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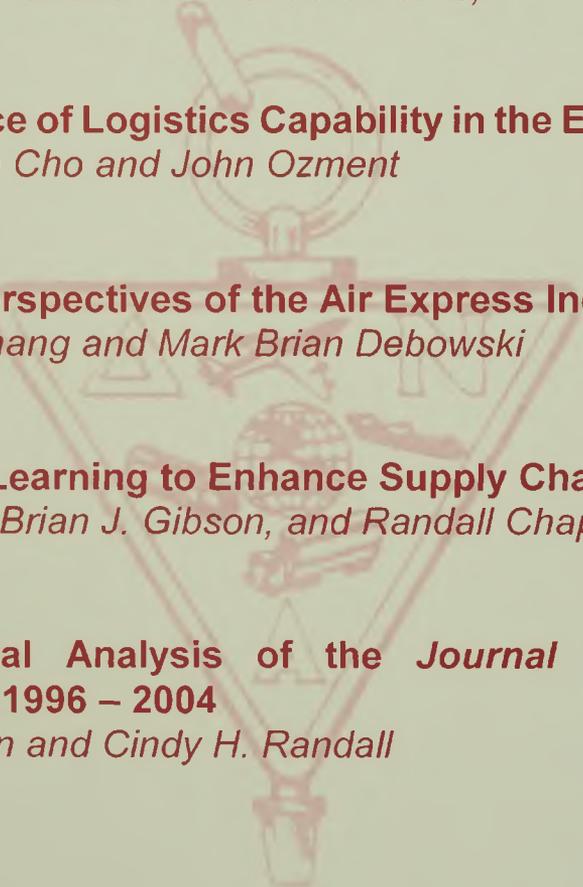
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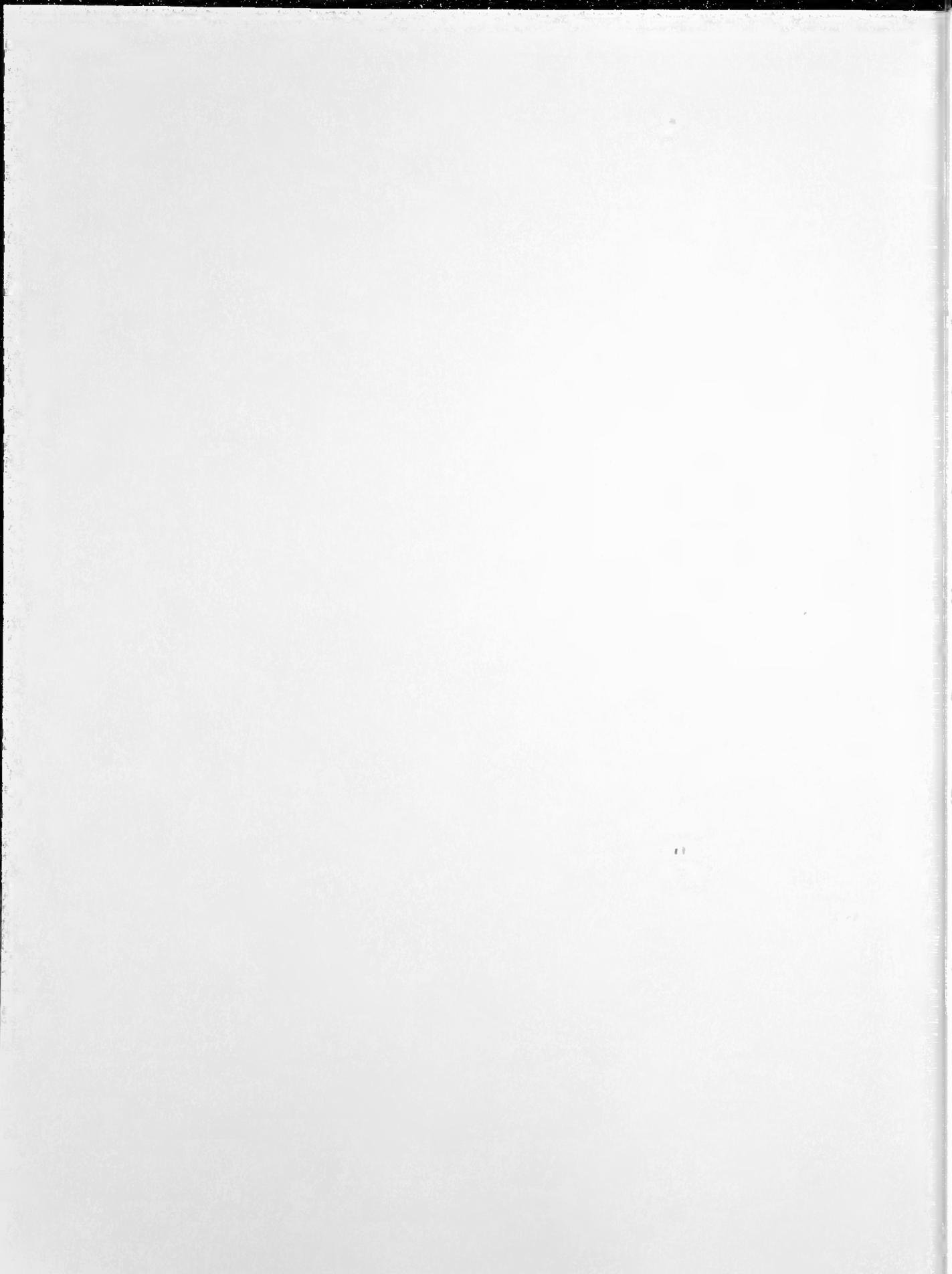
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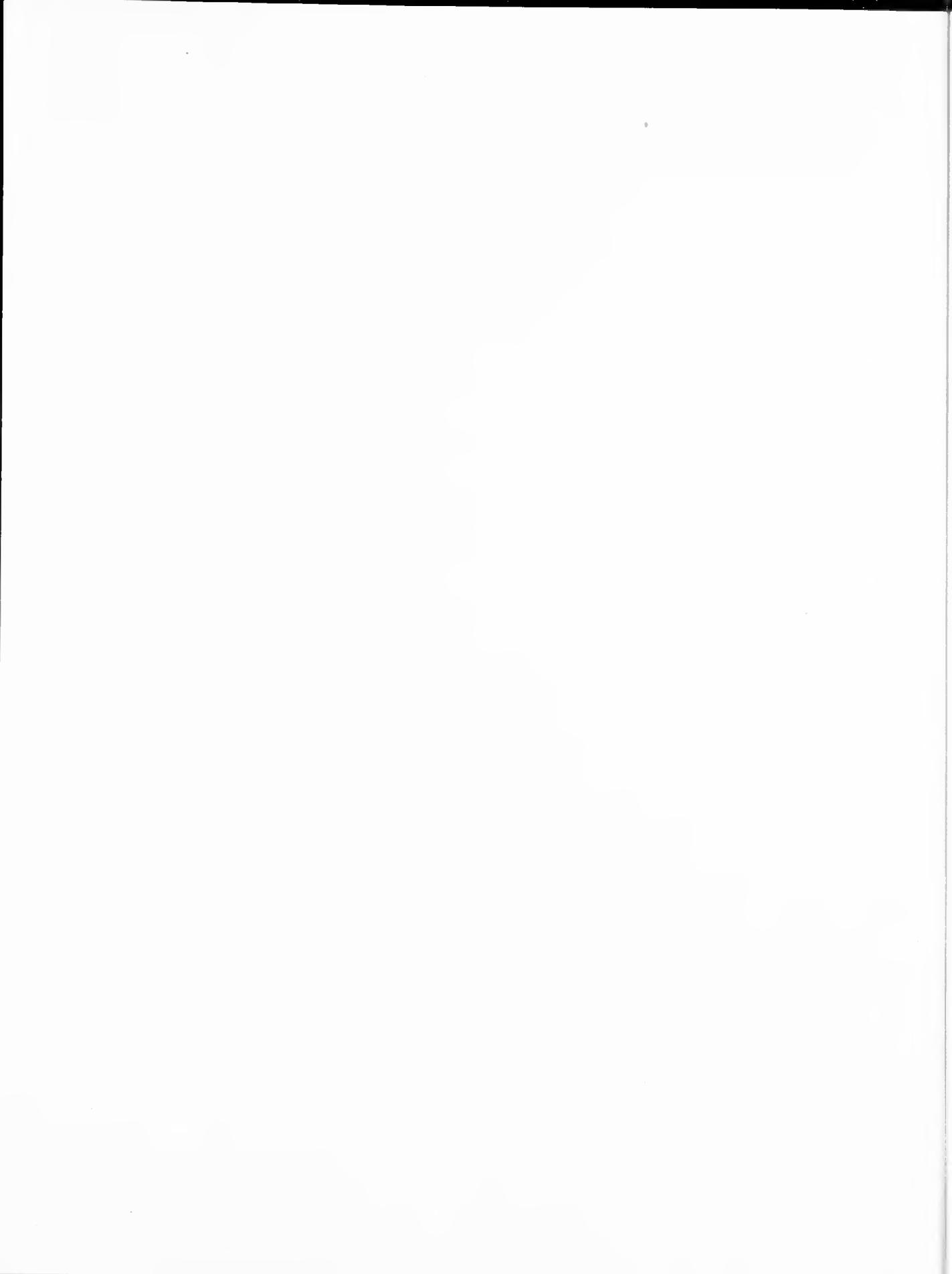


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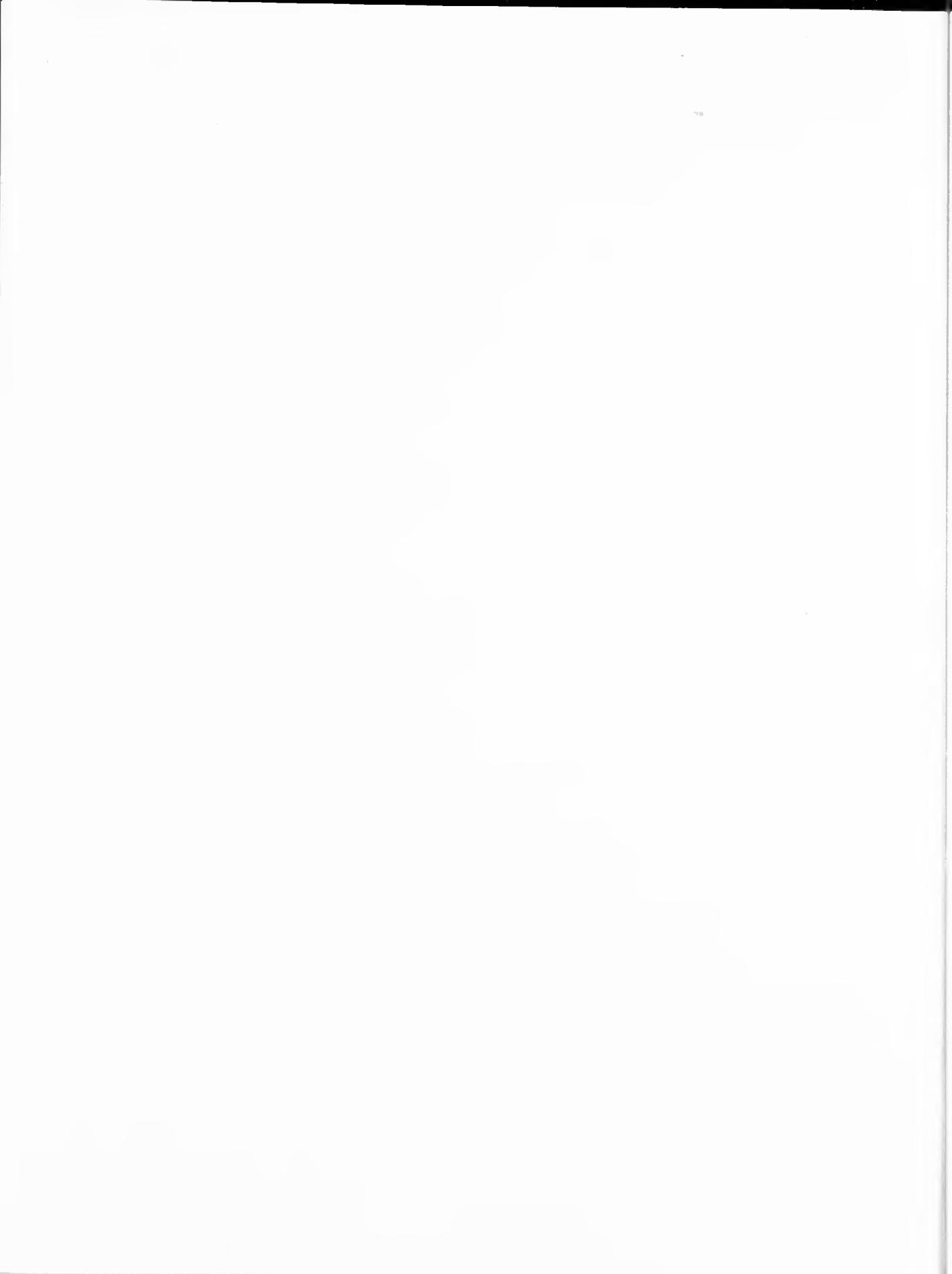
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From the Editor...

I have, since taking the job as editor in late 1995, been curious about the beginnings of the publication. With the help of the former editor, Mike Crum, I tracked down the first co-editor of the *JTM*, David Bloomberg, now a professor emeritus of Western Illinois University. David provided the rationale for starting this new journal seventeen years ago and helped to fill in the blanks in the time line to get to this current issue.

This information became part of the research that is presented in the last article of this issue and was the direct result of a conversation with my co-author on this article, Cindy Randall, more than a year ago. Besides providing a historical perspective for readers, the article compares the *JTM* to numerous other publications across a set of objectively measurable, published characteristics. Perhaps this same data and analysis can serve as a benchmark for a different editor at some point in the future. We hope that you find the material interesting.

There are four additional articles in this issue that should be of interest to you. The topics range from the problems international air express carriers face dealing with customs procedures to the funding of the United States highway network. Thank you to all who had a hand in bringing this issue to press and a special thanks to the members of the *JTM* editorial review board for your continuing support and dedication to the quality of the *JTM*.

Please remember that we cannot survive and continue to publish without reader support. Join or renew your membership in Delta Nu Alpha International Transportation Fraternity today and subscribe to the *Journal of Transportation Management*. Remember that, if you join DNA at the Gold level, a subscription to the *JTM* is included in your membership! That is a deal that is hard to beat!

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FINANCING AMERICA'S ROADS: THE PAST IS PROLOGUE

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The views in this article are those of the authors and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

ABSTRACT

This article provides a historical perspective of American roadway financing. It explores revenue collection and expenditures at the federal, state, and local governmental levels. Accounting practices of the Highway Trust Fund are discussed including the enactment of the Truth in Budgeting Act to shift revenue collection closer to a direct-user tax. Factors affecting roadway tax revenues are identified and the impact of increasing taxes is discussed. Four key considerations which will continue to shape roadway revenue collection are identified.

INTRODUCTION

The methods by which direct users finance American roadways continue to evolve. This discussion begins with a historical perspective of American roadway financing. It then explores revenue collection and expenditures at the federal, state, and local governmental levels. Accounting practices of the Highway Trust Fund are discussed including the enactment of the Truth in Budgeting Act to shift revenue collection closer to a direct-user tax. Factors affecting roadway tax revenues are identified and the impact of increasing taxes is discussed. Finally, the paper concludes by offering four key considerations which will continue to shape roadway revenue collection and expenditures in the future.

HISTORICAL PERSPECTIVE OF ROADWAY DEVELOPMENT

The federal government entered highway construction in 1806 with the authorization of the 824 mile National Pike (also known as the Cumberland Road) from Cumberland, Maryland to Columbus, Ohio as a means of encouraging westward expansion (Weingroff 2004). This began the initial development of a public road system which now exceeds 3.9 million miles (see Table 1). Historically, the development of the national roadway system has benefitted from financial participation of federal, state, and local governments and through taxes levied upon users. The total cost of the original National Pike project, including maintenance, was \$6.8 million (Sampson, Farris, and Shrock 1990). By

comparison, this would build less than two miles of interstate today (Federal Highway Administration 2004c).

State's Rights Shifted Responsibilities

Federal involvement in the development of a national roadway network was greatly reduced under the State's Rights movement of the Jackson administration when the responsibility for roadway development shifted to state and local municipalities. Subsequently, early roadway development occurred as a result of localized efforts. Various forms of state aid programs began to develop to expand statewide systems.

