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Motor Carrier Strategies in a Changing Environment: An Empirical Analysis

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I. INTRODUCTION

The concept of strategy has emerged in recent years as a useful tool in explaining a firm's level of performance. Organizational strategy is a multidimensional concept that seeks to capture the essential focus of a firm's activities and how it meets the challenges of the marketplace (Hambrick 1980). Dimensions of strategy include pricing policies, customer service, advertising and marketing efforts, financial control measures and many other management actions. It is therefore generally agreed that a firm's performance is at least partially determined by management decisions regarding approaches to executing the basic functions of the firm.

The Motor Carrier Act of 1980 (MCA) substantially reduced regulation in the motor carrier industry. Carriers now have greater freedom to initiate services since entry control by the ICC has been lessened considerably. The Motor Carrier Act also brought about profound changes in the ability of motor carrier rate bureaus to inhibit independent rate publication, which has resulted in a phenomenal increase in individual carrier initiated pricing activity. Thus, the post-1980 MCA environment gives motor carriers far greater freedom in deciding what markets to enter, what rates to charge, and what level to set other strategic variables.

Along with increasing the ability of firms to pursue strategic planning, a move towards deregulation also provides heightened incentives for strategic actions. As discussed by Smith and Grimm (1986), regulatory agencies normally shelter firms from competitive forces. However, with the advent of deregulation, careful consideration of strategic dimensions is essential.

The recent events which have increased both the potential and incentives for strategic actions by motor carriers provide a fruitful environment for study of motor carrier strategies. This paper is the first step in a major research project to study motor carrier strategic management in the post-MCA environment. The paper begins with a review of previous literature on motor carrier strategy, followed by a summary of work on competitive strategies in other regulated industries. In the next section of the paper, generic strategies proffered by Porter (1980) are used to provide a framework for empirical analysis of motor carrier strategies. Finally, preliminary results are presented, which indicate that strategic planning is receiving increasing attention in the post-MCA motor carrier environment.

II. REVIEW OF LITERATURE

Research to date on firm strategies in the motor carrier industry (McGee, 1982; Tye, 1983; Walters, 1985) has been largely descriptive, with an emphasis on interviews and case studies. Both emphasize expansion of existing services and diversification into new services, appropriate reactions to the environmental changes wrought by the MCA of 1980. However, there are disagreements among analysts regarding motor carrier strategies. For example, Tye (1983) foresees a decrease in selective service as rates on previously unprofitable traffic rise, while McGee (1982) foresees "greater concentration of carriers' assets to meet traffic movements." Such statements reflect a certain degree of uncertainty over what strategies are being practiced and point to the need for further strategy research.

A recent study by Booz, Allen and Hamilton (1984) represents the first empirical study of motor carrier strategies. The authors identified management and operating characteristics of carriers that performed above and below average. They found that successful firms focused more on marketing, customer service and firm diversification than their less successful counterparts. The study used discriminate analysis to separate the firms and then analyzed the groups to ascertain the most important differences. Not surprisingly, since firm strategy has been demonstrated to greatly affect performance, strategic factors such as marketing, service quality and diversification were found to explain much of the difference in performance between firms.

Previous studies are an important first step toward a comprehensive industry-wide study of motor carrier strategy and performance. These studies have provided insight into actual strategic factors in use in the industry. They also support other theoretical and empirical findings that strategy affects performance.

Another vein of related research is that linking strategy to regulation and deregulation in general. Strategy theorists have long argued that, in order to be successful, a firm's strategy must be congruent with its environment (Thompson 1967). A successful strategy prior to deregulation may not be successful after the dramatic change in environment. Khandwalla (1976) found that firm strategies become more complex as environmental uncertainty increases. Mahon and Murray, (1981) found in regulated, relatively stable environments (such as the pre-MCA environment of the motor carrier industry) that economic strategy factors are focused on much

less than social and political strategies. Therefore it is postulated that strategies in a volatile, deregulated environment are more complex and economically oriented than those in regulated environments.

A third area of related research deals with strategic planning in transportation. Examples of such research include: Fruhan, 1972; Grimm and Smith, 1985; Baker, 1985; Cunningham and Khandekar, 1985; Roberts and Mehring, 1985; and Smith and Grimm, 1986. Specifically, Fruhan (1972), in a study of the US airline industry, found that factors such as rates, and route selection were the most important factors in explaining firm performance. At the time of his study these variables were influenced strongly by the Civil Aeronautics Board. The implication for the US motor carrier industry is that firms should pay careful attention to basic factors such as route selection, market entry and rates charged.

