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-

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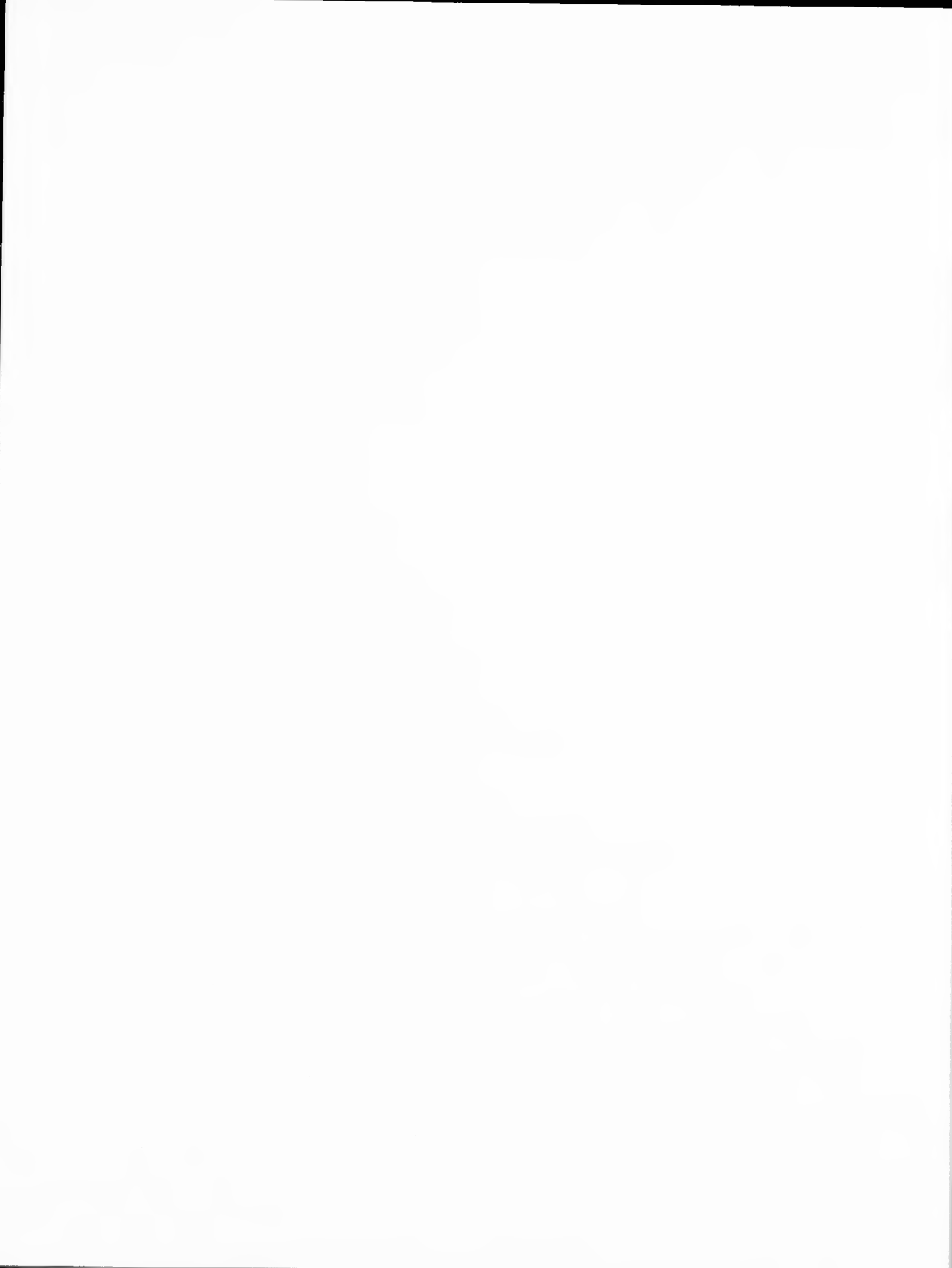


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From the Editor...

Welcome to the Spring, 1998 issue of the *Journal of Transportation Management*. My thanks to the members of the Editorial Review Board who contributed to the success of this issue. Again, thanks to my able and dedicated Associate Editors, Brian Gibson and Steve Rutner. The efforts of all involved in bringing this issue of the *JTM* to you have resulted in an excellent collection of articles on very timely subjects, dealing with topics ranging from keeping logistics education current with logistics practice to keeping truck drivers on the job.

The lead article in this issue, by Ted Stank and Thomas Goldsby, describes a model designed to keep university-level logistics programs in touch with logistics practitioners. Examples are provided that demonstrate the implementation of the model and the benefits to all participants. The second article, by Paul Murphy and James Daley, presents the results of a study designed to identify some of the more important characteristics of rail-truck intermodal users. The findings should be of particular interest to intermodal marketing companies and other IRT service providers. Susan Taylor and Bob Cosenza, in the third article, take a different approach in addressing the problem of truck driver turnover. They suggest that a successful program for driver retention should be based upon the principles and concepts of internal marketing. Philip Evers and Carol Emerson build upon the transportation choice model of Krapfel and Mentzer by examining the impact of shipper perceptions of the intermodal and motor carrier sectors on the choice of transportation mode in the fourth article. In the final article of this issue, Paul Larson and Barry Spraggins investigate the controversial merger between the Union Pacific and Southern Pacific railroads. Fortunately, the news is not all bad. Each article is well-written and offers the reader new insight and information on important topics in logistics and transportation. I hope you enjoy the reading.

This issue of the *Journal* is the second under the continuing financial sponsorship of the International Intermodal EXPO - the world's largest logistics and transportation related trade show. If you missed the 15th annual EXPO in May in Dallas, Texas, then make plans now to attend the 16th annual EXPO April 20-22, 1999, in Atlanta, Georgia. See the back cover of this issue for more information. I again thank John Youngbeck, CEO of the EXPO, and his board of directors for their commitment not only to the *Journal of Transportation Management* and Delta Nu Alpha International Transportation Fraternity but also to the future of logistics and transportation education.

Speaking of commitment and financial support, remember that we cannot survive and continue to publish without reader support. Please join or renew your membership in Delta Nu Alpha International Transportation Fraternity and subscribe to the *Journal of Transportation Management*. Share this issue with a colleague and encourage him/her to subscribe today!

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Journal of Transportation Management

OBJECTIVES

Editorial Policy. The primary purpose of the *JTM* is to serve as a channel for the dissemination of information relevant to the management of transportation and logistics activities in any and all types of organizations. Articles accepted for publication will be of interest to both academicians and practitioners and will specifically address the managerial implications of the subject matter. Articles that are strictly theoretical in nature, with no direct application to the management of transportation and logistics activities, would be inappropriate for the *JTM*.

Acceptable topics for submission include, but are not limited to carrier management, modal and intermodal transportation, international transportation issues, transportation safety, marketing of transportation services, domestic and international transportation policy, transportation economics, customer service, and the changing technology of transportation. Articles from related areas, such as third party logistics and purchasing and materials management are acceptable as long as they are specifically related to the management of transportation and logistics activities.

Submissions from industry practitioners and from practitioners co-authoring with academicians are particularly encouraged in order to increase the

interaction between the two groups. Authors considering the submission of an article to the *JTM* are encouraged to contact the editor for help in determining relevance of the topic and material.

The opinions expressed in published articles are those of the authors and do not necessarily reflect the opinions of the editor, the Editorial Review Board, Delta Nu Alpha Transportation Fraternity, the International Intermodal Expo, or Georgia Southern University.

PUBLISHING DATA

Manuscripts. Four (4) copies of each manuscript are to be sent to Dr. Jerry W. Wilson, Georgia Southern University, P. O. Box 8154, Statesboro, GA 30460-8154. Manuscripts should be no longer than 25 double-spaced pages. Authors will be required to provide electronic versions of manuscripts accepted for publication. Guidelines for manuscript submission and publication can be found in the back of this issue.

Subscriptions. The *Journal of Transportation Management* is published twice yearly. The current annual subscription rate is \$35 in U.S. currency. Payments are to be sent to: *Journal of Transportation Management*, Delta Nu Alpha Transportation Fraternity, 530 Church Street, Suite 700, Nashville, TN 37219.



BRIDGING THE GAP BETWEEN ACADEMIC RESPONSIBILITIES AND PRACTICAL APPLICATION IN LOGISTICS

Theodore P. Stank
Michigan State University

Thomas Goldsby
Iowa State University

The paper presents a model inspired by the success of innovative logistics programs that have enhanced the relevance of academic programs by developing closer ties with logistics and transportation practitioners. Discussion focuses on examples that illustrate implementation of the model. The intent is to provide a blueprint for academics to enhance cooperation at locations that do not currently have such programs in place.

INTRODUCTION

A continuing criticism of business education expresses concern that connections between traditional faculty responsibilities of research, teaching, and practice are breaking down (Foggin and Dicer 1992; Mowday 1997; Porter and McKibben 1988). Critics contend that the system is churning out irrelevant academic research and training students to be theoretical managers incapable of taking responsibility for the performance of others (Cheit 1985; La Force and Novelli 1985; Rudolph 1995; Van Auken, Cotton, and Chester 1996). Much of the criticism is directed toward faculty who are depicted as either unable or unwilling to integrate both research and practical teaching.

Changing economic forces have pressured business faculty to perform well in research,

teaching, and practice rather than excelling in just one area (Witt 1994). Many faculty, however, feel that they have either inadequate preparation or insufficient time and funding to contribute in all areas. Logistics faculty, with a history of close ties to industry as well as a fundamental understanding of cross-functional business activities, are uniquely positioned to lead the way in integrating activities on and off campus in a way that satisfies all constituents of higher business education at the lowest total cost.

This paper presents a model inspired by the success of logistics programs that have bridged the gap between academic responsibilities and practical application. It is intended to communicate to practitioners the benefits of interaction with the academic community as well as to present a guideline for academic

integration in other business disciplines. Discussion focuses on three case studies that illustrate the implementation of the model.

BACKGROUND

A 1996 report completed by the American Assembly of Collegiate Schools of Business (AACSB) contends that the gap between practice and academic research and teaching has widened in recent years. Business schools, critics suggest, are emphasizing a model that is so quantitative and theoretical that it ignores topics important to practical businesspeople (La Force and Novelli 1985; Rudolph 1995). Further, critics argue that the reigning model produces students capable of fulfilling advisory and consulting roles but not that of the practical manager, lacking in leadership qualities and the ability to assume responsibility for the performance of others (Cheit 1985).

The criticism underscores a perceptual gap between many business academicians and practitioners regarding the purpose and scope of knowledge generation. While logistics academicians share a long history of successfully integrating research, teaching, and practice, academicians in many other business areas generate knowledge in a cumulative manner that is less concerned with immediate, focused applications but rather seeks to influence the long-term conduct of broadly defined business processes. Knowledge generation and dissemination are viewed in terms of theory development and testing, evaluated on the basis of content as well as the rigor of the scientific method used to reach conclusions (Mentzer and Kahn 1995). Practitioners, however, generate knowledge to find the answers to specific, applied problems. The results of applied research are usually seen only by those immediately involved with the problem and are evaluated based on the degree

to which they influence decision-making as well as on the success or failure of the resulting decision. Academics, therefore, usually produce work that is relatively abstract and not directly concerned with immediate application while practitioners produce research that provides actionable data at the least possible cost (Brinberg and Hirschman 1986; Kover 1976).

Business schools can be depicted as possessing varying degrees of these two primary orientations of knowledge generation. At research-oriented schools, business is regarded as a science and knowledge is pursued to enhance understanding and theory development. Faculty are rewarded for publishing academic research. Contact with the business community is not assigned high priority and, therefore, is only modestly pursued by most. Other schools emphasize a professional model characterized by field-driven approaches to business and business techniques. Faculty are expected to maintain close ties to the business community and emphasis is placed on participating in privately directed research and executive education (Cheit 1985; Van Auken, Cotton, and Chester 1996). At these institutions, faculty evaluations may be split equally among teaching, research, and service to practitioners.

Economic pressure derived from decreasing enrollments, limited state and federal funding, and escalating tuition costs, however, has fueled and intensified the criticism leveled at business education and increased the attention paid to the activities of business faculty by government, taxpayers, parents, and business practitioners (Mowday 1997). The constituents of business schools are no longer satisfied with excellence in one area of the research, teaching, and practice mix. Therefore, business faculty today are under increasing pressure to perform well in research, teaching, and practice rather than excelling in just one

area. Additionally, there is growing demand to ensure that these activities address topics of relevance to the practitioner community (AACSB 1996; Witt 1994).

Most business school administrators agree that the need for significant shifts in emphasis affects virtually every business program (AACSB 1996). Many programs have made attempts to integrate theory with practice, although, as Arjay Miller, former dean of Stanford Business School noted, getting faculty to change in any manner is "like trying to move a cemetery" (Witt 1994). A blueprint for successful change would be helpful to facilitate the process. In the following section, a model for integrating research, teaching, and practice based upon the experience and successes of logistics programs at top academic institutions will be introduced.

INTEGRATING ACADEMIC RESPONSIBILITIES

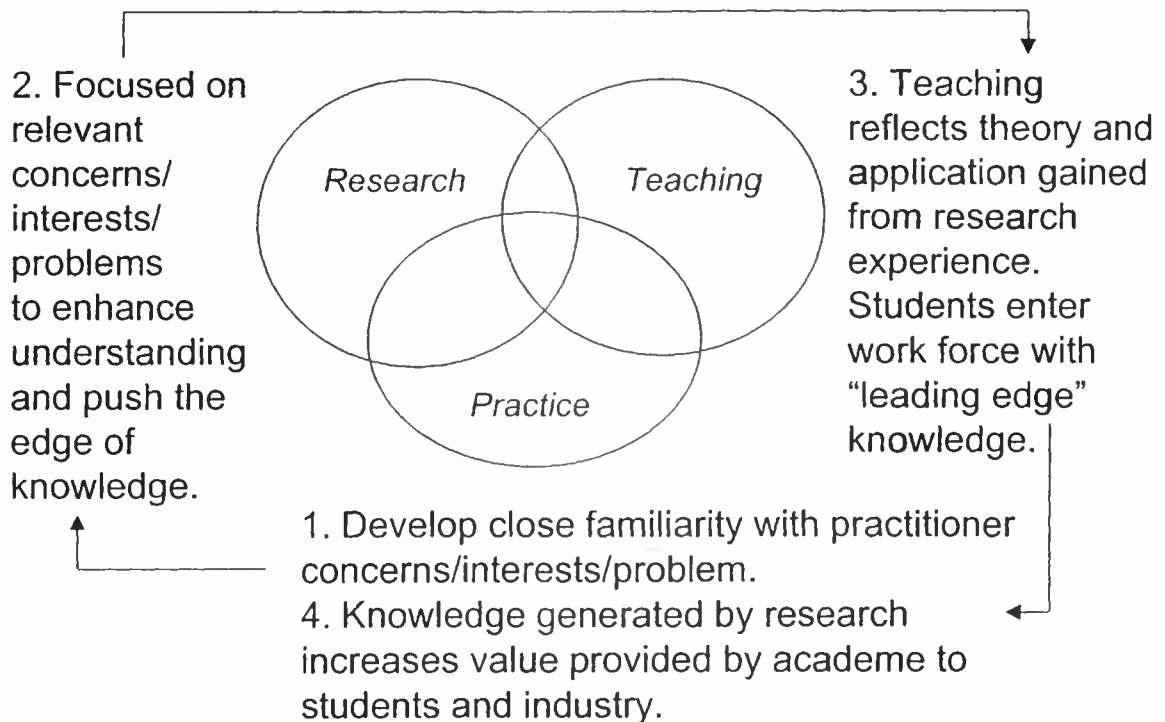
Logistics faculty enjoy a history of close ties to industry as well as a fundamental understanding of cross-functional business activities. Programs developed or under development at several academic institutions demonstrate logisticians' abilities to knock down barriers not only between departments on campus, but also between academics and practitioners. The top logistics programs emphasize research conducted jointly with industry. Many also have strong industry involvement in curriculum development and internship opportunities. Institutions such as Michigan State University, the University of North Florida, The Ohio State University, Pennsylvania State University, the University of Tennessee, The University of Nevada-Reno, and the University of Wisconsin-Madison have pioneered executive education in logistics and supply chain management to provide further links with industry (Aron 1997). While these

relationships offer benefits to faculty and practitioners directly involved in the executive programs, teaching at both the undergraduate and graduate levels is enhanced as a result of interactions between faculty and practitioners. Logistics academicians, therefore, are uniquely positioned to lead the way in integrating activities on and off campus in a way that satisfies all constituents of higher business education at the lowest total cost.

