Table 1a. Financial Statistics for TL, LTL, and Combined (TL & LTL) firms for 1999
($ million for revenue, expenses, income, and assets)

	Mean	Percent	Max.	Min.	s.d.
LTL firms (24 firms)					
Operating revenue	468.8	100%	2,219.4	6.7	642.4
Operating expenses ("operating ratio")	440.3	93.9%	2,217.6	8.3	610.9
Operating income	28.5	6.1%	215.9	(3.3)	52.2
Total assets (N = 20)	285.5		1,215.7	2.0	363.6
Total employment (20 firms)	5,392		23,009	32	6,645
TL firms (97 firms)					
Operating revenue	152.4	100%	1,559.6	0.15	252.1
Operating expenses ("operating ratio")	144.3	94.7%	1,541.6	0.15	241.4
Operating income	8.1	5.3%	102.2	(3.87)	15.8
Total assets (57 firms)	78.9		699.5	0.03	120.6
Total employment (54 firms)	1,199		12,032	11	2,395
Combined firms (offer both TL & LTL; 11 firms)					
Operating revenue	373.0	100%	2,590.7	12.8	719.5
Operating expenses ("operating ratio")	356.4	95.5%	2,506.9	12.5	695.2
Operating income	16.6	4.5%	83.7	(10.0)	28.3
Total assets (8 firms)	142.8		749.4	5.1	256.1
Total employment (7 firms)	4,226		23,279	54	8,588
Pooled sample (132 firms)					
Operating revenue	234.6	100%	2,590.7	0.15	431.9
Operating expenses ("operating ratio")	221.8	94.5%	2,506.9	0.15	412.8
Operating income	12.8	5.5%	215.9	(10.0)	28.4
Total assets (85 firms)	133.5		1,215.7	0.03	229.3
Total employment (81 firms)	2,496		23,279	11	4,828

Source: Form M data for 1999 from the Bureau of Transportation Statistics

Table 1b. Share of trucking in the U.S. economy ($ billion)

		1996		1992	
A.	**Gross domestic product (GDP)**	$ 7,825	*GDP share*	$ 6,260	*GDP share*
	For-hire motor freight & warehousing	$ 101	1.3%	$ 83	1.3%
	Own-account (in-house) trucking	$ 142	1.8%	$ 120	1.9%
	Contribution of trucking industry	*$ 243*	*3.1%*	*$ 204*	*3.3%*
	Other transportation (rail, pipe, air, water, transit)	$ 135	1.7%	$ 109	1.7%
	Total transporation	$ 378	4.8%	$ 313	5.0%
B	**Total intermediate inputs (all industries)**	$ 6,176	*Intermed. share*		
	For-hire motor freight & warehousing	$ 111	1.8%		
	Own-account (in-house) trucking	$ 58	0.9%		
	Contribution of trucking industry	*$ 169*	*2.7%*		
C	**Total industry output**	$14,001	*Output share*		
	For-hire motor freight & warehousing	$ 212	1.5%		
	Own-account (in-house) trucking	$ 200	1.4%		
	Contribution of trucking industry	*$ 412*	*2.9%*		
D	**Total commodity output**	$ 13,989	*Commod. share*		
	For-hire motor freight & warehousing	$ 200	1.4%		
	In-house trucking	$ 200	1.4%		
	Contribution of trucking industry	*$ 400*	*2.9%*		

Sources
A. U.S. Department of Transportation (July 2000) and Transtats (April 1998)
B-D. Survey of Current Business, May 2000, Table 2

Note: Across all industries, total commodity output equals GDP plus intermediate inputs

Table 2. The TSA Commodity-by-Industry Direct Requirements, 1996
(Direct requirements for commodity services per dollar of industry output, at producers' prices)

