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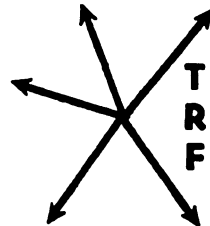
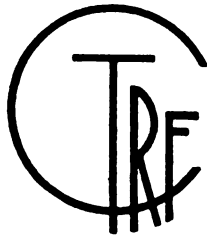
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Expanding the Role of Transportation Studies in Business Schools — An Example*

by D. H. Maister**

1. INTRODUCTION

IN THEIR STUDY of transportation and logistics education in the 1960s, Professors Cherington and Schneider concluded that many MBAs who subsequently entered into careers with transportation companies had not taken any course in transportation during their studies, and wished later they had done so. The authors concluded that there was a need for transportation faculty at business schools to "tap a wider audience" to expose the transportation industries to students who would not ordinarily elect to take a transportation course.

This goal will be shared by many transportation educators, who look for a more important role for their subject in the curriculum of their institution. However, in the absence of prior student interest, the fact that students may subsequently work for transportation companies is a weak argument in favor of expanding the scope of transportation education, since the same claim can be made for many other industries and subject areas.

In seeking to promote interest in his (or her) area, therefore, the transportation educator must argue that the study of the transportation industries has some intrinsic merit; that it may accomplish other educational goals of the institution as well as those of the department. In other words, an answer must be found to the question, "In addition to knowledge of a single industry, what can the student gain from a study of the transportation industries?" The course described in this paper was designed to provide an answer to this question.

The second-year MBA course entitled "Manufacturing Policy," which is described below, has been taught at the Harvard Business School since 1948. Since 1965 it has been the practice to study only three industries during the semester, devoting 10 to 12 successive class sessions to the study of each industry. In the summer of 1973, the author was asked by the current instructor in this course (Professor R. H. Hayes) to assist in the prep-

aration of teaching materials on the transportation industries, with a view to offering a transportation module in the course. The course described in this paper is the result of that effort, and has been taught at the Harvard Business School in the fall semesters of the last two years.

It is this use of the transportation industries as a part of a nontransportation course that is the essential interest of this paper. We shall therefore begin with a description of the Manufacturing Policy course, and a discussion of its pedagogical aims, before proceeding to examine how the transportation industries may be used to achieve those aims.

However, before proceeding, it should be noted that the course described here assumes the use of the "cast method" of instruction, whereby students are asked to discuss a business situation or problem described in a 10-20-page case that they have read prior to the class. It is not intended to discuss the relative merits of the case method here, but it should be noted that the use of this method is not restricted, among transportation topics, to carrier management. Extensive use of the case method in schools of law and public administration amply demonstrate the potential of the method to deal with such topics as the regulatory framework and national transportation policy.

2. WHAT IS MANUFACTURING POLICY?

Since its inception in 1948, the Manufacturing Policy course has had two defining qualities. The first, to "focus attention on decisions directed at operating problems," concerns the content of the course. The second, to "place the student, as far as is feasible, into the industrial climate so that he can draw upon his own knowledge during the decision-making process other than rely solely upon data selected for him by the casewriter," relates to the process of method of instruction. These two themes have been expanded and redefined over the years, but remain the essential characteristics of the course.

Content. In the refining of course goals that has taken place, the simple content concept has been adjusted to an objective of encouraging the students to "develop skills to . . . (be able to turn the) . . . manufacturing function into a com-

*The author is grateful to Professors R. H. Hayes, J. L. Heskett and D. D. Wyckoff for comments on earlier drafts of this paper, as well as invaluable guidance in the work reported here.

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petitive weapon." It is this concept of manufacturing as a strategic tool that differentiates Manufacturing Policy from many other courses in production and operations management offered at the Harvard Business School and elsewhere. The educational message has a dual nature: that strategic decisions cannot be taken by corporate management without a true understanding of the opportunities and constraints of the underlying technology (or technologies) of the industry in which the firm operates; and that optimal manufacturing decisions cannot be taken without a clear concept of the strategic policy of the corporation.