Logistics programs that have demonstrated the capability of business faculty to bridge the gap between sound academic research and practical application share a conceptual similarity. The success of these logistics programs forms the basis for a model that provides guidelines for business faculty behavior in an environment that requires sound performance across research, teaching, and practice. The model can serve as a blueprint for development of projects and curriculum aimed at bridging the gap between academic-oriented and practitioner-oriented activities. It is intended to counter the reluctance that faculty feel regarding involvement in activities that integrate the competing responsibilities of research, teaching, and practice by developing a synergy that optimizes one's time utilization and funding resources. Further, the model can help communicate to practitioners the benefits of interaction with the academic community.

The model presented in Figure 1 shows three primary faculty responsibilities – research, teaching, and practice. All business schools require a level of performance in each of the three overlapping areas. Success in all three areas, however, depends upon solid grounding of academic endeavors in practice. The model begins with faculty developing close familiarity with the concerns, interests, and problems confronted by managers practicing the discipline in an industrial setting. Familiarity

FIGURE 1
INTEGRATING ACADEMIC RESPONSIBILITIES



may stem from consulting, executive education, faculty internships, membership in professional organizations, participation in practitioner-oriented conferences and meetings, prior industry experience, and research projects conducted jointly with practitioner groups (Mentzer and Flint 1997).

The expertise and insight gained from familiarity with practitioner concerns, interests, and problems should be used to guide future academic research. Grounding the research in practitioner experience assures the relevance of the research and may assist in generating funding. The academician utilizes training in theory development and the

scientific method to assure that results are reliable, valid, and generalizable (Mentzer and Flint 1997). Data collection can be structured such that results are relevant to—and publishable in—academic journals as well as practitioner-oriented outlets.

Sharing results of relevant research in the classroom provides faculty with an important means for transferring knowledge and experience. Relevant research results have direct application in the classroom, regardless of student level. Both undergraduates and graduate students benefit from direct examples of theoretical concepts applied to the "real world". Instructors that cite current, relevant

force possessing the "leading edge" of knowledge regarding logistics principles and concepts e.g., how leading firms are managing inventory and transportation, what accounting procedures they are using, what enabling technology is making it all possible. Hopefully, they become managers that are aware of the value of higher education and are committed to hiring others from the program. In addition, they leave school with an appreciation for university-industry relationships and become willing to participate in interactive activities such as academic research. This "spiral" effect provides long-term benefits to the all constituents of higher business education.

Over the last 30 years logistics management has grown into a multi-functional, process-oriented discipline that emphasizes innovative concepts that are regarded as critical elements of many academic and practical areas. Conceptual issues that are central to modern business thought such as inter-departmental and interfirm communications, integration, relationalism, responsiveness/agility, and total system cost management are considered key elements of world class logistics management today. Logistics faculty, familiar with these concepts from research and teaching, have taken the lead in pushing change at many top institutions.

IMPLEMENTATION

Many prominent universities with strong logistics programs, including those listed previously, engage in activities designed to integrate faculty research, teaching, and service responsibilities to generate relevant knowledge. The following examples demonstrate how logistics programs at various institutions have integrated research, teaching, and service to directly benefit faculty, students, and business practitioners.

Michigan State University (MSU) logistics faculty have long demonstrated close relationships with industry colleagues to guide research efforts. The results of these efforts are used in the undergraduate, graduate, and executive education classrooms to enhance teaching. In the latest of these endeavors, the Global Logistics Research Team, consisting of MSU faculty and students as well as an advisory board of industry executives, investigated best logistics practices throughout the world. With substantial financial and administrative support from industry and professional organizations, faculty and doctoral students set out to identify leading edge logistics practices that lead to competitive advantage on a global scale (The Global Logistics Research Team at Michigan State University, 1995). The Global Logistics research built on the foundation established in an earlier study highlighting leading edge practices in North America (Bowersox, Daugherty, Dröge, Rogers, and Wardlow, 1989).

The research benefits practitioners who can use the findings to benchmark their own firms and develop logistics competencies. University students and executive education graduates derive a significant return from the faculty's involvement in the endeavor. Sharing the findings of the research and developing enthusiasm toward future investigations enhances classroom instruction. Students may, upon becoming industry managers, eagerly participate in future research efforts completed by faculty at MSU or elsewhere. In addition, fellow researchers in academia benefit from the contributions to conceptual and practical knowledge yielded from the findings of world class logistics research. Hence, the cycle illustrated in Figure 1 finds application in this setting. The research, however, was possible only through the financial support and guidance provided by industry colleagues as well as through the

participation of survey and interview respondents in the field.

Iowa State University (ISU) is a land-grant institution known for strong programs in agriculture, food engineering and food sciences that support knowledge generation in food systems. The College of Business contributes to that goal by fostering research and teaching in food business. An ISU research team consisting of faculty and students from the Department of Transportation and Logistics received a grant to extend knowledge in food logistics and supply chain management. The resulting efforts have been used to develop and enhance relationships with organizations involved in food distribution. These relationships have fostered food-related research activities, including investigations of other elements of food supply chains as well as internship opportunities for both students and faculty.

To strengthen relationships with industry and professional organizations and to establish a practical basis for research, ISU faculty developed a value chain management simulation based upon industry inputs. The industry involvement in the simulation's development ensures that the simulation adequately reflects the industry's concerns, interests, and constraints. Subsequent funding will be sought to support future investigations of logistics and supply chain management trends in the food industry. Additionally, curriculum changes centering on use of the value chain simulation in the classroom are being considered. The goal of these efforts is to produce better educated students with a sound understanding of the relationship between theory and practice. Anecdotal evidence suggests that these students are likely to contribute to future research and teaching as managers in industry with a desire to maintain ties to academia.

Logistics and transportation faculty at The University of Tennessee (UT) have led the way in applying the tools and philosophy of Total Quality Management to improve UT logistics and the MBA curriculum. Using the recommendations of industry representatives as guidelines for process improvements, UT faculty set up a task force to address student and industry concerns with the relevance of the undergraduate and graduate programs. Following a procedure involving close customer contact and process redesign, the Tennessee faculty were able to create an experimental MBA program that integrated functional business areas in the curriculum core within eight months of initial conception (Foggin and Dicer 1992). The focus of the new curriculum influences undergraduate and executive teaching as well as research efforts of logistics faculty. Similar innovative programs have been pursued by logistics faculty at several institutions including The University of Alabama, The University of Arkansas, Georgia Institute of Technology, the University of Maryland, Massachusetts Institute of Technology, Northwestern University, The Ohio State University, Old Dominion University, the University of Pennsylvania, Pennsylvania State University, and Western Michigan University, among others (Gentry, Keller, Ozment, and Waller 1997).

CONCLUSIONS

The experience accumulated by the top logistics programs in successfully merging theory and practice form the basis for the model suggesting an academic program grounded in practice. In the model, the classroom is viewed as an outlet for leading edge findings to create the next generation of managers committed to partnering with academia. The various examples illustrate how programs without a history of a strong academic-practitioner interface can utilize their strengths and forge an

ongoing relationship that benefits all constituents of higher business education. For the faculty member, it provides the opportunity to share ideas with top business managers and gain access to ideas and data that lead to publishable research, furthering knowledge in the field. Students can participate in research that contributes to the knowledge in their major while gaining practical experience and networking opportunities with potential employers and colleagues. Administration, government, and the public benefit from partnerships that spread financial support and foster working relationships between educators and practitioners, bridging theory and practice. Additionally, administrators may use the model as a basis for faculty performance evaluation. The model provides a template for monitoring faculty progress toward an integrated program of research, teaching, and outreach; a program that contributes to leading edge knowledge generation and dissemination that is grounded in business practice.

From the practitioner's standpoint, the model affords business managers a chance to guide the direction of academic research. Participating practitioners also benefit from the generalizable research across company boundaries, gaining a valuable view from "above the clouds" of everyday operations. Such a view is not often available to researchers operating from within industry due to proprietary risks. Partnering with academia provides managers with access to leading edge knowledge culled from a cross-section of top firms. In addition, the research findings will influence successive classroom teachings that will educate current and future employees. It should also be noted that such research is often disseminated in trade publications, professional meetings, and executive education, further enhancing the image of participating firms. In the process, managers working on joint industry-academic research teams with faculty as well as students

gain insights that may influence future hiring decisions.

While the primary emphasis of the model has been focused on business faculty housed in public universities that emphasize academic research, applications are also relevant to faculty from institutions with other missions. Regional universities, schools where teaching is the primary priority, and private colleges and universities can also benefit from application of the model. The focus of the faculty-business relationship may readily be shifted toward curriculum development, consulting and funded projects, internships, or business laboratories in which faculty-guided student teams work to solve real-world problems for local, regional, national, or global businesses.

Importantly, the model provides a basis for removing the barriers between educators and business practitioners in a win-win environment. Rather than approaching industry looking for charitable handouts, which faculty may view as job enlargement and inherently distasteful, the relationship is based upon the provision of mutual value. As in any relationship, small initial positive experiences should grow into greater commitment and trust between the partners. With continued success, partnerships between academia and industry may become the expected work environment for new faculty, managers, and students rather than unique exceptions. Logistics educators and practitioners, followers of a discipline that espouses process management from conception to completion utilizing agile operations and collaborative approaches enabled by information sharing, must step forward and lead business schools to this new model. Along the way, the importance of logistics programs to the vast number of business schools, faculty, and administrators that are unaware of the potential offered by the discipline may be realized, as it is increasingly realized in industry.

REFERENCES

- American Assembly of Collegiate Schools of Business (1996), *Report of the Faculty Leadership Task Force*, St. Louis: American Assembly of Collegiate Schools of Business.
- Aron, Laurie Joan (1997), "The Changing Course of Logistics Education," *Inbound Logistics*, 17(4):24-30.
- Bowersox, Donald J., Patricia J. Daugherty, Cornelia L. Dröge, Dale S. Rogers, and Daniel L. Wardlow (1989), *Leading Edge Logistics: Competitive Positioning for the 1990's*, Oak Brook, Illinois: Council of Logistics Management.
- Brinberg, David, and Elizabeth C. Hirschman, (1986), "Multiple Orientations for the Conduct of Marketing Research: An Analysis of the Academic/Practitioner Distinction," *Journal of Marketing*, 50(October):161-173.
- Cheit, Earl F. (1985), "Business Schools and Their Critics," *California Management Review*, 27(3):42-62.
- Foggin, James H., and Gary N. Dicer (1992), "Meeting the Customer's Needs in Graduate Business Education," in James M. Masters (ed.) *Logistics Education for the 1990's*, The Proceedings of the Twenty First Annual Transportation and Logistics Educators Conference, San Antonio, TX, 1-19.
- Gentry, Julie, Scott B. Keller, John Ozment, and Matthew A. Waller (1996), "Themes and Issues from the 1996 Graduate Logistics Educators Symposium," in James M. Masters (ed.) *Planning for Virtual Response*, the Proceedings of the Twenty Fifth Annual Transportation and Logistics Educators Conference, Orlando, FL, 31-52.
- Kover, Arthur J. (1976), "Careers and Noncommunication: The Case of Academic and Applied Marketing Research," *Journal of Marketing Research*, 13(November):339-344.
- La Force, J. Clayburn, and Rebecca J. Novelli (1985), "Reconciling Management Research and Practice," *California Management Review*, 27(3):74-81.
- Mentzer, John T, and Daniel J. Flint (1997), "Validity in Logistics Research," *Journal of Business Logistics*, 18(1):199-216.
- Mentzer, John T, and Kenneth B. Kahn (1995), "A Framework of Logistics Research," *Journal of Business Logistics*, 16(1):231-250.
- Miles, Raymond E. (1985), "The Future of Business Education," *California Management Review*, 27(3):63-73.
- Mowday, Richard T. (1997), "Reaffirming Our Scholarly Values," *The Academy of Management Review*, 22(2):335-343.
- Porter, Lyman, and Lawrence McKibben (1988), *Management Education and Development: Drift or Thrust into the 21st Century*, New York: McGraw-Hill.
- Rudolph, Bennett L. (1995), "Higher Education in Marketing: Continuously Improving Irrelevance," *Marketing News*, 29(2):4-5.
- The Global Logistics Research Team at Michigan State University (1995), *World Class Logistics: The Challenge of Managing Continuous Change*, Oak Brook, Illinois: Council of Logistics Management.

Van Auken, Stuart, Chester C. Cotton, and John F. McKenna (1996), "Alternative Models of Collegiate Business Education: Their Validity and Implications," *Journal of Managerial Implications*, 8(3):380-393.

Witt, Robert E. (1994), "Reengineering the MBA," *Directors & Boards*, 19(1):43-45.

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Theodore P. Stank is an assistant professor of logistics and supply chain management at Michigan State University. He holds a Ph.D. in marketing and distribution from The University of Georgia. He has published numerous articles in academic and professional journals including *Business Horizons*, *International Journal of Logistics Management*, *International Journal of Physical Distribution and Logistics Management*, *International Journal of Purchasing and Materials Management*, *Journal of Business Logistics*, *Journal of Transportation Management*, *The Logistics and Transportation Review*, and *Transportation Journal*. Dr. Stank's research interests focus on the strategic implications and performance benefits associated with integrated logistics and supply chain management concepts.

AUTHOR BIOGRAPHY

Thomas J. Goldsby is an assistant professor of transportation and logistics at Iowa State University. He holds a Ph.D. in marketing and logistics from Michigan State University. Dr. Goldsby has published articles in *International Journal of Logistics Management* and the *International Journal of Physical Distribution and Logistics Management*. His research interests included supply chain strategy and reverse logistics systems.

SOME PROPOSITIONS REGARDING RAIL-TRUCK INTERMODAL: AN EMPIRICAL ANALYSIS

Paul R. Murphy
John Carroll University

James M. Daley
John Carroll University

Using data compiled from a recent of businesses located in a major metropolitan area, the present paper evaluates a series of propositions concerning rail-truck intermodal. In general, the study results tend to support the various propositions, and key findings suggest that users and nonusers of intermodal transportation have different perceptions about the quality of, and barriers to, intermodal service.

Intermodal transportation may be one of the most misunderstood concepts (Jennings and Holcomb, 1996) in the logistics discipline. In some instances, intermodal is not even defined, resulting in an assumption that there is an implicit knowledge about what is meant by intermodal. Alternatively, there are myriad definitions of intermodal, such as (Coyle, Bardi, and Novack 1994) "...the use of two or more modes of transportation in moving a shipment from origin to destination."

Indeed, there are so many definitions of intermodal (Jennings and Holcomb, 1996) "...that researchers, government bodies, and practitioners may wind up spending more time arguing over its definition than implementing its ideas." For purposes of this paper, intermodal transportation will refer to

(Jennings and Holcomb, 1996) "...a container or other device which can be transferred from one vehicle or mode to another without the contents of said device being reloaded or disturbed."

While intermodal transportation has registered impressive growth during the past two decades, there has been relatively little academic research dealing with intermodalism. In fact, a review of two key logistics journals, **Transportation Journal** and the **Journal of Business Logistics**, reveals a total of three empirical studies on intermodalism in the five year time period from 1993 to 1997. These articles are summarized below.

Jennings and Holcomb (1996) used interview-type case studies to learn about

noncontainerized intermodal (transload) movements by mode and by commodity. Transload activities tend to involve large volume or large-sized commodities; shippers, rather than carriers, are the initiating party for transload movements. Transload shippers cited a variety of reasons (e.g., service abandonment, location) for being involved in transloading activities.