Federal Funding Re-Emerges

Federal involvement did not increase substantially until the Federal-Aid Highway Act of 1916 allocated federal funds to states primarily to build rural post roads. One key clause of the act required that, in order to receive the funds, each state must establish a public roads department (Weingroff 1996c). Originally, only rural mileage was funded. Rural mileage accounted for 7 percent of total road mileage and was supported on a 50-50, federal-state basis. The federal aid secondary system, which originated during the Depression, was concerned with less heavily traveled roads. Approximately 398,000

miles were designated as secondary aid roads and received matching support from the federal government. These secondary roads along with the primary and urban systems were known as the ABC aid program. Federal aid was generally limited to 75 percent of the expenditures on the ABC system. In 1944, urban extensions of the primary system were brought under the federal aid program. By 1998, much of the control of the highway mileage had been placed at the state and local levels. Table 2 reflects the current state of governmental control in 2003. Many readers may be surprised to find that 96.9 percent of roads are supported through local and state taxes.

Federal Highway Trust Fund Created

Recognizing that the nation's highway system was deficient, Congress authorized the selection of pre-existing roads for the National System of Interstate Highways in the Federal-Aid Highway Act of 1944. The intent was to develop a state-of-the-art, 40,000-mile national roadway system serving all principal metropolitan areas and connecting as many state capitals as possible (Jacobson 1996). However, funding posed a major obstacle to the construction of a national roadway system (Smith 2004; Weingroff 2003).

TABLE 1
U.S. PUBLIC ROAD AND STREET MILEAGE

	1960	1970	1980	1990	2000	2001	2002	2003
Rural	3,116,125	3,169,412	3,233,626	3,122,788	3,083,988	3,071,331	3,071,761	3,033,138
Urban	429,568	560,670	623,232	757,364	852,241	877,004	894,724	940,969
TOTAL	3,545,693	3,730,082	3,856,858	3,880,152	3,936,229	3,948,335	3,966,485	3,974,107

Source: Federal Highway Administration, *Highway Statistics 2003*, Table HM-20

TABLE 2
ROADWAY MILEAGE IN THE U.S. BY TYPE OF CONTROL, 2003

	Federal Control	State Control	Local Control	TOTAL
Urban mileage	3,560	120,033	817,376	940,969
Rural mileage	120,208	652,522	2,260,408	3,033,138
TOTAL	123,768	772,555	3,077,784	3,974,107

Source: Federal Highway Administration, *Highway Statistics 2003*, Table HM-10

Congress decided that expenditures for this system should be on a pay-as-you-go basis. After much controversy, the Highway Revenue Act of 1956 created a fenced revenue source (called the Highway Trust Fund) and construction began. While federal motor taxes existed prior to this, the receipts were directed to the General Fund with no relationship between the receipts from these taxes and federal funding for highways (Goldman and Wachs 2003; Rao 1986). With the Highway Trust Fund, tax revenues generated from excise taxes on fuel and heavy vehicles funded highway improvements, and general revenue funds were no longer to be used for this purpose (Federal Highway Administration 1998a). A federal fuel tax of 4 cents per gallon, a weight tax of \$3 per 1,000 pounds gross weight on larger vehicles, and excise taxes on heavy motor vehicles, tires, tubes, and retread rubber were enacted.

The basic aid formula on the Interstate System was 90 percent federal and 10 percent state, with a federal maximum of 95 percent under some circumstances (Federal Highway Administration 2004a). The 1956 Act authorized the federal government to spend \$25 billion from 1957 to 1969 to build the system to the highest highway standards (Weingroff 1996a). In a real sense, this was a crash program of providing high-speed, limited access highways for commerce and defense. Construction proved slower than anticipated and costs larger than planned. The Interstate System was not completed until 27 years later in 1993. Outlays from the Highway

Trust Fund to support its construction and maintenance have totaled more than \$370 billion (Federal Highway Administration 1998a).

SOURCES OF REVENUE

Most citizens generally perceive that roadways are heavily subsidized by the government. In fact, just the opposite is true. Federal, state, and local governments typically collect more revenues from users than are expended to support the transportation system. Revenues to support the roadway system are collected by federal, state, and local governments from fuel, vehicle registration, and user fees. As shown in Table 3, fuel-related user taxes historically have represented between 11 percent and 35 percent of the retail cost of a gallon of gasoline.

The highway program began to show indications of potential financial shortfalls in the late 1970's because of three factors. First, inflation had greatly accelerated the cost of completing the Interstate System and maintaining the other federal-aid highways. Second, in response to the energy program started in the 1970's, both smaller cars and increased fuel efficiency led to a leveling out of funds available in the Highway Trust Fund. Finally, many of the parts of the Interstate System constructed earlier were in need of repair and rehabilitation (Sampson, Farris, and Shrock 1990). Beginning in 1976, a special category of Interstate funds was authorized specifically for the resurfacing, restoration, and rehabilitation (3R) work. In

TABLE 3
RETAIL PRICE TREND OF A GALLON OF GASOLINE IN THE U.S. (INCLUDES TAXES)

Year	Regular	Unleaded	State/ Federal Taxes	Taxes as a Percentage
1955	\$0.291		\$0.077	26.3%
1960	\$0.311		\$0.101	32.5%
1965	\$0.312		\$0.105	33.7%
1970	\$0.367		\$0.111	30.2%
1975	\$0.448		\$0.124	27.7%
1980	\$1.191	\$1.245	\$0.138	11.1-11.6%
1985	\$1.115	\$1.202	\$0.220	18.3-19.7%
1990	\$1.149	\$1.164	\$0.269	23.1-23.4%
1995		\$1.147	\$0.404	35.2%
2000		\$1.485	\$0.420	28.3%
2001		\$1.426	\$0.429	30.1%
2002		\$1.340	\$0.423	31.6%
2003		\$1.559	\$0.421	27.0%
2004		\$1.825	\$0.423	23.2%

Source: Energy Information Agency (2005)

1981, the program was amended to include reconstruction (4R) and funding was substantially increased (Federal Highway Administration 2004b).

Table 4 reflects how the direct user burden has changed over time. In 1983 the tax rate per gallon was significantly increased to help complete the Interstate System and rehabilitate the street and highway system. Users also saw motor fuel taxes increase when the Highway Trust Fund's revenue-generating processes became a venue for gathering other transportation-related taxes. In April 1983, one cent per gallon of the federal gasoline tax was set aside for transit purposes in the Mass Transit Account of the Highway Trust Fund. The amount was increased to 1.5 cents per gallon in 1990 and to 2.0 cents in 1995. On October 1, 1993, the gasoline tax was levied at a rate of 18.4 cents per gallon, with 6.8 cents of that amount earmarked for federal budget deficit reduction. On October 1, 1995, 2.0 cents of the 6.8 cents was dedicated for highway purposes and 0.5 cents for transit (Bureau of Transportation Statistics 2004). As of

October 1997, 15.44 cents of the 18.4 cents collected was directed to the Highway account, 2.86 cents to the Mass Transit account, and 0.1 cents to the Leaking Underground Storage Tank (LUST) Trust Fund (Federal Highway Administration 1998a).

TABLE 4
HIGHWAY TRUST FUND
TAX RATE PER GALLON

Year	Gasoline	Diesel
1951	2.0 cents	2.0 cents
1956	3.0 cents	3.0 cents
1959	4.0 cents	4.0 cents
1983	9.0 cents	9.0 cents
1984	9.0 cents	15.0 cents
1987	9.1 cents	15.1 cents
1990	14.1 cents	20.1 cents
1993	18.4 cents	24.4 cents
1996	18.3 cents	24.3 cents
1997	18.4 cents	24.4 cents

Source: Federal Highway Administration (2003),

Under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), resurfacing, restoration and rehabilitation were funded under the Interstate Maintenance (IM) Program. The federal share of IM projects is generally 90 percent. While ISTEA primarily addressed highway construction, it also placed a special emphasis on intermodal connections so as to enhance the overall transportation system, and sparked controversy by diverting some revenue from the Highway Trust Fund to reducing the federal deficit. The ISTEA eliminated the historical federal-aid system designations of Primary, Secondary, and Urban, and created the National Highway System which includes the existing Interstate System routes, a large percentage of urban and rural principal arteries, the Strategic Highway Network, and major connectors. ISTEA also created a new flexible funding program, the Surface Transportation Program (STP), that can be used for roads and streets not functionally classified as local or rural minor collector, for bridges on any public road, and for transit capital projects (Public Law 102-240 1991; Sutton and Marks 1999; FHWA 1999; Nystrom 1999).

The Transportation Equity Act for the 21st Century (TEA-21), enacted June 9, 1998, extended the ISTEA program structure through Fiscal Year 2003 at higher program levels making important changes in Federal Highway Trust Fund legislation. Beginning with Fiscal Year 1999, TEA-21 provided that a substantial portion of highway support receive special budgetary treatment by creating a separate budget category outside the domestic discretionary cap for a significant part of the funding. This creation of a separate category is often referred to as putting up a "firewall" around the spending. A firewall ensures that the protected funding no longer has to compete with other programs for a place in the annual budget. Authorizations in excess of this guaranteed funding level remain subject to the domestic discretionary budget cap and must continue to compete with other discretionary spending priorities (Federal Highway Administration 1998a). Significantly, TEA-21 ties federal-aid

highway funds directly to receipts of the Highway Account of the Highway Trust Fund. However, the Highway Account no longer earns interest on balances, and excess balances in the Highway Account will be transferred to the General Fund (Federal Highway Administration 2004a).

TEA-21 officially expired in September of 2003 and Congress has yet to approve a bill to replace it. Now, more than a year overdue, the Safe, Accountable, Flexible and Efficient Transportation Equity Act of 2003 (SAFETEA) is a bill that will authorize federal surface transportation programs for highways, highway safety, and transit for the 6-year period from 2004-2010. The administration proposal allocates \$27.7 billion for 2004. In the general bill, apart from the research sections, there is an extraordinary commitment to the concepts, policies, and practices of intelligent transportation systems, pavement preservation, and pavement management. Provisions are also made for asset management. About 77 percent of funds would account for highway maintenance, 20 percent for public transportation, and 1 percent for research. There are commitments to highway safety and congestion, freight, borders, fraud, tax evasion, and specific federal highway programs, such as the Appalachian Highway. SAFETEA expands the role of the federal government in all aspects of surface transportation policy and operations. The DOT will set agendas, allocate funds per federal priorities, and increase oversight of state operations (Federal Highway Administration 2005).

State and Local Participation

State and local user taxes and fees actually generate more revenue than federal programs as shown in Table 5. The federal aid system provides for only a portion of the total construction costs, with state and local funds responsible for the remainder. Only 3.1 percent of the 3,974,107 miles of streets and highways are supported through federal aid. The vast majority of U.S. streets and highways, over 3.8 million miles, are supported by state and local

TABLE 5
ROADWAY REVENUES VERSUS EXPENDITURES
(CURRENT \$ MILLIONS)

Revenues	1985	1990	1995	1996	1997	1998	1999	2000	2001	2002
Federal	12,906	13,453	19,377	22,692	21,314	24,307	33,823	30,347	26,917	27,983
State & Local	25,260	36,492	47,366	48,487	50,500	52,992	54,845	57,453	59,173	N/A
Total	38,166	49,945	66,743	71,179	71,814	77,299	88,668	87,800	86,090	N/A
Expenditures										
Federal	15,039	15,517	20,144	20,695	21,425	20,725	23,553	27,759	29,950	33,214
State & Local	31,574	47,112	59,232	60,927	62,865	68,802	72,003	76,192	80,515	N/A
Total	46,613	62,629	79,375	81,623	84,290	89,527	95,556	103,952	110,465	N/A

Source: Bureau of Transportation Statistics (2004)

governmental revenues. State and local user taxes and fees represented 68.7 percent of all transportation user fees in 2001. State taxes include fuel tax (ranging from 8 cents per gallon in Alaska to 32 cents per gallon in Connecticut), vehicle registration fees, ton-mile fees, and special use permits (Federal Highway Administration 2003a: Table MF-121T). Local governments may have additional gasoline taxes, but property taxes and sales taxes are typically important sources of revenue for maintaining local streets (Sampson, Farris, and Shrock 1990).

EXPENDITURES

Roadway expenditures include capital outlays, maintenance and traffic services, administration and research, and highway law enforcement and safety. Expenditures have not been without controversy as there have been 1) problems with the collection and allocation of funds, 2) proposals that the expenditures resulting in social benefits be borne by social or defense programs, and 3) advice that expenditures should be dramatically increased to pay for road repair and bridge upgrades.

Problems Allocating Highway Funds

Motorists pay taxes as they purchase the various taxed items comprising the Highway Trust Fund, but the U.S. Department of Treasury

actually collects most of these taxes twice a month from large corporations whose corporate headquarters are located in a handful of states. The collected funds go into the Treasury Department's General Fund. The funds are returned to the states in accordance with legislatively established formulas. Each state is guaranteed that at least 90.5 percent of its highway user percentage attributions to the Highway Account will be returned to the state (U.S. Government Accounting Office 2003).

Many states claim their annual allocations fall far short of matching their annual contributions. In a June 2000 Report to the Committee on Transportation and Infrastructure of the House of Representatives, the General Accounting Office (GAO) stated that the Federal Highway Administration's "attribution" process—which estimates each state's relative roadway motor fuel usage from state tax data and uses that information to estimate the relative contributions to the Highway Account from each state's roadway users—has significant weaknesses that raise concerns about its reliability. The methodology is susceptible to error since it 1) has never been fully documented or independently reviewed, 2) is extremely complicated, involving nearly 200 formulas that are needed to accommodate all of the differences in states' methods for taxing and reporting on motor fuels, and 3) has been repeatedly adjusted over several

decades in response to changing state tax laws and federal program requirements (U.S. Government Accounting Office 2000).

Social Considerations

A portion of the fuel taxes support more than just highway construction and maintenance. For example, public transportation does not pay for itself and tends to be a social program in which funding is justified in part by difficult-to-measure social benefits. In addition, the fact that highway expenditures have "a defense goal and a general policy goal of mobility and safety of our population as well as of assisting commerce and industry with an improved transportation system," supports the argument that a portion of the expenditures should come from social or defense programs instead of from direct users.

The Call to Dramatically Increase Revenues

While some new road construction has been completed, there is an on-going need to maintain, repair, and upgrade the current infrastructure. In an April 1995 letter to every Congressional Senator and Representative, Highway Users Federation President William D. Fay pointed out that revenues in the Highway Trust Fund were insufficient to meet the backlog of \$212 billion required for roadwork and \$78 billion required to make needed bridge improvements. At the time the Federal Highway Administration reported 242,567 highway miles in mediocre-to-poor condition and 102,207 bridges structurally deficient (PR Newswire 1995). Chairman of the House Transportation and Infrastructure Committee, Bud Shuster, estimated \$315 billion in repairs and upgrades were needed. In 2001, federal roadway revenues totaled \$26.917 billion, federal roadway expenditures totaled \$29.950 billion; resulting in a reduction in the cash balance of the Highway Trust Fund to \$26.917 billion. The funds required to repair and upgrade the roadways will never be available without other sources of support.

It is reasonable to suggest that users should continue to be the most likely, as well as most logical, candidates to provide funding. For example, the tax rate on diesel fuel, used primarily by trucks, is 6 cents more per gallon than the tax on gasoline. This "diesel differential," along with the non-fuel taxes that target the heaviest trucks, reflects an effort to charge heavy-vehicle users for the substantially higher damage (and the resulting repair and replacement costs) their vehicles inflict (Federal Highway Administration 1999). The argument for an increase in transportation-related tax revenues also includes the growth of roadway use, wear and tear of the system over time, and elimination of two sources of funding as a result of the discontinuation of the new automobile excise tax in 1970 and the 1983 discontinuance of the tax on parts and accessories.

ACCOUNTING PRACTICES OF THE HIGHWAY TRUST FUND

Given the need for additional funds, the balance in the Highway Trust Fund has grown as reflected in Table 6 as Congress appropriated less expenditures than it received into the fund from user taxes. A minimum balance must be maintained in the Highway Trust Fund. A safety cushion equal to 3 months of expenditures is recommended to ensure that obligations could be liquidated during an emergency until Congress can act to reduce future commitments or to increase future revenues. Based on the projections of Highway Account expenditures for the 6-year TEA-21 authorization period, a minimum balance averaging \$7 billion is needed (Federal Highway Administration 1999). Proponents argue that the excess funds should be made available for roadwork repair.

