customhouse brokers, their services and rules would also be needed.

Although ELIS concerns itself with European export, it could be extended, as say GLIS, to include other destinations, such as the Far East and Australia. This would provide companies the information necessary to go completely global.

References


[27] *Transportation Research, Special Issue on “European Railways”, Vol.25A, No.4 (1991).*


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Carolyn I. Barkhouse received a Bachelor’s degree (Mathematics) and Master’s degree (Management Sciences) from the University of Waterloo. She is currently a systems specialist at Canadian Pacific Railway in Toronto. Her forthcoming paper in the *Transportation Journal* concerns shipment consolidation.

James H. Bookbinder is Professor of Logistics in the Department of Management Sciences, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1. Phone (519) 888-4013. For 20 years he has worked with manufacturing firms, distributors, and transportation carriers on the modeling and analysis of logistics strategies and operations. He is a past-president of the Canadian Operational Research Society and past-chair of the transportation science section of the Operations Research Society of America. He holds an MBA from the University of Toronto and a PhD from the University of California, San Diego. His current research concerns shipment consolidation, distribution requirements planning, intermodalism in global supply chains, and transportation aspects of JIT systems.