		Industry (Output sector)											
						Transportation							
Commodity (Service sector)		Agriculture, forestry and fisheries	Mining	Con-struction	Manu-facturing	*Railroad and passenger ground*	***Motor freight and ware-housing***	*Water*	*Air*	*Pipelines and freight forwarders*	*State and local passenger transit*	***Own-account transportation***	Communications and utilities
Agriculture, forestry and fisheries		0.237	0.000	0.005	0.040	0.000	***0.000***	0.000	0.000	0.000	0.000	***0.000***	0.000
Mining		0.001	0.175	0.007	0.032	0.000	***0.000***	0.000	0.000	0.004	0.000	***0.000***	0.091
Construction		0.011	0.020	0.001	0.007	0.048	***0.005***	0.001	0.002	0.014	0.277	***0.004***	0.053
Manufacturing		0.160	0.077	0.299	0.358	0.130	***0.072***	0.090	0.126	0.042	0.547	***0.098***	0.041
Railroad and passenger ground		0.006	0.006	0.002	0.005	0.043	***0.002***	0.000	0.001	0.001	0.021	***0.001***	0.009
Motor freight and warehousing		***0.014***	***0.007***	***0.015***	***0.016***	***0.007***	***0.185***	***0.003***	***0.002***	***0.006***	***0.011***	***0.006***	***0.002***
Water transportation		0.001	0.001	0.000	0.000	0.000	***0.005***	0.193	0.000	0.001	0.002	***0.001***	0.001
Air transportation		0.002	0.002	0.001	0.004	0.004	***0.009***	0.002	0.061	0.006	0.001	***0.000***	0.003
Pipelines and freight forwarders		0.000	0.000	0.000	0.001	0.008	***0.031***	0.047	0.085	0.023	0.004	***0.001***	0.002
Own-account transportation		***0.052***	***0.021***	***0.056***	***0.006***	***0.000***	***0.000***	***0.000***	***0.000***	***0.000***	***0.000***	***0.000***	***0.002***
Communications and utilities		0.015	0.056	0.006	0.020	0.011	***0.032***	0.007	0.014	0.042	0.078	***0.026***	0.118
Wholesale and retail trade		0.046	0.019	0.083	0.062	0.037	***0.034***	0.014	0.016	0.010	0.077	***0.038***	0.009
Finance, insurance and real estate		0.071	0.136	0.016	0.017	0.028	***0.040***	0.056	0.030	0.053	0.019	***0.010***	0.026
Services		0.025	0.030	0.091	0.059	0.073	***0.101***	0.166	0.085	0.229	0.029	***0.100***	0.108
Other		0.001	0.006	0.001	0.008	0.006	***0.007***	0.099	0.075	0.013	0.001	***0.003***	0.016
Total value added		0.357	0.443	0.416	0.365	0.605	***0.477***	0.322	0.501	0.557	-0.066	***0.711***	0.521
Total output (%)		1.000	1.000	1.000	1.000	1.000	***1.000***	1.000	1.000	1.000	1.000	***1.000***	1.000
Total industry output ($ billion)	13,989	290	173	868	3,666	69	*212*	35	118	42	7	*200*	661

Summaries

Truck share (motor freight & own-account)		6.6%	2.8%	7.1%	2.2%	0.7%		0.3%	0.2%	0.6%	1.1%		0.4%
Truck share x Total industry output ($ bln)	302.6	19.2	4.8	61.5	79.3	0.5		0.1	0.3	0.2	0.1		2.6
Weighted mean (omits intra-truck)	2.2%												

This table reports the contribution (direct requirement) of each commodity in producing $1 ouput from an industry.
For example, "Manufacturing" requires 1.6 cents of "Motor freight" and 0.6 cents "Own-account" transport in order to generate $1 output.
Source: Survey of Current Business (Table 1 and Table 3), May 2000

Table 3. The TSA Industry-by-Commodity Total Requirements, 1996

(Total direct and indirect requirements of services from industry, per dollar of commodity delivered to final demand, at producers' prices)