Given this dual lesson, it will be seen that the prospective audience for the course is not restricted to those students with a special interest in production topics. Rather, the course is aimed with as much force at the generalist, who seeks his career goal at the top levels of corporation decision making. It is this "upgrading" of the field of production that explains the educational importance of the Manufacturing Policy course.

In a recent article in the *California Management Review*, Martin Starr observes (variously) that "Production managers (have) regressed to positions exercising minimal organizational influence. . . . R&D and market-management are almost arbitrarily coordinated with production management . . . few business students concentrate in production management as compared to other functional areas . . . Many corporate officers know almost nothing about the production processes required to make the product line."

In part, this state of affairs is perpetuated by the "classical" approach to the teaching of production and operations management that still prevails in many business schools. By this approach, production courses are concerned with problems faced by plant managers and other executives at a similar level in the organizational hierarchy, covering topics such as production scheduling, inventory control or work flow system design. Whether the pedagogical approach is practical or theoretical, such courses tend to be "self contained" or "inward looking," stressing a puzzle-solving approach to closed system problems. This is clearly demonstrated by the contents of many of the most popular texts in production or operations management.

That such courses perpetuate the isolation of production executives in the corporate hierarchy is a consequence of the low status attributed to the study of production by many business students. The generalist feels (perhaps rightly) that a detailed knowledge of, for example, linear programming techniques, is not essential to his career in the formulation

of strategy. He may formulate an image of the typical production executive as a "nuts and bolts man," an image that, if retained, will lead to continued neglect of manufacturing by corporate executives. In a similar way, the student that is attracted to the study of production as taught in the classical manner may receive a very limited view of what the concerns and skills of a manufacturing executive should be. This in turn will affect his performance characteristics in his future career. (It is interesting to compare Cherington and Schneider's observation that transportation teaching often "vacillates between the extremes of ethereal theory and 'nuts and bolts' description," with these charges leveled at production courses.)

In order to transcend these problems, Manufacturing Policy has adopted two related devices. First, most of the case studies used in the course concern decisions to be taken at the vice presidential level, usually by a manufacturing executive. Second, the problems under study are those that are "critical to the success of the enterprise." We may note that because of the status of manufacturing executives reported by Starr, certain case studies may not combine both of these desiderata. Such cases retain an important educational role in studying either the misplacement of decision-making authority or the dangers of ignoring the manufacturing implications of strategic decision making.

In summary, one may note that because of its appeal to both generalists and specialists, the Manufacturing Policy course is equidistant between "traditional" courses in Business Policy and Production Management. The former is often a required course for MBA students, the latter less often. It may be argued that if any production-oriented course should be required, then it is the Manufacturing Policy course rather than the classical Production Management which is the prime candidate. This will be especially true for those schools that place heavy reliance on the case method of instruction, since one of the underlying principles of the case method is that the student needs to be convinced of the importance of what he is studying before he will give it his full effort and attention. A Manufacturing Policy approach may thus pave the way for increased student interest in the more traditional Production Management course.

Process. We now turn to the second key principle embodied in the Manufacturing Policy philosophy, the industry approach. Phrased in a simple manner, one of the prime justifications for this approach is that the student cannot be expected to make rational evaluations of companies and recommendations concern-

ing strategic decisions without sufficient data on industry norms and competitive information. Information provided within the context of one case is often too selective and directive, in the sense that it fails to convey the range and depth of competitive and industry factors that are available and useful in formulating corporate strategy. Only through the device of numerous case studies within one industry may a realistic approximation of the "on-the-job" climate and context of business decision be simulated.

In addition to this broad educational justification (which may be termed the objective lesson of the industry approach), there is a more subjective message—that each industry has its own "flavor" or "character" that must be fully understood in order to make sense of many actions taken by industry participants.

These arguments raise the question of whether the industry approach should be recommended for all courses that address policy issues, or whether the industry approach is uniquely suited to the study of manufacturing decisions. It is clear that excessive use of the industry approach would significantly restrict the range of issues that most courses would wish to cover.