Johnston and Marshall (1993) looked at shipper perceptions about intermodal equipment in six categories such as cubic capacity, ease of loading and unloading, and cleanliness. They found that various types of intermodal equipment have different strengths and weaknesses. For example, TOFC (trailer-on-flatcars) trailers are perceived to be strong in cubic capacity, but weak in cleanliness; RoadRailers are strong in cleanliness, but weak in capacity.

Harper and Evers (1993) investigated competitive issues in intermodal rail-truck (IRT) service among manufacturers in the state of Minnesota. Their research suggested that IRT service was not available to many potential customers, that larger firms tend to use IRT, and that shippers do not have a very good perception of IRT. In particular, shippers emphasized the seriousness of poor IRT transit times.

THE PRESENT STUDY

The Harper and Evers research is particularly valuable because a portion of it looked at the perspectives of both users and nonusers of IRT services with respect to select intermodal issues. Their findings involving the users and nonusers serve as an excellent source for the development of a series of propositions concerning rail-truck intermodal. The present paper will evaluate the various propositions using data compiled from a recent study of

business organizations located in a major metropolitan area. These propositions will be developed below.

One portion of the Harper and Evers research involved a mail survey of manufacturers located in the state of Minnesota. Their findings (1993) suggested that larger firms were more likely than smaller firms to be users of IRT services. The Harper and Evers research also investigated the modal splits of users and nonusers of IRT services. Their findings suggested different modal split patterns between users and nonusers for their outbound shipments. More specifically, IRT users tend to rely more heavily than nonusers on truckload (TL) motor carriage service, while less-than-truckload (LTL) service is the preferred form for IRT nonusers. Furthermore, based on aggregate figures, IRT tends to be a secondary mode of outbound transportation among IRT users.

Proposition 1: IRT users will be larger than nonusers.

Proposition 2: IRT users will have different modal usage characteristics than nonusers for outbound shipments.

Proposition 3: IRT users will make heavier use than nonusers of TL motor carrier service, while LTL service will be the preferred form among IRT nonusers.

Proposition 4: On an aggregate basis, IRT will be a secondary mode of outbound transportation for IRT users.

Harper and Evers (1993) also investigated user and nonuser perceptions of IRT service. Their

findings suggested that there were noticeable differences between users' and nonusers' perceptions of IRT service. Indeed, nonusers indicated a "substantially lower" overall perception (mean score = 2.18, where 1 = poor and 5 = excellent) of IRT service than did users (mean score = 3.10).

Proposition 5: IRT nonusers will have a substantially lower perception than IRT users of the overall quality of IRT service.

Proposition 6: IRT users and nonusers will differ with respect to their perceptions associated with the barriers to rail-truck intermodal.

Proposition 7: IRT nonusers will have stronger opinions than IRT users concerning the barriers to rail-truck intermodal.

METHODOLOGY

The propositions concerning rail-truck intermodal will be evaluated using data collected from a survey dealing with goods movement in Northeast Ohio. More specifically, the Greater Cleveland Growth Association (essentially the Chamber of Commerce for Cleveland, Ohio) commissioned the authors to work with them to develop, distribute, and analyze the goods movement study. The primary purpose of the study was to develop a comprehensive perspective concerning the strengths and needs of the goods movement system in Northeast Ohio, with Northeast Ohio defined as a 13 county region.¹

Due to collaborative nature of the research (i.e., economic development group and academia), the authors had significant input into, but not total control of, questionnaire design and sample frame development. With respect to the former, the survey could not be distributed until its contents were acceptable to both the Growth Association as well as several other peer economic development groups (e.g., the Akron Regional Development Board).

In addition, while we developed the composition parameters of the sampling frame (e.g., suggestions attempting to ensure industry and geographic representativeness), the actual sampling was the responsibility of the Growth Association and its peer development groups. As a result, the sampling frame reflected their desires to collect comprehensive, community-wide information as opposed to a sampling frame comprised of people with a greater familiarity with goods movement issues (e.g., transportation supervisors, traffic managers, and the like).

The Growth Association, in collaboration with the other economic development groups, presented us with a sampling frame of 2,170 Northeast Ohio companies, to include 150 of Northeast Ohio's "top" or "leading" firms (as defined by the various economic development groups). Our inspection of the sampling frame suggested that a substantial number of seemingly inappropriate organizations and/or individuals (i.e., those with limited knowledge and/or exposure to goods movement issues) had been included in the study. (The initial sampling frame, for instance, included the person who snow plows one of our driveways during the winter!) Removal of identifiably "inappropriate" members reduced the

sampling frame to 1,510. We received 146 responses to the study, of which 116 were usable, for an effective response rate of 7.7%.

In terms of demographic characteristics, the 116 organizations appear representative of the Northeast Ohio business community. For example, each participant conducts business in one or more of the 13 counties. Approximately one-half of the participants are engaged in some type of manufacturing activity, with another 20% involved in wholesale or retail trade. Moreover, the participants encompass a variety of firm sizes; 40% employ between 1 and 10 workers, while 30% employ more than 100 workers. Tonnage figures exhibit a similar profile: nearly 40% of the participants report annual shipment volumes of less than 100 tons, while slightly more than 25% report annual volumes of greater than 10,000 tons.

The goods movement study asked respondents for a combination of detailed attitudinal and factual information. With respect to intermodal rail-truck issues, respondents provided information about the percentage of outbound volume moving by IRT, as well as perceived barriers to IRT service. For the purposes of this paper, a participant indicating that "0%" of their outbound shipments moved by rail-truck intermodal was classified as a nonuser of rail-truck intermodal services. Over one-third of the respondents could not, or would not, provide information about their outbound shipment patterns. Of the remaining respondents, 85% indicated **no usage** of rail-truck intermodal; thus, 15% of the respondents are **current users** of IRT service. Interestingly, in the Harper and Evers (1993) study, less than 30% of the actual survey respondents were actual users of rail-truck intermodal service.

EVALUATION OF PROPOSITIONS

Proposition 1: *IRT users will be larger than nonusers.* Two measures of firm size will be used to investigate this proposition, namely, total number of employees and total shipment volume. In the present study, firm size (employees) was measured as a categorical variable, that is, 1-10 employees; 11-100 employees; greater than 100 employees. Comparisons of IRT users and nonusers in terms of firm size (employees) indicate that the nonusers are fairly evenly distributed across firm sizes; 38.1% of the nonusers employ between 1 and 10 workers, while 33.3% employ more than 100 workers. By contrast, IRT users indicate a much different profile: less than 10% of the users employ between 1 and 10 workers, while over 60% employ more than 100 workers.

Although outbound volume was captured as a continuous variable, for analysis purposes it was categorized into three groups, namely, less than 100 tons; 100 to 10,000 tons; more than 10,000 tons. Analysis of the nonusers' tonnage volumes reveals that approximately three quarters report annual shipment volumes of less than or equal to 10,000 tons. Eighty percent of the IRT users, by contrast, report shipment volumes of more than 10,000 tons.

Both the employee and tonnage results appear to suggest a relationship between firm size and the use or nonuse of IRT services, a finding that tends to **support** Proposition 1. Furthermore, while IRT users tend to be larger firms, nonusers can be found in a variety of different firm sizes. For example, nearly 25% of the nonusers report annual volume in excess of 10,000 tons, and might be potential customers for rail-truck intermodal service,

considering that the vast majority of current IRT users have annual volume of greater than 10,000 tons.

Proposition 2: *IRT users will have different modal usage characteristics than nonusers for outbound shipments.* As previously mentioned, participants were asked to indicate the percentage of total volume shipped from the major metropolitan area by various transportation services, to include air freight,

truckload motor carriage, rail-truck intermodal, among others. Results for modal usage are presented in Table 1, and appear to suggest that IRT users and nonusers have different modal profiles. On an aggregate basis, for example, IRT nonusers report a greater reliance on air transportation than do IRT users. Alternatively, IRT users are much more likely to use truckload motor carriage than nonusers. These results tend to **support** Proposition 2.

TABLE 1
MODAL USAGE CHARACTERISTICS—OUTBOUND VOLUME

Mode	Nonuser (% of volume)	User (% of volume)
Air	12.82	2.25
Truckload motor carriage	29.58	49.43
Less-than-truckload	48.19	37.59
Rail	3.28	.56
Rail-truck intermodal	.00	4.80
Water	.22	1.13
Other	4.64	.09

Note: Percentages may not sum to 100 because of item nonresponse.

Proposition 3: *IRT users will make heavier use than nonusers of TL motor carrier service, while LTL service will be the preferred form among IRT nonusers.* The information in Table 1 indicates that IRT users do indeed make heavier use of truckload motor carriers than IRT nonusers; in fact, nearly 50% of IRT users' volume involves TL motor carriers, compared to 30% for IRT nonusers. Moreover, LTL is a popular form among IRT nonusers, involving nearly 50% of their outbound volume. On a relative basis, less-

than-truckload is the most popular modal alternative for IRT nonusers, while truckload motor carriage is the most popular alternative for IRT users. These findings tend to **support** Proposition 3.

Proposition 4: *On an aggregate basis, IRT will be a secondary mode of transportation for IRT users.* As shown in Table 1, the two most popular forms of transportation for IRT users are TL motor carriage and less-than-truckload (LTL) service, both of which

combined account for over 85% of the IRT users' shipment volume. Rail-truck intermodal, by contrast, represents slightly less than 5% of the IRT users' shipment volume. These findings tend to **support** Proposition 4.

However, analysis of the relative importance of the users' modal split characteristics (Table 1) reveals rail-truck intermodal to be the third most popular form of outbound transportation for IRT users, behind TL and LTL service. Interestingly, IRT service also ranked as the third most popular mode for outbound shipments in the Harper and Evers (1993) study.

Proposition 5: *IRT nonusers will have a substantially lower perception than IRT users of the overall quality of IRT service.* Using a 1 (poor) to 5 (excellent) scale, survey participants were asked for their perceptions about the overall quality of rail-truck intermodal service. The average rating among IRT nonusers was 2.81, compared to 3.18 among IRT users. Thus, while the nonusers do have a lower perception than the users, the difference between 2.81 and 3.18 would not appear to qualify as "substantially lower." Thus, there appears to be **partial support** for Proposition 5.

Proposition 6: *IRT users and nonusers will differ with respect to their perceptions associated with the barriers to rail-truck intermodal.* The barriers to rail-truck intermodal, which appear in Table 2, were drawn from those identified in the *Intermodal Index*, an annual study (last conducted in 1994) which was co-sponsored by the Intermodal Association of North America and the National Industrial Transportation League. Note that the *Intermodal Index* appears to have developed the barriers to intermodal through content analysis of an open-ended question. The present study, by contrast,

asked respondents to evaluate each barrier along a 1 (strongly disagree) to 5 (strongly agree) scale.

Results for the barriers to rail-truck intermodal, presented in Table 3, indicate some noticeable ranking differences between IRT users and nonusers. For example, "slow speed" emerged as the top ranked barrier among IRT nonusers, compared to tied for seventh among IRT users. Similarly, "price", the second ranked barrier among nonusers, was the tenth ranked barrier among users. Alternatively, lack of equipment, which tied as the top barrier among IRT users, ranked seventh among nonusers. Furthermore, the Spearman coefficient of within-group ranks was approximately 0, which suggests that there are notable ranking differences between IRT users and nonusers. These results tend to **support** Proposition 6.

Proposition 7: *IRT nonusers will have stronger opinions than IRT users concerning the barriers to rail-truck intermodal.* For purposes of this paper, "stronger perceptions" will be operationalized by stronger agreement with the barriers to rail-truck intermodal that are listed in Table 2. Note that each of the barriers is presented in a "negative", or non-positive, framework (e.g., "intermodal prices/rates too high"). Thus, greater agreement with the respective barriers will be seen in higher average ratings for them.

The information in Table 3 indicates that IRT nonusers have the higher average ratings for eight of the ten barriers. Furthermore, several of the barriers are characterized by noticeably higher average ratings for IRT nonusers. For example, the average rating for "price" by the nonusers was 3.73, compared to 2.40 for users, a difference of over 1.30 (out of a possible maximum difference of 4.00). Likewise, "slow speed" has an average rating of 3.76 among

IRT nonusers, compared to 2.91 among IRT users, for a difference of .85. In addition, the IRT nonusers' average rating for all 10 barriers was 3.25, compared to 3.00 for users (calculated by adding the scores for all 10 barriers and dividing by 10). These results tend to **support** Proposition 7.

Ramps/railroads are too far away ("distance")

Damage rate is too high/heavy damage using intermodal ("damage")

Intermodal equipment not sufficient ("lack of equipment")

No need for intermodal services/trucking meets needs ("no need")

Customer designates service/someone else determines mode of service ("customer choice")

Multiple stops/too many stops ("stops")

Insufficient volume/loads not large enough ("low volume")

Source: 1994 *Intermodal Index*, p. 20.

TABLE 2
BARRIERS TO RAIL-TRUCK
INTERMODAL

Intermodal transit time is too slow or unreliable; truck is faster than intermodal (hereafter referred to as "slow speed")

Intermodal prices/rates too high ("price")

Lack of availability of service/equipment ("service availability")

TABLE 3
COMPARISON OF USER AND NONUSER BARRIERS TO RAIL INTERMODAL

Barrier	Mean score (rank)	
	Nonuser	User
Slow speed	3.76 (1)	2.91 (7.5)
Price	3.73 (2)	2.40 (10)
Multiple stops	3.62 (3)	3.18 (4)
Service availability	3.31 (4)	3.27 (2)
No need	3.18 (5)	3.27 (2)
Distance	3.16 (6)	2.91 (7.5)
Lack of equipment	3.13 (7)	3.27 (2)
Customer choice	3.12 (8)	3.09 (5)
Damage	3.05 (9)	3.00 (6)
Low volume	2.98 (10)	2.73 (9)
Average score	3.25	3.00

Mean score: 1 = strongly disagree; 5 = strongly agree

Spearman coefficient of rank correlation = 0; not statistically significant

CONCLUSIONS AND MANAGERIAL IMPLICATIONS

In general, the study results support the findings from the Harper and Evers (1993) research. As such, the results from this study, in conjunction with the findings from the Harper and Evers research, lead to the following propositions concerning IRT service:

1. IRT users tend to be larger than nonusers.
2. Some current IRT nonusers have the size characteristics to make them potential IRT users.
3. IRT users have different modal usage characteristics than nonusers for outbound shipments.
4. IRT users tend to favor TL service, while LTL service is the preferred form among IRT nonusers.
5. On an aggregate basis, IRT will be a secondary mode of outbound transportation for IRT users.
6. On a relative basis, IRT will be one of the three most popular forms of outbound transportation for IRT users.
7. IRT nonusers and users will have different perceptions about the overall quality of IRT service.
8. IRT nonusers will have a lower perception than IRT users about the overall quality of IRT service.
9. IRT users and nonusers will differ with respect to their perceptions associated with the barriers to rail-truck intermodal.

10. IRT nonusers will have stronger opinions than IRT users concerning the barriers to rail-truck intermodal.

The study's findings present a number of implications for various intermodal stakeholders, to include IRT users, IRT nonusers, and IRT service providers. Using this information, the various stakeholders could evaluate relevant IRT issues. Current IRT customers, for instance, could use the results to learn about relevant demographic characteristics and select perceptions of other IRT customers. Such information could help companies to assess their modal split strategies relative to like-minded organizations.

In a similar vein, IRT nonusers could utilize the results to learn about relevant demographic characteristics and select perceptions of other nonusers. Moreover, those nonusers who are seriously considering the use of IRT are provided with valuable information to strengthen their position. Intermodal's "slow speed", for example, is frequently cited as a major shortcoming by IRT nonusers; IRT users, by contrast, do not view intermodal's "slow speed" as a major barrier.