Industry (Service sector)	Commodity (Output sector)													
						Transportation								
		Agriculture, forestry and fisheries	Mining	Con-struction	Manu-facturing	*Railroad and passenger ground*	***Motor freight and ware-housing***	*Water*	*Air*	*Pipelines and freight forwarders*	***Own-account transport***	Communications and utilities	Wholesale and retail trade	Finance, insurance and real estate
Agriculture, forestry and fisheries		1.334	0.014	0.038	0.088	0.021	***0.013***	0.016	0.015	0.011	***0.012***	0.011	0.010	0.011
Mining		0.024	1.231	0.037	0.076	0.020	***0.016***	0.015	0.016	0.019	***0.013***	0.121	0.011	0.006
Construction		0.028	0.041	1.013	0.023	0.081	***0.018***	0.016	0.014	0.026	***0.012***	0.066	0.017	0.041
Manufacturing		0.401	0.212	0.550	1.649	0.360	***0.207***	0.248	0.262	0.157	***0.202***	0.161	0.129	0.067
Railroad and passenger ground		0.011	0.010	0.005	0.009	0.939	***0.006***	0.003	0.003	0.003	***0.003***	0.011	0.002	0.002
Motor freight and warehousing		***0.035***	***0.019***	***0.033***	***0.037***	***0.021***	***1.222***	***0.013***	***0.012***	***0.015***	***0.014***	***0.039***	***0.010***	***0.008***
Water transportation		0.003	0.001	0.001	0.001	0.001	***0.008***	1.158	0.001	0.002	***0.001***	0.002	0.000	0.000
Air transportation		0.007	0.006	0.006	0.009	0.007	***0.013***	0.006	1.013	0.009	***0.002***	0.006	0.006	0.003
Pipelines and freight forwarders		0.004	0.002	0.003	0.005	0.020	***0.052***	0.066	0.119	1.025	***0.002***	0.004	0.002	0.001
State and local passenger transit		0.001	0.001	0.001	0.001	0.096	***0.000***	0.000	0.000	0.000	***0.000***	0.001	0.000	0.000
Own-account transportation		***0.080***	***0.034***	***0.071***	***0.025***	***0.014***	***0.009***	***0.010***	***0.008***	***0.010***	***1.008***	***0.014***	***0.045***	***0.007***
Communications and utilities		0.044	0.085	0.036	0.052	0.038	***0.058***	0.034	0.037	0.063	***0.041***	1.027	0.047	0.027
Wholesale and retail trade		0.098	0.047	0.131	0.118	0.079	***0.064***	0.043	0.041	0.031	***0.058***	0.034	1.035	0.014
Finance, insurance and real estate		0.146	0.221	0.071	0.082	0.071	***0.095***	0.122	0.075	0.107	***0.041***	0.079	0.104	1.188
Services		0.111	0.101	0.179	0.151	0.141	***0.191***	0.270	0.163	0.296	***0.143***	0.162	0.169	0.111
Other		0.016	0.025	0.015	0.026	0.020	***0.024***	0.186	0.111	0.027	***0.013***	0.116	0.024	0.027
Total industry output multiplier		2.340	2.050	2.189	2.353	1.928	***1.996***	2.204	1.892	1.800	***1.563***	1.852	1.610	1.515
Total commodity output ($ billion)	13,988	288	162	868	3,593	75	*200*	37	124	36	*200*	691	1,457	2,115

Summaries

Truck share (motor freight & own-account)		11.4%	5.4%	10.4%	6.2%	3.5%		2.3%	2.0%	2.5%		5.3%	5.5%	1.5%
Truck share x Total commodity output	640	32.9	8.7	90.2	222.3	2.6		0.8	2.5	0.9		36.6	79.8	31.1
Weighted mean (omits intra-truck)	4.6%													

Source: Survey of Current Business (Table 1 and Table 4), May 2000

Table 3 shows how much demand for each industry's output will increase for an increase of $1 in the demand for each of the commodities.
For instance, $1 increase in demand for "Manufacturing" commodities would generate 3.7 cents new demand for "Motor freight and warehousing" services, plus 2.5 cents additional demand for "own-acount tran

Table 4. Value of U.S. Land Exports to and Imports from Canada and Mexico by Mode
($ millions)

Exports to Canada	1994		1997	
Truck	$ 89,151	71%	$ 102,743	74%
Rail	$ 13,594	11%	$ 15,679	11%
Other	$ 21,956	18%	$ 20,688	15%
Total	$ 124,701	100%	$ 139,110	100%
Exports to Mexico				
Truck	$ 39,066	84%	$ 44,092	85%
Rail	$ 4,192	9%	$ 5,119	10%
Other	$ 3,245	7%	$ 2,542	5%
Total	$ 46,503	100%	$ 51,753	100%
Imports from Canada				
Truck	$ 79,456	64%	$ 98,401	63%
Rail	$ 30,323	25%	$ 39,811	25%
Other	$ 13,726	11%	$ 17,995	12%
Total	$ 123,505	100%	$ 156,207	100%
Imports from Mexico				
Truck	$ 35,014	80%	$ 48,350	77%
Rail	$ 7,769	18%	$ 12,298	19%
Other	$ 833	2%	$ 2,665	4%
Total	$ 43,616	100%	$ 63,312	100%

Source: National Transportation Statistics, 1999, p. 71, table 1-45

Table 5. Firms using Internet for doing Business, 1999-2000

Segment	Total No. of Firms in segment	No. Firms using Internet	Percentage Firms using Internet
TL	19	15	79%
LTL	36	26	72%
Combined	69	52	75%
Private	53	40	75%
Total	177	133	75%

Source: Survey Of the Transportation Management Industry
Information Technology: Use, Resources, and Strategy
University of Michigan Trucking Industry Program, 2000