Fortunately, one may argue that such a course of action is not necessary, and that the industry approach is indeed especially suited to the study of manufacturing decisions. The major reason for this is that manufacturing processes are complex and difficult to comprehend and learn in a short time. As a consequence, the "fixed cost" (in terms of time) of studying these processes is only educationally "economic" if spread out over a number of cases. In addition, it is often only the manufacturing process that provides a commonality within an industry. Finance, marketing and organizational strategies more frequently vary widely between companies in the same industry. In a very real sense, the study of an industry is a study of various consequences of its manufacturing processes. It is often observed that financial, marketing and organizational strategies are conditioned by the economics of the industry. An understanding of the underlying technological alternatives, such as provided by Manufacturing Policy, enables an assessment to be made of the extent to which these economies may be altered.

Other Manufacturing Policy Traditions. One of the prime dangers of the industry approach is that, in expanding a great deal of time in the study of one industry, the student may not be absorbing interdisciplinary skills. In part, this problem is unavoidable if, as argued

above, one of the key lessons of the course is the importance of industry-specific inputs in the managerial decision process. However, this problem is one that is amenable to solution, if the instructor is careful to give sufficient emphasis to the process of industry analysis as well as to its results. The study of three industries in one semester facilitates the instructor's task in this, enabling him (or the students) to make the relevant comparisons between the industries studied, and, from there, to go on to more general reflections. If the student comes away having learned that consideration of the industry as a whole is important to him, and has learned an approach to conducting such a study, then the course may be considered to have achieved its aim.

A final aspect of the course, as currently conceived, is the fact that the definition of what constitutes "an industry" has been expanded to include not only consideration of competitors (i.e., a "horizontal" definition), but also to include a "vertical" slice of the industry under study (i.e., including suppliers and customers). Such an expansion is not applied uniformly. In fact it is only done when vertical integration is a common industry practice and the manufacturing executive would therefore be expected to possess a knowledge of the successive stages in the manufacture of his own company's product. This "vertical slice" approach to the study of an industry serves to demonstrate to the student the need to become aware of what he needs to know, i.e., to be flexible in his definition of industry boundaries. However, it is not necessary for all industries studied under the aegis of Manufacturing Policy to be vertically integrated. The message of variations in industry boundaries may be conveyed in other ways.

Before turning to a consideration of how the transportation industries fit into the Manufacturing Policy "mold" as presented above, it may be useful to itemize some of the issues and problems addressed in case studies selected for the course. The following (incomplete) list is taken from Skinner and Rogers.

- (1) Choice of Process
- (2) Span of Manufacturing
- (3) Scale of Production
- (4) Location of Plants
- (5) Selection of Equipment
- (6) Finding Key Control Factors in the Manufacturing Process
- (7) Control System Design

3. THE TRANSPORTATION INDUSTRIES

Service vs. Manufacturing. In this section we shall use the framework of the preceding discussion to analyze the suit-

ability of the transportation industries as a forum for the discussion of manufacturing policy. The first problem that must be addressed is how the basically service nature of these industries permits the study of manufacturing policy.

This apparent contradiction is easily resolved. As was demonstrated (indeed, urged) by Theodore Levitt in his article, "The Production-Line Approach to Service," viewing service firms as if they were manufacturing concerns yields many insights that are of assistance in analyzing the operations and strategy of such enterprises. The success of this approach has been demonstrated at the Harvard Business School in the "Management of Service Operations" course which continues to attract a high student enrollment. Professor Levitt's article is usually the first (and only noncase) assignment in this course.

However, it is reasonable to question whether the appropriate forum for the teaching of transportation may not be a course devoted solely to service industries rather than Manufacturing Policy. It is certainly true that transportation cases have been used with great success in the Management of Service Operations course as taught at the Harvard Business School. However, it is argued here that the use of a service industry in the Manufacturing Policy course serves an important pedagogical purpose, i.e., enabling comparisons and contrasts between the two forms of industry to be made within the context of one course. In the remainder of this section, therefore, we restrict attention to the Manufacturing Policy context.

The Importance of Operations. As noted in the previous section, one of the primary lessons of the Manufacturing Policy course is the inter-relationship between manufacturing decisions and corporate strategies. The transportation industries are well suited to demonstrating this relationship, for a number of inter-related reasons.