The study results also appear to offer several important implications for IRT service providers (e.g., carriers and intermodal marketing companies). For example, the findings suggest opportunities to expand IRT's market penetration, in the sense that some current nonusers appear to possess "favorable" demographic attributes such as sufficient annual tonnage volumes. The challenge for IRT service providers involves moving some (or all) of these companies from nonuser to user status.

Furthermore, the findings suggest that IRT service providers should pursue multiple managerial strategies with respect to addressing the various concerns of IRT users and nonusers. Our research indicates, for example, that current users are most concerned that intermodal equipment is not sufficient to meet their needs. Nonusers, by contrast, most concerned about the speed and reliability of intermodal transit times.

Third, IRT service providers might study ways to address the apparent misinformation about rail-truck intermodal service in the sense that there appear to be noticeable gaps between the perceptions and realities of IRT service. For example, Harper and Evers (1993) discovered low cost to be the primary reason for using IRT service; likewise, our results indicate price to be the lowest ranked barrier among IRT users. IRT nonusers, by contrast, view price as one of intermodal's most significant barriers.

Finally, further research is needed to evaluate the robustness of the propositions presented at the beginning of this section. For example, the present study focused on shippers located in a major metropolitan area. Are the propositions applicable to shippers in more rural locations? Similarly, Harper and Evers (1993) indicated that their study was best generalized to "...areas in the country that have relatively good IRT service." Are the propositions applicable to shippers who might not have access to good IRT service? Moreover, both the present study (Great Lakes region) and the Harper and Evers (Minnesota) study were conducted among shippers located in "northern" states. Are the propositions applicable to shippers located in other US regions? Are the propositions applicable to shippers located in non-US regions?

ENDNOTES

1. The 13 counties were: Ashtabula; Columbiana; Cuyahoga; Geauga; Lake; Lorain; Mahoning; Medina; Portage; Stark; Summit; Trumbull; Wayne.

REFERENCES

- Coyle, J.J., E.J. Bardi, and R.A. Novack (1994), *Transportation*, Fourth edition, West Publishing.
- Harper, D.V. and P.T. Evers (Spring 1993), "Competitive Issues in Intermodal Railroad-Truck Service," *Transportation Journal*, 32(3): 31-45.
- Jennings, B.E. and M.C. Holcomb (Spring 1996), "Beyond Containerization: The Broader Concept of Intermodalism," *Transportation Journal*, 35(3): 5-13.
- Johnston, M.L. and S. Marshall (Fall 1993), "Shipper Perceptions of Intermodal Equipment," *Transportation Journal*, 33(1): 21-30.

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TRUCK DRIVER TURNOVER: AN INTERNAL MARKETING PERSPECTIVE

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Carriers and industry analysts agree that driver turnover is the largest problem facing the industry today. Truck drivers regularly move from one trucking company to another or they change to careers out of the industry. Opinions for high driver turnover are diverse, such as long hours and extended time away from home, poor advancement opportunities, a lack of respect, and old/uncomfortable equipment. In this article the authors examine the truck driver turnover problem from an internal marketing perspective. Membership, socialization, identity, structural, interpersonal, and environmental issues are examined as primary influences on desired quality of truck driver employment. Suggestions are made concerning the implementation of an internal marketing strategy that in the long run might significantly enhance driver retention.

INTRODUCTION

Environmental pressures have created havoc for the trucking industry during the last several years. For example, downward rate pressures in the motor carrier industry in the post deregulation decade forced cost reduction measures that resulted in a serious decline in profitability, which in turn negatively affected truck drivers' wages. This decline contributed to a shortage of drivers for unionized less-than-truckload (LTL) carriers and extremely high turnover rates for nonunion for-hire truckload (TL) carriers. Industry-wide focus on price setting and market coverage as the primary tools of marketing strategy resulted in the continuation of rate pressures in an increasingly competitive environment.

Consequently, raising truck driver wage levels was not seen as an option for some carriers.

The current situation has somewhat improved. Myron P. Shevell, CEO of New England Motor Freight and Chairman of the New Jersey Motor Truck Association reports that the LTL business is healthier now than it has been for five or six years ("Myron P. Shevell....." 1998). This comes as a result of the growing economy. Customers are requiring the shipment of more goods which translates into more business for the trucking industry. Early in 1997, many carriers announced they would be raising their general freight rates, some as much as 5.7 percent ("Carriers Announce....." 1997). Nine months later some shippers imposed a second price increase of 4.9 to 5.9 percent (Mullins

1997). Bill Zollars, President of Yellow Freight System, believes these increases are necessary if carriers are to continue delivering the level of service and enabling technology that customers have come to expect ("Carriers Announce...." 1997). Executives at Roadway Express communicate similar needs. They want to ensure their ability to invest in the equipment, information systems, personnel, and training needed to permit the carrier to provide the stable relationship and service level customers demand. Thus, it would appear that a healthy economy, strong consumer demand, and rock-bottom retail inventories are delivering carriers the heavy freight traffic they have long desired along with desired rate increases.

Even with these positive developments, the trucking industry is still facing an uphill battle. A major shortage of drivers and therefore, a shortage of available equipment, has turned what could be a boon into a bust for some carriers in the industry as they find themselves unable to move the additional traffic. In other words, even with the implementation of a much needed freight rate increase, the trucking industry is still faced with a severe problem -- driver turnover.

For years, carriers have been attempting to buy their way out of shortage/turnover problems. One common approach has been to out recruit the problem. Recruitment and training has played a significant role in providing fleets with drivers. Careful scrutiny reveals the pitfalls of relying exclusively on this aspect of human resource management. Thus, managers have begun to seek other solutions to the problem. John Smith, President and CEO of CRST International reports that "ten years ago, recruitment was a line item in our safety budget, now we spend more on recruiting than we do on marketing activities" (Richardson 1994). It costs approximately \$3,000 to \$6,000 to recruit and train each new

driver and to integrate him/her into the fleet (Leibowitz, Schlossberg, and Shore 1991; Stephenson 1996). These costs are sufficiently high to change a profitable operation into an unprofitable one suggesting that a purely recruiting based strategy--guarding the front door of the company, while leaving the back door unprotected--may be effective, but is much too costly. Thus, this tactic has not been effective in the long run.

Driver retention is possible provided the company treats each driver as a vital member of the company. This approach requires managers to think of drivers as a primary employee group. In other words, in much the same way that they think of customers. Thus, the opportunity exists for carriers to improve their competitive situation in the labor market by internally applying the ideas of marketing.

Traditionally, marketing has had an external emphasis— focusing strictly on the customer. However, recent marketing research on services has highlighted the significance of internal marketing, by which the importance and contribution of the employee is acknowledged. Internal marketing seems to be an effective means to help control driver turnover and to limit the impact of driver shortages. The purpose of this article is to demonstrate the need for the development and implementation of internal marketing programs in the trucking industry.

PREVIOUS FINDINGS

Authors have been examining driver shortages, turnover, retention/recruitment practices, and strategies since the late 1980s. Corsi and Fanaara (1988) explored the relationship between driver turnover rates and carrier accident rates. Motor carriers with higher turnover rates were found to have more accidents than carriers with lower turnover

rates suggesting a relationship between safety performance and turnover rates.

Changing demographics have contributed to and will continue to contribute to the driver shortage problem (LeMay and Taylor 1989). It has been suggested that current recruitment procedures are flawed because they appeal entirely to the traditional driver labor market (i.e., white, male, and 25-45 years old). Demographic projections suggest the need for the development of 'new' recruitment strategies for 'new' drivers (i.e., women, minorities, and older people). LeMay and Taylor (1989) examined sources of driver turnover/shortage and suggested possible solutions to the problem by examining demographic, industry, and firm specific factors. Driver shortage was viewed as a personnel problem which should be dealt with by taking relatively inexpensive, proactive steps in response to the problem. The authors suggested (1) developing help-wanted advertisements targeted at new groups identified by looking at changing demographics, (2) developing innovative programs for in-house driver training, and (3) revising managerial techniques.

According to U.S. Labor Department surveys, the U.S. is expected to see 20 million new jobs in the 1990s, yet the work force will grow by only 21 million between 1986 and 2000 – down from 31 million in the previous 15 years. Contributing to this troublesome situation is the fact that the number of 18-24 year-olds to fill these jobs has fallen (Fitz-enz 1990). By the end of this decade, the 18-24 age group will have 500,000 fewer members than in 1980. And, this will greatly increase the applicant gap. Additionally, the white male, which the trucking industry has traditionally relied on, is the slowest growing segment of the population (Friedman 1995). The past decade has seen this applicant gap filled with women and

minorities, but these segments of the population are not sufficient to fill the growing void. As a result, the trucking industry will be especially vulnerable through the end of this decade and into the 21st century. The American Trucking Association, Inc., estimates that approximately 400,000 new truck drivers will be needed each year until 2005 just to keep up with customer demand (Crawford 1997; Tompkins 1997; Bump 1998). However, the number of potentially qualified workers in the labor market has been steadily shrinking (Eddy 1988; LeMay and Taylor 1989).

Changes in federal licensing laws have also had a significant impact on the qualified driver applicant pool. These changes make it more difficult to obtain a commercial driver's license. It also tracks a driver's speeding tickets and his/her license can be revoked if too many are accumulated. Furthermore, the federal government recently passed legislation requiring that drivers be randomly drug tested. Thus, it is difficult to locate drug free applicants possessing the new commercial driver's license. Additionally, applicants must not have accumulated too many speeding tickets, have no criminal record or driving under the influence (DUI) incidents.

Circumstances such as these paint an ominous picture for the trucking industry—there are not enough qualified people to fill the number of expected jobs. Since many truckload carriers turn over their entire pool of drivers annually, and some carriers exceed 200 percent (Stephenson 1996) it is imperative that carriers develop effective strategies for retaining qualified drivers.

Recruitment and driver shortage issues continued to attract attention in 1989. Researchers observed that when trucking companies recruited, they focused on salary level and equipment condition rather than

other important employment issues (Rakowski, Southern, and Godwin 1989; Southern, Rakowski, and Godwin 1989). Truck driver wages continued to slip lower than stay-at-home construction and factory jobs. Earnings on average were \$27,500 yearly, not the \$40,000 to \$50,000 that conditions and responsibilities of the job implied (Richardson 1994). In 1997, Stephen L. Palmer, executive vice president for human resources and risk management with J. B. Hunt Transport Services, Inc. noted that driver pay had not kept up with inflation for two decades and yet carriers had made greater demands on their drivers such as longer trips away from home, better customer relations, and better use of technology (Maxon 1996). Thus, it has not been uncommon for drivers to leave one carrier for another or to leave the trucking industry altogether in a quest for improved financial status. In an attempt to lessen driver turnover problems, J. B. Hunt implemented wage increases in February 1997. They purportedly raised salaries for drivers an average of 33 percent, ranging from 48 percent for first-year drivers to 24 percent for drivers with 10 or more years' of experience (Waxler 1997). Other carriers also participated in similar wage increases. Early in 1998, Ron DeBoer, President and CEO of DeBoer Transportation Inc, noted that the perception that truck driving is a low-paying profession is outdated. He suggests that today truckers can make as much as \$42,000 annually plus bonuses after just one year of experience (Bump 1998). Others project that the national median income of truckers will be \$48,000 annually by 2000 (Tompkins 1997).

While carriers have concentrated on increasing wages, the question remains, how will they cover the cost of higher wages? Perhaps they intend to utilize the revenue earned from the increase in freight rates to cover the cost of higher salaries. This tactic has merit, but it has been suggested that freight rates would

have to increase approximately 30 percent to allow payment of the wages drivers deserve (Mele 1989). Current market conditions will not allow an increase of that magnitude since profit margins on truck freight remain slim due to severe price competition. Some carriers have closed their truck-driving schools and have cut back on advertising and recruiting (e.g., J. B. Hunt). Others plan to cut training staff but still provide training for new employees (e.g., Ronnie Dowdy, Inc.). And, while carriers hope that higher wages will attract older, more experienced drivers who do not require training, younger, less experienced and inadequately trained drivers will also be attracted by better wages, which in the long run could increase costs.

As mentioned earlier, studies have indicated that drivers' job satisfaction is affected by factors such as the newness and comfort of their trucks. In fact, a common driver complaint concerns the discomfort associated with operating cab-over-engine models which are noisier and less comfortable than other models. Some drivers have indicated their desire to have fast, modern trucks to drive on routes; truck that can go more than 60 miles per hour (Maxon 1996). Thus, the industry is finding it necessary to provide the best equipment and other amenities for drivers (Deierlein 1996).

Rodriguez and Griffin (1990) explored job satisfaction of professional drivers. Both drivers and management personnel were surveyed. The majority of drivers surveyed found their jobs rewarding or somewhat rewarding. They rated overall job satisfaction moderately high; however, advancement opportunities within their companies were considered to be poor. Both managers and drivers perceived that the professional driver's job suffers from an image problem.

Career stage, time spent on the road, and driver work-related attitudes have also been examined (McElroy et al. 1993). Negative attitudes were found to be more common in employees with greater tenure. Income was not found to be a major factor affecting attitudes over the stage of a driver's career. Equipment, benefits, perceived advancement opportunities, and driver perceptions of company's attitude toward employees were major factors. Richardson (1994) suggested that given the undesirable lifestyle of truck drivers, current salaries are not nearly high enough to retain drivers. The over-the-road lifestyle and generally disrespectful treatment of drivers has taken its toll. The American Trucking Association Foundation reports that spending too many days away from home and family is one of the biggest drawbacks to a truck driver's job and one of the prime reasons for a worsening shortage of qualified drivers ("Industry Seeks..... 1993).

In 1995, researchers investigated why truck drivers leave one carrier to go to another (Richard, LeMay, and Taylor 1995). Three factors were found to be statistically significant—driver attitude toward dispatchers, top management, human resource management of the firm, and other companies. The authors suggested carriers give drivers a realistic job preview establishing a driver's expectations on the job. Additionally, they proposed retention of drivers can be accomplished through open channels of communication.

In the most recent article on turnover/retention strategies, driver job and demographic characteristics, job objectives, and retention needs were investigated (Stephenson and Fox 1996). The authors found that driver pay is competitive with average levels in other trades but it is below average if one considers pay per hour, length of work week, and time spent

away from home. Interestingly, when drivers were asked to indicate the main factor in their decision to become a truck driver, earnings potential was by far the most frequently given reason, followed by independence, enjoyment of driving big rigs, job security, and desire to travel. Likewise, when retention needs were analyzed, the researchers found compensation to be the most important for remaining with a carrier. Self-esteem and pride, appreciation and treatment, and security and job tools were also considered important. Working conditions were deemed the least important reason for staying with a company.

MARKETING AND THE TRUCKING INDUSTRY

The philosophy and tools of marketing can be of genuine value to the trucking industry as they begin to address the human resource management challenge, yet most carriers remain reluctant to engage in any type of marketing activity. Those trucking companies which have adopted marketing are primarily practicing "traditional marketing." Traditional marketing is associated with the idea that an exchange takes place between the customer and the organization. In other words, the focus has been on the external customers of trucking companies. This becomes obvious when one looks at the definition of the marketing concept that says that the organization must satisfy the wants and needs of the consumer. However, the marketing concept is also applicable to the exchange between employees and the organization. Marketing research has proposed that the marketing concept be broadened to apply to employees as well as customers. A majority of companies in the service sector have employed many of the marketing processes to external relationships and have found them of equal importance to internal relationships. It has been suggested that "employees are simply internal customers

rather than external customers . . . people do buy and quit jobs making it useful to think of jobs as 'products', and attempt to design them to encourage buying and performance and discourage quitting" (Berry 1984). In other words, the exchange that takes place between employees and employers is just as important as the exchange that takes place between consumers and companies.

There is nothing novel about the concept of internal marketing. In fact, organizations direct various marketing activities toward the various publics influencing their operation. One group of these publics is referred to as input publics. This group is composed of supporters, employees, and suppliers. Some authors suggest that employees precede other publics as the initial market of an organization (George and Wheeler 1986). Thus, traditional marketing can no longer succeed externally without considering its internal aspects, particularly in service industries.

