THE CHALLENGE OF COMPETITIVE STRATEGY IN TRANSPORTATION

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1. SUMMARY

The world of transportation and logistics is changing very rapidly. As production and distribution become more global, increasing emphasis is being placed on the total logistics chain. Competition in increasing, and new firms can be expected to enter this field.

If a firm wishes to compete effectively in this situation, it must consider developing a new basic competitive strategy. This strategy will generally make heavy use of information systems and telecommunications (IST). To be successful, a strategy must also utilize the human resource base effectively.

Development of a strategy must recognize the distinction between competitive necessity and competitive advantage. For example, today in transportation EDI is a competitive necessity. However, EDI by itself does not create a competitive advantage for a firm.

An effective strategy must have four major components: build a base, achieve parity, incremental initiatives, and breakthrough elements.

A systematic process for developing a strategy is outlined. DSS tools to support strategic planning are described.

2. THE CHANGING WORLD OF TRANSPORTATION AND LOGISTICS

Today, the world of freight transportation and logistics is being affected by several major forces. [23]

The structure of manufacturing, sourcing and distribution is changing in fundamental ways. There is substantially-increased emphasis on quality of product and on quality of service. Associated with this, there is significant movement by many companies toward single-sourcing for most required products and services. Thirdly, there is a greatly-increased coordination between a firm and its suppliers, and a firm and its customers and distribution channels.

At the same time, production and distribution is becoming global in scope in many industries; firms are sourcing their needed inputs on a global basis and selling their outputs globally. Competition is also global. More than ever before, companies are facing global competitors in both domestic and foreign markets. The basis of this competition is not only on price, but also on product quality and customer service. In some industries, such as computers and consumer electronics, "flexible manufacturing" means flexiblity at the world scale: the ability to shift sourcing, production, assembly, and distribution flexibly as market conditions, relative currency rates, labor resources, and other factors change.

These broad forces mean that the "logistics chain," from materials and components sources to final consumer, is being increasingly viewed as a single coordinated and integrated process. This "total logistics chain" (TLC) must be managed ever more tightly, regardless of the number of firms along the chain. To provide integrated management of the TLC, providers of transportation and logistics services are developing new products and services, involving increased responsibility for managing these services in a coordinated way on behalf of the shipping customer.

3. THE NEW COMPETITION

New organizations are emerging to provide these integrated services, and significant further change in logistics and transportation products and services will occur in the next few years. Existing firms will provide some of these new services; but we expect that new firms will enter this field. The nature of competition in logistics and transportation will change dramatically in the next five years - it is quite possible that the major service providers in 1994 will be companies not now in this business! These new entrants will be companies which provide logistics and transportation services as a means of selling other, higher-margin services - perhaps financial services, perhaps others. (We expect this change to be most rapid in Europe-oriented markets, driven by the industrial restructuring caused by, and causing, "Europe 1992.")

There will be two main elements of the new competition: the human resource base of a company, and the technology base - information systems and telecommunications (IST) capabilities. [16, 17, 21, 22]

IST capabilities will play a central role in the new competition. [1-8, 10, 11, 22, 25-27, 30-40] Today, we already see significant advances in IST uses for internal applications. There is widespread capability for integrated control of vehicles and of shipments, at the container or waybill level; some leading firms now also are able to track and control to the level of the item in the shipment. Basic computerized management information systems (MIS) are well-established. New decision-support systems (DSS) for operational decision-making and service management (including service measurement) are beginning to be used effectively.

The most significant gap is that of inter-organizational coordination: connections among shipper, receiver, transporters, and other elements of the TLC, such as customs, insurance, trade finance, etc. The emergence of established EDI (Electronic Data Interchange) standards, within North America, and now on a global basis (with EDIFACT), is creating the possibility for rapid developments in this area. Progress is still slow, because most firms are not yet ready to exploit this technology, but the rate of change is increasingly rapid. Inter-firm EDI will soon be providing the basis for tight coorindation and integration along the logistics chain: queries, shipment orders, the total order cycle, service monitoring and reporting, transmission of supporting documentation, electronic funds transfer (EFT), and many other elements of the full set of needed services.

It is useful to sketch out an image of the future. World-wide, carriers, forwarders, and other service providers will exchange detailed information about shipments, in close-to-real-time, to provide a shared base of shipment information. Some of this information will come from automatic identification

of shipments at the item or pallet level at each major point in the total door-to-door movement. This information base will be supported by all major firms in the total logistics chain, even though it may be provided by a number of different vendors.