First, we note the fact that most of the transportation industries are subject to extensive federal regulation on the rates that may be charged for the services and the routes that may be served. As a consequence major marketing decisions concerning price and market selection are not subject to the sole discretion of corporate management. In turn, this means that competition often takes place primarily on the quality of service provided. Operations management thus achieves a significance almost unmatched in other industrial sectors. (The heavy reliance on operating decisions as a competitive tool has been documented by Fruhan, who concludes that this is a result of regulatory restrictions upon management choice.)

It is not only federal regulation, however, that determines the importance of operations to transportation companies. The demand for the industries' services may be considered to have a "real-time dimension" in the sense that the "product" may not be inventoried and must be provided when (and where) demands arise. This places critically and urgency constraints upon the operating system that helps to stress the importance of operations management within the total management task.

It is thus seen that operating decisions in the transportation industries are "critical to the success of the enterprise." What is more, they are normally perceived to be so by corporate management. This may be demonstrated by examining the background of chief executive officers (CEO) and other top officials in transportation organizations. For better or worse, there have long been traditions in each of the major transportation modes that top corporate officials should have a background in the operating side of the company's business. The ranks of airline CEOs show a high proportion of ex-pilots, and many trucking company presidents began their careers behind the wheel. Among railroad CEOs, ex-operating men are now perhaps outnumbered by lawyers (for understandable reasons), but it remains true that the career path for new entrants (including MBAs) still includes some period in a position in line operations, regardless of the final career goal of the person involved.

The importance and status of operations management in the transportation industries clearly provide a perfect setting for demonstrating the interrelationship of corporate strategy and operating decisions. We shall now show that these industries also match with the second defining characteristic of the Manufacturing Policy course, the use of the industry approach.

The Industry Approach. There has long been a tradition of studying the transportation industries, as a unit, in many business schools. For many schools, transportation courses have been (and remain) the only industry based courses in the curriculum. It is not the intention here, however, to demonstrate fully why this has been so, although a discussion of the role of transportation studies will be presented in a later section. Rather, the object of this section is to show how the pedagogical lessons of the industry approach may be furthered by study of the transportation industries.

We first note the need to refer to the transportation industries. According to many definitions of "an industry," the motor carriers, the airlines and the railroads (to name only the three major

modes) each constitute a separate industry. Yet it is easily demonstrable that corporate strategists (and operating managers) must possess knowledge of their competitors in other modes in order to make rational decisions. Thus, at a very practical level, the definition of what constitutes "the industry" is expanded to transcend modal distinctions. This "many industries in one" aspect of transportation serves two major pedagogical purposes.

First, it enables simultaneous comparisons between the modal sectors, thus strengthening the process of industry analysis. The instructor may lead the students to distinguish between dimensions that are common to any industry analysis and those that are peculiar to the specific industry-wide study. This lesson may be brought out after two or three other industries have been studied, but with the transportation industries as a single module, the generalities of industry analysis may be developed early in the semester. This provides assistance in addressing one of the major objections to the industry approach, as discussed above.

The second pedagogical benefit of the "many industries in one" nature of transportation is that it reinforces the important lesson referred to in our discussion of the goals of manufacturing policy, i.e., the need for a careful definition of industry boundaries. We noted above that this lesson may be achieved by a discussion of vertical integration. The transportation industries provide a good example of the need for horizontal expansion of industry boundaries. The inclusion of examples of both types in one semester will serve to reinforce the lesson.

This is not to say that a discussion of vertical integration is not possible within the context of transportation. Instances of intermodal operations, particularly the example of air freight wherein the full "process" involves both an air and truck movement, enable a discussion of the relative merits of common ownership of the various stages in the provision of the "product" (i.e., service).

The transportation industries serve the industry approach in yet another way. We have noted that an important rationale for the industry approach to the study of management action is that each industry has its own norms, standard procedures and "conventional wisdom," and that it is important for the observer to understand these. While it would be unwise to suggest that these norms are less observable in other industries, it remains true that the transportation industries have a strong unique

"flavor" that demands attention to industry specific considerations in management decisions. It is readily demonstrable that the analysis of transportation companies requires an understanding of the peculiar conditions and attitudes that prevail in these industries. In part this is facilitated by the fact that these are regulated industries. For whatever reason, the lesson learned in this way is an important one: that the student must study carefully whatever industry he enters.