INTERNAL MARKETING

The subject of internal marketing has a growing literature base and numerous definitions exist. Internal marketing has been described as "the means of applying the philosophy and practices of marketing to people who serve the external customer so that (1) the best possible people can be employed and retained and (2) they will do the best possible work" (Berry 1984). The primary goal of internal marketing is to take a holistic view of the company's human resources and attempt to build an inspiring internal climate (Mattsson 1988). Thus, the importance of employee motivation and morale is emphasized, rather than focusing entirely on the customer. Others regard internal marketing as a firm's efforts to communicate with and motivate employees to share in the goal of improving customer satisfaction. Thus, a firm's employees play a

crucial role in delivering customer satisfaction especially in service businesses in which employees interact directly with customers.

Regardless of the definition chosen to describe internal marketing, the underlying theme seems to evolve around corporate culture and communication. "Internal marketing hinges on the assumption that employee satisfaction and customer satisfaction are inextricably linked," mandating the development of a strong corporate culture and effective communication system (Zeithaml and Bitner 1996). Because trucking companies historically have had poor communication systems and have given little thought to corporate culture, management may not understand what drivers seek in employment. Thus, incongruities may exist regarding managements' perceptions of quality employment and the tasks associated with delivery of quality employment to drivers.

IMPORTANCE OF CORPORATE CULTURE

Corporate culture has been suggested for the design of internal marketing strategies (Wasmer and Bruner 1991). This suggestion is supported by the contingency theory of management that proposes that culture is manageable--thus, receptive to change. Corporate culture is based on the philosophy, attitudes, beliefs, and shared values upon which and around which the organization operates. All organizations have a culture that is either a positive or negative force in achieving effective performance. Culture is revealed in people's attitudes, feelings and the general chemistry that emanates from the work environment. Some researchers view corporate culture "as the internal equivalent of consumer lifestyles which marketers are accustomed to considering when formulating strategy" (Wasmer and Bruner 1991). Thus, marketers with well-developed methods of

measuring attitudes and values via psychographic profiles, are better equipped to study organizational culture and use these findings to develop internal marketing strategies.

If employees are expected to create a positive image of the company, then organizations must strive to create a quality employment experience for employees similar to the quality service experiences for consumers (Schneider 1988). To create the quality of employment desired, companies might begin by addressing six issues: membership issues, socialization issues, identity issues, structural issues, interpersonal issues, and environmental issues.

Membership Issues

As mentioned previously, many trucking companies attempt to buy drivers by raiding other carriers (Crawford 1997). This strategy does not work in the long run. A better solution to the turnover problem is the development of a strategy for retaining people by investing in programs designed to keep them while paying wages that the company can afford. Organizations first need to understand what causes people to commit to being productive and loyal. Then they must design jobs, systems, and organizations that support productivity and loyalty. The company should communicate the values of the organization to its employees in order to increase their level of consent, participation, motivation, and moral involvement. In other words they must practice internal marketing.

Management must also be committed to quality employment. Many managers talk quality employment, but do not act on quality employment. Those committed to reducing the turnover problem will set goals that are designed to convince drivers that management

has a positive attitude and is committed to improving the quality of employment. However, management may be confronted with constraints that prevent them from delivering the quality of employment that drivers seek. For example, resource and market constraints make it impossible for management to continually give liberal increases in pay since this acts as an inflationary force that ultimately drives up the cost of shipping.

Schneider (1988) suggested that people and organizations generally make choices that are appropriate matches. In other words, different personality types seek out different types of employment because they are attracted to the culture and structure. However, occasionally both individuals and organizations make mistakes. As the pool of qualified drivers continues to dwindle, the likelihood increases that companies will hire inappropriate job candidates. It is imperative that trucking companies give prospective drivers a true picture of the organization, if they hope to match driver personality type with the climate and culture of the company. This technique is referred to as realistic job previews (RJPs) in which recruits are given a balanced picture of the truck driving job they are considering. Typically RJPs take the form of brochures, videos or personal presentations that inform recruits about both positive and negative aspects of the job. Developing RJPs is absolutely essential since many carriers report they lose approximately 50 percent of their drivers in the first three months of employment (Richardson 1994). In this way, recruits form an accurate and realistic picture of the job. Likewise, companies should attempt to get a realistic view of candidates' expectations and be honest if they cannot meet those expectations. Thus, it may be appropriate not to hire drivers on the first interview since a candidate's qualifications, personality, and attitudes are more likely to surface after

several interviews. Finally, carriers should consider permitting the candidate to talk to a number of carrier employees to get a first hand, hopefully accurate view of the job.

Socialization Issues

While recruitment and selection may build a sufficient pool of drivers, new employees must be socialized in the organization's service perspective. This involves both informal and formal socialization. Informal socialization takes place in the natural order of things. This means that simply by accepting employment and observing the surroundings, new drivers draw conclusions about the organization and the organization's values. Formal socialization on the other hand, involves the training programs provided for new drivers. The magnitude of the driver turnover problem suggests that carriers should establish links with accredited driver-training schools and/or set up in-house training programs to prepare graduates for real driving conditions. Once the training process is completed, co-workers should extol the virtues of the training program and the new driver should be rewarded and supported. Drivers must feel that their work is important. When carriers discontinue training programs [e.g., J. B. Hunt, Inc.] it sends a negative message to drivers about the usefulness of training. To successfully implement training programs, the process should be ongoing and well supported. In fact, this element of the socialization process is considered to important that the Driver Training and Development Alliance has identified four areas of driver training needs: (1) driver candidate screening and selection; (2) entry level training; (3) finishing and ongoing training; and (4) driver-development techniques (Deierlein 1996). The alliance has suggested that thorough training can help recoup the large sums of money commonly spent to recruit.

Identity Issues

An increased sense of identity is linked with improved job satisfaction, improved extra role performance, and lower turnover. Trucking companies need to aid drivers in identifying with the organization's goals and values. Again, as in the selection process, organizations should clearly state their purpose to find a proper fit between the goals and values of drivers and the company. If new drivers are not given an accurate picture of 'life on the road', retention rates will not improve. But giving candidates a glimpse of their future lifestyles is not enough. Much more is required. Without significantly changing the lifestyles of drivers, carriers will find it difficult to attract new people. As reported repeatedly one of the major problems associated with the drivers' job is the extensive amount of time spent away from home (2 to 3 weeks at a time). Some carriers have attempted to address this issue by combining a shorter-haul type of operation with an intermodal system for long-haul ("A Driver Shortage....." 1994). Other carriers are encouraging the formation of team drivers. Ninety percent of these teams are husband and wife combinations which reduces the burden of time away from home.

A serious problem confronting carriers is the lack of advancement opportunities truck driving offers people who would like to consider it a career. Some fleets offer drivers pay increases or other monetary rewards for longevity, but few offer drivers significant career advancement. Some companies have begun to promote from within so that city drivers can move to the road fleet, and people working on the dock can move to the city fleet. This type of program seems to be successful in helping drivers identify with the goals and

values of the organization and often has resulted in declining driver turnover. Carriers also need to concentrate on strengthening their image, as well as the image of the trucking industry. The professional driver's job has an image problem and until this issue is addressed, it will be difficult to attract and retain qualified drivers.

Although research studies have provided carriers with a number of reasons why drivers leave the trucking business, carriers should begin to utilize their own exit interviews to determine why drivers are leaving their company. In other words, every time a driver leaves the company, a structured exit interview should take place. This type of interactive approach permits the interviewer to capture the factors responsible for their resignation and their relative importance. This gives the firm important feedback related to other drivers and company policies and the information collected can be used to change policies and procedures to prevent or reduce the number of other drivers experiencing the same negative feelings.

Structural Issues

Structural issues involve the organization's policies, practices, and procedures. Studies indicate that drivers believe management is not interested in their ideas. They give truckers little if any input into the operations of the company. It is not unusual for service employees to be unhappy with established rules and procedures. Management needs to be aware of this fact and recognize that rules and procedures can lead to dissatisfied and frustrated drivers who are likely to quit. Thus, management must give drivers more opportunity to influence management by giving them more input into the operations of the business. Some companies have begun to take a company wide customer focus program and

have found that many of their drivers could contribute but have not been asked to. As a result, drivers were given more responsibility and accountability. These drivers now feel as if they make a difference, their work influences others, and it influences how well the company does (Harrington 1995). Obviously, those drivers with a longer employee history should be given more input. For example, some carriers have permitted drivers to develop the companies' operations manual(s).

Another potential area for giving drivers more input is in the ordering of new equipment. Since drivers are the operators of the organization's equipment, they deserve to be consulted when specifications are being put together for the purchase of any new equipment. Driver's jobs are getting more difficult and providing the best equipment and other amenities for drivers is necessary for a successful driver retention program. More driver comfort and safety features need the input of drivers when updating models. As such, companies should consider permitting driver representatives to sit down with management and review specifications for equipment orders with suppliers of the organization. After the meeting, all of the carrier's drivers should be furnished a summary of the outcome of the meeting.

Interpersonal Issues

Since interpersonal interaction is an important aspect of the trucking business, carriers must attract, select and retain interpersonally oriented people. But first, supervisors must work on their human relations skills if they hope to attract and retain interpersonally oriented drivers. These skills are extremely important because the quality of the service offered by the driver will ultimately depend upon the previous efforts of the organization to cultivate effective interpersonal relationships.

Drivers have reported that they are dissatisfied with the manner in which their supervisors, especially dispatchers, treat them. Since the dispatcher is the operational link between the driver and the company, it is imperative that they have strong interpersonal skills as well as technical expertise.

Dispatchers should be given basic training in supervisory skills and should be encouraged to treat drivers with the respect they deserve if carriers hope to attract and retain qualified drivers. In other words, treat drivers with the same level of respect that dispatchers would like to receive.

Environmental Issues

An organization attempts to operate effectively within its environment. Effective communication enhances the organizations operation. Internal communications represent the flow of information from management to employees of the company. Internal communications can affect the desires and the perceptions of the driver regarding quality of employment (both positively and negatively). Organizations must make certain they do not promise more in communications to drivers than they plan to deliver. This can lead to an initial increase in desires or expectations, but will lower the perception of quality of employment when the promises are not fulfilled.

Internal communications can also influence drivers' quality of employment expectations by informing them of actions or plans to improve the quality of employment. Employees are often not aware of these actions or plans. Effective communications are those that are appropriately presented, framed, and sustained and they must be two-way. Effective communication can only be achieved through the matching of actions and communications.

Otherwise, employees view communications as merely 'hot air' and the communications fail to get their attention. Research has consistently shown that employees prefer to receive company related information from their immediate supervisor because it permits a two-way flow.

Companies should encourage innovation by soliciting the advice and input of its truck drivers, followed by responses to ideas, complaints or questions. This type of activity may result in more efficient and effective ways of accomplishing tasks since they have such intimate knowledge of the tasks to be performed. Many trucking companies are inflexible in this area. They believe that if a task was performed in a certain manner in the past, it should continue to be performed in the same way in the future. This type of neglect might result in drivers feeling ignored and/or unimportant. To overcome this potential problem area, carriers might schedule regular meetings with drivers to permit them to present and exchange ideas. It is conceivable that these sessions could expose potential problem areas before they have time to materialize and grow. This might also be accomplished by conducting employee surveys to keep a pulse on attitudes. Thus, management must be prepared to listen and respond to employee grievances. In fact, many positive suggestions may be generated in these sessions. Additionally, companies should consider using internal newsletters to help develop a sense of involvement and to inspire confidence by reporting significant new developments. This newsletter can be used to inform company employees about achievements of individual employees. Finally, management should monitor other carriers in the industry to make certain that their company is up-to-date in their offering of resources and support.

CONCLUSIONS

The problem of driver shortage/turnover has plagued the trucking industry for years. It is clear that carriers with high rates of driver turnover will find themselves severely disadvantaged in the labor market of the late 1990s and the new millennium. How can carriers alleviate the driver shortage/turnover problem? While the most common solution for most carriers seems to be raising driver pay, this solution might result in survival problems for the carrier if they must pass along this additional cost through higher freight rates. And, higher pay might backfire if it results in keeping dissatisfied employees handcuffed to the job. Clearly, money is important, but it is not a long term motivator and is not sufficient to inspire loyalty. Money alone does not promote loyalty and seldom retains motivated people. Drivers may be motivated to leave a carrier because of pay, but pay alone does not necessarily translate into increased driver retention, if the drivers' quality of work life is traded for higher compensation. The changing values of the workforce suggest that employees want more interaction with management, more self-satisfaction on the job, more responsibility, and more control over the decisions affecting them. They are interested in elevating their quality of life. Drivers want their work to make a difference and want to be part of something that matters. Carriers must help drivers see a return on the investment they are making. Those companies failing to offer drivers career opportunities, room for advancement, and

enhancement of skills and knowledge may find it difficult to retain qualified drivers.

The answer to the driver turnover may lie in managements' ability to undertake a systematic approach to internal marketing. One important ingredient of any internal marketing plan is communication. Communication programs that open the lines between management and drivers seem a logical place to start. Channels of communication must remain open and consist of a two-way flow if the challenge is to be met. Through communication, companies can achieve a greater understanding of what drivers seek from the company--what makes their jobs more satisfying. Lack of communication and a failure to concentrate on improving the cultural climate of the organization may have contributed to driver turnover problems.

Trucking companies should investigate the possibility that significant gaps exist between managements' perception of what drivers desire in a job and the expectations of the drivers. If a gap exists, steps should be taken to narrow the gap and eventually eliminate it. Elimination of this gap may aid the industry in its attempt to retain qualified drivers as well as improve its ability to recruit newly qualified drivers. The course seems clear. The best managed companies in the 21st century will begin to close this gap by focusing on internal marketing.

REFERENCES

- "A Driver Shortage Drives Truckers To the Rails." (1994), *Railway Age*, 195(10): 34.
- Berry, Leonard L. (1984), "The Employee As Customer," in *Services Marketing*, ed. Christopher H. Lovelock. Englewood Cliffs, New Jersey: Prentice-Hall.
- Bump, Greg (1998), "Economy Truckin' But Drivers in Short Supply," *Marshfield News-Herald*, (March 13): 1A
- "Carriers Announce General Rate Increases." (1997), *Transportation & Distribution*, 38(January): 15.

- Corsi, Thomas M. and Philip Fanaara, Jr. (1988), "Driver Management Policies and Motor Carrier Safety," *Logistics and Transportation Review*, 24(2): 153-163.
- Crawford, Dan (1997), "Accelerating Driver Shortage Jackknives Trucking Industry: Firms Canabalize Each Other to Meet Their Own Demand," *Business First-Columbus*, (September 26): 6.
- Deierlein, Bob (1996), "Driving Considerations," *Fleet Equipment*, 22(February): 24-28.
- Eddy, Art (1988), "Driver Shortage Solution: Improve Wages, Conditions," *Transportation and Distribution*, 29(July): 2.
- Fitz-enz, Jac (1990), "Getting--and Keeping--Good Employees," *Personnel*, (August): 25-28.
- Friedman, Michael (1995), "Getting, Keeping Drivers Still No. 1 Problem," *Frozen Food Age*, 44(November): 45.
- George, William R. and Kent W. Wheeler (1986), "Practice Development--A Services Marketing Perspective," *The CPA Journal*, 56(October): 30-43.
- Harrington, Lisa (1995), "Get Serious About Driver Retention," *Transportation & Distribution*, 36(5): 72.
- "Industry Seeks Solutions to Driver-Shortage Problem." (1993), *Traffic Management*, 32(November): 26.
- Leibowitz, Zandy B., Nancy K. Schlossberg, and Jane E. Shore (1991), "Stopping the Revolving Door," *Training and Development Journal*, (February): 43-50.
- LeMay, Stephen A. and G. Stephen Taylor (1989), "The Truck Driver Shortage: An Overview and Some Recommendations," *Journal of Transportation Management*, 1(1): 47-55.
- Mattsson, Jan (1988), "Developing an Axiological Method to Measure Company Values," *European Journal of Marketing*, Vol. 22(6): 21-35.
- Maxon, Terry (1996), "J.B. Hunt Boosts Truckers' Wages To Slow Turnover," *Dallas Morning News*, (December 30).
- McElroy, James C., Julene M. Rodriguez, Gene C. Griffin, Paula C. Morrow, and Michael G. Wilson (1993), "Career Stage, Time Spent on the Road, and Truckload Driver Attitudes," *Transportation Journal*, 33(1): 5-14.
- Mele, Jim (1989), "Solving Driver Turnover", *Fleet Owner*, 84(September): 45-52.
- Mullins, Robert (1997), "Truck, Driver Shortages Throttle Up Shipping Costs." *Business Journal-Milwaukee*, (December 5): 25.
- "Myron P. Shevell Discusses the Tough Road Ahead for the Trucking Industry." (1998), *BUSINESS News New Jersey*, (January 12): 11.
- Rakowski, James P., R. Neil Southern, and Lynn R. Godwin (1989), "Recruiting and the Truck Driver Shortage: Is the Industry Reactive or Proactive?" *Transportation Practitioners' Journal*, 56(4): 381-392.
- Richard, Michael D., Stephen A. LeMay, and G. Stephen Taylor (1995), "A Factor-Analytic Logit Approach to Truck Driver Turnover," *Journal of Business Logistics*, 16(1): 281-298.