Research regarding the impacts of deregulation on strategy in the railroad industry has been performed by Grimm and Smith (1985, 1986). The authors have found that railroad firms may be clustered according to strategy and that environmental change brought about by deregulation prompted changes in firm strategies. Another finding was that firms which changed strategies in response to deregulation outperformed firms which did not.

III. DIMENSIONS OF MOTOR CARRIER STRATEGY

The notion that firm strategies can be grouped into a limited number of types has become one of the basic tenets of strategic management research. Porter (1980) has posited three generic strategy types: (1) low cost strategy, which involves cost minimization and superior production efficiencies; (2) differentiation strategy, which entails setting the firm apart from its competitors by creating superior brand image, product quality, or customer service; and (3) focus strategy, which involves concentration on particular customers and market segments. However a focus strategy must also incorporate either lower costs or successful differentiation in order to be profitable. Dess and Davis (1984) have found empirical support for Porter's theories of generic strategy.

Porter provides a useful framework for analysis of motor carrier strategies. In particular, dimensions of strategy can be derived from Porter's generic strategies. The low cost dimension reveals to what extent a firm is trying to earn superior profits by being a cost leader, while the differentiation dimension indicates to what extent firms are focusing on brand image or superior quality.

The empirical section of this paper contributes in two ways to the existing research on motor carrier strategy. First, it is shown that Porter's dimensions of strategy can be operationalized and measured through publicly available annual report data. Second, a comparison of strategic variable values in 1977 and 1984 reveals that more attention is being given to strategic dimensions, particularly product differentiation.

Annual report variables which would reflect the low cost dimension are: operating expense per ton mile; operating expense per vehicle mile; pick up and delivery expense per ton; insurance and safety expense per vehicle mile; general and administrative expense per ton mile; maintenance expense per vehicle mile; percent owned vehicle miles; vehicle miles per truck; and trucks purchased as percentage of total trucks.

The first six measures relate to the carrier's cost per unit of output. It is reasonable to predict that firms with a low cost dimension to their strategies would seek to minimize these rather easily identified areas of cost. Percent owned vehicle miles measure the extent to which a firm utilizes owner operators. It is expected that firms pursuing low cost strategies would employ higher percentages of owner operators, as this is generally acknowledged to be a source of cost savings. The last two measures relate to how intensively a firm uses its existing fleet. It may be reasonably assumed that firms attempting to achieve a cost advantage over their competitors would seek to maximize fleet productivity, generating higher vehicle miles per truck and lower trucks purchased as a percentage of total trucks. The firm pursuing a low cost type strategy would therefore be expected to rate relatively low on the cost measures discussed.

Second, the differentiation dimension is represented by the following variables: tariff and schedule expenses as a percentage of operating expenses; advertising expense as a percentage of operating expenses; commissions and agent fees as a percentage of operating expenses; and communications as a percentage of operating expenses.

These measures have been selected to discern the degree to which the firm differentiates itself through an image of uniqueness. Advertising expenses as a percentage of operating expenses and commissions and agents fees as a percentage of operating expenses are intended to measure the firms emphasis on marketing and sales activity to achieve presence in their markets. Tariff and schedule expenses as a percentage of operating expenses is a related measure indicating the efforts of the firm to create an image of uniqueness for itself through independent rate publications and schedules. Finally, communications expenses would indicate efforts to promote product image.

IV. MOTOR CARRIER STATISTICS ON STRATEGIC DIMENSIONS: 1977 AND 1984

In order to measure how firms rate along low cost and differentiation strategic dimensions, the variables listed above were selected from general freight carriers' annual reports to the Interstate Commerce Commission. Only predominately less-than-truckload carriers, those with 75% or more of shipments from LTL operations, were included in the analysis to ensure comparability. The overall hypothesis to be tested is that the post MCA, competitive environment of 1984 will prompt more emphasis on these two strategic dimensions.

Results for the low cost dimension are presented in Table 1, while results for the differentiation dimension are presented in Table 2. Examining first the low cost dimension, operating expense increases from 24 cents/ton mile in 1977 to 47 cents/ton mile in 1984, a 98% increase. Operating expense per vehicle mile shows a significantly lower increase of 60%, from $2.25 in 1977 to $3.60 in 1984. It is necessary to control for inflation to discern the ex-

TABLE 1: COST AND EFFICIENCY DIMENSION

VARIABLE	1977 MEAN	1984 MEAN	PERCENT CHANGE
OPERATING EXPENSE PER TON MILE	.236	.467	97.9
OPERATING EXPENSE PER VEHICLE MILE	2.25	3.60	60.0
PICK UP AND DELIVERY EXPENSE PER TON	16.8	34.2	103.6
INSURANCE AND SAFETY EXPENSE PER 100 VEHICLE MILES	2.41	3.71	54.2
GENERAL AND ADMINISTRATIVE EXPENSE PER 100 TON MILES	1.37	2.97	116.8
MAINTENANCE EXPENSE PER 100 VEHICLE MILES	5.45	9.28	70.3
PERCENT OWNED VEHICLE MILES	83.1	79.6	−4.2
VEHICLE MILES PER TRUCK	39902	40539	1.6
TRUCKS PURCHASED AS PERCENTAGE OF TOTAL TRUCKS	14.2	11.0	−22.5