On September 19, 1995 the Senate Environment and Public Works Committee dipped into the Highway Trust Fund to solve budgetary problems that had little to do with roads. The committee took \$919 million that would otherwise be spent on roads as part of its effort

TABLE 6
CASH BALANCES OF HIGHWAY TRUST
FUND-RELATED ACCOUNTS
(\$ MILLIONS)

Year	Highway Account	Transit Account
1957	516	-
1960	119	-
1965	285	-
1970	2,612	-
1975	9,597	-
1980	10,999	-
1985	12,906	1,420
1990	13,453	1,977
1995	19,377	2,813
2000	30,347	4,625
2001	26,917	4,553
2002	27,983	4,621
2003	28,964	4,762

Sources: Bureau of Transportation Statistics (1997); Department of Transportation and Bureau of Transportation Statistics (2004).

to cut federal spending by \$2.3 billion through 2002 (Carney 1995). A powerful alliance of about 100 transportation, business and labor organizations lobbied hard for a bill (HR 842 titled the "Truth in Budgeting Act) to prevent this practice, contending that each \$1 billion in highway spending would support 42,100 full-time jobs. Also backing the bill was an array of local government groups, such as the National Association of Counties, which wanted more money for road projects. Proponents of the Truth in Budgeting Act argued that the government should stop using gasoline taxes and other transportation user fees to offset the federal deficit because the money is collected specifically for much-needed transportation projects. Transportation and Infrastructure Chairman, Bud Shuster, stated,

These transportation trust funds have been distorted and manipulated and used, so we have not kept faith with the American people. We should either spend

this money, these user fees, for the purpose for which they were created, or if we do not have the needs, we should reduce the tax (Hosanky, 1996).

After a decade of failed attempts, on April 17, 1996 transportation advocates won overwhelming House passage of the bill that moved all four transportation trust funds off budget and increased spending on infrastructure. Under the bill, trust funds would not be counted as new budget, outlays or receipts in budgetary proceedings and would be exempt from congressional spending rules such as "pay as you go" requirements when lawmakers offset new spending with tax increases or spending cuts (Hosanky 1996). With the passage of this bill, the Highway Trust Fund moved closer to truly being a direct user tax.

FACTORS AFFECTING ROADWAY TAX REVENUES

Any action to increase roadway tax revenues must also override government incentives promoting alternative fuels and improving motor vehicle fuel efficiencies, overcome tax evasion, and modify the tax structure to take into account demand elasticity as fuel prices increase.

Promoting Alternative Fuels

The Energy Policy Act of 1992 and the Department of Energy required the energy secretary to assess the feasibility of replacing 10 percent of petroleum-based fuels with "alternative" fuels by the year 2000, rising to 30 percent by 2010. The Act also mandated that federal, state, and certain private fleets acquire alternative fuel vehicles (Mobile Corporation 1995). To help meet these goals, the government exempts ethanol—an alcohol commonly made from corn—from 5.4 cents of the gasoline tax. It boosts ethanol as a blend with gasoline to reduce air pollution, while unsubsidized antipollution additives remain available. It is estimated that in 1996 this policy resulted in between \$500 million and \$3.5 billion in lost tax revenue (Samuelson 1995).

Improving Fuel Efficiency

During the "energy crisis" of 1975, the Corporate Average Fuel Economy standards (known as CAFE) were legislated to improve fuel economy. Since then the average fuel economy required of new domestic cars and trucks has risen significantly as shown in Table 7.

**TABLE 7
NEW GASOLINE CAR AND LIGHT
TRUCK FUEL EFFICIENCY**

Year	Domestic	Imported
1980	21.4	28.6
1985	24.0	30.3
1990	23.9	28.5
1995	23.8	27.9
1996	24.1	27.7
1997	23.3	27.5
1998	23.3	27.6
1999	23.7	26.9
2000	28.7	28.3
2001	28.7	29.0
2002	29.1	28.8
2003	29.0	29.8
2004	29.3	29.3

Source: National Highway Transportation Safety Administration (2004)

Gains in fuel economy have been achieved by automakers by reducing the average weight of vehicles by 1,000 pounds, reducing engine size, installing fuel injection systems and converting vehicles to front wheel drive (O'Brien 1996). Improvements in fuel efficiency have reduced per-mile revenues collected. If the average fuel economy of all passenger cars in today's fleet were the same as 1975's fleet, we would consume a billion more barrels of oil each year and collect another \$7.728 billion annually (Federal Highway Administration 1999). The efforts in the 1970's have resulted in an overall improvement in the average miles per gallon in America as shown in Table 8.

Reducing Tax Evasion

Improved compliance with the diesel fuel tax law has helped to increase the amount of revenues collected. In the early 1990's it is estimated that the federal highway program faced an annual loss of over \$1 billion in revenues due to motor fuel tax evasion schemes. In the aggregate, states suffered comparable revenue losses due to evasion of state level fuel taxes (Federal Highway Administration 1999). The Federal Highway Administration began the Joint Federal-State Motor Fuel Tax Compliance Project, which forged alliances among the IRS, state revenue

**TABLE 8
ROADWAY DEMAND FOR MOTOR FUEL**

	1960	1970	1980	1990	2000	2001	2002	2003
Fuel Consumed	57,880	92,329	114,960	130,755	162,260	163,047	167,730	174,141
Vehicle Miles	719,000	1,110,000	1,527,000	2,144,000	2,746,925	2,781,462	2,855,756	2,890,893
MPG	12.4	12.0	13.3	16.4	16.9	17.1	17.0	16.6

Fuel consumed cited in millions of gallons, vehicle-miles traveled cited in millions of miles

Sources: Federal Highway Administration (2004); Department of Transportation and Federal Highway Administration (2004)

agencies, other federal and state regulatory and enforcement agencies, and petroleum industry members. After adjusting for changes in the motor tax rates, the total amount of diesel fuel tax receipts credited to the Highway Trust Fund increased by over \$1.2 billion between calendar years 1993 and 1994. The Treasury Department has estimated that up to \$700 million of this amount was due to improved tax compliance alone. State revenues rose by an average of approximately 7 percent as well, largely due to these increased enforcement initiatives (Federal Highway Administration 1999). The Compliance Project meets annually to report results for each state. For example, at the 2003 meeting, Massachusetts indicated it had completed 68 special fuel and gasoline audits since July 1, 2002 with a total assessment of \$3.5 million (Federal Highway Administration 2003b).

Countering the Flat Tax

Demand for fuel is partially elastic. When fuel prices increase, the amount of fuel purchased drops as users seek alternative means of transportation. User taxes are essentially a flat tax. Lower fuel purchases result in fewer taxes collected to support the system. Legislation cannot quickly or effectively change a flat user-tax based on fuel prices which constantly change due to market conditions. To counter the effect of changing fuel prices, many states are switching from a per-gallon to a percent-of-sales-price method (also known as an "ad valorem tax") of fuel-based taxation. The percent-of-sales-price approach can avoid much of the revenue decline experienced during periods of increasing prices resulting in a more stable tax base.

The Impact of Increasing Taxes

Fuel prices in the U.S. are very low compared to many other countries due to the amount of tax applied to each gallon. Table 9 reflects a significant disparity in prices throughout the world.

**TABLE 9
GASOLINE PRICES
THROUGHOUT THE WORLD
(PER GALLON, 2003)**

Country	
Norway	\$5.33
United Kingdom	\$4.95
France	\$4.74
Sweden	\$4.45
Italy	\$4.41
Germany	\$4.39
Spain	\$3.43
Japan	\$3.36
Brazil	\$2.44
Mexico	\$2.31
Argentina	\$2.27
Canada	\$2.24
Ecuador	\$1.94
U.S.	\$1.65
Saudi Arabia	\$0.91
Nigeria	\$0.82
Russia	\$0.69
Venezuela	\$0.16

Source: Energy Information Agency (2004).

In 1995, Jerry Flint, writing for *Forbes Magazine*, pondered the effect of adding \$1 tax to each gallon of gasoline to help bring American prices more in line with those found in other countries. Flint argued that every penny increase in the gasoline tax would produce about \$1 billion in tax revenue (Flint 1995). Based on 2003 consumption, a \$1 per gallon increase in the federal gasoline tax would annually bring in up to \$174 billion in additional tax revenue. These funds could be directed toward badly needed roadway and bridge repair, replacement of the current infrastructure, as well as state-of-the-art upgrades.

While tax increases are unpopular and an increase of this magnitude is unlikely, consider the impact. The average passenger auto owner would experience an increase in operating costs averaging approximately \$551 per year. Sales of fuel-efficient automobiles would increase. Use of alternative fuels may become more economically viable. Use of public transportation may increase. Bringing fuel taxes in line with those levied by other countries not only would increase government revenues, it could dramatically influence the characteristics of the entire U.S. roadway transportation system.

CONCLUSIONS

Roadway financing continues to evolve. There are four key considerations which will continue to shape roadway revenue collection and expenditures.

First, there are factors which may positively impact collection of revenues in the future including changing the tax levy method and further efforts to reduce reporting errors and improve reporting reliability. The gradual change toward collection of fuel taxes on a percentage-of-the-sales-price would help solidify the tax base of revenue derived from the users. The impact resulting from significant changes in price in either direction will be reduced. Continued efforts to improve and simplify revenue reporting, modify allocation formulas, and continuing reduction of tax evasion will also help ensure revenue collection is a direct user tax.

Second, there are factors which will continue to negatively impact revenue collection, including alternative fuels, CAFE and fluctuating fuel prices. As long as gasoline tax incentives are offered to promote a social agenda and changing

usage patterns are not addressed, revenues will fluctuate.

Third, reducing the amount of legislative "gaming" and clamping down on collection fraud has helped make revenue collection much more of a direct user tax. Users should be responsible for "paying their way" and should be charged accordingly. Taxation beyond "paying the way" is excessive. Legislative changes installing a firewall to eliminate or reduce outside interests and efforts at fraud reduction have gone a long way to equally match revenues with expenditures to make roadway revenue collection more of a direct user tax. These efforts are progressive and should continue.

Finally, in addition to properly tying tax revenues collected to directly benefit the users, increasing taxes could significantly influence the characteristics of the entire U. S. roadway transportation system. While a tax increase is unpopular, increasing needs of society to address urban roadway congestion and failing infrastructure could swing public opinion.

This article has provided a historical perspective of American roadway development. It explored revenue collection and expenditures at the federal, state, and local governmental levels. Accounting practices of the Highway Trust Fund were discussed including the enactment of the Truth in Budgeting Act to shift the revenue collection closer to a direct user tax. Factors affecting roadway tax revenues were identified and a discussion of the impact of increasing taxes was offered. The presentation concludes by offering four key considerations which will continue to shape roadway revenue collection and expenditures.

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THE IMPORTANCE OF LOGISTICS CAPABILITY IN THE E-COMMERCE MARKET

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ABSTRACT

This research is focused on the importance of logistics capability and its effect on firm performance in the e-commerce market. Technology-based net companies are known to have poor business network and infrastructure compared to resource-based traditional non-net based companies. A multiple-item logistics capability measurement scale is used to measure logistics capability of the firm. Firm performance is also measured by multiple items. The results indicate that logistics capability has a positive relationship with firm performance and this relationship is stronger for net based firms than for non-net based firms. Logistics capability is perceived as the firm's critical capability in providing a competitive advantage in both traditional and e-commerce market environments.

INTRODUCTION

The study of firm performance is grounded in several disciplines including economics, sociology, and organizational behavior. Many researchers have attempted to explain why certain firms perform better than others do by linking various elements of the organization with performance measures. These studies include linking performance with strategy, structure, environment, organizational learning, market orientation, resources, and capability.

One of these areas, logistics capability, has been widely studied, and measurement scales have been developed to link to competitive advantage

and superior firm performance (Ellinger et al., 2000; Lynch, 1998; Clinton and Closs, 1997; Eckert and Fawcett, 1996; Morash et al., 1996; Bowersox and Daugherty, 1995; Global Logistics Research Team at Michigan State University, 1995). These studies have found that logistics activities affect performance in terms of revenue enhancement as well as cost reduction. Other studies also found that many firms stress logistics capability as a means to create differentiation and a competitive advantage (Daugherty, Stank, and Ellinger, 1998; Anderson and Narus, 1995). It seems safe to say that logistics capability contributes to overall corporate strategy and performance and often provides the core competitive competence.

The Logistics Challenge in an E-commerce Market

There is a revolution in the marketplace brought on by information technology, exemplified by the rapid growth of electronic commerce or "e-commerce." The Internet has emerged now as a dynamic medium for channeling transactions between customers and firms in a virtual marketplace. E-commerce initiatives undertaken by firms reflect active engagement in order to build capability and compete in the e-business market. These moves allow firms to position themselves advantageously and to exploit the potential growth in online business, leading to benefits in future periods (Subramani and Waldon, 1999).

However, e-commerce requires a new logistics approach. Firms selling to businesses and consumers online must face the simple truth that they cannot send a product over the Internet. Launching e-business enterprises has forced conventional firms to become logistics companies. Small order size, increased daily order volumes, small parcel shipments, and same-day shipments become reality and are common. Getting goods delivered to a customer's doorstep in a timely manner is a much more complicated task. Now, the success of firms in the e-commerce markets depends on the efficiency of their distribution networks (Huppertz, 1999; Foster, 1999; Harrington, 2000; Hill, 1999). Jeff Bezos of Amazon.com notes,

Logistics and ... customer service—the nonglamorous parts of the business—are the biggest problem with e-commerce. A lot of these companies that are coming online spend all their money and effort building a beautiful Web site and then they can't get the stuff to the customer (*U.S. News & World Report*, 1999).

Thus, the effective and efficient movement of goods is critical in the e-commerce logistics supply chain. Yet for many retailers and manufacturers, distribution historically has involved large shipments to distribution centers rather

than small mixed lots in overnight packages to consumers, which results, in many instances, in an entirely new distribution infrastructure to handle online business. Often, these new fulfillment requirements are being outsourced and are creating opportunities for third-party logistics service providers (Deckmyn, 1999; Scheraga, 1999; Kroll, 1999). Thus, with the e-commerce revolution, the importance of logistics capability and logistics outsourcing using third-party providers will continue to increase.

Non-Net and Net-Based Firms

In the e-commerce market, firms can be divided into two categories: conventional 'brick and mortar' firms engaging in e-commerce and emerging firms for whom e-commerce is central to their business model. The first category comprises traditional firms with a history of competing in their traditional markets such as IBM or Ford Motors. These firms have extended their activities to include e-commerce operations as an extension of their conventional operations. For these firms, e-commerce initiatives offer strategic opportunities to redefine and extend their current activities. These firms are non-net based. The second category comprises newer dot com firms such as Amazon.com, Yahoo! and Ebay.com, whose operations are primarily enabled by Internet technologies. These are net based firms (Subramani and Waldon, 1999). This categorization parallels the distinction made by many investment analysts between e-commerce firms engaged primarily in e-commerce activities and conventional firms for whom e-commerce is an extension of their traditional activities (Burnham, 1998).

From a resource based perspective (Conner and Prahalad, 1996), non-net based firms accumulate valuable experience and understanding of their market and their customers over years of operating in their chosen market. However, while non-net firms have significant experience in the business domain in comparison to net firms, they often are deficient in their understanding of the technology component required for e-commerce operations. In contrast,

net based firms tend to be technology driven and have significant capability related to Internet technologies. However, net firms are likely to face a challenge in creating an effective organizational structure and organizational process to exploit their technological advantages. While the ability to build an organization particularly suited to e-commerce operations is a major opportunity, the unfamiliarity of the business context and the lack of established industry relationships is a big handicap faced by net based firms. Thus, net based firms tend to be poor in logistics infrastructure and need to rely more on third-party logistics service providers than non-net based firms.

A general assertion of this research is that firms have a higher likelihood of creating a competitive advantage and better performance if they have strong logistics capability in the e-commerce market. The importance of logistics capability and the use of third-party logistics are further emphasized in net based firms because of their poor logistics infrastructure.

RESEARCH HYPOTHESES

The goal of this research is to explore the role of logistics capability in the performance of net and non-net based firms in an e-commerce market. Additionally, the contribution of third-party logistics to the performance of net based firms is also investigated.

The Effects of Logistics Capability on Firm Performance

The strategic use of logistics capability and distinctive competencies for competitive advantage are major concerns for many firms in a heavily competitive environment. As discussed, logistics capability can make major contributions in achieving superior performance and sustained competitive advantage over competitors. The Michigan State University study (Global Logistics Research Team, 1995) investigated how firms use logistics capability to achieve competitive superiority by consistently meeting customer expectations better than competitors.