- Richardson, Helen L. (1994), "Can We Afford the Driver Shortage?" *Transportation & Distribution*, 35(August): 30-34.
- Rodriguez, Julene M. and Gene C. Griffin (1990), "The Determinants of Job Satisfaction of Professional Drivers," *Journal of the Transportation Research Forum*, 30(2): 453-464.
- Schneider, Benjamin (1988), "Notes on Climate and Culture," in *Managing Services Marketing, Operations, and Human Resources*, ed. Christopher H. Lovelock. Englewood Cliffs, New Jersey: Prentice Hall.
- Southern, R. Neil, James P. Rakowski, and Lynn R. Godwin (1989), "Motor Carrier Road Driver Recruitment in a Time of Shortages," *Transportation Journal*, 28(4): 42-48.
- Stephenson, Frederick J. (1996), "Driver Retention Solutions: Strategies For For-Hire Truckload (TL) Employee Drivers," *Transportation Journal*, 35(Summer): 12-25.
- _____ and Richard J. Fox (1996), "Driver Retention Solutions: Strategies For For-Hire Truckload (TL) Employee Drivers," *Transportation Journal*, 35(4): 12-25.
- Tompkins, Wayne (1997), "Demand Fuels Truckers-In-Training BCC Driving Course Gets Students Ready to Hit the Road," *Florida Today*, (December 7): 01.E
- Wasmer, D. J. and Gordon C. Bruner II (1991), "Using Organization Culture to Design Internal Marketing Strategies," *The Journal of Services Marketing*, 5(1): 35-46.
- Waxler, Caroline (1997), "Trucker, Part One," *Forbes* 159(April 21): 382.
- Zeithaml, Valerie A. and Mary Jo Bitner (1996), *Services Marketing*, New York, NY: McGraw-Hill.

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AN EXPLORATORY ANALYSIS OF FACTORS DRIVING INTERMODAL TRANSPORTATION USAGE

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The purpose of this study is to investigate certain aspects of a transportation choice model proposed by Krapfel and Mentzer (1982) pertaining to the influence of shipper perceptions on the selection of a mode. Specifically, this study attempts to identify the impact that shipper perceptions of intermodal and over-the-road truck service, as well as other characteristics of the shipper, have on intermodal usage. The research findings support the notion that shipper perceptions affect modal usage and indicate areas in which intermodal providers should focus their attention to improve intermodal usage.

INTRODUCTION

Intermodal transportation provides an essential integration of modes for freight both within North America and around the world. At the recent Intermodal Transportation Summit (University of Denver, October 1997), U. S. Secretary of Transportation, Rodney Slater, defined a vision of America's transportation system in the 21st century. "It is important it be an integrated system. That is be international in reach, intermodal in form, intelligent in character, and inclusive in service...unless we bring highways, transit, rail, airports, and seaports together, we will not be as efficient as we need to be." Continuing on, he added that intermodal is the fastest growing sector in American freight transportation.

At that same Summit, Ed Emmett, President of the National Industrial Transportation League, noted that, along with being a seamless, integrated method of transport, intermodal transportation must also provide cost-effective customer service to the shipper. It is well known that providing service that meets or exceeds a customer's (in this case, a shipper's) expectations will provide customer satisfaction (Oliver 1980), which often leads to loyalty. However, it is not just service performance that is important, but also customer perception of the service that is essential in determining whether a customer will continue purchasing from a particular company or industry segment (Tucker 1980). Regarding intermodal transportation, Evers, Harper, and Needham (1996) found that the most important service

factors influencing shipper perceptions of the intermodal sector were timeliness and availability.

The purpose of this study is to identify the impact that shipper perceptions of the intermodal and motor carrier sectors, as well as other characteristics of the shipper, have on intermodal usage. Though exploratory in nature, the research findings indicate areas in which intermodal providers should focus their attention to improve intermodal usage. The paper is organized as follows: first, relevant previous research efforts are highlighted as justification for the research question; next, the source of data for this study is discussed along with the methodology; the results are then examined; and finally, conclusions, as well as future research directions, are noted.

SPECIFICATION OF RESEARCH QUESTION

Tucker (1980) suggested that it is not so much the actual performance as it is the customer's perception of performance that is important in a business-to-business transaction. The well-known disconfirmation theory of satisfaction holds that a customer compares his or her expectations with the perceived performance received (Oliver 1980). Only if the perceived performance is equal to or greater than the expectation is the customer satisfied. This was originally applied to consumer transactions but has recently been extended to relational business-to-business settings (Emerson and Grimm 1996).

The level of expectations of performance that are ultimately met, however, may not yield a satisfied customer (Spreng, MacKenzie, and Olshavsky 1996). For example, if a customer expects a low level of performance from a vendor for whatever reason, and the vendor meets that expected low level of performance,

the customer is not necessarily satisfied. Furthermore, social exchange theory argues that choice is determined by a comparison with available alternatives (Thibaut and Kelley 1959). "...For a relationship to be viable, it must provide rewards and/or economies in costs which compare favorably with those in other competing activities (Thibaut and Kelley 1986, p. 49). This comparison may prescribe the level of initial expectation used by the customer in determining his or her satisfaction.

Along the same lines, Krapfel and Mentzer (1982) proposed that shippers choose transportation modes based at least partly on their perception of services offered. Their efforts established a framework for studying the impact that shipper perceptions of transportation service (instead of just the actual service performance) have on shipper choice. In a survey of Minnesota manufacturers, Harper and Evers (1993) compared shipper perceptions of intermodal, railroad, and over-the-road truck service. They concluded that shipper perception of intermodal service was better than that of rail service but not as good as that of truck service. Evers, Harper, and Needham (1996) determined that shipper perception of timeliness and availability were the most important drivers of overall shipper perception of transportation service, with cost, firm contact, restitution, and suitability also having some influence. Using two different sources of data, the Minnesota data and data from the Intermodal Index (this second source will be discussed in more detail later), they found that these service perception factors varied only slightly in importance over time and by transport mode.

This study is intended to examine the notion posed by Krapfel and Mentzer that shipper perceptions influence their choice of modes. Overall shipper perceptions of the modes

(including competing modes as suggested by Harper and Evers) are used to examine this effect, since overall perceptions have been shown by Evers, Harper, and Needham as being comprised largely of shipper perceptions of individual service factors. Of course, other factors besides shipper perceptions also affect modal usage. These factors may include both shipper characteristics, such as items being shipped and size of firm, as well as carrier characteristics, such as actual service performance (in terms of transit times, reliability, etc.) and size of carrier. A model of modal usage incorporating these relationships is shown in Figure 1.

Specifically, the first set of arrows in Figure 1 (linking the individual service perception factors to the overall perception of the mode) has already been addressed by Evers, Harper, and Needham as it relates to intermodal transportation and, therefore, will not be considered in this study. The second set of arrows (connecting overall perception and other characteristics to modal usage) is in accordance with Krapfel and Mentzer and represents the relationships of interest here. In particular, this research focuses on the usage of intermodal transportation versus truck transportation.

SOURCE OF DATA AND METHOD OF ANALYSIS

The data for this research come from the *Intermodal Index*, a five year study (1990-1994) co-sponsored by the Intermodal Association of North America and the National Industrial Transportation League and carried out by Mercer Management Consulting. Approximately 500 telephone responses were compiled each year from a wide range of companies (the responding firms generally differed from year to year), though not every company answered every question.

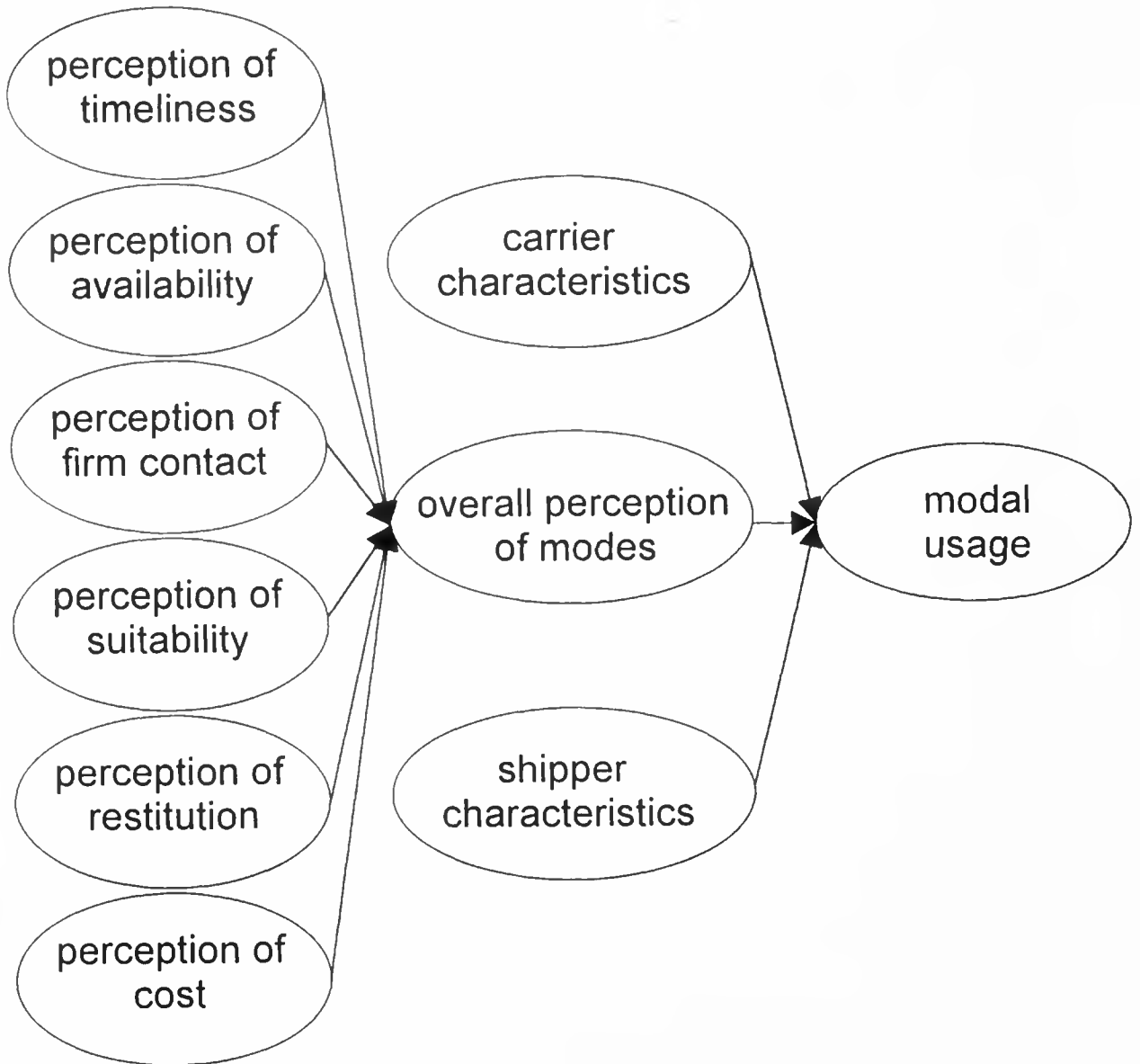
Exploratory regression analysis was used to identify the factors influencing the use of intermodal transportation. The dependent variable, which measured intermodal usage, was regressed onto independent variables measuring overall shipper perceptions and other pertinent characteristics. The specification of the linear regression equation is as follows:

$$\text{Intermodal usage} = \alpha + \beta_1 (\text{overall perception}_i) + \beta_j (\text{shipper characteristic}_j) + \delta_k (\text{year}_k) + \varepsilon$$

where: each β represents a regression coefficient indicating whether a link actually exists between the dependent and independent variables (in Figure 1, this is associated with the second set of arrows); each δ is associated with a year dummy variable to account for any changes that may arise over time; α represents the intercept; and ε represents the error term. Because of the nature of the data, carrier characteristics were not available and, hence, could not be examined.

Regarding the dependent variable, intermodal usage was defined as the proportion of a shipper's total trailerload and containerload shipments moving over 500 miles via intermodal transportation; as this proportion increases, intermodal usage increases relative to over-the-road truck usage. Regarding the independent variables, overall shipper perceptions were obtained for both intermodal and motor truck transportation. Respondents were asked for their overall perception of intermodal and truck service, separately, on a scale of 1 (poor) to 5 (excellent). Shipper characteristics included their awareness of third party providers and of railroad carriers, the susceptibility of their product to damage, the size of their company and its type, the density of their product, and the value of their shipments.

FIGURE 1
MODEL OF MODAL USAGE



Awareness of third party providers was measured as the number of intermodal marketing companies (IMCs) that the respondent was familiar with from a list of seven major ones (Alliance, APL Distribution Services, Con-Way Intermodal, Greater South [GST], Hub City, Mark Seven, and C.H. Robinson). Consequently, 0 indicated that the respondent was not familiar with any of the IMCs, and 7 indicated that the respondent was familiar with all of them. Awareness of railroad carriers was similarly measured from 0 to 7 (in the 1990-1994 time frame there were seven major U.S. railroads: Burlington Northern, Conrail, CSX, Norfolk Southern, Santa Fe, Southern Pacific, and Union Pacific). Susceptibility of product to damage during transit was measured as either 1 for high (very sensitive), 2 for medium (somewhat sensitive), or 3 for low (not very sensitive). Size of firm indicated the responding company's annual revenue level, ranging from a low of 1 (less than \$50 million) to a high of 5 (greater than \$1 billion). Type of firm identified whether the respondent's company was primarily a manufacturer, retailer, or wholesaler/distributor. Product density was measured as either heavy (item weighs out a 48-foot trailer before it cubes out) or light (item cubes out a 48-foot trailer before it weights out). Shipment value was also measured relative to a 48-foot trailer: high (if \$100,000 or more), medium (if between \$30,000 and \$100,000), or low (if \$30,000 or less). These last three shipper characteristics (type of company, product density, and shipment value) were modeled using dummy variables.

Average values for the dependent variable (intermodal usage), as well as for certain independent variables (the overall perception and awareness variables), are shown in Table 1 on a year-by-year basis. Over the five-year period, the mean percentage of a shipper's total trailerload and containerload shipments

handled by intermodal over 500 miles was fairly stable, averaging between roughly 22% and 23% (this does not mean that intermodal transportation had a 22-23% market share since these averages are not weighted by volumes). During that same time frame, the average overall shipper perception of intermodal service consistently lagged behind that of motor truck service (a result in accordance with the aforementioned findings of Harper and Evers using a different data set). While shippers were, on average, generally aware of almost all railroad carriers (out of a maximum seven possible, the annual average fluctuated around six), they were less aware of the major third party providers (the yearly average was between four and five, again out of a maximum seven possible).