A final manner in which the study of transportation industries lends credence to the industry approach is the extensive amount of inter-organizational coordination of operations that prevails. Apart from the already cited example of air-truck intermodal movement, "interlining" of freight between carriers in the same mode is very common, mainly because of the regulatory restrictions on routes. The interdependency of operations and the consequent impact on corporate decision making argue strongly for an industry approach to the study of management problems.

Other Considerations. In this section we shall discuss other aspects of the transportation industries that support their study within a Manufacturing Policy course.

First, we note that they are, in general, characterized by high capital intensity as measured by the level of fixed investment per dollar of revenue. This is particularly true of the rail, air and water modes. The consequences of this is that process choice and equipment selection decisions achieve an importance that necessitates consideration of strategic implications. Such decisions are the central study of Manufacturing Policy.

Contrary to some popular beliefs, the transportation industries possess a high rate of technological change. In its more obvious aspects, one may point to the development of successive generations of jet aircraft, continued functional refinements of railroad cars and motor vehicles, and the development of intermodal technologies. Although definitional disputes are ever present, most observers agree that the percentage rate of productivity increase has been high (relative to manufacturing as a whole) in the transportation industries. Changing technology and productivity increases are, once more, central concerns of Manufacturing Policy.

Finally, we may note that within each transportation mode there is a wide range of firm sizes, yielding the opportunity to explore the alternate operating and corporate strategies that we appropriate to firms with varying scales of operation. Along another but related di-

mension, the transportation industries contain a wide range of firms in varying "life cycles." Contrast, for example, some of the more established railroads faced with a relative decline in the demand for their services, with an aggressively expanding motor carrier. Again, contrary to some popular beliefs, there continue to exist opportunities for rapid expansion of transportation companies, with unique opportunities for entrepreneurship. Such an industry climate not only allows case examples to be found demonstrating important strategic choices, but also assists in the process of student involvement in his studies.

4. COURSE DESIGN

In this section we shall discuss the design of a transportation module for Manufacturing Policy. Apart from explaining the rationale of the design chosen for the course as taught in 1973 and 1974, consideration will be given to alternative designs for courses of different lengths.

We shall take as a starting point the list of issues given at the end of Section 2 of this paper. These issues were offered as examples of problems considered the relevant domain of Manufacturing Policy. In Table 1 we present a matrix with these issues as one axis, the other axis being a broad (and somewhat arbitrary) categorization of the transportation industries.

It is not too difficult a task to find examples of each issue in the transportation industries. By way of example, consider the following:

Choice of Process—a freight forwarder choosing between rail and motor carriage; an airline choosing between alternate ground handling procedures; a transit company choosing between rail and bus services.

Span of Manufacturing—a motor carrier deciding whether to offer both truckload and less than truckload services, an airline deciding whether to provide a shuttle service, a railroad deciding whether to offer stop-off privileges.

Scale of Production—capacity planning by any mode.

Location of Plants—a motor carrier planning a "hub" system, a transit authority deciding on stops and garages, a rail carrier establishing (or abandoning) a branch line.

Selection of Equipment—by any form of carrier.

Finding Key Controls—contrast between passenger and freight operations in each mode, contrast between truckload and less than truckload operations, contrast between service requirements of different market segments.

Control System Design—rail-car tracking systems, airline booking systems, scheduling procedures.

It is clear from this sample list that there is no lack of operating issues in transportation companies that are worthy of study. It is equally clear that if the transportation industries are to be used as a single module within a three-industry semester program that a high degree of selectivity is necessary. The matrix in Table 1 has 56 cells, and a case study for each cell would create a course exceeding the number of class meetings for a whole semester at most schools.

On the other hand, if one were to choose cases to illustrate both an industry sector and an issue, the area of coverage would be so broad as to prevent in-depth analysis. It will be recalled that a major purpose of the industry approach is to permit information and principles of one case to support the analysis of succeeding cases. Attention must therefore be restricted to some subsector of the overall transportation industries, while retaining sufficient multisector aspects to support one of the strongest motivations for choosing the transportation industries for study.