This information will be the basic source for EDI transactions among all the partners in a particular trade transaction. The information will be used by each firm for control of the shipment and for internal mangement, and, in the case of manufacturers, for control of the production cycle. A wide variety of decision-support system applications will use this data. New types of customer services will be provided using this information augmented by other proprietary sources.

We are already seeing some elements of this emerge. Manufacturers and transporters are already engaged in tight coordination of manufacturing scheduling and transportation scheduling. New "contract logistics" services have emerged in North America and Europe, in a few cases including positioning the product to the specific retail counter in a particular store, with single responsibility for managing the total logistics chain to that point. Already firms are emerging which are providing new, speciallized value-added services for shippers, third parties, and transporters; the range of such services includes information, customs, packing and crating, insurance, financial, and others, as well as traditional forwarding and transportation activities.

4. KEY STRATEGY QUESTIONS FACED BY THE TRANSPORTATION AND LOGISTICS FIRM

If a firm wishes to compete effectively in this new world, there are many difficult strategy questions which must be analysed carefully. These questions apply to both shippers, and logistics and transportation providers:

a. Basic competitive strategy: What role does the enterprise wish to play in this new highly-competitive, global, integrated environment? Can the firm succeed in offering a broad range of integrated services? Can the enterprise be a specialized niche player? In which geographic markets and in which customer industry sectors does the enterprise wish to compete?

What products and services will the enterprise choose to provide itself, among all of those in the full bundle of integrated logistics services along the total logistics chain? For those services which the enterprise chooses not to provide, with whom will the enterprise form strategic alliances in order to be able to offer an integrated service package to the customers who seek it?

b. Use of information systems and telecommunications: How will the enterprise use IST effectively as part of its overall strategy? What systems capabilities will the enterprise need for internal management? for external linkages with its customers, suppliers, and logistics partners? What will be the overall architecture of its information systems? What IST capabilities will the enterprise build internally? What will the enterprise buy from others? from whom?

c. People resources: How will the enterprise build and maintain the quality human resource base required for this new competitive environment?

d. Competitive advantage: Will the enterprise be a leader or a follower? Does the enterprise have, or can the enterprise develop, unique strengths which will give it a sustainable competitive advantage over other firms in its chosen markets?

e. Process for developing a strategy: How can an enterprise develop an effective strategy?

5. DEVELOPING A STRATEGY: OVERVIEW

Developing an effective strategy to respond to this rapidly-changing competitive environment is not simple. The process through which a company or other enterprise can develop and implement an effective strategy must be carefully designed, and carefully managed. In the remainder of this paper, we will suggest some of the elements which should be considered in developing an effective strategy.

The material presented here is based on the results of ten years of research into the uses of information systems as a competitive weapon by companies. More than 50 companies in North America, Europe and Japan have been interviewed in this research. The principles and methods which are presented are based on this empirical work, theoretical developments, and the work of other researchers. In this research, particular attention has been given to the role of information systems and telecommunications as a competitive weapon, and the necessary and complementary role of the human resource base of an enterprise.

6. COMPETITIVE ADVANTAGE VERSUS COMPETITIVE NECESSITY

The following concepts are central to understanding the strengths and weaknesses of an enterprise's present strategy, and developing a strategy for the future. [5-8, 11]

A sustainable competitive advantage means that an organization or a region is clearly more effective than any competitor for a substantial period of time, say 5 - 10 years. In the case of a business entity - a firm - a sustainable competitive advantage is often defined as "producing profits which are significantly above the average for firms in the same industry."

The concept has not been defined operationally in the same way for public-sector organizations or regions. One possibility is to measure the rate of growth of some key indices of Amsterdam or the Amsterdam region, relative to other regions in Europe. For example, we might say that Amsterdam has achieved a sustainable competitive advantage if over a certain period the percentage rate of growth in regional product; employment in top management or technical jobs; personal disposable income; etc.; is significantly greater than that of any other European region. Of course, historical evidence of a sustained advantage as reflected in above-normal returns is no guarantee of future defensibility of that advantage.

A competitive necessity is some feature of an organization's strategy which must be adopted if an organization is to remain at least equally competitive with other leading organizations of the same type.

To see the implications of these distinctions, we will examine a current strategic issue in transportation and logistics, electronic data interchange.