The study model empirically demonstrated a positive association between superior logistics capability and performance improvements. Other studies also support the positive effect that logistics capability has on certain dimensions of a firm's performance explained by profitability and growth. These studies provide the framework for the current research, relating logistics capability of non-net and net based firms to firm performance in an e-commerce market.

Hypothesis 1: There is a positive relationship between logistics capability and firm performance in the e-commerce market.

Net based firms are characterized by the lack of organizational structure, equipment, experience, and logistics proficiency. The challenge for these firms is to create effective organizational structures and organizational processes to exploit their technological advantages in a product market that is novel to these firms. It is assumed, therefore, that logistics capability will play a more critical role in these firms than non-net based firms that have already built their logistics systems.

Hypothesis 2: The positive relationship between logistics capability and firm performance is stronger for net based firms than for non-net based firms.

As e-commerce continues its explosive growth, logistically challenged firms need help, and they are primarily looking at third-party logistics (3PL's) to solve the problem (Kroll, 1999; Karpinski, 1999; Harrington, 2000). There are already several examples of total outsourcing of logistics functions, where a 3PL or group of 3PL's handles a retailer's entire logistics operation in an e-commerce market. The 3PL receives the goods from vendors based on Internet orders. The 3PL then performs warehousing, order picking, assembly, packaging, and shipping, as well as the huge job of handling returns. Some firms outsource portions of the e-commerce supply chain, such as the warehousing and order

fulfillment, or the shipping and delivery. In most cases, however, the web-based net companies are poor in logistics infrastructure and eager to outsource as much of the logistics portion of the business as makes sense.

Hypothesis 3: Net based firms rely more on third-party logistics than non-net based firms do.

METHOD

Scale Development

A fairly comprehensive set of items from pre-validated scales was used to measure the dependent variable (firm performance) and independent variable (logistics capability). All items were rated on a seven point Likert-type scale for which a score of 1 indicated 'poor,' or 'low,' and a score of 7 indicated 'excellent,' or 'high.' Intermediate scores represented ratings between these extremes.

Logistics capability. Measurements for logistics capability in this study particularly focused on the capability required to perform the key activities in the critical loop of business logistics (Ballou, 1999). Logistics capability in the critical loop is well represented by Morash et al. (1996) in their study to relate strategic logistics capability to competitive advantage and firm success. After the comprehensive review of the logistics capability literature, including the MSU study, Morash et al. (1996) selected eight logistics capability variables, which include pre and post-sale customer service, delivery speed, delivery reliability, responsiveness to target market, widespread distribution coverage (availability), selective distribution coverage and low total cost distribution. Thus, measures of logistics capability used in this study are based on those of Morash et al. (1996).

In addition to the eight logistics capability measures used by Morash et al. (1996), several e-commerce specific logistics capability items were included for possible modification and addition. The e-commerce logistics literature identified

logistics capabilities that need close attention in an e-commerce market environment. These are the ability to handle small, frequent orders, the ability to deliver correct orders on time, the ability to communicate with customers for shipping information, the ability to handle and fill the order using a Web-based order handling system, the need for information technology to share logistics information with other channel members, the ability to handle return products, and the ability to handle global distribution. After discussion with a panel of experts and careful comparison with definitions of strategic logistics capability used by Morash et al. (1996), the eleven logistics capability items were finalized.

Firm performance. Since data are rarely published for individual business units or for privately held companies, empirical studies that deal with firm performance face a serious challenge in obtaining accurate and reliable objective performance data. Fortunately, recent research has shown that certain perceptual measures (such as managerial perceptions of market share, profit margin, etc.) correlate closely with objective financial and marketing information (such as percentage in market share, return on assets, and return on equity) (Fawcett et al., 1997; Vickery et al., 1993). Thus, this research uses perceptual performance measures related to financial and marketing issues: profitability, sales growth, and overall performance. In addition to three performance measures, customer satisfaction was added simply because previous studies indicated that customer satisfaction was directly related to firm performance and logistics managers were well aware of the overall customer satisfaction level (Ellinger et al., 2000; Lynch, 1998; Thomas, 1998).

Firm performance was measured by asking respondents to self-evaluate their firm in comparison with their perceptions of the performance of their largest competitor. The scales were based on those used by Ellinger et al. (2000), Lynch (1998), and Thomas (1998). However, actual performance measures, such as

sales growth, gross profit margin, and net profit margin, were also analyzed to identify any deviations from perceptual performance measures.

Control variables. A number of control variables deemed to be important determinants of performance have been included in the analysis. The majority of these measures (market growth, buyer power, supplier power, seller concentration, ease of entry, and technological change) were taken from Narver and Slater (1990) who included them as control variables in their assessment of the relationship between market orientation and performance. The other control variables (competitive intensity, market dynamism, and government regulation) were taken from Baker and Sinkula (1999) who used them in addition to previous control variables to assess the relationship between market orientation, learning orientation and firm performance.

The Sample

The setting for the study is the computer and consumer electronic retailing industry. This industry was selected for a number of reasons. First, computer-related products, consumer electronics, books, clothing and video/recorded music are the products that are most frequently purchased online (Ernst & Young, 1999; McQuivey et al., 1998). Secondly, the computer and consumer electronics retailers are the most affected by the e-commerce revolution because they directly deal with the ultimate customers who shop online. It is widely accepted that studying one industry allows more control of extraneous variables and thus controls cross-industry variance and provides robust results for theory testing (Morash et al., 1996; Innis and La Londe, 1994). Third, this retail industry yields a large enough sample to provide a reasonable assessment of the hypothesized model. Finally, in the computer and consumer electronics retail industry, logistics is of paramount importance due to frequent transactions, customer interactions, and inventory turnover.

A preliminary survey instrument was pretested by six logistics managers and six academic

researchers who are familiar with the areas of logistics. Pretest participants were asked to comment on the wording, presentation, and face validity of items in the instrument. Suggestions for rewording and repositioning the items were incorporated into the final survey instrument.

The mailing list was obtained from the Computer & Consumer Electronics Retailers Directory published by Chain Store Guide. The sampling frame of 1,232 companies was selected from the Directory. A questionnaire was mailed either to the president or logistics managers of each firm. Of the 126 total questionnaires returned, six were dropped because of missing data points. The final analysis was performed with the remaining 120 surveys. Table 1 provides descriptive statistics of the sample. On average, firms in the sample earned \$45 million in sales revenue per year, grew about 21% in sales, and employed 140 employees (14 in logistics area). Their average gross profit margin was about 21% and net profit margin was 7.8%.

DATA ANALYSIS

The assertions about relationships between constructs represented by the measures can be made only after reliability and validity are demonstrated. In accordance with accepted practice (Churchill, 1979; Gerbing and Anderson, 1988), the properties of measurement scales for reliability, unidimensionality, and construct validity were assessed.

Reliability Assessment

Reliability analysis was first performed using SPSS 10.0 and the results were confirmed using LISREL (Joreskog and Sorbom, 1996). The results of this analysis are shown in Table 2. The eleven items in logistics capability and four items in firm performance measurement were subjected to an analysis extracting one principal component. From the one factor solution, the scale was further refined based on retaining factor loadings greater than 0.6. The scale refinement process was repeated until all the item-to-total correlations of retained items were

TABLE 1
SURVEY RESPONDENTS CHARACTERISTICS

Annual Sales Revenues (\$)	
Minimum	2.6 million
Maximum	312 million
Median	21 million
Mean	45 million
Average Growth in Sales (%)	
Minimum	-20
Maximum	250
Median	15
Mean	20.7
Gross Profit Margin (%)	
Minimum	4
Maximum	50
Median	20
Mean	20.9
Net Profit Margin (%)	
Minimum	-10
Maximum	35
Median	5
Mean	7.8
Number of Full-Time Employees	
Minimum	5
Maximum	2,200
Median	50
Mean	140
Number of Employees in Logistics Division	
Minimum	0
Maximum	200
Median	7
Mean	14

TABLE 2
RELIABILITIES AND FACTOR LOADINGS

<i>Constructs/ Items</i>	<i>Factor Loadings</i>	<i>Item-To-Total Correlation</i>	<i>Alpha If Item Deleted</i>	<i>Cronbach Alpha</i>
Logistics Capability/				.80
LC 6	.65	.48	.79	
LC 7	.86	.75	.70	
LC 8	.81	.66	.74	
LC 9	.74	.58	.77	
LC 10	.65	.48	.79	
Firm Performance/				.75
FP 1	.84	.66	.63	
FP 2	.76	.55	.71	
FP 3	.68	.47	.74	
FP 4	.77	.55	.70	

over 0.5 (with the exception of three items in the 0.47 range). The results of this scale refinement process yielded the following results for two measurement constructs.

The two constructs, logistics capability and firm performance, had Cronbach alphas of 0.80 and 0.75, respectively. The logistics capability construct resulted in five items being retained with factor loadings ranging from 0.65 to 0.86. The item-to-total correlations for the construct ranged from 0.48 to 0.74. It is interesting to note that three new logistics capability measures that were developed to count the e-commerce specific logistics challenges were all highly loaded on the logistics capability measurement construct during the scale refinement process. The firm performance construct resulted in four items being retained with factor loadings and item-to-total correlations ranging from 0.68 to 0.84 and 0.47 to 0.66, respectively. The customer satisfaction item (FP 3) was retained for further analysis because of its high factor loading although its item-to-total correlation was marginally acceptable.

Unidimensionality and Construct Validity

To ascertain the validity of the scales utilized in this research, confirmatory factor analysis (CFA) via LISREL 8.50 was conducted to assess uni-

dimensionality following suggestions of Gerbing and Anderson (1988). They suggested that CFA affords a stricter interpretation of unidimensionality than can be provided by traditional methods, such as item-to-total correlations or exploratory factor analysis. The results of this test are presented in Table 3. The confirmatory factor analyses for both measurement constructs established that each construct had unidimensionality (low chi-square, high P-value, and high fit indexes). Convergent validity was also established as all items for each scale loaded significantly (t values > 1.96).

A final measurement analysis to establish discriminant validity was conducted following the procedures outlined by Fornell and Larcker (1981). The average variances extracted were 0.47 and 0.44, which were close to 0.5, and they were all greater than the squared correlations of the items. The correlations within construct measures were significantly larger than correlations between measures of different constructs (Table 4). Thus, the conditions for discriminant validity were met for all measurement constructs. Therefore, validity was established for all the measurement scales. Based upon previous discussions and analyses, reliability and validity of measurement scales were established.

TABLE 3
CONFIRMATORY FACTOR ANALYSIS MAXIMUM LIKELIHOOD ESTIMATES

<i>Constructs/ Items</i>	<i>Lambda-X (T value)</i>	<i>Chi-X² (P, df)</i>	<i>RMSEA</i>	<i>GFI (AGFI)</i>	<i>NFI (NNFI)</i>	<i>CFI</i>
Logistics Capability/		5.63	.041	.97	.95	.99
LC 6	.53 (4.60)	(.34, 5)		(.91)	(.98)	
LC 7	.89 (8.86)					
LC 8	.76 (7.18)					
LC 9	.67 (6.15)					
LC 10	.50 (4.28)					
Firm Performance/		1.89	0.0	.99	.97	1.00
FP 1	.75 (6.38)	(.39, 2)		(.94)	(1.01)	
FP 2	.66 (5.51)					
FP 3	.55 (4.46)					
FP 4	.67 (5.66)					

TABLE 4
CORRELATIONS BETWEEN/WITHIN MEASUREMENT CONSTRUCTS

	LC6	LC7	LC8	LC9	LC10	FP1	FP2	FP3	FP4
LC6	1.00								
LC7	.489**	1.00							
LC8	.324**	.676**	1.00						
LC9	.337**	.603**	.506**	1.00					
LC10	.369**	.397**	.451**	.307**	1.00				
FP1	.242*	.144	.291**	.218*	.410**	1.00			
FP2	.186	.186	.393**	.169	.473**	.527**	1.00		
FP3	.315**	.305**	.401**	.157	.531**	.381**	.329**	1.00	
FP4	.486**	.358**	.477**	.309**	.307**	.494**	.414**	.437**	1.00
Mean	5.55	4.83	5.18	3.76	5.39	4.71	4.87	5.79	5.46
STD	1.41	1.61	1.35	1.80	1.19	1.22	1.35	.96	1.06

NOTE: LC: Logistics Capability, FP: Firm Performance * $p < .05$, ** $p < .01$.

RESULTS

The ordinary least square regression was mainly employed to test the hypotheses, and independent sample T-tests were conducted to support the test results. The control variables described earlier were included in all regression models to control for compelling alternative explanations of performance. The results of the tests are presented in Table 5. In all cases, the models that include main effects of logistics

capability, firm performance, and control variables were highly significant.

The first model involving firm performance explains a significant amount of variance (adjusted R square = .511, $F = 8.139$, $p < .001$). All other models that include each firm performance measure in Table 5 also explain significant amounts of variance. While specific hypotheses were not offered in regards to the control variables, it is notable that controlling for buyer

power ($b = -.408$, $p < .001$), supplier power ($b = .300$, $p < .01$), seller concentration ($b = .209$, $p < .01$), technology change ($b = .200$, $p < .05$), and market dynamism ($b = -.479$, $p < .001$) would appear to be important when interpreting the regression involving firm performance.

Hypothesis 1: Positive association between logistics capability and firm performance

The first hypothesis investigates the relationship between logistics capability and firm performance. It stated that logistics capability would positively affect firm performance. The results of regression analyses are presented in Table 5. The logistics capability measure shows a significant positive relationship with the aggregated firm performance measurement ($b = .636$, $p < .001$). Logistics capability also evidenced significant positive relationships with each of the performance measures: profitability ($b = .366$, $p < .01$), sales growth ($b = .499$, $p < .01$), customer satisfaction ($b = .613$, $p < .001$), and overall performance ($b = .681$, $p < .001$). These findings support the first hypothesis.

Hypothesis 2: Stronger and positive association between logistics capability and firm performance for net based companies

The second hypothesis investigates whether net based firms have a stronger positive relationship between logistics capability and firm performance than non-net based firms. The results of the regression analyses are also presented in Table 5. The regression coefficients for net based firms support this hypothesis. Net based companies have consistently higher regression coefficients in all of the firm performance measures ($b = .279$ versus $.177$ for profitability; $b = .266$ versus $.178$ for sales growth; $b = .609$ versus $.446$ for customer satisfaction; $b = .676$ versus $.446$ for overall performance; $b = .759$ versus $.351$ for aggregated firm performance measure). Thus hypothesis 2 is supported.

Hypothesis 3: Net based firms rely on third-parties more than non-net based firms

To investigate the association between the type of firm and its dependence on third-party logistics providers, data on sales generated by the use of third-party partners were analyzed. Independent samples T-tests demonstrate that net based firms depend on third-parties more to generate sales volume than non-net based firms (mean value of 4.8 versus 1.8 with $p = .003$). Thus, Hypothesis 3 is also supported.

Other Findings

In addition to hypotheses testing, independent samples T-tests were conducted to investigate the difference between net based and non-net based firm's performance. T-tests revealed no significant difference in logistics capability between these two types of firms even though net based firms indicated higher dependence on third parties for sales support. In terms of firm performance, net based firms reported higher performance than non-net based firm's. In profitability, no significant differences were found. For sales growth and customer satisfaction, net based firms performed better than non-net based firms. Non-net based firms had much higher revenue. However, net based firms reported higher growth rates and net profit margin. Finally, gross profit margin was not significantly different between the two types of respondents.