Table 6. ABF Freight System's Path to Internet Usage

Year	Internet application
1994-1995	Downloadable personal computer rating software Routing and zip code directories General marketing information
1996-1997	Rating guide Shipment tracing Online bill of lading Customer pick-up request Customer-specific on-line pricing quotations
1998	ABF Toolkit (web site navigation tool) Shipping document retrieval Loss and damage claims online review
1999	Transparent Direct Links for shippers (data integration)
2000	Shipment Planner (shipment report timeline) Dynamic Rerouting (re-route in-transit shipments)

Table 7. Internet-Based Load Matching Exchanges

Name of Firm	Transaction Cost
EFlatbed (specialty)	Carrier $ 24.95
Efr8 (TL)	Free trial period
Freightquote (LTL)	Commission
Getloaded (TL & LTL)	$ 35 / month
Internet Freight Terminal (TL)	$ 20 / month or $ 50 / qtr
Loaddock (TL)	$20
Massmotion (LTL)	$49
National Transportation Exchange (TL & LTL)	Margin between charge to shippers and payment to carriers
Nettrans (TL), Nettrans Lite (OO)	$ 15 / wk or $ 49 / mon or $ 429 / yr
Truckstop (TL & LTL)	$35
Tranzlink (TL)	$14.95
Transportal	Not active at time of writing

Source: Internet search by authors

Table 8. Internet applications available at U.S. trucking firms in 1999/2000
(130 survey respondents that report at least one internet application)

Internet Application	Firms with application (%)
1. Exploration	
Attracting new customers	72%
Service customization	27%
2. Exploitation of existing skills: Customer-related	
Marketing your company's services	75%
Online shipment orders from existing customers	37%
Online pricing and rating software	31%
Freight pick up request	29%
Dedicated customer service	26%
Cargo claims status	16%
Offering special discounts	10%
3. Exploitation of existing skills: Process-related	
Office communications	61%
Recruiting drivers	39%
Recruiting personnel other than drivers	37%
Real time shipment tracking	30%
Forms and permits	30%
Online bill of lading and proof of delivery	28%
Load viewing and availability	23%
Recruiting owner operators	18%
Online bill payment	17%
Real time routing	14%
Real time trailer tracking	12%
Posting real time driver schedules	10%

Source: UMTIP survey of U.S. trucking firms

Table 9. use of internet for business functions (130 cases)
Impact of internet on business functions 1=no effect, 5=significant effect (higher mean=more impact)

Business Activity	Mean Effect
1.- Exploration	
Variety of services increase	2.3
Customization of services	2.3
2. Exploitation of existing skills: Customer-related	
Company image enhancement	2.8
Exchange of information with shippers and consignees	2.7
Market share	2.0
3. Exploitation of existing skills: Process-related	
Process improvement	2.6
Exchange of information with third parties	2.5
Exchange of information with other trucking firms	2.1
Service quality improvement	2.1
Security of transactions	1.7

Source: UMTIP survey of U.S. trucking firms

Table 10. Role of internet in changes of business activity at the firms since 1996 (130 cases)
Cases where firm changed in which internet had role in change (higher % = more common internet role)

Area where changed occurred	% firms reporting at least some of the change was due to Internet
1.- Exploration	
Acquisition of new customers	72%
Addition of new services	51%
Acquisition of new markets	45%
2. Exploitation of existing skills: Customer-related	
Improved shipper relationships	67%
Improved consignee relationships	63%
Enabled quicker service	57%
Enabled customer analysis	51%
Improved dedicated services	50%
Increased dependability	48%
Improved on-time delivery	46%
3. Exploitation of existing skills: Process-related	
Provided quality improvements in internal processes.	72%
Improved third-party relationships	64%
Enhanced the management of change .	64%
Provided time improvements in internal processes.	59%

Source: UMTIP survey of U.S. trucking firms, 177 responses

Table 11. Correlation of No. of internet features in 1999/2000 & firm performance change since 1996 (177 cases)
Performance change: 3=increase, 2=same, 1=decrease (r > 0 = more Internet features <=> more of outcome)

Performance Measure	Correlation
Total assets increase	0.21
Profit increase	0.15
Market share increase	0.13
Revenue increase	0.12
Miles operated increase	0.12
Number of shipments increase	0.12
Tons of freight carried increase	0.10
Labor cost	0.04
Total costs including labor	0.02

Source: UMTIP survey of U.S. trucking firms, 177 responses

Table 12. Descriptive Statistics for Financial Indicators and Correlations with No. of Internet Features Used by Firms