SOURCE: MOTOR CARRIER ANNUAL REPORTS AS FILED WITH THE INTERSTATE COMMERCE COMMISSION

tent to which firms are now emphasizing lower costs vis-à-vis 1977. Although development of a motor carrier factor price index is beyond the scope of the paper, two standard inflation indices were used to compare changes in industry costs to general inflation. The producer price index and GNP deflator both indicated levels of inflation of 64% between 1977 and 1984. Thus, the evidence is mixed regarding incidence of low cost strategies during this time period, with average operating expense/ton mile increasing more than inflation and average operating expense/vehicle mile increasing at a slightly slower rate.

Examining individual cost categories, the largest increases are in general and administrative and in pick up and delivery, with increases of 117% and 104%, respectively. Maintenance along with insurance and safety show lower increases on 70% and 54%, respectively. Of the four, only insurance and safety increases are less than general inflationary trends, indicating that greatest attention is being directed at reducing these costs.

Turning next to use of owner operators, percent of owned vehicle miles declines from 83% in 1977 to just under 80% in 1984. This indicates that, on average, carriers are increasingly pursuing this dimension of low cost strategy.

With regard to efficiency measures, vehicle miles per truck increases from 39,900 in 1977 to 40,500 in 1985, a 1.6% increase. This indicates that carriers are utilizing their fixed capital assets more intensively in the post-MCA period. Additional evidence for this notion is provided by the decrease in trucks purchased as a percentage of total trucks from 14.2 in 1977 to 11.0% in 1984.

The results in Table 2 indicate a substantial move toward product differentiation in the post-MCA period. Tariffs and schedules as a percentage of operat-

TABLE 2: DIFFERENTIATION DIMENSION

VARIABLE	1977 MEAN	1984 MEAN	PERCENT CHANGE
TARIFFS AND SCHEDULES AS PERCENTAGE OF OPERATING EXPENSES	.200	.265	32.5
ADVERTISING AS PERCENTAGE OF OPERATING EXPENSES	.119	.161	35.3
COMMISSIONS AND AGENT FEES AS PERCENTAGE OF OPERATING EXPENSES	1.61	2.42	50.3
COMMUNICATIONS AS A PERCENTAGE OF OPERATING EXPENSES	1.03	1.38	34.0

SOURCE: MOTOR CARRIER ANNUAL REPORTS AS FILED WITH THE INTERSTATE COMMERCE COMMISSION

ing expenses increases by 32%, indicating a greater marketing effort. Moreover, advertising as a percentage of operating expenses is up 35% in 1984 as compared to 1977, revealing a significant increase in promotional activity. Commission and agent fees as a percentage of operating expenses and the percentage of communication expenses both increase between 1977 and 1984, 50% and 34%, respectively. All four measures corroborate the hypothesis that carriers will place greater emphasis on the strategic dimension of differentiation in the less-regulated 1984 environment.

V. CONCLUSION

This paper has contributed in three ways to the existing literature on strategic planning in the motor carrier industry. First, relevant literature on motor carriers, other transportation modes and the impact of deregulation on strategy was reviewed. Second, Porter's framework for generic strategy groups was utilized to derive and operationalize two key dimensions for motor carrier strategies: low cost and product differentiation. Third, motor carrier annual report data for 1977 and 1984 was presented to test the hypothesis that on average, carriers will increase their emphasis on both strategic dimensions in the post-MCA period. Support is found for this hypothesis; in particular, the data reveal that motor carriers are now emphasizing product differentiation to a much greater extent than in 1977.

This paper is the first step in a major research effort to investigate motor carrier strategies. Other segments of the motor carrier industry, including various specialized carriers, will be examined. Future research will also extend the number of strategic dimensions examined to include product and geographic focus/diversification and innovation. Additional variables will also be examined on the low cost and differentiation dimensions.

Moreover, individual firms will be evaluated across all strategy dimensions in both of the two time periods. Cluster analysis will be used to classify each firm into a strategic group, according to its ranking on the dimensions. This will allow in depth analysis on the prevalent of various motor carrier strategies both before and after regulatory reform and the link between strategy and organizational performance. Though much remains to be done, this paper provides a contribution to an important topic.

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ENDNOTE

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