DISCUSSIONS AND IMPLICATIONS

The focus of this research was to explore the role of logistics capability and logistics outsourcing in the performance of net and non-net based firms in the e-commerce market environment. For this purpose, an e-commerce specific logistics capability measurement was developed together with firm performance measurement constructs. Hypotheses were examined by regressing performances of net and non-net based firms

TABLE 5
ESTIMATES OF RELATIONSHIPS BETWEEN
LOGISTICS CAPABILITY AND FIRM PERFORMANCE

Predictor and Control Variable/ Statistics	Dependent Variables				
	Firm Performance	Profitability	Sales Growth	Customer Satisfaction	Overall Performance
<i>H₁: Logistics Capability/</i>				.613*** (.102)	.681*** (.101)
Unstandardized Coefficient	.636*** (.097)	.366** (.135)	.499** (.164)		
<i>H₂: Net and Non- net/</i>				.609** and .446**	.676*** and .446***
Unstandardized Coefficient	.759*** and .351**	.279 and .177	.266 and .178		
Control Variable/					
Market Growth	.132 (.088)	.102 (.123)	.131 (.150)	.119 (.093)	.105 (.093)
Buyer Power	-.408*** (.085)	-.455*** (.119)	-.252 (.144)	-.410*** (.090)	-.275** (.089)
Supplier Power	.300** (.086)	.346** (.119)	.305* (.145)	.118 (.090)	.283** (.090)
Seller Concent.	.209** (.067)	.236* (.094)	.277* (.115)	.008 (.071)	.148* (.071)
Ease of Entry	-.001 (.073)	-.009 (.102)	-.007 (.124)	.128 (.077)	-.003 (.076)
Techno. Change	.200* (.098)	.399** (.137)	.166 (.167)	.139 (.104)	.0005 (.103)
Compet. Intensity	-.004 (.077)	-.005 (.108)	-.299* (.132)	.164* (.082)	-.0006 (.081)
Market Dynamism	-.479*** (.110)	-.379* (.153)	-.379* (.186)	-.616** (.116)	-.265* (.115)
Gov. Regulation	-.123 (.074)	-.227* (.104)	-.115 (.126)	.001 (.079)	-.009 (.078)
Constant	2.27** (.796)	6.06** (1.112)	6.51** (1.354)	8.27** (.842)	7.672** (.834)
Adjusted R ²	.511	.360	.226	.403	.526
F statistic	8.139***	4.831***	2.987**	5.601***	8.571***

NOTE: Tests of hypotheses are one-tailed tests. Numbers in parentheses are standard errors.

* $p < .05$, ** $p < .01$, *** $p < .001$. Statistic for control variables is unstandardized coefficient.

against logistics capability and the control variables.

The positive relationship between logistics capability and firm performance is consistent with other research findings on the subject (Ellinger et al., 2000; Lynch, 1998; Morash et al., 1996; Global Logistics Research Team, 1995). The study supports that firms need strong logistics capability to perform well in both traditional and e-commerce markets. The importance of logistics capability and third

parties is emphasized more for net based firms. It can be interpreted that logistics capability plays a more important role in net based firms than in non-net based firms. Thus, net based firms need to focus more attention on developing their logistics capability. In addition, net based firms responded with a stronger dependence on third parties than non-net based firms do in generating sales. This finding suggests that the efficient management of third-party relationships is critical in sales generation and firm performance for net based firms.

LIMITATIONS AND FUTURE RESEARCH

This study was conducted in the context of the computer and consumer electronics retailing industry that sells the products most often traded on-line. Therefore, any generalization to other industries must be made with caution. In addition, a single key informant was used to obtain the perceptual information on logistics capability and firm performance. This may cast some degree of doubt regarding the validity of the information obtained. However, the president or logistics manager of the firm should have adequate knowledge about firm capability and performance. The responses were assumed to be valid and reliable.

Another limitation is that firm performance may be affected not only by logistics capability but also by various other extraneous variables not measured in this study. Logistics capability needs to be integrated with other functional areas of the firm such as marketing, finance, and operations to better support firm performance (Ellinger et al., 2000). Projecting firm performance based solely on logistics capability may not be valid.

A major objective of this study was to investigate the relationship between logistics capability and net and non-net based firm's performance in the e-commerce market. Upon the completion of this study, several related avenues of future research can be outlined. This study was conducted in one industry and there exist obvious generalization issues due to this limitation. Logistics capability, especially, may be the most critical issue to some industries and may not be that critical in other industries. It would be beneficial to examine the role of logistics capability and links to performance in other industries.

Although logistics capability was successfully linked to firm performance in this study, future research needs to examine other types of capability or functions and links to firm performance. In this new context, the role of logistics capability and links to firm performance may become clearer. Future research should also include an extensive investigation of the role of logistics outsourcing in firm performance. This study may be best conducted by a longitudinal study of the same firms comparing the differences in firm performance before and after logistics outsourcing.

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APPENDIX MEASURES AND ITEMS

Logistics Capability (Coefficient Alpha = .80)
(7-point scale, in which 7 = excellent and 1 = poor. Five items were retained for this construct)

My firm has the ability to:

- LC1. Pre-Sale Customer Service:
The ability to service the customer during the purchase decision process (i.e., provide product information before the customer buys the products).
- LC2. Post-Sale Customer Service:
The ability to service the customer after the sale of the product to ensure continuing customer satisfaction (i.e., efficient return product handling).
- LC3. Delivery Speed:
The ability to reduce the time between order taking and customer delivery.
- LC4. Delivery Reliability:
The ability to exactly meet quoted or anticipated delivery dates and quantities (i.e., deliver correct orders on time).
- LC5. Responsiveness to Target Markets:
The ability to respond to the needs and wants of the firm's target market(s) (i.e., handle small and frequent orders).

- LC6. **Delivery Information:**
The ability to communicate shipping and delivery information to customers.
- LC7. **Web-based Order Handling:**
The ability to handle and fill orders using a Web-based order handling system. It also includes the ability for logistics information sharing with other channel members.
- LC8. **Widespread Distribution Coverage:**
The ability to effectively provide widespread and/or intensive distribution coverage (global coverage is not included).
- LC9. **Global Distribution Coverage:**
The ability to effectively provide global distribution coverage.
- LC10. **Selective Distribution Coverage:**
The ability to effectively target selective or exclusive distribution outlets.
- LC11. **Low Total Cost Distribution:**
The ability to minimize the total cost of distribution.

Firm Performance (Coefficient Alpha = .75)

(7-point scale, in which 7 = excellent and 1 = poor. Four items construct)

Relative to your largest competitors, how well does your company perform in the following areas?

- FP1. Profitability
- FP2. Sales Growth
- FP3. Customer Satisfaction
- FP4. Overall Performance

Contribution by Third-Parties

(7-point scale, in which 7 = high and 1 = low)

How much of your sales volume is generated through the use of third-party logistics providers?

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REGULATORY PERSPECTIVES OF THE AIR EXPRESS INDUSTRY

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ABSTRACT

In its early days, the international air express industry was synonymous with on-board couriers, carrying bags of documents on commercial flights. The industry has changed dramatically. That initial focus on documents has widened into the transport of packages and freight, carried by fleets of fully owned or dedicated aircraft, trucks, trains and delivery vans. The bulk of the business is dominated by 24-hour guaranteed and next-day deliveries. "Every day, hundreds of thousands of employees serve the distribution needs of an increasing number of businesses worldwide from one region to another" (European Express Association, 2002). The express companies are also making use of state-of-the-art information technology systems to provide minute-by-minute control and track and trace information. All the resources in the industry are dedicated to providing customers maximum reliability and flexibility of service.

In this article, detailed information on major regulatory barriers in the air express industry are presented. Furthermore, recommendations on how to minimize the impact of these barriers in order to build a better future (with reference to operational efficiency, cost effectiveness and wider coverage of services to the final customers) are also discussed.

MAJOR REGULATORY CHALLENGES

Due to its presence in more than 200 countries around the world, the air express industry is tightly influenced by local regulatory environments. Government policies, practices and regulations always effect the ability of air express companies to operate efficiently and can reduce the potential economic benefits associated with air express services. The following are the major regulatory challenges:

- 1) Customs clearance
- 2) Air traffic rights
- 3) Labor law
- 4) Company ownership
- 5) Local postal regulation
- 6) Ground transportation

These barriers will be discussed in light of the researchers' definition of regulatory problems as well as an analysis of the tangible and intangible impacts to the industry. Possible resolutions to

mitigate the anticipated damages are then raised.

Customs Clearance

Customs clearance is by far the biggest regulatory barrier impacting the efficient flow of cargo between countries. This barrier is now more obvious and severe after the terrorist attacks of Sept 11, 2001. There are many customs laws and/or resolutions that can easily affect the flow of cargo in and out of countries. The following is a list of the most common customs regulations in many countries:

- De minimis value - This is a measure of worth determined by customs. If the shipment value is lower or equal to this value, there will be no duty and tax levied on the importer. Although many countries have increased their de minimis values to an acceptable level that enables smooth movement of cargo importation, there are still a number of countries that either do not set any de minimis value (and tax virtually all imports) or the value is too low. This practice results in almost all shipments into that country being subject to tedious and costly clearance procedures as well as high import duties and taxes. Some relevant examples of countries with this barrier are the Philippines, Vietnam and India.
- Licensing control - For controlled shipments such as telecommunication equipment, foods and drugs, magazines and video tapes, it is very common that the importers will have to obtain permits or licenses in order to clear these shipments. In some countries, such as Thailand, China, Vietnam, and the Philippines, the application for licenses and permits can take several weeks, often causing packages to be held at the airport customs warehouse for many days.
- Shipment information submissions - Due to the tightening of customs controls, many countries have started implementing pre-flight shipment information submission

schemes, or as they are more commonly called, "Advanced Cargo Manifests." This regulation has a profound impact on the air express industry. The window between the cutoff time for package pickup to loading into the aircraft can often be very small, making it very difficult for air express companies to complete all of the required information before loading the aircraft. Many express carriers have already started developing contingency plans to minimize the potential risks of not being able to accept same day shipments due to the new requirements.

- Original supporting documents - Customs laws in some developing countries still require original supporting documents (commercial invoice, power of attorney, packing list) to be furnished together with the customs entry form before shipments can be released. This requirement can result in long delays in the entire clearance process. The consignee will need to submit the original documents to the customs broker before the arrival of the shipment.
- Pre-clearance - In order to ensure that all cargoes can be successfully delivered to customers the day after pickup, it is necessary to carry out pre-clearance procedures at the destination. One task of pre-clearance is to submit all necessary supporting documents and entry forms to customs before flight arrival. Then the goods can be released based purely on information within the submission and without the presence of the physical package. Many countries have already allowed express carriers to do so in view of their "race against time." However, there are still some countries that insist on waiting until package arrival before their release can be approved. This mode of operation is causing at least half a day delay on the shipment release.

Apart from customs regulations, there are also many practices in customs agencies around the world that cause costly delays in customs clearance processes. The following are the most

common practices that delay clearance and release:

- Duty and tax payment – Before packages can be released from the airport customs warehouse, the importer or the customs broker has to make payment on import duty and all associated taxes. Except for some developed countries, many customs agencies are still unable to accept Electronic Funds Transfer (EFT), or implement post-payment when the importer/broker is allowed to make payment after the shipment is released. All duty and tax payments can only be made by check or cash in person at the customs office. This practice causes huge bottlenecks at cashier counters and packages can be held up in the warehouse for an entire day.
- Customs office working hours – The air express industry is a 24 X 7 industry with most of its operations running almost non-stop everyday. Flight operations are concentrated in the evening and early morning hours. Consequently, most customs clearance operations have to be carried out in the early morning in order to ensure that packages can be released and delivered in the afternoon. The same pattern occurs 7 days a week and 365 days a year. Public sectors, such as customs administrations, find it difficult to provide express carriers with extended hours of operation. Countries such as Thailand, China, Vietnam, and India only offer normal daytime office hours for customs services, and this often results in large numbers of held packages, particularly over weekends.
- Entry form submission – This process is essentially the most important part of the customs clearance. The customs broker is required to assist the importer in completing the customs entry form, making sure that all information is accurately entered and submitted to the authority on time. Air express companies often handle up to 1,000 entries a night, and it is important to ensure the preparation and submission process is efficient and reliable. In most developed countries, the

submission of customs entry forms is already fully automated through Electronic Data Interchange (EDI). However, in countries such as Vietnam, Thailand, and China, the customs authorities still demand original documents, causing the entire submission process to be time-consuming and error-prone.

- Consistency – Consistency in customs enforcement is an important issue for the air express industry. As a result of the large volume of cargo handled in any particular country, the inconsistent practices of some customs officers can be quite a big issue to resolve. This problem is especially common in developing countries where different officers (when on duty) can make decisions based on their own judgment. One of the more common causes for variance in practice in some countries is the use of bribery by officials. Air express companies are required to carry out illegal activities in order to do business with these public agencies. Hence, these companies become the victims of corruption in these countries.
- Physical inspection – Package inspection is another important part of the customs clearance process. In developed countries, packages are inspected selectively before release, and the selection is based on risk management techniques, such as assessing the risk profile of the shipment. The main reason why risk management is used in customs is because of the ever increasing volume of cargoes entering and exiting countries. It is virtually impossible to inspect all packages physically. However, in some countries, there is an “open box” inspection requirement on shipments with declared value above a certain threshold. This practice has a significant impact on the efficiency of the entire shipment flow when additional manpower is needed as volume increases.

Customs regulations and practices can either assist or restrict economic growth in any country. This is by far the most challenging area

facing the air express industry since its inception.

Air Traffic Rights

Flying into a country and picking up cargo is not a simple task. It involves long negotiation between the two relevant governments on the agreement of air traffic flying rights. These rights entitle airlines to fly into the country whether just for refueling or to pick up passengers and cargo. This is defined as "degree of freedom" in the air traffic industry. In order to minimize the cost of flying an aircraft into a country, it is ideal if the local authority allows the express carrier to load the cargoes during a "technical stop" (refueling) and proceed to a third location. Such a stop-over tactic is termed a "5th degree of freedom." However, this is not common in most countries, except for countries which have adopted an "Open Sky" policy. For example, Singapore Airlines is not allowed to fly to London and pick up passengers or cargo and then fly directly to New York. Similarly, Federal Express is not allowed to fly to China (from USA) to pick up cargoes and fly directly to a third destination. This restriction has greatly impacted the cost efficiency of flying aircraft in and out of many countries.

Another common challenge is the number of air traffic rights between two countries. Many countries release limited air traffic rights to other countries, in order to protect their own carriers. One good example is the service between the U.S. and China. Due to year long negotiation between the two governments, weekly air service between the U.S. and mainland China will grow nearly 400% by 2010 under a treaty announced in June 2004. The treaty will enable more than double the number of carriers allowed to fly between the U.S. and China. Under the agreement, the number of weekly commercial flights between the two nations aboard U.S.-based airlines will rise gradually to 249 from 54 (Reed, 2004).

Air traffic rights are a sensitive political issue and need to be handled with care and sensitivity. There is usually no quick resolution to such problems, since it often takes a few years for two governments to agree on what needs to be done to liberalize air space bilaterally.

Labor Laws

The air express industry is a labor intensive business. It employs tens of thousands of workers to process the packages. This industry operates in 24 X 7, "around the clock" work pattern. Consequently, domestic labor laws can be a big challenge for the efficient running of air express operations.

Most of the developed countries set the benchmark in labor relations for others to follow. The labor conditions in many of the industrialized economies are very restrictive for express carriers to operate in. Truck drivers, air pilots, airport workers and customs broker unions are some of the biggest and strongest labor groups. They often threaten to withdraw labor in disputes in the air express industry. This problem becomes more serious in countries such as Australia, the United States, Germany, France and South Korea. The root cause of the labor problems in these developed countries is mainly liberal labor laws that give considerable power to labor unions to represent employees in the negotiations with employers on salary and other benefits.

Any strike caused by the labor movement can be devastating to the express company. This comes about because many of the operations are still relatively manual and cannot be replaced by machines. In August 1997, 185,000 members of the International Brotherhood of Teamsters, one of the largest and historically most powerful unions in the U.S., struck against United Parcel Service (UPS). UPS ships 80 percent of all packages in the U.S. It was the first nationwide strike in the 90-year history of UPS. It involved

more workers than any strike in that decade (The Internationalist, 1997). That strike cost UPS tens of millions in lost revenue, and it was called off after two weeks when the management team from the company agreed on the terms proposed by the union.

In addition to the threat of strikes, in many countries, there are unreasonable labor laws that make operating in such markets very costly and noncompetitive. The following are a few examples of such laws and regulations—

- Due to Argentina's current high unemployment rate, the government restricts the ability of employees to incur overtime. Overtime hours are limited to 30 per month and failure to adhere to the policy will result in penalties.
- In Germany and France, the governments have implemented 35-hour work week for all employees, raising operating costs for almost all businesses in these countries.
- Australian workers are entitled to at least one "continuous weekend rest" in a month. Therefore, it is impossible for the employer to schedule staff to work on every Saturday or Sunday. Failure to comply will subject the employer to higher percentages of overtime payments and/or penalties.
- Mandatory minimum wages in many countries have caused high operating costs for businesses. Express companies are often a victim of such wage restrictions due to the labor intensive nature of their business.
- In New Zealand, it is necessary to have at least two or more staff working in any office from 12 midnight until morning. This policy aims to ensure the safety of the employees. This regulation causes companies to schedule at least one more employee in late hours that may not have sufficient work, increasing operational costs with lower productivity.