	Correlation with No. of Internet Features			
Financial Indicator	*All features*	*Exploration*	*Customer-related*	*Process-related*
1. Operating revenue, 1999	0.59	0.51	0.30	0.59
2. Profitability: Return on operating revenue (Income / Revenue), 1999	0.27	0.31	0.18	0.22
3. Three-year growth, operating revenue, 1996-1999	0.10	0.11	0.07	0.07
4. Three-year growth, return on operating revenue, 1996-1999	0.02	0.03	-0.08	0.03

1999 figures: 113 firms (21 LTL, 80 TL, 12 combined)
1996-1999 growth figures: 97 firms (18 LTL, 70 TL, 9 combined)

Internet Features
1.- Exploration
Specialty Services Description
Special Service Charges Summary
2. Exploitation of existing skills: Customer-related
General Marketing Information
Shipping Information/Help, General
Pickup Request
Status Report
E-mail notification of Shipment Status / Delivery
Contact Information
Freight Bill Review w/ e-mail reply
3. Exploitation of existing skills: Process-related
Create Bill of Lading
Rating
Download Base Rates
Tracking
Document Retrieval (BOL, POD, Packing slip, wt.certificate)
Terminal (Service Center) Locator
Cargo Claims Status Check / Filing
Carrier Forms and Documents, View & Print

Sources
"Financial Indicators" from Form M reports for 1999 and 1996 from the Bureau of Transportation Statistics
"Internet Features" from Internet search by authors, August 2000

Table 13. Estimates of how internet usage by the trucking industry will affect the economy

A. GDP contribution of changes within the trucking industry *(estimates in italics)*

Scenario assumptions		**1. Optimistic**			**2. Modest**			**3. Pessimistic**		
Post-1999 GDP growth		*5%*			*3%*			*1%*		
Post-1999 trucking growth		*10%*			*5%*			*3%*		
(GDP and trucking figures: $ trillion)	Year	GDP	Truck	GDP %	GDP	Truck	GDP %	GDP	Trucking	GDP %
	1992	$6.3	$0.20	3.2%	$6.3	$0.20	3.2%	$6.3	$0.20	3.2%
	1996	$7.8	$0.24	3.1%	$7.8	$0.24	3.1%	$7.8	$0.24	3.1%
	1999	$9.3	*$0.30*	*3.2%*	$9.3	*$0.30*	*3.2%*	$9.3	*$0.30*	*3.2%*
	2000	*$9.8*	*$0.33*	*3.4%*	*$9.6*	*$0.31*	*3.3%*	*$9.4*	*$0.31*	*3.3%*
	2001	*$10.3*	*$0.36*	*3.5%*	*$9.9*	*$0.33*	*3.3%*	*$9.5*	*$0.32*	*3.3%*
	2002	*$10.8*	*$0.40*	*3.7%*	*$10.2*	*$0.34*	*3.4%*	*$9.6*	*$0.33*	*3.4%*
Impact on GDP: 2002 - 1999 GDP				*0.5%*			*0.2%*			*0.2%*
*GDP contribution, 2002 ($ bln) **				*$52*			*$19.3*			*$18.6*

* 2002 GDP x (2002 GDP share - 1999 GDP share)

B. Contributions from trucking-industry internet usage that affects the larger economy

		1. High growth baseline economy					***2. Modest growth baseline economy***				
		Effective internet use		**Baseline 1**	*Flawed internet use*		*Effective internet use*		**Baseline 2**	*Flawed internet use*	
		1a	**1b**	**1c**	**1d**	**1e**	**2a**	**2b**	**2c**	**2d**	**2e**
Post-1999 GDP growth assumptions		5.5%	5.25%	5%	4.75%	4.50%	3.5%	3.25%	3%	2.75%	2.50%
	Year	GDP	GDP	GDP	GDP	GDP	GDP	GDP	GDP	GDP	GDP
(GDP figures: $ trillion)	1999	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
	2000	9.8	9.8	9.8	9.7	9.7	9.6	9.6	9.6	9.6	9.5
	2001	10.4	10.3	10.3	10.2	10.2	10.0	9.9	9.9	9.8	9.8
	2002	10.92	10.84	10.77	10.69	10.61	10.31	10.24	10.16	10.09	10.02
*GDP contribution, 2002 ($ bln) ***		*$155*	*$77*		*-$77*	*-$153*	*$149*	*$74*		*-$74*	*-$147*
Impact on 2002 GDP (Contribution/GDP)		*1.4%*	*0.7%*		*-0.7%*	*-1.4%*	*1.4%*	*0.7%*		*-0.7%*	*-1.5%*

** Difference between baseline GDP and GDP estimate in 2002