It is proposed here that the basic choice is between the passenger and freight subsectors. The nature of these sectors in the real world is such that study of one may be conducted almost without reference to the other. Both airlines and railroads provide both services, but the management of freight and passenger operations among most carriers of either mode is distinct enough for purposes of study.

While it will not be argued here that choice of the passenger transportation industry is infeasible, there are certain aspects of the freight transportation industries that make them "fit" well with a Manufacturing Policy course. First, this sector has an "industrial" flavor that corresponds to that of most other industries studied in Manufacturing Policy. Part of this flavor is attributable to the fact that most freight transportation is purchased by industrial concerns as part of their logistics system. In con-

ISSUE-INDUSTRY SECTOR MATRIX

ISSUE	INDUSTRY SECTOR							
	Passenger				Freight			
	Air	Bus	Rail	Urban	Air	Truck	Rail	Water
Choice of Process								
Span of Manufacturing								
Scale of Production								
Location of Plants								
Selection of Equipment								
Finding Key Controls								
Control System Design								

TABLE 1

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sequence, the relationship of transportation to other aspects of this system, such as inventory control, may be explored, thus expanding the range of manufacturing issues considered in the course. By way of contrast, the purchase of passenger services (mainly by the general public) involves considerations that do not relate to other aspects of Manufacturing Policy.

In addition, intermodal competition in the transportation industries is more intense, leading to a more "unified" industry sector than is true in the passenger market. The latter is characterized by the importance of private transportation (auto) which in many ways may be considered the major competitor of each mode. The study of private versus common carrier transportation does yield the opportunity to draw the analogy between "make or buy" manufacturing decisions, but the dominance of this as an issue is not to be welcomed. In contrast, air-truck, truck-rail and rail-water competition is very intense, affording the opportunity to study these "process" alternatives.

Unfortunately, even removal of consideration of passenger operations leaves four modes to be discussed in the space of 10-12 class sessions. This is not an impossible task, but it is traditional (and advisable) to take one class session for the discussion of an industry note and another for an industrial visit. The time available for case discussion is thus reduced to 8-10 class sessions. At the lower limit, this would imply two cases per mode, which experience suggests is too few.

It will therefore often prove necessary to restrict attention to three or even two

modes. In fact, due to the use of separate industry notes for each mode (see below) it appeared feasible in 1973 and 1974 to restrict attention to two modes. Apart from the criterion that the two modes should be directly competitive, the choice of airlines and motor carriers was arbitrary. Discussion of railroads was enabled both by the industry notes and the inclusion of a case that focused on a particular instance of rail-truck competition.

It is not suggested that this design is optimal, and indeed it is recommended (on the basis of student response to the course) that inclusion of railroad cases is much to be desired. This will probably involve expansion of the course to at least 12 class sessions.

An alternative approach to the desirable contents of the course may be gained from the alternative classification of issues and industry sectors presented in Table 3. It will be seen that, in contrast to Tables 1 and 2, the issues given in this table are examples of specific transportation operational problems. In addition, a further subdivision of industry sectors has been attempted. It should be noted that since the distinctions between sectors is narrower than in Table 1, Table 3 is not subject to the same criticism that the scope is too broad to be contained in a short course.

Classification of cases by the industry scheme contained in Table 3 will enable an instructor to judge whether a wide enough range of representative companies has been chosen within each mode. A true understanding of the various forms of transportation companies, and of their respective operating strategies, is essential to an understanding of the

DESIGN FOR 1973, 1974 COURSES

ISSUE	FREIGHT									
	AIR				TRUCK					
	Air Canada Cargo	Flying Tiger Line	American Airlines (a)	Federal Express (b)	Howard Systems	Tar Heel	Eastern Express (a)	Portland Fish (b)	Ryder Truck Lines (a)	LPI (a)
Choice of Process	1			1	2	*		1	1	
Span of Manufacturing			1	*	1	*	2		*	1
Scale of Production		2	*				2	1		*
Location of Plants	2									
Selection of Equipment		1		*						2
Finding Key Controls			2		*	1	*			
Control System Design				2				2	2	

Key: 1 = Prime Issue
 2 = Secondary Issue
 * = Subsidiary Aspects

a = Used Only in 1973
 b = Used Only in 1974

Note: Company names refer to case studies.