Company Ownership

In most developed countries, express companies are free to set up a wholly-owned entity to handle the business. There are still many developing countries that do not allow foreign companies to have 100 percent wholly-owned representation. Such restriction forces express carriers to use local handling agents. Also, it is usual that there is only one company (which is usually owned at least 51 percent by the government) to provide the warehouse storage, customs clearance, and pick up and delivery services. The express carriers are forced to operate in a high cost environment in these markets. Barriers to foreign ownership may also cause poor service quality and corruption or no service differentiation between different express companies. In some countries, there is only one company licensed to operate door-to-door courier services. This is a major regulatory issue in Vietnam, China, Indonesia and the Philippines.

Local Postal Regulations

Many countries around the world have stringent regulations prohibiting or controlling the offering of domestic and international courier services in their domestic market. This practice is designed to protect the monopoly advantage of the local postal service providers. The following are some typical examples of such restrictions:

- In Thailand, there is a postal fine of THB\$25 per document delivered by express courier companies. This is to ensure that international express courier services are priced higher than the local Thailand postal service provider.
- Under postal laws of many countries, there are differences in customs clearance requirements between postal and express shipments. Normally it is easier and more cost effective to move shipments via local postal services than by express couriers. Postal shipments usually enjoy higher de

minimis thresholds, fewer inspections and fewer documentation requirements.

- The majority of the governments around the globe prohibit foreign companies from entering into the domestic postal market. This is common for both developed countries and third world economies.

Postal restrictions are an outdated regime by which governments protect their local postal agency. This practice usually results in lower efficiency of the local agency and waste of public resources, since there is virtually no competition. Nevertheless, this issue is always raised during negotiations of free trade agreements between two countries.

Ground Transportation

Due to traffic conditions in various countries, express courier companies often encounter local transportation barriers when operating in these markets. One of the most prominent examples is Singapore's highly stringent traffic laws to curb the increase of car ownership. Strategies used to restrict car ownership include:

- Certificate of Entitlement (COE) – All vehicles must have a COE before driving on the road. This certificate is only obtained and issued through an open bidding system. The bid occurs once every month. The cost of one certificate can be as high as US\$15,000 for one box truck that is normally used by the courier company. Furthermore, these certificates are only valid for ten years. This policy has drastically increased the operating costs in Singapore for all express companies as they require a large fleet of trucks and vans.
- Electronic Road Pricing (ERP) – This is an automated version of road tolls for all drivers passing through certain stretches of road. All vehicles have to install a special electronic cash-card reader. This enables sensors mounted on overhead gantries to deduct the appropriate amount of the road toll automatically. This amount is determined based on different timings of travel during the day (Chin, 2002). It can be costly for cargo vans and trucks to go in and out of central business districts during the pick-up and delivery cycles. ERP definitely increases the operating costs for express courier companies.
- Higher Taxes on Cars & Petrol – In order to further curb the growth of car ownership in Singapore, the government has also implemented higher duties and taxes on cars and petrol. All car imports are required to pay 175 percent import duty. Similarly, there is high tax on petrol consumption. These regulations cause business costs for express courier companies in Singapore to be among the highest in the entire industry.

There are other rules and regulations that are implemented in other countries to control traffic volumes and conditions:

- In Thailand and the Philippines, trucks of certain tonnage are not allowed to travel during peak hours or into certain business districts. This regulation makes the delivery and pick-up of large packages very difficult during peak hours and in prescribed business districts. Careful planning and additional resources are needed to satisfy customers under these conditions.
- It is very difficult to find suitable parking lots in Taipei City. Hence, illegal parking is very common, especially during office hours. The Taipei traffic police have adopted tough measures on illegal parking. Vehicles are always towed away within minutes of illegally parking. In order to collect the vehicle, the owner must pay up to several hundred U.S. dollars. Such regulations create huge challenges for many courier companies.
- In the Philippines, certain cars are prohibited from traveling into the city areas on certain days. The prohibited vehicles are determined by the last digit on the car number plate (odd or even digit). This

regulation results in firms incurring additional costs, since they will need to have vehicles with different plate numbers in order to drive on the roads every day.

Strategies to Overcome Regulatory Barriers

A lot of regulatory challenges have been outlined in this article. These barriers cannot be resolved overnight, and careful strategies are required to address them separately and at different socio/economic and political levels. A number of divergent strategies can be used by the air express industry to overcome the regulatory barriers imposed. These strategies include:

(1) Cooperation between local agencies and company's representatives in country.

Air express companies need to set up local operations in many countries that they serve. These in-country or national operations are normally managed by local management teams. There are many issues best handled by a local country management team, rather than at the corporate level in another country. Examples of day-to-day regulatory issues best handled locally are

- inconsistencies of practices by customs officers,
- poor system reliability of customs EDI connections, and
- frequent flight delays due to Air Traffic Control (ATC) problems.

Local management teams can also work with regional and local governments during trade agreement negotiations. This can help to ensure the removal of unreasonable regulations that obstruct the growth of the air express business.

The largest air express companies (FedEx, DHL, UPS, and TNT) have joined together to set up various local industry representatives to lobby for regulatory improvement. The local

industry representatives are important to demonstrate to the public agencies the unity to be found in the air express industry. These companies pool their resources together and work closely with governmental agencies in countries where they have joint operations.

(2) Collaboration between regional organizations and industry representatives.

The four major air express companies have formed a regional representative organization called the Conference of Asia Pacific Express Carriers (CAPEC). The main objective of this organization is to provide a platform for all four companies to work toward common goals in the areas of regulatory lobbying and deregulation. Through this organization, the air express industry actively organizes many regional forums with customs agencies and regional associations. Examples of these regional associations are the European Union, APEC (Asia-Pacific Economic Corporation) and ASEAN (The Association of Southeast Asian Nations). They express the concerns of the industry to these groups and provide suggestions to work with the authorities in order to achieve common objectives. The regional office of UPS and FedEx also constantly work with the U.S.-ASEAN Business Council to provide valuable feedback to local governments on the existing regulatory barriers and to propose ways to remove them.

The main reason why there is a need for regional representation of the industry is due to both the variety and number of regulatory issues that need to be addressed. These issues require a high level of attention and focus in order to effectively tackle and resolve them. As a consequence, in most cases, the regional representatives of the air express industry are being assigned greater authority to make decisions on behalf of the company. They are likely to have ample resources to work with the respective agencies. These factors are important and necessary in the negotiation

at the regional conferences with senior governmental officers.

(3) **Worldwide lobbying at the international level.** Worldwide lobbying is similar to the lobbying effort via regional representation. It is used to complement the other channels of regulatory lobbying. There are many important worldwide organizations that are highly influential in setting directions of economic and social policies. They undertake appropriate representation and participation in these international forums so as to be beneficial to the interests of the air express industry. Some examples of such international organizations are

- World Customs Organization (WCO),
- World Trade Organization (WTO),
- International Air Transport Association (IATA),
- Asian Development Bank,
- International Monetary Fund (IMF),
- World Bank, and
- World Economic Forum (WEF).

It is common for the air express industry to send representatives to attend workshops or conferences organized by these international institutions in order to present the views of the air express industry.

(4) **Individual lobbying effort via senior management.** Senior management staff from the four largest express companies work hard to develop close relationships with some local governments. This can be useful when it comes to making requests that improve an individual company's competitive edge. One good example of this

involves the desire for more air flying rights from governments. When two countries have agreed on how many air-lines can fly in and out of their borders, having a good relationship with local governments can help in expanding rights and improving flight schedules.

SUCCESS STORY IN DEREGULATION

Removing regulatory barriers is not likely to happen within days or even weeks. Barrier removal is normally a long process with multi-dimensional efforts and support. There are few success stories to quote on the power of lobbying. One such case study is that of Royal Malaysian customs, which offers a positive example of a close working partnership between industry and a customs agency.

Project ACCESS in Malaysia

In October 1999, CAPEC launched a special project called ACCESS (ASEAN Customs Clearance & Express ServiceS). This project aimed to assist customs agencies in ASEAN countries to improve their customs regulations and operations in line with the explosive cargo volume growth. ASEAN customs directors-General welcomed this initiative, whereby industry would collaborate closely with ASEAN customs administrations to re-engineer and modernize customs procedures and regulations.

Royal Malaysia customs volunteered to be the pilot agency for this project. The following changes in customs procedures have been implemented with help from the air express industry (Wolf, 2003):

- expedite clearance of non-dutiable shipments below RM\$2,000 value,
- increase of de minimis level to RM\$500, a significant improvement from the previous threshold (RM\$200 at Kuala Lumpur International Airport; RM\$10 in other Malaysian airports), and

- develop a post-release declaration for inbound and outbound shipments in free trade zones.

These regulatory changes had profound impacts on both customs and the express industry. The following benefits have been observed after the changes:

- Malaysian customs reduced processing work by approximately 50%;
- Direct release of 60-65% of inbound shipments;
- Formal declarations declined by 20-25%; and
- Businesses in the free trade zones benefit through earlier delivery of import shipments and later pick-up for export shipments.

The important lesson learned in this successful case study is the multi-directional approach of partnership with the customs authority. The industry proposed the idea at the annual ASEAN dialogue session with the directors-general of customs. Two project teams were formed at different levels—a planning team and a working team. The scope and responsibility of the planning team was to collect and analyze proposals from industry on the impacts to local economy

and customs operations. This team took into consideration all recommendations and developed a final proposal submitted to Royal Malaysia Customs. Once the final proposal had been endorsed and accepted by the senior management of Malaysian Customs, a working team was formed to implement the recommendations. This approach proved to be effective and efficient, and the entire project required about three years to complete with positive results.

CONCLUSION

This article has presented many existing regulatory barriers facing the air express industry. Many of these barriers have been around for many years. It is not easy to resolve regulatory barriers due to the political, economic and social pressures facing the local governments. In order to better handle these regulatory challenges, some air express companies (DHL and UPS) have set up dedicated departments to work closely with local authorities. Other air express companies have started sending their senior management staff to participate in the meetings and discussions regarding regulatory reform. Apart from lobbying efforts, all express companies are also investing heavily to improve their operational capability and flexibility in order to mitigate the negative impacts of local regulations.

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USING ACTIVE LEARNING TO ENHANCE SUPPLY CHAIN KNOWLEDGE

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ABSTRACT

The constantly evolving logistics discipline confronts practitioners with the challenge of keeping pace with the many advancements in the field. The authors examine ways in which logistics trainers may be able to improve their ability to effectively convey knowledge to logistics practitioners by supplementing the traditional lecture-based approaches with active learning exercises. The results of a recently conducted survey detailing current usage levels and approaches of active learning exercises, specifically simulations, by logistics educators is then presented. The paper also summarizes comments from individual simulation participants after they have completed a training experience designed to immerse them in a real world supply chain scenario. The article concludes by providing suggestions and managerial implications.

INTRODUCTION

The Internet revolution has helped to create many new business opportunities and challenges for logistics practitioners. Past research (Murphy and Poist, 1994, Fawcett, 1992) has found that the skills required of most logistics and supply chain practitioners are evolving rapidly as technology brings about constant change in the marketplace. As the tools necessary to practice effective logistics operations rapidly evolve and supply chain issues play an increasingly strategic role in business success, the importance of effective training and professional develop-

ment will be heightened (Lancioni, Smith, and Forman, 1998).

The information age has impacted many areas of our lives including how we convey and receive information and turn it into knowledge. The technology barrage includes high tech computer and entertainment products, personal computers, palm pilots, cell phones, and other technological advances. As the information age impacts society, many individuals have discovered that they prefer to learn by doing and actually show a unique aptitude for mastering new tasks through activities that used to be

considered to be either entertainment-based or pure play (Duderstadt, 2002). While many now prefer to obtain information in a non-traditional way, research by Brown and Duguid (2000) shows that individuals repeatedly exposed to learning in the information age society multi-task very well. Furthermore, they are very adept at navigating complex information networks to acquire knowledge and build sophisticated learning resource networks. In fact, scientists have shown that individuals raised with a heavy dose of high technology learning opportunities actually process information in a different manner, leading to physiological differences between their brain structures and the brain structures of those previous generations not provided with high technology learning opportunities (Committee on Developments in the Science of Learning, 2000).

What does this mean for professional supply chain trainers? Is there an opportunity to capitalize on information age tools to assist our ability to convey knowledge? Past research (Gibson and Whitaker, 2004) suggests perhaps technology can play a vital role in the diffusion of supply chain knowledge to practitioners.

As our abilities and preferences for processing information evolve, the traditional lecture-based training experience may not fit very well with the technical skills and temperament of today's professionals. One alternative to the traditional passive method of conveying knowledge is the concept of active learning.

This article discusses the use of active learning, in the form of simulation models, as an alternative teaching tool for furthering the skills of logistics practitioners. Following a brief discussion of the merits of active learning and simulation, the results of a recent study on the use of simulations by logistics educators are presented. Many of the survey respondents are the individuals who will be responsible for training future logistics practitioners as the discipline grows. Comments from recent simulation participants are also summarized. Based on

both the administrator and participant feedback, conclusions and managerial implications are offered.

BACKGROUND

Active Learning

Learning by participation is not a new concept. Early active learning can be traced back to Socrates, with modern application dating back to the early 1900's (Kellar, et al., 1995). While active learning has a long history, what is relatively new is the manner in which most trainers and educators assess learning effectiveness. Learning effectiveness has traditionally been evaluated by the learner's ability to recall information. However, trainers are now focusing on the learner's ability to find and use information effectively (Simon, 1995). With this change in focus, learning techniques like active learning are gaining renewed and increased attention.

Professional trainers have recently embraced active learning techniques as a way to engage individuals, foster cooperation, and enhance learning (Ravenscroft, 1997). Active learning is a broad term encompassing a variety of innovative approaches involving joint intellectual effort by learners, or by learners and their instructor together (Smith and MacGregor, 1992). Instead of an instructor delivering information in a lecture format, the instructor serves as a coach while individual learners collectively and actively dig for knowledge (Graham, 1992). The focus is on teaching the trainee how to access information and then perform a critical review of the information obtained. The focus of these types of active learning approaches is always on encouraging active participation in the learning process (Johnson, Johnson, and Holubec, 1998).

While several variations of active learning exist, effective active learning exercises tend to have six key attributes included in their design (See Table 1).

TABLE 1
KEY ATTRIBUTES OF ACTIVE LEARNING EXERCISES

Key Attribute	Example of Application to Learning Activity
Face-to-face peer interaction	Dedicate course time to group interaction Instructor guided instruction to each group
Intentional group formation	Instructor formation of groups to enhance heterogeneity Control size and balance group member qualifications to encourage interaction
Promote positive interdependence	Assign complementary roles to different group members All group members must feel they contribute When multiple groups are involved, assign complementary roles to different groups
Require application of knowledge	Include issues that can actively be discussed Require decisions to be debated and finalized
Instructor serves as a facilitator	Instructor guides exercises Instructor interjects knowledge and provides input when necessary
In-depth learning assessment	De-briefing at the conclusion of the exercise Written and/or oral assessment requirement

Simulations as an Active Learning Tool

Simulations have recently gained the attention of training professionals as the shift from the traditional instructor to learner model gives way to the more active learning model. Specifically, simulation games are gaining popularity in professional training as evidence begins to establish a possible link between instructional strategies, motivational processes, and positive learning outcomes (Cordova and Lepper, 1996; Ricci, Salas, and Cannon-Bowers, 1996). For purposes of this research, a simulation is broadly defined as "a useful heuristic device designed to: 1) provide the user with a realistic picture of a real world scenario or 2) imitate a real world scenario and/or event." A simulation can be computer based and/or can take the form of an instructional game or model of realistic events.

Recent research has examined cost effectiveness, time efficiency, and skill enhancement via technology based training aids. While results are not conclusive regarding the use of technology based training, employee skill enhancement via technology based methods received relatively

high marks (Gibson and Whitaker, 2004). It appears that support is beginning to emerge for the use of technology to effectively convey supply chain knowledge. One popular form of technology-based training is computer based simulations.

Simulations and role-playing exercises give today's trainees the hands-on experiences they crave in order to learn and retain information (Farrington, 1998). However, not all simulations and games provide equal educational value. Research shows the higher the level of realism or fidelity included in the simulation, the more effective simulation is as a learning aid (Feinstein and Cannon, 2002). As a result, much work has been done over the last 10 to 20 years to enhance the robustness of simulations and improve their level of realism (Perotti and Pray, 2002).

In management training settings, management simulations support learning in a non-threatening but competitive environment of the kind that real managers face every day. As a training activity, there is nothing quite like

taking over the management of a real company. Unfortunately, real life has real costs and consequences associated with it. As a result, few companies would permit novices to run part or all of their business in real time.