Of the 1471 respondents during the five years, the overwhelming majority of them were manufacturers (nearly 81% versus 16% for wholesalers/distributors and 4% for retailers). Roughly 70% of the respondents shipped heavy density items while the remaining 30% shipped light density items. Slightly over half of all respondents (approximately 51%) reported making shipments of medium value (\$30,000 to \$100,000), with the rest almost equally distributed between low (23%) and high (26%) value shipments. Susceptibility of product to damage was a bit less unevenly disbursed: 38% of respondents reported low susceptibility; 45% reported medium; and 17% reported high. In terms of annual revenues, firm size was fairly spread out as well. Respondents reporting revenues of less than \$50 million represented about 26% of the total; those between \$50 million and \$100 million represented 19%; those between \$100 million and \$400 million represented 26%; those between \$400 million and \$1 billion represented 13%; and those over \$1 billion represented 17%. All of these observations were fairly stable over the five-

TABLE 1

MEAN VALUES OF SELECTED VARIABLES BY YEAR

<u>Year</u>	<u>Intermodal usage</u>	<u>Overall perception of intermodal</u>	<u>Overall perception of trucking</u>	<u>Awareness of third party providers</u>	<u>Awareness of railroad carriers</u>
1990 (214 ^a)	.231 ^b	3.879 ^c	4.107 ^d	4.107 ^e	6.061 ^f
1991 (282)	.217	3.734	4.138	4.135	6.266
1992 (295)	.219	3.708	4.115	4.136	5.892
1993 (320)	.223	3.662	4.078	4.616	6.316
1994 (360)	.238	3.539	4.008	4.911	6.519
Total (1471)	.226	3.687	4.084	4.426	6.234

^anumber of observations

^bproportion of all vehicle-load shipments over 500 miles

^cscale of 1 (poor) to 5 (excellent)

^dscale of 1 (poor) to 5 (excellent)

^escale of 0 (none) to 7 (all)

^fscale of 0 (none) to 7 (all)

year period. (Some percentages do not add up to 100% due to rounding.)

RESULTS OF REGRESSION

An initial regression was performed that incorporated all of the independent variables mentioned above. However, a number of the regression coefficients proved to be insignificant. Since the research was exploratory in nature (the intent was to determine whether relationships exist), other

regressions with fewer variables were run. By eliminating some of the insignificant variables and combining the susceptibility to damage variable with the density dummy variables, a parsimonious model was readily constructed (the year dummies were left in to show that time does not have an impact on intermodal usage). Results of this model are presented in Table 2.

Before examining the regression coefficients and their implications, the overall model

**TABLE 2
REGRESSION RESULTS**

Dependent variable = intermodal usage (proportion of all vehicleload shipments over 500 miles)

Model F-statistic = 8.736

p-value = .0001

R-square = .062

Adjusted R-square = .055

Significant coefficients:

<u>Independent Variables</u>	<u>Parameter Estimate</u>	<u>Std. Error</u>	<u>t-stat.</u>
Intercept	0.208	0.054	3.880
Overall perception of intermodal	0.064	0.009	7.267
Overall perception of trucking	-0.059	0.011	-5.425
Awareness of third party providers	0.011	0.004	2.873
Susceptibility to damage x light density	0.013	0.007	2.000
Medium shipment value	-0.039	0.017	-2.249
Low shipment value	-0.048	0.020	-2.421
Wholesaler/distributor	0.058	0.019	3.053
1990	-0.014	0.023	-0.618
1991	-0.018	0.021	-0.830
1992	-0.014	0.021	-0.667
1993	-0.015	0.020	-0.711

diagnostics need to be discussed. While the F-statistic indicates that the regression model is significant at a 99% confidence level, the adjusted R-square term, a measure of the percentage of total variation in the dependent variable explained by the variation in the independent variables, is very low. The low score obtained in this model (5.5%) suggests that the items considered here do not have a large effect on intermodal usage and that other items not considered here might have a greater effect. This is not surprising since carrier characteristics, including such factors as actual transit times and reliability, were not available. It is expected that these other items, especially those related to actual service performance, would have a substantial impact on modal usage. Nevertheless, overall perceptions and shipper characteristics do, in general, have some substantive effect on intermodal usage.

The results indicate that a number of specific factors have a significant impact on intermodal usage. One factor positively related to usage is the firm's overall perception of intermodal transportation. As the firm's overall perception of intermodal increases, its usage of intermodal also increases. On the other hand, the firm's overall perception of over-the-road truck transportation is negatively related to intermodal usage. The more highly a firm perceives motor carrier service, the less likely it is to use intermodal transportation. In addition, as a firm's awareness of third party intermodal providers increases, its intermodal usage also increases. Moreover, shippers of light density products, especially those that are less susceptible to damage, are more likely to use intermodal. Usage of intermodal transportation is also more likely for firms having higher valued shipments than for those having lower valued shipments. Lastly, the research finds that wholesalers/distributors tend to use intermodal transportation more than either manufacturers or retailers do.

Conversely, a couple of factors had no influence on intermodal usage. Neither shipper awareness of railroad carriers nor shipper size had a significant impact on intermodal transportation use. The year of the data had no effect, either.

Closer inspection of these results yields some interesting insights, most of which would be expected, into intermodal transportation usage. The analysis lends support for the argument made by Krapfel and Mentzer that perceptions influence behavior. The positive relationship between the overall perception of intermodal and the use of intermodal is an obvious indication of this. Indeed, as the perception of intermodal improves, increases in usage are fairly sizeable according to the corresponding regression coefficient. The negative relationship between the perception of over-the-road trucking and the use of intermodal is another clear indication of this. Interestingly, the regression coefficient associated with the perception of trucking is nearly as large as, but in the reverse direction of, the coefficient associated with the perception of intermodal, suggesting that shippers use trucking as a reference point when deciding on whether to use intermodal and to what extent.

The other regression coefficients give some indication of which shipper characteristics are important and which are not. Shipper awareness of railroad carriers has no impact on intermodal usage. This is not surprising since many shippers do not deal directly with railroads for intermodal service; instead, they often use IMCs to arrange for service. In addition, since there are only a handful of major railroads, it is probably the case that most shippers are aware of all or nearly all of them whether they use intermodal or not. Consequently, their awareness of railroad carriers does not affect their use of intermodal.

However, their awareness of IMCs does have an effect. Since IMCs play an integral part in making intermodal service available to the public, it is not unexpected that increased awareness improves intermodal usage. As IMCs and their offerings become more widespread and better known, shippers may be more inclined to use them.

The product being shipped also affects intermodal usage. Items that are low in density and difficult to damage, as well as those that are high in value, are more likely to be shipped via intermodal. Rightly or wrongly, intermodal service may still be associated by many with railroad service, which may directly lead to the finding that light density items not prone to damage have a greater tendency to be shipped via intermodal. Along these same lines, though, the finding that higher valued shipments have a greater tendency to be shipped by intermodal is surprising.

The conclusion that time does not have an impact on intermodal usage is also interesting. The early 1990s represented a period of dramatic growth in intermodal traffic. However, this did not translate into any fundamental changes in terms of when shippers decide to use intermodal transportation. Nor did shipper size (in terms of annual revenues) influence this decision. Lastly, according to the analysis, wholesalers and distributors are more inclined to use intermodal than either manufacturers or retailers are. Since most retailers have little opportunity to effectively employ intermodal transport, it is not surprising that they do not use it much. However, it is difficult to explain why manufacturers do not use intermodal as much as wholesalers and other intermediaries do; perhaps it is the nature of the latter's business that somehow lends itself better to intermodal transport.

CONCLUSIONS AND IMPLICATIONS

The study reported here was performed chiefly to determine whether a relationship existed between overall perceptions and modal usage. Specific shipper characteristics were factored into the analysis to determine their impact as well. Since this research was exploratory in nature, it would be inappropriate to generalize a lot of conclusions. Indeed, a follow-up longitudinal questionnaire (similar to the original *Intermodal Index*) is presently being administered. This subsequent survey will be used to test hypotheses derived from the above findings. Nonetheless, the current work sheds some light onto the shipper's decision to employ intermodal transportation.

An important managerial implication of this research is that intermodal providers (including IMCs, railroads, and drayage carriers) should work to improve the overall perception of the transportation service they offer. By enhancing shipper perceptions of the service, the percentage of a shipper's total vehicleload shipments handled by intermodal should increase. As previous research has shown, timeliness and availability are the two primary areas that should be addressed when attempting to improve shipper overall perceptions. This may not be easy, but it is necessary. For example, while recounting its efforts to improve the perceptions of intermodal held by two large shippers at the most recent International Intermodal Expo (Dallas, May 1998), a major IMC noted that it was a tough task but, ultimately, should lead to increased usage (Cottrill 1998).

Another managerial implication involves actual service performance, since satisfaction is also related to desires (Spreng, MacKenzie, and Olshavsky 1996). That is, if customer expectations are low, and intermodal providers simply meet those low expectations, it is likely

that the customer will remain unsatisfied and thus be unwilling to continue choosing intermodal. Therefore, service improvements might be necessary as well.

Intermodal providers also need to recognize that shipper perceptions of over-the-road trucking also affect intermodal usage. As a result, these providers must develop effective strategies to counter this tendency. One possible strategy is for intermodal providers to ensure that shipper perceptions of trucking are not unjustifiably high. Two additional strategies include focusing attention on traffic lanes in which trucking services are perceived as inferior and improving perceptions (and performance) of intermodal in lanes where perceptions of trucking are high in order to offset the latter's effects.

While the preceding implications are relatively straightforward, the final two implications are a

bit less obvious. According to the findings, intermodal usage was directly related to shipper awareness of third parties but not to shipper awareness of railroads. Thus, if shippers are unaware that intermodal service is available, that IMCs arrange for intermodal service and deal with the issue of complexity, or that multiple and competing IMCs exist, they will avoid using intermodal transportation. On the other hand, knowledge of the actual railroad service providers does not matter to shippers. To increase intermodal usage then, third party providers should strive to enhance awareness by expanding marketing communications. The positioning may be related to ease of use and cost savings relative to over-the-road trucking. Railroads, however, can refrain from making significant marketing expenditures since they do not have an effect, perhaps using the monies instead to improve their service offerings.

AUTHORS' NOTE

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REFERENCES

- Cottrill, K. (1998), "Intermodal's Hard Sell," *Traffic World*, 255(August 6), 40-41.
- Emerson, C.J. and C.M. Grimm (1996), "Logistics and Marketing Customer Service: An Empirical Test of the Mentzer, Gomes, and Krapfel Model," *International Journal of Physical Distribution and Logistics Management*, 26(8), 29-42.
- Evers, P.T., D.V. Harper, and P.M. Needham (1996), "The Determinants of Shipper Perceptions of Modes," *Transportation Journal*, 36(2), 13-25.
- Harper, D.V. and P.T. Evers (1993), "Competitive Issues in Intermodal Railroad-Truck Service," *Transportation Journal*, 32(3), 31-45.

- Krapfel, R.E. and J.T. Mentzer (1982), "Shippers' Transportation Choice Processes Under Deregulation," *Industrial Marketing Management*, 11, 117-124.
- Mercer Management Consulting (various dates), *Intermodal Index*, Greenbelt, MD: Intermodal Association of North America and The National Industrial Transportation League.
- Oliver, R.L. (1980), "A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions," *Journal of Marketing Research*, 17(November), 460-469.
- Spreng, R.A., S.B. MacKenzie, and R.W. Olshavsky (1996), "A Reexamination of the Determinants of Consumer Satisfaction," *Journal of Marketing*, 60(July), 15-32.
- Thibaut, J.W. and H.H. Kelley (1959), *The Social Psychology of Groups*, New York, NY: John Wiley.
- Thibaut, J.W. and H.H. Kelley (1986) *The Social Psychology of Groups*, 2nd ed., New Brunswick, NJ: Transaction Books.
- Tucker, F.G. (1980), *Customer Service in a Channel of Distribution: The Case of the Manufacturer-Wholesaler-Chain Drug Retailer Channel in the Prescription Drug Industry*, unpublished doctoral dissertation, The Ohio State University.

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UNION PACIFIC/SOUTHERN PACIFIC MERGER: IMPACT ON SHIPPERS

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In the Summer of '96, Union Pacific Railroad merged with Southern Pacific to create the largest American railroad. Controversy continues to surround the merger. This paper reports results of a recent merger-impact survey. Survey respondents were rail and intermodal shippers. Among the interesting research findings are the following: (1) while shippers report a negative impact due to less rail competition, trackage rights granted to Burlington Northern/Santa Fe have failed to dampen this impact; (2) railroad service has deteriorated, but freight rates have remained stable; and (3) service problems are more severe for rail, as opposed to TOFC/COFC, shippers.

INTRODUCTION

Since merging with Southern Pacific, Union Pacific Railroad has been in the news. Headlines, such as "Union Pacific Says its Network Jammed" and "Local Businesses Steamed over Union Pacific Backlog," tell a tale of congested rail yards, late shipments, missing rail cars, neglected customers and overall poor service. As "Union Pacific's Problems Continue," other headlines, like "Union Pacific Faces Undoing Part of Merger" and "Union Pacific Reports to Feds on Service Meltdown," suggest shipper and federal responses to post-merger service problems. These responses have included diversion of traffic to motor carriers and requiring submission of weekly service reports to the U. S. government, as well as talk of dismantling the merger, opening up access to UP tracks,

and even railroad re-regulation. Some shippers are also laying their own tracks (Machalaba 1998a).

The purpose of this paper is to report results of a recent survey of shippers on the UP/SP railroad merger. The second and third sections briefly describe the merger and market area surveyed--Reno/Sparks, Nevada. Then, the fourth and fifth sections outline research methods and present statistical results, respectively. Finally, the paper closes with a discussion on implications of the results for transportation management.

The Merger

Union Pacific (UP) has sought control of Southern Pacific (SP) since the dawn of this century. In 1901, UP gained financial control of

the Southern Pacific holding company which, in turn, had control of both SP and the Central Pacific (CP) railroads. (On May 10, 1869, UP and CP linked together near Ogden, Utah to form the first transcontinental railroad in North America.) But, in 1912, the U.S. Supreme Court instructed UP to relinquish its 46 percent stake in SP. SP and CP merged in 1959 (Wilner 1997).

On July 3, 1996, the Surface Transportation Board (STB) approved the UP/SP railroad merger. This made UP the largest railroad in the USA, with over 31,000 miles of track in 25 states. UP and Burlington Northern/Santa Fe (BNSF) now control 90 percent of all rail freight in the West. STB approval of the merger came with conditions. One potentially important condition for shippers involves the trackage rights granted to BNSF on all "two-to-one" lanes, i.e. lanes formerly served by both UP and SP (Burke 1996).

Despite STB conditions, the merger was opposed by several groups, including the National Industrial Transportation League (NITL). The NITL is the nation's largest shipper group. According to Bradley (1995): "Shippers worry that the (UP/SP) merger will lead to reduced service--partly as a result of possible line abandon-ments--and higher rates." The merger was also opposed by the Coalition for Competitive Rail Transportation and the United States Justice Department.

Before the merger, UP and SP operated a large number of parallel lines. The consolidation of parallel lines under one railroad affords an opportunity to route faster intermodal trains over one line and slower (e.g. coal) trains over the other (Bradley 1997). Indeed, the UP/SP merger application promised shippers faster TOFC/COFC movement between Chicago and both Northern and Southern California (Wilner

1997). Faster movement of freight is a form of improved service to shippers.

Consolidation of parallel lines, creating two-to-one lanes, can also eliminate competition and reduce incentives the remaining railroad has to improve its service to shippers. In the UP/SP merger, there were more than 130 two-to-one points (Wilner 1998). This concern--that a parallel or side-by-side merger will eliminate competition and result in worse service--has been confirmed in a prior shipper survey (Anon. 1978).

Reno/Sparks

The railroad created Reno, Nevada. CP entered Northern Nevada from the West in early 1868. Since the transcontinental railroad was to be routed along the Truckee River, towns such as Reno and Verdi emerged in the Spring of 1868 (Miluck 1994).