7. EDI: COMPETITIVE NECESSITY OR COMPETITIVE ADVANTAGE?

Electronic data interchange (EDI) refers to the transmission of data among partners in a business or trade transaction by electronic means. Usually, the transmissions are computer to computer, although transmission from a terminal in one organization to a computer in another organization is often included in the definition of EDI also. In general, the transmissions are for structured business messages, such as a purchase order, invoice, shipping status query, shipment pick-up request, etc. Non-structured messages, such as ordinary business mail - electronic mail (EM) - are sometimes included, as is also electronic funds transfer (EFT).

In the early years of EDI, such transfers of information took place between companies using specific, tailored formats for the data transmission. Usually, one large company would develop such formats and insist that its trading partners - e.g., its suppliers - use these formats. Because these standards were narrowly used, the growth of EDI was slow; development of appropriate software was expensive and because the number of companies using software for a particular firm's proprietary standard was relatively small, the softwae was costly.

In the 1980's, various industry groups have established broadly-accepted standards for EDI. In North America, the TDCC developed standards for the transportation industry; and now at an international scale, the EDIFACT standards are being developed and becoming widely accepted.

EDI poses a major strategic issue for a transportation or logistics service provider, and for shippers, whether in manufacturing or in merchandizing. Because of the forces described earlier, a high level of electronic communication and coordination is increasingly being required.

Can a company gain a strategic advantage through implementing EDI?

We have studied a number of companies, in transportation [22], in steel manufacturing [26], and in other sectors. In our view, in almost every sector, EDI is a competitive necessity but not, by itself, a source of cometitive advantage. For EDI to be effective for a company, a substantial number of that company's trading partners - suppliers, distribution channels, and/or customers - must adopt the same EDI standards and approaches. But, in most cases, all of these firms will typically be trading partners with a company's competitors: very few suppliers or customers deal exclusively with one company's products. For those suppliers or customers, their investment in EDI will be fully productive only if they are able to use it in interaction with other firms. For this reason, EDI tends to be adopted by groups of companies in an industry at about the same time.

Furthermore, leading companies usually find it in their own interest to assist others in keeping up with EDI. For example, in the steel industry in the U.S., the integrated steel mills have been reducing their processing functions significantly in the last decade. Many major aspects of final finishing, cutting, and shaping of steel products are now being done by smaller firms, called

"outside processors." This segment of the industry has been growing rapidly, at rates of 50 -100% per year. These outside processors play a critical role in providing specialized services to complement the basic processes of the major steel companies. If the major companies simply tried to use EDI as a competitive weapon against the smaller, less-financially strong outside processors, they would be hurting themselves because they need the processors to finish their products to serve special customer needs. Therefore, the industry trade association, the American Iron and Steel Institute, funded a development effort to develop personal-computer-based software to provide EDI services for use by small and medium size firms. [26]

Thus, the very dynamic of EDI works against it being a source of unique, competitive advantage for any single company. Rather, when an industry segment does begin to move toward adopting EDI, it becomes a competitive necessity for all firms in that industry: if a firm does not keep up with its competitors and business partners, it will face a competitive disadvantage.

It is important to note, however, that EDI does provide an opportunity to take other, additional actions which can lead to a competitive advantage. While every firm in an industry sector moves, more or less uniformly, to implement EDI with its trading partners, not every firm will be creative, or effective, in exploiting the opportunities which EDI creates:

a. Changes in internal procedures: To fully exploit EDI, a company must make significant changes in its internal procedures, including manual and information systems-based procedures, and often extending to changes in its organization and people. For example, if the customer can place an order via EDI, then internal procedures must be changed to give the customer access to price, availability and delivery date, and other information. In some cases, this access may be unlimited; more likely, this access will be controlled through an internal sales or marketing or production scheduling function. Changes such as this require significant internal shifts. The company which can move ahead effectively to make these types of changes may gain an advantage over its competitors, who are more rigid or less creative.

b. Changes in product or service offerings: Another direction for exploiting EDI is to use EDI as a platform for delivering value-added services. This is an especially promising direction in transportation. For example, some logistics service providers are offering services to their customers such as actually purchasing input materials on the customer's behalf and managing that inventory until it is delivered directly to the production line on a just-in-time basis. Other service providers are offering financial services such as insurance, or trade financing such as factoring of goods on behalf of the customer.

Thus, EDI is a competitive necessity, which can move the industry to a new plateau, but it can be a basis for taking further actions which can lead to a competitive advantage for firms with vision.