Even if management turned their company over to novices for the sake of learning, it would take quite a while for management initiatives to be developed and implemented. Feedback from real-life business decisions is often slow in coming and can be difficult or impossible to interpret. While operating a real company would be an excellent training opportunity, it is hardly realistic in most instances.

Simulation models and tools overcome these issues and potential problems while providing a dose of reality-oriented learning. Simulations allow rapid time compression and quick feedback to the learner, in a low-risk process where jobs and company survival are not on the line. A well-designed simulator can provide the learner with a realistic training experience in the relative safety of a controlled operating environment provided by the simulation. Perhaps most importantly, the lessons learned in the simulation environment occur within hours or days, not the months, quarters, or years associated with real life.

Given these benefits, it is not surprising that simulation tools are employed in a wide variety of training environments. Following the lead of the airline industry's longstanding use of flight simulators to train pilots, medical schools are using computer simulations to educate future doctors and the U.S. military is using combat simulation games to prepare future commanders in low risk environments (Noonan, 2002; Chuang, 2003). Likewise, manufacturers are employing computer simulation tools to improve employee skills and engineering schools are being encouraged to expand the use of simulation in the classroom (Robb, 2002; Babicz, 2003).

What about the use of simulations in supply chain management (SCM) training? The next section provides insight into the current use of

supply chain simulation tools. The discussion is based upon a recent survey of supply chain and logistics educators. These individuals from leading academic institutions were selected to participate for three reasons:

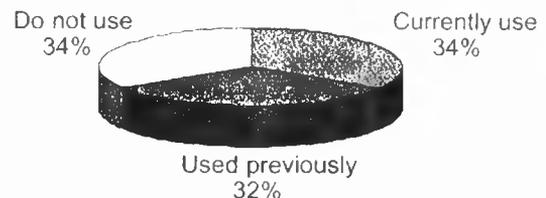
1. They will be helping to train future supply chain practitioners
2. They have significant experience with industry training activities
3. They are well versed in SCM concepts and the use of innovative educational tools.

SURVEY RESULTS AND DISCUSSION

To gain insight into the use of simulations in SCM education, an iterative design-critique-revise survey development process was used to create an eight-question survey. The survey was attached to an e-mail request explaining the purpose of the study and sent to 150 attendees of the 2003 Council of Supply Chain Management Professionals (formerly Council of Logistics Management) Educators Conference. The original request and a reminder e-mail generated feedback from 47 supply chain educators, a participation rate of 31.3 percent.

The results suggest that simulation tools are commonly used by supply chain educators. Figure 1 reveals a fairly even split between the numbers of instructors who currently use simulations, have used them in the past, and have never used them.

FIGURE 1
SUPPLY CHAIN SIMULATIONS



Of the 31 instructors with simulation teaching experience, 20 provided detailed insights regarding their use of simulation tools across 43 different courses. Those who use simulations tend to embrace them regardless of the level or focus of the course where the simulation is being applied. Respondents identified 14 simulations by name, with the Beer Game, LOGA, and LOGEX listed most frequently by the respondents. Additionally, several home grown or proprietary simulations were mentioned as being used by the respondents.

Respondents indicated that simulations are used for a variety of reasons. Most frequently, simulations (51.2 percent of the courses identified) are used to illustrate specific principles in a course (e.g., using the Beer Game to demonstrate the Bullwhip Effect). Simulations are also frequently integrated into the course (32.6 percent) to supplement large portions of the course content. Rarely do instructors indicate that they use these types of active learning tools as the focal point of the course (14 percent).

Teams are typically assembled for simulation assignments. Over 70 percent of the courses identified by respondents are organized by having teams compete against each other or by trying to attain a specific goal over the duration of the simulation. According to survey participants, teams run from two to twenty people in size, with four team members as the median number per team. The size and make-up of the team varies depending on the training situation faced by the instructor.

As Table 2 highlights, the participants strongly believe that simulations are of value to the individuals participating in them and are an effective teaching tool. However, their opinions were not as strong regarding the ability of current tools to model SCM. These respondents see room for improvement in supply chain simulations.

Given these opinions, it should be no surprise that 81.5 percent of the survey respondents (including all current simulation users, all but one former user, and three current nonusers) indicated that their future plans are to expand the use of simulations in their courses or keep them at the same level of use. The remaining 18.5 percent suggest that they have no plans to use simulations in future supply chain training activities. Clearly, supply chain educators see an ongoing need for active learning via simulation in the curriculum.

Simulation Participant Feedback

Based on the previous section, it is clear that a significant portion of logistics educators see value in using simulations to augment traditional course content. While the educator perspective is useful, it only provides information from the perspective of the instructor. The researchers also wished to gain insight into the receptiveness of participants to using a simulation and their perceptions of simulation effectiveness.

TABLE 2
PERCEPTIONS REGARDING SUPPLY CHAIN SIMULATIONS

Statement	Mean Response	Standard Deviation
Active participation in a simulation helps individuals learn and retain key concepts	6.60	0.68
Simulations are an effective supplement to traditional teaching methods	6.45	0.68
Current simulation tools effectively capture the essence of SCM	5.05	0.89

Scale: 7 = Strongly Agree, 1 = Strongly Disagree

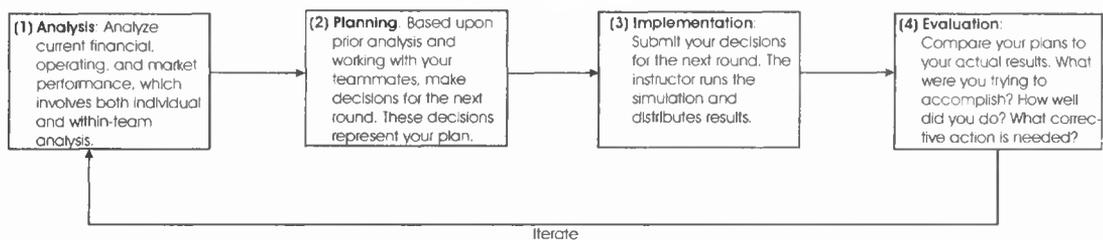
To obtain information feedback from the perspective of the learner, the researchers queried a select group of individuals who had recently been exposed to simulation based logistics training. During the training, a robust and realistic supply chain simulation was introduced to trainees. In order to prepare for participation in the simulation, the trainees were provided with a detailed manual describing the simulation. They were asked to read the manual and take a series of on-line quizzes and tutorials prior to beginning the simulation. Each team of four participants was then provided with detailed information about their company including financial and operating data on the following functional units: transportation, warehousing and distribution, suppliers, raw material and finished goods inventories, customer demand forecasting, and product configurations.

Students were asked to make a series of decisions and interface with the simulation through a web-based decision entry process. Students were asked to keep track of their decisions, and the reasons for their decisions, for each of the nine rounds of the simulation. Figure 2 illustrates the iterative process confronted by the simulation participants.

Roughly half way through simulation administration, each firm was asked to provide a short, 2-3 page executive summary (similar to an abbreviated SWOT analysis) of their performance to date and their strategy for the remainder of the simulation. At the conclusion of the simulation, each group was asked to provide a written annual report of their performance and provide a presentation to their stockholders. The annual report was to include the final financial and operating data for their simulated firm. In addition, an in-depth analysis of their firm's recent performance, an identification of management's strengths and weaknesses during the simulation period, and a comprehensive strategy for moving the firm forward in the future were required.

The simulation was designed to allow participants to maximize learning by participating in a realistic, group-based experience designed to simulate the decision-making processes faced by today's supply chain practitioners. Given this goal, the researchers were curious about participant feedback at the conclusion of the training.

FIGURE 2
SUPPLY CHAIN SIMULATION LEARNING PROCESS



At the conclusion of the training, each participant filled out an evaluation form. These semi-structured, open-ended evaluations were designed to provide the instructors with written feedback about the simulation experience and to provide suggestions on how to improve simulation administration for future courses. The feedback form used broad-based, general questions designed to allow students to use their own words to critique the simulation, the administration of the simulation, and the positives and/or negatives obtained from the simulation experience. Given the unrestricted nature of the feedback, Table 3 provides a general overview of participant impressions of the simulation experience.

CONCLUSIONS AND MANAGERIAL IMPLICATIONS

This research revealed three primary benefits of using a simulation to enhance supply chain training. First, similar to past research (Colbeck, Campbell, and Bjorklund, 2000), the active learning simulation resulted in improving participants' interactive skills and enhancing their abilities to deal with conflict, goal setting, and work delegation within their group. The exercise also forced participants to work through differences of opinion prior to submitting decisions for their firm.

Second, the simulation increased participant involvement in the learning environment by enhancing the interest level and level of discussion throughout the course. By having multiple firms compete against each other, participant involvement in the course was enhanced by creating a friendly environment of competition among group members of different firms. The positive byproduct of competition helps to confirm what prior researchers (Holcomb, Foggin, and Rinehart, 2002) have recently suggested; that it can be beneficial to participants to compete against each other in a truly competitive environment.

Third, participant energy and preparation throughout the project was generally enhanced due to participant perceptions that they were involved in an evolving supply chain simulation with "real-world" applicability. Real-world applicability was made possible since the simulation being used allowed the instructors to create a dynamic market environment by altering or adding one or more features during simulation administration. As suggested by prior researchers (Meyer and Rose, 1998), the instructors introduced a relatively simple version of the simulation and then increased its difficulty over time by adding additional features and complexities.

TABLE 3
EXAMPLES OF PARTICIPANT FEEDBACK ON SIMULATION PARTICIPATION

Category	Specific Participant Comments
Real-World Applicability	<ul style="list-style-type: none"> • "It was easier to become interested and involved since the project was a supply chain simulation with decisions relevant to what we have been confronted with in practice." • "I liked being involved in a project where I thought some of the things I was learning would be useful once I return to industry."
Class and Group Interaction/ Communication Skills	<ul style="list-style-type: none"> • "I liked having interactive discussion where I was free to discuss issues with my group members and obtain input from the instructor." • "It was good to see how different team members approach the same problem. It was a great learning experience to have to figure out how to work with other team members with different functional areas of expertise."
Active Preparation Skills	<ul style="list-style-type: none"> • "Actually seeing the interactions between different functions of the supply chain was fascinating. Using a simulation where not only your own decisions, but the decisions of other companies impact your results made for a challenge when managing the supply chain." • "I didn't realize how difficult and time-consuming the research and analysis portion of the project would be."

Simulations can be very powerful educational tools, especially given the background of individuals raised in the information age. While much work remains to be done to continue to improve the effectiveness of simulations as active learning tools for training purposes, the results experienced by the authors would certainly be described as positive. While participant feedback was generally positive, the educator survey respondents provided mixed reviews about the effectiveness of current simulations to capture and present key supply chain concepts to current and future practitioners. Future research should explore the identification of which key concepts and/or functional areas should be included in a supply chain simulation. Results of the research could help professional trainers and educators move towards a consensus about the content and complexity of effective supply chain simulations appropriate for various audiences.

Educator survey respondents also indicated that they believe active participation in a simulation helps participants to learn and retain key concepts. However, research on retention rates of supply chain trainees participating in simulation-based active learning projects compared to other types of learning is lacking and should be explored. The extent to which instructors should

augment or replace their current instructional methods with simulation-based active learning exercises is unclear and needs to be examined further.

Simulation designers not only have to be cognizant of student learning processes, but also must understand instructor requirements of a simulation. Is the instructor adoption decision based on simulation complexity or perhaps the availability of instructor or participant support materials? Is cost a significant issue when considering simulation adoptions and, if so, what is the maximum acceptable cost per participant? How much time is an instructor willing to invest in training activities to help assure the simulation is executed properly? Increased understanding of these questions is paramount to enhancing simulation adoption by supply chain instructors.

Traditional training methods must evolve to effectively maximize the learning and retention of critical supply chain information. Our research suggests that simulations support these learning requirements. Thus, supply chain trainers and educators should seek out opportunities to supplement lecture based training with simulations and other active learning tools whenever possible.

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A LONGITUDINAL ANALYSIS OF THE JOURNAL OF TRANSPORTATION MANAGEMENT: 1996 – 2004

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ABSTRACT

The first issue of the *Journal of Transportation Management (JTM)* was published in the Fall of 1989. This new publication was to provide an outlet for research and writing of a practical nature, of direct benefit to logistics and transportation managers and their firms. Since that first issue, the *Journal* has weathered three sets of editorial staff that have collectively produced sixteen full or partial volumes. This article provides some of the history of the *JTM* and an analysis of some of the characteristics of its contributors during the tenure of its third and current editor, Jerry Wilson.

INTRODUCTION

The publication of this issue of the *Journal of Transportation Management (JTM)* is especially significant. The *JTM*, which is published by Delta Nu Alpha Transportation Fraternity and Georgia Southern University, turns seventeen with this issue. The *Journal* has experienced a resurgence in interest from potential authors as well as from subscribers in recent years. It seems particularly fitting at this time to reflect on how far the publication has come since its inception and to examine its future.

Summary articles such as this have been written for many journals. For example, similar pieces

can be found in the *Journal of Marketing Education (JME)* (Clarke and Hanna, 1986), the *Journal of Purchasing and Materials Management (JPMM)* (Williams and Oumlil, 1987), the *Journal of Personal Selling and Sales Management (JPSSM)* (Swan, Powers, and Sobczak, 1991), *The Journal of Advertising (JA)* (Muncy, 1991), the *Journal of the Academy of Marketing Science (JAMS)* (Malhotra, 1996), the *Journal of Business and Entrepreneurship (JBE)* (Hyman and Steiner, 1997), the *Journal of Business Strategies (JBS)* (Mehta, Maniam, and Leipnik, 1999), and the *Journal of Marketing Theory and Practice (JMTP)* (Randall, Miles, and Randall, 1999). No article of this type has been written for

the *JTM*, and it seems appropriate for such an endeavor at this time.

HISTORY

The *Journal of Transportation Management* began as a means of disseminating academic and practitioner research in a form that logistics and transportation managers could directly apply in their organizations. It was felt that some of the more traditional research outlets, such as the *Journal of Business Logistics*, were lacking in direct managerial application. In 1988, David Bloomberg of Western Illinois University, Jerry Foster of the University of Colorado, and Jim Adams of Auburn University began to discuss the need for a new practitioner-oriented journal. All three were long-time members of Delta Nu Alpha and felt that adding a journal as a member benefit would both strengthen the organization and fit the stated purposes of Delta Nu Alpha. The following excerpt is taken from the preface to the Spring 1992 (Volume IV, Number 1) issue.

The objective of the *Journal of Transportation Management* is to report and disseminate new information and new techniques to improve and advance the management of transportation. Articles in the *Journal of Transportation Management* are of interest to both transportation practitioners and academics. As such, they report topics relevant to the practice of transportation as a profession, to professionals. Because articles are to have a real-world orientation, those which are theoretical in content with no application for practitioners are inappropriate for the *Journal of Transportation Management*.

As the above excerpt makes crystal clear, this new journal would only publish articles that offered practical application to the transportation/logistics manager. This objective has remained a cornerstone of the publication throughout its 17-year history.

The first edition of the *JTM* was published in the Fall of 1989. The coeditors were David Bloomberg of Western Illinois and Jerry Foster of the University of Colorado. Jim Adams of Auburn University served as the book review editor and Tom Dardis of Delta Nu Alpha was the associate editor. Dave and Jerry continued as coeditors through the spring of 1992 (Volume IV, Number 1) issue.

Mike Crum of Iowa State became editor of the *Journal* for the Fall 1992 (Volume IV, Number 2) issue and published five more through the Spring of 1995 (Volume VII, Number 1). Due to a significant reduction in the number of quality article submissions, publication was suspended from the Spring 1995 issue until the Fall of 1996. Mike and Jerry Wilson of Georgia Southern University co-edited the next issue of the *JTM*, Volume VIII, Number 1, in the Fall of 1996.

Jerry replaced Mike as editor with the publication of the Spring 1997 (Volume IX, Number 1) issue. At the time that Jerry assumed the editor position, Georgia Southern University became the co-publisher with Delta Nu Alpha. While two issues of the *Journal* have been published each year since Wilson became editor, no issues appear in print dated 2001. This year was skipped in order to catch the issue date up with the calendar date of issue.

As noted below, the current editorial staff does not have a complete set of issues of the *JTM*. Any reader with issues before 1996, who is willing to donate them to preserve a historical record of the publication, should contact the editor using the information provided in the preface to this issue.