Recently, the railroad has been a source of controversy in Reno. Due to the UP/SP merger, the number of freight trains rolling through downtown Reno is expected to increase from 14 to 25 per day. To handle increased congestion at RR crossings, the federal government recommends speeding up trains through Reno, from 20 to 30 mph (Voyles 1998a). On the other hand, the Reno City Council wants to keep the trains moving at 20 mph. The Council also wants UP to pay \$100 million toward lowering the tracks into a trench under downtown Reno (Voyles 1998b).

Reno-area rail shippers have also been in the news recently. Shippers across a variety of industries--from automobiles to utilities to building supplies, for instance--have reported service problems with UP, the only (rail) show in town. An auto dealer complains about a shipment of 50 new cars being ten days late--and counting. The regional power company is

down to an 18-day supply of coal, but a 30 to 40-day supply is desired. A building supply wholesaler reports three to four week delivery delays on incoming materials. Shippers that have alternatives are starting to shift freight to trucks and/or work with BNSF (Henderson 1997).

The Reno/Sparks market area is fertile ground for understanding the impact of the UP/SP merger on rail and intermodal shippers. The two former railroads linked up at Reno, due to the old UP branch line North of town. Moreover, each railroad had an intermodal terminal in the area, and there are a variety of rail and intermodal shippers in Northern Nevada. In short, the merger made Reno, "the biggest little city in the world," a two-to-one point.

RESEARCH METHODS

Survey data were collected by telephone, and primarily analyzed using t-tests. A list of likely Northern Nevada rail and inter-modal shippers was developed, through consultation with Reno-area logistics and transportation professionals. This list was given to a research bureau at a major University in the West. Bureau staff performed the telephone survey, which lasted approximately ten minutes per completed call. The first survey question asked shippers to estimate the percent of their inbound and outbound freight (by weight) moved by each of the following modes: TOFC/COFC, rail, truckload, less-than-truckload (LTL) and "other." If the percent of TOFC/COFC plus rail freight was zero, for both inbound and outbound movement, the shipper was thanked and spared further questioning. Bureau staff completed surveys with over 30 shippers, representing an estimated 80 percent of rail and inter-modal freight moving into and out of the Reno/Sparks area.

The survey included questions on rail transportation service and overall logistics performance, before and after the merger. Transportation service attributes were drawn from the literature, e.g. Coyle and colleagues (1994). Additional questions probe the expected impact of merger-related changes, such as abandonment of a branch line North of Reno, BNSF trackage rights, and closing of one intermodal facility.

STATISTICAL RESULTS

Overall Impact of Merger-related Changes

Table 1 reveals the overall impact of certain merger-related changes on shipper operations. On average, shippers perceive the impact of BNSF trackage rights over UP/SP lines to be slightly positive--but not statistically significant. While the impact of closing the intermodal (TOFC/COFC) facility in North Reno is perceived to be negative, this impact is also not statistically significant (at $\alpha < .05$). A second TOFC/COFC terminal, in Sparks, remains open to serve intermodal shippers.

However, the impact of abandonment of the UP branch line from Reno-Stead North to Hallelujah Junction, California, is perceived to be negative ($t = -2.99$) and significant ($p\text{-value} = .003$). Prior to the merger, this branch line was UP's sole path to Reno. Western Pacific (WP) ran this branch line North from Reno to Hallelujah Junction until 1982, when UP gained control of both Missouri Pacific (MP) and WP (Tardy 1998; Wilner 1997).

The impact of reduced railroad competition, due to the merger, is also perceived by Northern Nevada rail shippers to be negative ($t = -5.22$) and significant ($p\text{-value} = .000$). This result confirms the findings of a 1978 *Railway*

TABLE 1
IMPACT OF MERGER-RELATED CHANGES ON OPERATIONS*

Change	Average Impact	t	p-value
BN/SF Trackage Rights	.03	.44	.332
Closing of Intermodal Facility	-.21	-1.65	.055
Branch Line Abandonment	-.48	-2.99	.003
Less Rail Competition	-.79	-5.22	.000

* scaled from -2 (very negative) to 2 (very positive), with 0 = no impact.

Age shipper survey on rail mergers. Only 3 percent of respondents to that survey favored operating in a region served by a single railroad, and the other 97 percent opposed such an arrangement (Anon. 1978).

Impact of Merger on Logistics Performance

Table 2 shows shipper perceptions of rail freight performance changes, before and after the merger. Performance is measured in terms of freight rates, service availability, transit time, on-time delivery and total logistics costs. A recent Mercer survey of shippers reports that "timeliness" (transit time and on-time delivery) are especially important to intermodal shippers (Anon. 1996).

Shippers responding to the current survey indicated that freight rates are slightly worse (i.e. higher) after the merger, but the change is not statistically significant (see Table 2). However, railroad performance is reported to have deteriorated on all of the other measures, as follows: service availability ($t = -3.77$), transit time ($t = -5.11$), on-time delivery ($t = -7.10$) and total logistics costs ($t = -3.42$). It is interesting to note that total logistics costs of moving freight via rail have increased—even though freight rates have not. Apparently, shippers are feeling the cost impact of poor service. A lack of timeliness means higher inventory carrying and stockout costs for shippers.

TABLE 2
POST-MERGER PERFORMANCE CHANGES*

Measure	Average Change	t	p-value
Freight Rates	-.03	-.37	.356
Service Availability	-.66	-3.77	.001
Transit Time	-.97	-5.11	.000
On-time Delivery	-1.17	-7.10	.000
Total Logistics Costs	-.55	-3.42	.001

* scaled from -2 (much worse) to 2 (much better), with 0 = same.

TABLE 3
UP/SP PERFORMANCE: BEFORE & AFTER THE MERGER

Performance Factor	Before Merger	After Merger
Average Transit Time (days)	8.6	17.8
On-time Delivery	88.1%	50.8%

The survey also asked shippers to estimate average transit time (days) and on-time delivery (percent) provided by the railroad, before and after the merger. These results are presented in Table 3. Note that average transit time has more than doubled, from 8.6 to 17.8 days, since the UP/SP merger. As transit time doubles, so does in-transit or pipeline stock. Moreover, percent of deliveries on-time has fallen from 88.1 to 50.8 percent. Reduced delivery reliability implies higher destination safety stock.

Shipper Reactions to the Merger

As shippers perceive a lack of rail competition--and a decline in service levels--one reasonable reaction is to divert traffic from railroad to motor carrier. Bearth (1997) reports an increase in freight diversion, from rail and intermodal to truck, especially due to the UP situation. The survey asked shippers to estimate the percent of rail and TOFC/COFC traffic (by weight) diverted to truck since the merger. These Reno-area shippers have diverted an average of 9.8 percent of their traffic to motor carrier. The percent of traffic diverted ranged from 0 to 48 percent.

A more extreme reaction is to advocate dismantling the merger. Machalaba (1998b) asserts that momentum toward an unprecedented partial dismantling of the UP/SP merger has been building. The survey asked shippers: "Do you believe the UP/SP merger should be dismantled?" While 59

percent of the respondents replied "no" to this question, 24 percent said "yes." The remaining 17 percent expressed no opinion. An open-ended follow-up question simply asked shippers "why" they replied yes or no to the dismantling question.

Reasons given by the yes (dismantle) group include:

- "it (UP) is a monopoly now, employees are extremely rude"
- "no competition, merger is disastrous"
- "poor management, unprepared, not being corrected"
- "service was better when they (UP and SP) were separate"
- "lack of competition has raised prices"

Among the reasons given by the no group were the following:

- "don't think it (dismantling) would change anything"
- "merger itself is not the problem"
- "it would be more of a mess than it is now"
- "(they, i.e. UP) just need to improve service"
- "what alternative is there?"

Impact of Merger on Intermodal vs. Rail Shippers

Table 4 compares the merger impact on intermodal (TOFC/COFC) vs. rail shippers. The Mercer shipper survey found 48 percent of its respondents agreeing that rail mergers will make TOFC/COFC more attractive (Anon. 1996). Unfortunately, according to Thomas

(1998), service problems at UP are stunting intermodal's growth. UP handles a substantial share of the intermodal volume in the USA. Since most TOFC/COFC shippers can switch to motor carriers with relative ease (Greenfield 1998), negative impacts of the merger should be stronger for rail—rather than intermodal—shippers. Rail shippers tend to be more captive.

TABLE 4
IMPACT OF MERGER ON INTERMODAL VS. RAIL SHIPPERS

Impact Item ^a	Intermodal Shippers	Rail Shippers	t	p-value
Closing of Intermodal Facility	-.18	-.22	.15 ^b	.440
Branch Line Abandonment	-.09	-.72	2.27 ^c	.016
On-time Delivery	-.73	-1.44	2.26 ^b	.016
Transit Time	-.45	-1.28	1.96 ^c	.036

^aFor closing facility and line abandonment, impact is scaled from -2 (very negative) to 2 (very positive), with 0 = no impact. For on-time delivery and transit time, impact is scaled with -2 (much worse) to 2 (much better), with 0 = same.

^bt-statistic based on pooled variances

^ct-statistic based on separate variances

The difference between intermodal and rail shippers' perceptions on the impact of closing the North Reno TOFC/COFC terminal are not statistically significant. Both groups expressed a modest, negative impact (see Table 4). On the other hand, the negative impact of abandonment of the North-bound branch line is stronger for rail shippers, as opposed to intermodal shippers. The difference between the two groups ($t = 2.27$; $p\text{-value} = .016$) is significant at the .05 level.

Post-merger railroad performance, in terms of on-time delivery and transit time, declined for both intermodal and rail shippers. However, rail shippers report a greater service slide, compared to TOFC/COFC shippers, on both on-time delivery (-1.44 vs. -.73) and transit time (-1.28 vs. -.45). Table 4 shows that these differences are statistically significant. It

appears that UP is doing a better job serving its intermodal customers, as opposed to its rail customers. Still, the merger hardly seems to be making intermodal transportation more attractive for shippers.

IMPLICATIONS FOR TRANSPORTATION MANAGEMENT

This section combines implications of the results for carriers (e.g. UP) and government agencies (e.g. the STB), since both are involved in transportation management.

It must be noted that the results are based on a relatively small sample of shippers in one area of the West (Northern Nevada). Further research is needed to expand investigation of the merger impact, by including a larger, more geographically diverse group of shippers

The results compel a person to question conventional wisdom on trackage rights, as conditions for STB approval of rail mergers. Trackage rights are supposed to assuage shipper concerns about less rail competition, especially at two-to-one points like Reno/Sparks. However, shippers responding to the survey felt quite concerned about reduced rail competition since the UP/SP merger—despite trackage rights granted to BNSF. Survey results also suggest that a railroad can close one TOFC/COFC terminal (for consolidation purposes), without upsetting shippers, as long as a second terminal remains open.

There are two main reasons shippers may fear two-to-one points and less rail competition: higher rates and worse service. It is interesting to note that shippers participating in this survey reported a general deterioration of service since the merger, but no significant increase in freight rates. It seems UP is not using its monopoly situation in Northern Nevada to raise rates. Or, perhaps UP's service problems are not all merger-related. As one expert observes, even before the merger, Union Pacific was experiencing "unprecedented problems with service" (Welty 1995).

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REFERENCES

- Anonymous (1978), "How Shippers View Rail Mergers," *Railway Age* (October 30): 44-45.
- Anonymous (1996), "Intermodal: Service Gap," *Progressive Rail-roading* (September): 99-104.
- Associated Press (1998), "Union Pacific Says its Network Jammed," *San Francisco Examiner* (March 12): B-1.
- Bearth, Daniel P. (1997), "Brokers, Shippers Scramble for Trucks: Rail Diversions Add to Crunch in Some Areas," *Transport Topics* (October 20): 1, 100.
- Bradley, Peter (1995), "Shippers Take Aim at Mega-Mergers," *Traffic Management* (December): 19-20.
- Bradley, Peter (1997), "Tough Times in the Short Haul," *Logistics Management* (August): 46-48.
- Burke, Jack (1996), "STB Unanimously Approves UP-SP Merger with Expanded Trackage Rights Conditions," *Traffic World* (July 1/8): 11-12.
- Coyle, John J., Edward J. Bardi and Robert A. Novack (1994), *Transportation*, 4th ed., St. Paul/Minneapolis.: West Publishing.
- Greenfield, Mark J. (1998), "Intermodal Upswing," *Progressive Railroading* (April): 39-46.
- Henderson, Mike (1997), "Local Businesses Steamed over Union Pacific Backlog," *Reno Gazette-Journal* (October 26): 1E, 5E.

- Machalaba, Daniel (1998a), "Tired of Costs, Delays of Railroads, Firms Lay Their Own Tracks," *Wall Street Journal* (February 6): A1-8.
- Machalaba, Daniel (1998b), "Union Pacific Faces Undoing Part of Merger," *Wall Street Journal* (February 9):A3-4.
- Miluck, Nancy C. (1994), *Nevada: This is Our Land*, Genoa, NV: Dragon Enterprises.
- Sparkman, David L. (1997a), "Union Pacific's Problems Continue," *Transport Topics* (November 17): 41.
- Sparkman, David L. (1997b), "Union Pacific Reports to Feds on Service Meltdown," *Transport Topics* (October 27): 7, 10.
- Tardy, Randy (1998), "Caught in the Merger," *Arkansas Democrat-Gazette* (January 11): 1G, 4G.
- Thomas, Jim (1998), "Intermodal Stands Strong," *Logistics* (April): 67-69.
- Voyles, Susan (1998a), "Feds' Rail Fix is Simple: Speed Up Trains," *Reno Gazette-Journal* (February 11).
- Voyles, Susan (1998b), "Reno Takes Tough Stance to Slow Down Trains in Downtown," *Reno Gazette-Journal* (February 18): 1C.
- Welty, Gus (1995), "For Union Pacific, 'unprecedented problems with service,'" *Railway Age* (December): 20.
- Wilner, Frank N. (1997), *Railroad Mergers: History, Analysis, Insight*, Omaha: Simmons-Boardman Books.
- Wilner, Frank N. (1998), "CN-IC Filing Near," *Rail Merger Intel-ligence* (June 1): 1.

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Johnson, James C. & Donald F. Wood (1996), *Contemporary Logistics*, 6th ed., Upper Saddle River, NJ: Prentice-Hall, Inc.

MANUSCRIPT SAMPLE

TEACHING LOGISTICS STUDENTS TO TAKE OWNERSHIP OF INFORMATION INFRASTRUCTURE DEVELOPMENT

Frank W. Davis, University of Tennessee
Kenneth J. Preissler, Logistics Insights Corporation

Logistics systems, developed gradually over the past decades, are undergoing necessary radical change in this era of increasing global competition. This article describes an approach taken by the authors to teach logistics students how to take ownership of designing their own information infrastructure and how to use it to make their organizations more flexible, providing more strategic options.

INTRODUCTION

Advances in information systems technology such as data base management systems, bar code scanning, telecommunications, and image processing have enabled logistics and information managers with vision to reengineer the way the firm conducts its business. The usage of mainframe computers, personal computers, and logistics information systems has been widely studied (Gustin 1989). These studies have universally concluded that there has been a rapid growth in the usage of computers and logistics information systems.

Computer Usage in the Classroom

The usage of computer applications in a logistics course has also been studied. Rao, Stenger and Wu stated that there are several approaches to integrating computers into the classroom in a business curriculum, each with its individual advantages and drawbacks (1992).

Table 1 about here

Systems Development In Practice

The study of the information systems development process of computer applications has been almost universally left up to the computer science, software engineering, and information systems educators and practitioners.

$$y = a + lx + ax \tag{1}$$

REFERENCES

Collison, Fredrick M. (1994), "Transpacific Air Service with Hong Kong: Characteristics and Issues," *Journal of Transportation Management*, 6(2):1-39.

Crum, Michael R. (1996), "On the Improvement of Carrier EDI Implementation Strategies," in *EDI Implementation in the Transportation Industry*, New York: Transportation Press, 387-404.

Johnson, James C. & Donald F. Wood (1996), *Contemporary Logistics*, 6th ed., Upper Saddle River, NJ: Prentice-Hall, Inc.

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