8. ELEMENTS OF AN EFFECTIVE COMPETITIVE STRATEGY

In practice, an effective strategy requires a number of elements. We find it valuable to define a "Balanced Multi-Thrust Strategy" as a strategy in which various components are combined to achieve these objectives:

BASE: build a base - build the technology, organization and human resource base to maintain competitive parity and to lay a foundation for seeking competitive advantage

PARITY: seek parity - implement actions to maintain competitive equality - based on analysis of actions taking place in the industry and emerging competitive forces, identify those actions which are necessary on the basis of competitive necessity - that is, those actions which will be necessary to keep the organization at least comparable to its major competitors

INCREMENTAL INITIATIVES: implement focussed initiatives - by targetting on specific segments of the organization's "markets," seek to achieve an incremental lead over competitors. The lead may be three years, two years, or six months. Competitors will likely respond and match these actions, so it is necessary to have a continuous process of moving ahead with next-step actions to keep ahead of competitors. Thus, a "rolling, incremental" lead is sought in focussed areas.

BREAKTHROUGH: seek to develop and implement potential breakthrough strategies - The conservative base of an organization's strategy should be developed by building its base effectively and implementing an effective program of rolling, incremental focussed initiatives. At the same time, the organization should seek opportunities for innovative, "breakthrough" strategies that may have potential for achieving a sustainable competitive advantage.

9. DEVELOPING AN EFFECTIVE STRATEGY

To develop an effective strategy requires a number of elements.

First, there must be leadership. Ideally, this leadership should come from the top of the organization; but sometimes leadership comes from the middle managers in a company, or even from the field or lower levels. Leadership must create a vision of the possibility of change, and must have the capacity to lead the process of creating visions of possible specific changes and their consequences.

Second, there must be creativity. To be effective in gaining a competitive advantage, a strategy must have new, unique elements which have not yet been comceptualized by the competitors, or which have not yet been successfully implemented by them. Thus, by definition, a successful strategy requires at the very least a new creative insight.

Third, there must be a systematic process of managing the formulation and implementation of strategy. To develop and implement a significant strategy will require coordinated efforts of a number of major groups in the firm. To pull together these interests in a coherent way requires a coordinated and systematic process.

A systematic process which we have found useful is that we have called the Information Technology Strategic Assessment (ITSA). [16, 17, 21, 22, 26] This process consists of four major types of activity:

a. Diagnosis and Assessment - information collection and analysis, and identification of the critical issues which the firm must address in its strategic management process

b. Strategy Formulation and Evaluation - development of candidate strategy alternatives and systematic comparison and evaluation of alternatives

c. Strategy Choice and Implementation Planning - selection of a strategy for implementation and planning of that implementation, including organizational, human resource, and information systems aspects

d. Monitoring, Evaluation, and Strategy Revision

A number of techniques have been developed to support this process.

To assist in Diagnosis and Assessment, a diagnostic framework has been developed. This framework places integrates concepts from the strategy literature as well as concepts regarding the organizational aspects of strategy implementation barriers and forces. In addition, PC-based computer software has been applied to support this process, particularly the use of Lotus Agenda, a "Personal Information Manager" system. [24, 25]

To assist in Strategy Formulation and Evaluation, a number of techniques have been developed to support the process of inventing candidate strategies. For example, a PC-based computer program has been developed, using morphological analysis together with theoretical concepts from the strategy field. [15, 20, 29]

To assist in Implementation Planning, an integrated methodology has been developed. [22]

10. THE CHALLENGE TO RESEARCHERS AND TO MANAGERS

Transportation firms, especially those involved in freight transportation, are usually very lean organizations, especially at the senior management levels. As a consequence, therefore, there is typically little or no staff devoted to strategic management, and little or no effort.

In the emerging world of global competition and its implications, no transportation or logistics service provider can afford to continue operating without the benefit of strategic planning and strategic management. Strategy is not a luxury, it is a competitive necessity and a key to survival.

Yet, the elaborate planning methods described in the academic literature and advocated by some practitioners are not appropriate for many transportation companies. There is an urgent need for development of strategy theory and practical methods appropriate to the transportation sector, and especially the information systems and human resource dimensions of strategy.

The development and testing of such approaches should be a priority research area, for researchers.

The development of strategies using new methods and approaches should be a priority for transportation managers.

11. CONCLUSIONS

There is only one thing which is indeed certain about the future world of transportation and logistics: it will look very different from how it appears today - new services, new customers, and new competitors. The changes brought about by deregulation, in North America and elsewhere, will be minor by comparison with those to come as the world of trade and transportation responds to truly global forces.

Every firm in transportation or logistics must prepare for this unknown future, by having a strong strategic management process. Information systems and telecommunications (IST), and people, will be critical elements of this strategy.

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