TABLE 2

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ALTERNATIVE DESIGN SCHEME FOR SHORT COURSE

	FREIGHT								
	AIR				TRUCK			RAIL	
	All Cargo Carrier	Combination Carrier	Non-truck Carrier	Forwarder	General Commodity Carrier	Commodity Carrier	Private Trucking	Surface Forwarder	Rail-road
Route Selection					Eastern Express Tar Heel				
Equipment Selection	Flying Tiger						LPI		
Terminal Mechanisation/ Automation		Air Canada Cargo	Federal Express (B)						
Container Technology									
Intermodal Operations			Federal Express (A)		Eastern Express	Howard Systems			
Joint Product Costing						Howard Systems			
Commodity Specialisation		American Airlines	Federal Express (A)			Portland Fish			
Scheduling					Kyder				
Interorganisational Problems							Portland Fish		

Note: Entries in this table demonstrate location of cases used in course in 1978 and 1974, and do not represent an optimal design scheme.

TABLE 3

industry. The list of issues presented in Table 3 represent most of the major operational problems of transportation companies, and some reference to each of these should be included in the course (It is not necessary that one issue be the sole focus of any given case).

It will be seen that the main areas for future case development (in the Harvard Business School version of this course) are the topics of container technology, coating/pricing problems, and scheduling, with forwarders and railroads as the most neglected industry sectors. Since each instructor will possess his own special interests and concerns, it would be unwise to recommend "optimal" contents for the course. It is hoped that the schema outlined above, together with the specific case examples given in the Appendix, will have served to highlight the main considerations in course design.

5. A NEW ROLE FOR TRANSPORTATION STUDIES IN BUSINESS SCHOOLS

Experience with the course described in this paper reveals that it did achieve the goal of introducing transportation studies to students who would not previously have elected to take a transportation course. As a "bonus," it has also had the effect, while serving the pedagogical goals of Manufacturing Policy, of arousing sufficient interest among some students to attract them to further

studies in the field of transportation. It is therefore suggested that this approach to transportation studies (one of which emphasizes lessons that are applicable beyond the transportation industries themselves) is worthy of consideration by many business schools.

It is, of course, not necessary that a Manufacturing Policy framework be utilized in order to embody this approach. An alternative structure might be provided by a course based on the causes, nature and effects of government regulation. Here, too, there is potential to use the transportation industries as a vehicle to discuss principles of wide importance and interest. Another example, alluded to previously, is the possibility of a transportation module in a course studying the management of service companies.

The common element of these alternatives is the use of a body of transportation materials, rather than single examples, i.e., the use of an industry approach. Aside from its pedagogical benefits (discussed above), the importance of the industry approach in this context is that it permits an informative and proselyting role on behalf of the transportation industries on a consistent basis. While transportation examples are almost certainly employed in most existing courses dealing with service industries and government regulation, it is argued here that many benefits are to be gained

from the consolidation of these "examples," and the design of consistent course modules within these other courses.

A benefit not previously described is the opportunity to develop interdisciplinary relationships and teaching effort. This goal, which appears to be increasingly valued, has attractions both for faculty and students. For the former it provides an opportunity to take a "fresh look" at their subject areas, to develop new viewpoints that are often the source of new insights. For students, interdisciplinary studies are a useful device in integration of the total business school experience.

The approach to transportation studies urged in this paper may also prove of

value to those business schools where transportation is viewed as a "marginal" subject, with few, if any, full-semester courses offered in the field. For such schools, a course such as that described here could serve to satisfy whatever student or faculty interest does exist in the transportation industries.

It should be stressed, however, that the use of transportation studies in this manner is not restricted to institutions without well-developed transportation programs. The success of the Manufacturing Policy application discussed in this paper demonstrates that there are, indeed, many benefits to the study of the transportation industries, benefits which provide the opportunity to "market" our subject to a wide audience.