METHODOLOGY

While the authors would have preferred to include every issue of the *Journal* in the analysis reported here, this was not possible. Unfortunately, the current editor does not have a complete set of all issues. For this reason, only the issues from 1996 to 2004 of the *Journal of Transportation Management* were detailed in

this study. The included issues were analyzed to determine output, authorship, and reference sources based on the Mehta, Maniam, and Leipnik (1999) study of the *Journal of Business Strategies* and the Randall, Miles, and Randall (1999) study of the *Journal of Marketing Theory and Practice*.

The authors, in order to develop the descriptive data, assessed the available collection of the *JTM*. In each instance, the descriptive data were tabulated by the categories listed above.

FINDINGS

Output

From the fall of 1996 through the fall of 2004, 15 issues of the *Journal of Transportation Management* were published. The *JTM* is published in the spring and fall of each year. A total of 75

articles have been published with each issue containing 5 articles or 10 articles a year. The issues varied in length, as did the length of the articles and the number of citations. The average article was approximately 12 pages in length and used 22 citations. Table 1 summarizes the *JTM*'s 1996 output.

These figures are comparable to the *Journal of Business Strategies* in which an average of 11.7 articles were published each year from 1984 through 1998 with an average page length of 12.22 pages per article (Mehta, et. al., 1999). The mean number of cites per article was 23.85. The *Journal of Business and Entrepreneurship* had a smaller average page length, 10.5 pages, but in an average year published roughly 24 articles. The average number of citations per article was 20.6. The *Journal of Marketing Theory and Practice* averaged 31 articles a year with the average length of the articles being 12.04 pages.

TABLE 1
LENGTH OF ARTICLES AND NUMBER OF CITATIONS BY ISSUE

Issue	Total # of Pages	Average # of Pages	Total # of References	Average References per Article
Fall 1996	66	13.2	114	22.8
Spring 1997	65	13.0	65	13.0
Fall 1997	64	12.8	61	12.2
Spring 1998	50	10.0	88	17.6
Fall 1998	67	13.4	135	27.0
Spring 1999	60	12.0	89	17.8
Fall 1999	53	10.6	81	16.2
Spring 2000	48	9.6	146	29.2
Fall 2000	36	7.2	123	24.6
Spring 2002	52	10.4	85	17.0
Fall 2002	64	12.8	173	34.6
Spring 2003	71	14.2	115	23.0
Fall 2003	74	14.8	107	21.4
Spring 2004	66	13.2	96	19.2
Fall 2004	61	12.2	130	26.0
Average	59.80	11.96	107.20	22.88

The Authors

A total of 115 different authors have published in the *JTM*. As is seen in other serials as well, these researchers were predominately male. Only 22 of the 115 were female and only 2 of that 22 have appeared more than once in the journal as an author. Table 2 provides a breakdown of authors by gender for the *JTM* as well as the *Journal of Business and Entrepreneurship* and the *Journal of Marketing Education*.

Mehta, Maniam and Leipnik (1999) state in their findings that the ratio of male authors to female authors is roughly 4 to 1. This conclusion was reached after studying various academic journals and comparing them to the gender of authors for the *JBS*, which had 84.5% of its authorship as male.

These authors were from 63 different institutions or corporations (10 of the 63 were industry or military institutions). The most prolific authors in *JTM* were Kathryn Dobie, Joe B. Hanna, John L. Kent, Hokey Min and R. Stephen Parker, who each have had 5 articles published in the journal. Richard L. Clarke, Brian J. Gibson and Drew M. Stapleton each have had 4 articles appear in the journal. A total of 20 of the 115 authors have had multiple articles accepted and published in the *Journal of Transportation Management*. Table 3 provides a breakdown of these 20 authors.

TABLE 2
PERCENTAGE OF AUTHORS BY
GENDER
FOR THE JOURNAL OF
TRANSPORTATION MANAGEMENT
AND OTHER SELECTED SERIALS

Gender	JTM	JBE	JME
Female	19.13	19.7	8.6
Male	80.87	80.3	91.4

TABLE 3
THE MOST FREQUENTLY
PUBLISHED AUTHORS IN THE
JOURNAL OF TRANSPORTATION
MANAGEMENT

Author	Number of Articles
Kathryn Dobie	5
Joe B. Hanna	5
John L. Kent	5
Hokey Min	5
R. Stephen Parker	5
Richard L. Clarke	4
Brian J. Gibson	4
Drew M. Stapleton	4
James M. Daley	3
Paul R. Murphy	3
William A. Cunningham	2
M. Theodore Farris, II	2
Shashi N. Kumar	2
Karl B. Manrodt	2
Charles E. Pettijohn	2
Stephen M. Rutner	2
Stephen M. Swartz	2
Evelyn Thomchick	2
Jerry W. Wilson	2
Donald F. Wood	2

The total number of authors for the 75 articles is 158 (115 different authors with 20 publishing multiple times). Of those 158 who have published in the *Journal of Transportation Management*, over one-third held the rank of professor at the time that his/her article appeared in print. Another 44 percent were either associate or assistant professors. Overall this breakdown is similar to those of other serials with the exception that the *JTM* had more authors of the rank Professor and more non-academicians (see Table 4).

TABLE 4
RANK OF PUBLISHED AUTHORS IN
PERCENTS FOR THE *JOURNAL OF*
TRANSPORTATION MANAGEMENT
AND OTHER SELECTED SERIALS

Rank	JTM	JMTP	JBE	JAMS
Professor	36.7	29	34.9	31.9
Associate Professor	24.1	27.7	23.6	31.4
Assistant Professor	20.3	31.3	24.1	26.8
Instructor/ student	3.2	4.9	6.9	6.4
Non-academician	10.8	3.6	3.7	0.0
Unknown	5.1	3.4	6.9	3.5

The majority of the articles published were written with contributions from multiple authors. The 75 articles were written by a total of 158 authors. Only 18 of the total articles published, or 24 percent, were not co-authored. This statistic is comparable to the breakdown of authorship as seen in the review of publications of the *JMTP*. As compared to other selected serials, the percentage of single authorship for the *JTM* was low. Table 5 provides a breakdown by authorship.

Author Affiliation

The 53 institutions at which these researchers were on faculty were diverse. No one region of the country appeared to have been over or under represented. Of the 53 institutions represented, 30 were seen more than once when tallies were made breaking down authors by university or college. The universities that appeared most frequently for author affiliation were Southwest Missouri State University and the University of Wisconsin-La Crosse (13 times each) followed by Auburn University and Georgia Southern University (9 each) and North Carolina A&T

State University (8). Table 6 provides a breakdown by colleges or universities for the institutions that appeared at least 3 times in the affiliations of the *JTM* authors.

TABLE 5
PERCENTAGE OF SINGLE AND
MULTIPLE AUTHORSHIPS FOR
ARTICLES IN THE *JOURNAL OF*
TRANSPORTATION MANAGEMENT
AND OTHER SELECTED SERIALS

Author-ships	JTM	JMTP	JPSSM	JAMS	JME
One	24.0	24.5	49.6	76.6	90.0
Two	48.0	45.7	25.2	15.4	9.0
Three	24.0	25.5	11.1	4.2	1.0
Four	2.7	4.3	7.9	1.9	0.0
Five or more	1.3	0.0	6.2	1.9	0.0

TABLE 6
AUTHORSHIP BY INSTITUTION

Institution	Authorship
Southwest Missouri State University	13
University of Wisconsin-La Crosse	13
Auburn University	9
Georgia Southern University	9
North Carolina A & T State University	8
John Carroll University	6
University of North Texas	6
University of Louisville	5
Clemson University	4
Embry Riddle Aeronautical University	4
Iowa State University	4
Pennsylvania State University	4
St. Cloud State University	4
Air Force Institute of Technology	3
Indiana University	3
University of Missouri-St. Louis	3

It is interesting to note that in the summary articles for the *JBS* and the *JMTP*, Southwest Missouri State University was cited when tabulating top colleges or universities with which the authors were affiliated. Southwest Missouri State University was ranked 15th in the *JBS* with 4 articles and was 7th in the *JMTP* with 6 articles. Auburn University also appeared in tables of author affiliation with the university being noted 4 times in the *JMTP* (rank of 21st) and 9 times in the *JBS* (rank of 2nd).

REFERENCES

The 75 articles contained a total of 1,599 references. These references included journal citations, trade publications, books, government and/or research documents and/or industry reports, web sites, newspapers, magazines, and personal interviews. Journals were referenced most frequently and accounted for almost 38 percent of the total citations. Trade publications accounted for just under 26 percent. Table 7 provides a break down in references by type.

TABLE 7
REFERENCES CITED
IN THE JOURNAL OF
TRANSPORTATION MANAGEMENT

Reference	Frequency	Percent of total citations (%)
Journals	605	37.84
Trade Publications	412	25.77
Government Documents, Research or Industry Reports	190	11.88
Books	145	9.07
Web Sites	99	6.19
Newspapers	52	3.25
Proceedings	48	3.00
Magazines	33	2.06
Personal Interviews	7	0.44
Other	8	0.50

These statistics appear to be somewhat different than those of other serials. The percent of the *JTM* citations that were for journals was lower than seen in other summary articles of serials. For example, the *JBE* reported 48.9 percent of its citations were from journals, the *Journal of Business Communication (JBC)* (Reinsch and Lewis, 1993) reported 55 percent, the *Journal of International Business Studies (JIBS)* (Inkpen and Beamish, 1994) reported 55.7 percent, and the *JBS* reported 71.8 percent. The difference in the percentage of serial citations in turn created a difference in other types of citations.

The 605 journal citations covered more than 125 different serials. Sixty-two of those serials were referenced more than once in the 75 articles. The journals that were referenced most frequently were the *Transportation Journal*, the *Journal of Business Logistics*, the *International Journal of Physical Distribution and Logistics Management*, the *Harvard Business Review*, the *Strategic Management Journal* and the *Journal of Marketing*. Table 8 contains a listing of the journals that were cited at least 4 times in the 15 issues of the *Journal of Transportation Management*.

CONCLUSIONS

There were two primary reasons for conducting this research. First, the authors felt that members of Delta Nu Alpha and the readership of the *JTM* would be interested in the history of the publication. When Wilson first became the editor in 1996, there was little written evidence of the development of the *JTM* to that point in time. There were few files, virtually no correspondence, and only five back issues of the *Journal* in archive. The previous editor, Mike Crum, was able to provide direction in researching the beginnings of the publication, those involved, and the purpose for starting a new journal in transportation and logistics. The authors owe a debt of gratitude to Dr. David Bloomberg, professor emeritus, of Western Illinois University for providing the rationale for starting the *JTM* and for naming those that had a part in the development of the concept.

TABLE 8
MOST FREQUENTLY REFERENCED JOURNALS
IN THE *JOURNAL OF TRANSPORTATION MANAGEMENT*

Journal	Frequency	Percent of Total Journal Citations (%)
<i>Transportation Journal</i>	96	16.6
<i>Journal of Business Logistics</i>	70	12.1
<i>International Journal of Physical Distribution and Logistics Management</i>	22	3.8
<i>Harvard Business Review</i>	20	3.4
<i>Strategic Management Journal</i>	19	3.3
<i>Journal of Marketing</i>	17	2.9
<i>Journal of Transportation Management</i>	16	2.8
<i>Journal of Marketing Research</i>	14	2.4
<i>The Logistics and Transportation Review</i>	14	2.4
<i>Academy of Management Journal</i>	13	2.2
<i>International Journal of Logistics Management</i>	12	2.1
<i>The Journal of Commerce</i>	11	1.9
<i>Transportation Quarterly</i>	10	1.7
<i>Supply Chain Management Review</i>	9	1.6
<i>International Journal of Operations and Production Management</i>	8	1.4
<i>Journal of Purchasing and Materials Management</i>	8	1.4
<i>Logistics Management</i>	8	1.4
<i>Industrial Marketing Management</i>	7	1.2
<i>International Journal of Physical Distribution and Materials Management</i>	7	1.2
<i>International Journal of Purchasing and Materials Management</i>	7	1.2
<i>Journal of Transportation Research Forum</i>	7	1.2
<i>Sloan Management Review</i>	7	1.2
<i>Production and Inventory Management Journal</i>	6	1.0
<i>California Management Review</i>	5	0.9
<i>Interfaces</i>	5	0.9
<i>Journal of Personal Selling and Sales Management</i>	5	0.9
<i>Journal of the Academy of Marketing Science</i>	5	0.9
<i>Journal of Transport Economics and Policy</i>	5	0.9
<i>Academy of Management Review</i>	4	0.7
<i>European Journal of Operations Research</i>	4	0.7
<i>Journal of Consumer Research</i>	4	0.7
<i>Journal of Education for Business</i>	4	0.7

The second purpose for conducting the research was to examine some of the characteristics of the *Journal* and to compare them with similar

characteristics in other journals. The research works cited in the introduction to this article were used to set the benchmarks for this

comparative analysis. Among the items analyzed, across the publications used, the *JTM* compared favorably in all aspects. While a few minor variations were found and discussed, for the most part, the analysis suggests some level of validation, at least among the peer publications indicated, for the role of the *Journal of Transportation Management*.

Note that the two most popular logistics journals, the *Journal of Business Logistics* and the *Transportation Journal*, were not included in the analysis. While the omission may appear intentional, it was nothing more than practical.

The data used for the analysis presented here were not available for these two publications, at least in published form.

Members of Delta Nu Alpha should be pleased with the results of the analysis and proud of the publication they have supported for the past seventeen years. The leaders of DNA made quite a financial commitment back in 1988 when the approval was given to start the new publication. The decision demonstrates the commitment of Delta Nu Alpha and its members to logistics and transportation research and education.

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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.

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Journal of Transportation Management

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EQUATIONS, CITATIONS, REFERENCES, ETC.

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$$y = c + ax + bx \tag{1}$$

$$y = a + 1x + 2x + 3x + ax \tag{2}$$

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Book:

Coyle, John J., Bardi, Edward J., and Novack, Robert A. (2004), *Transportation*, 6th ed., Cincinnati, OH: South-Western College Publishing.

Website:

Wilson, J. W. (2003), "Adapting to the Threat of Global Terrorism: Reinventing Your Supply Chain," [On-line]. Available: <http://georgiasouthern.edu/coba/centers/lit/threat.doc>. Accessed: 11/12/03.

MANUSCRIPT SAMPLE

A FRAMEWORK FOR EVALUATING SUPPLY CHAIN PERFORMANCE

Terrance L. Pohlen, University of North Texas

ABSTRACT

Managers require measures spanning multiple enterprises to increase supply chain competitiveness and to increase the value delivered to the end-customer. Despite the need for supply chain metrics, there is little evidence that any firms are successfully measuring and evaluating interfirm performance. Existing measures continue to capture intrafirm performance and focus on traditional measures. The lack of a framework to simultaneously measure and translate interfirm performance into value creation has largely contributed to this situation. This article presents a framework that overcomes these shortcomings by measuring performance across multiple firms and translating supply chain performance into shareholder value.

INTRODUCTION

The ability to measure supply chain performance remains an elusive goal for managers in most companies. Few have implemented supply chain management or have visibility of performance across multiple companies (Supply Chain Solutions, 1998; Keeler et al., 1999; Simatupang and Sridharan, 2002). Supply chain management itself lacks a widely accepted definition (Akkermans, 1999), and many managers substitute the term for logistics or supplier management (Lambert and Pohlen, 2001). As a result, performance measurement tends to be functionally or internally focused and does not capture supply chain performance (Gilmour, 1999; *Supply Chain Management*, 2001). At best, existing measures only capture how immediate upstream suppliers and downstream customers drive performance within a single firm.

Table 1 about here

Developing and Costing Performance Measures

ABC is a technique for assigning the direct and indirect resources of a firm to the activities consuming the resources and subsequently tracing the cost of performing these activities to the products, customers, or supply chains consuming the activities (La Londe and Pohlen, 1996). An activity-based approach increases costing accuracy by using multiple drivers to assign costs whereas traditional cost accounting frequently relies on a very limited number of allocation bases.

$$y = a^2 - 2ax + x^2 \quad (1)$$

REFERENCES

Manrodt, Karl (2003), "Drivers of Logistics Excellence: Implications for Carriers," In J. W. Wilson (Ed.), *Logistics and Transportation Yearbook 2003* (pp. 126-154) Englewood Cliffs, NJ: Prentice-Hall, Inc.

Coyle, John J., Bardi, Edward J., and Novack, Robert A. (2004), *Transportation*, 6th ed., Cincinnati, OH: South-Western College Publishing.

Wilson, J. W. (2003), "Adapting to the Threat of Global Terrorism: Reinventing Your Supply Chain," [On-line]. Available: <http://georgiasouthern.edu/coba/centers/lit/threat.doc>. Accessed: 11/12/03.

