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THE USE OF INTERMODAL INFORMATION TECHNOLOGIES BY INTERMODAL PORTS AND TERMINALS SERVING AGRICULTURE IN MISSISSIPPI

FINAL REPORT

Disclaimer

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National Center for Intermodal Transportation, Mississippi State University

Submitted by

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Table of Contents

List of Tables

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Introduction

Intermodal information technologies can be defined as those technologies involved in acquiring, storing, processing, and distributing data and information by electronic means (including radio, television, telephone, and computers) between two or more different modes of transportation in such a way that all parts of the freight-transportation process are efficiently connected, seamless, coordinated, and continuous. This definition is a modification of the two definitions found in Collin 1997 and Muller1999.

Results from this study should help firms and ports improve their operational efficiencies, reduce information delays and errors, speed up cargo transfers, improve customer service, and improve overall productivity for the firm and port. Using intermodal information technologies also should help intermodal ports and terminals in maintaining or attracting additional traffic, since the competition for business is as fierce among ports and terminals as it is among carriers and agribusiness enterprises.

Objectives

This study=s general objective is to assess the use, adoption, benefits, and impacts of intermodal information technologies on intermodal ports and terminals serving agribusiness firms in Mississippi. The specific objectives are to (1) identify Mississippi=s intermodal ports

and terminals that handle agricultural and food products at their facilities; (2) identify the various types of information technologies systems available for use and adoption by intermodal ports and terminals in Mississippi; (3) determine the reasons intermodal ports and terminals implement do or do not implement information technologies at their facilities; and (4) examine how well intermodal port and terminal operators feel that information technologies are helping them to better manage their facilities.

Procedures, Data, and Methods

To accomplish the objectives of this study, data and information were gathered from literature, secondary sources, and surveys that were developed and sent to port and terminal operators in the state. This research is concentrated on those intermodal ports and terminals that primarily serve agricultural and food product firms.

To accomplish objective one of the study, data and information were gathered from port officials, terminal operations, and the publication AComprehensive Assessment of the Ports of Mississippi@ (Parsons et al., 2000). Sources were reviewed and contacted to determine the extent of the handling of agricultural and food products at the terminals and ports in Mississippi.

Objective two was accomplished by using the publication AChallenges and Opportunities for an ITS Intermodal Freight Program@ (Cambridge Systematics, Inc, in association with VZM/TranSystems (1999).

This report was prepared for the U.S. Department of Transportation, Office of the Secretary-Office of Intermodalism Federal Highway Administration-ITS Joint Program Office. This report describes how a national Intelligent Transportation Systems (ITS) program for intermodal freight

can promote the application of ITS technology to intermodal freight transportation. The intermodal information systems identified in this study were obtained from this publication.

Existing intermodal ports and terminal information technologies systems were characterized and compared in terms of quality and efficiency of service. Major emphasis was placed on the technical and functional potential of recent intermodal information technologies to help transform the handling and shipping phase of the intermodal ports and terminal system in Mississippi into a more seamless and integrated system in its linkage to the agribusiness sector. The Internet also was used to identify manufacturers of intermodal information technology systems for intermodal ports and terminals. Many manufacturers had used the World Wide Web to post literature describing their technologies and products. One of the Web sites the authors used was Cargo Systems (http://www.containershippend.com), which provided information on some of the most recent developments in information technologies for intermodal ports and terminals on a worldwide basis.

In objectives three and four, information on the reasons intermodal ports and terminals implement do or do not implement advanced information technologies at their facilities and how well intermodal port and terminal operators feel advanced intermodal information technologies at their facilities have impacted them and their customers were obtained through surveys. This information will provide valuable feedback to manufacturers, distributors, users, and potential users of the various types of systems. The questionnaires and letters to various port and terminal officials are found in the appendix.

As previously mentioned, a survey instrument was used to provide information to accomplish objectives three and four of this study. The questionnaire was developed following a comprehensive review of information technology literature, which included similar surveys used in other information technology studies (Berry et al., undated and Bigras and Roy, 2000). The target population for the study was made up of ports and terminals serving agriculture in Mississippi. A list of all firms with offices physically located at port facilities was obtained from port officials in Mississippi. It should be noted that while a number of companies ship cargo through the ports and a number of transportation companies call at ports, not all of them maintain physical offices at the port sites; therefore, this study was limited to the firms that had physical facilities at port sites in Mississippi.

A list of 84 firms was obtained from the port respondents. Of that total, 21 firms could be identified as agribusiness firms. Because there were 84 firms identified by port respondents, a decision was made to send these firms the questionnaire. Also, all port respondents with physical facilities of firms located at their sites were sent questionnaires; this group totaled 11. In the first request for facilities physically located at their port sites, 14 ports (about 88 percent of the ports in the state) responded to the request.

Eight ports (about 73 percent of those who had responded earlier to the request for firms physically located at port sites) filled out the questionnaire. Seven agribusiness firms, or 33 percent, and eight non-agribusiness firms responded to the questionnaire. Overall, the response rate to the questionnaire was 27 percent. In addition, there were 10 nondeliverables that were

included in the non-agribusiness sector. Results from the surveys are reported as mean values of the respondents.

The survey consisted of eight sections, with the first section designed to obtain general information about the profile of the port firm. The second section contained 21 types of intermodal information technology. Respondents were asked to indicate their familiarity with various types of intermodal information technologies by placing the letter of one of the nine AChoice Types@ in each of the blank spaces on the questionnaire. The third section contained 10 selected sources of intermodal information technologies. Respondents were asked where they learned about current or new intermodal information technologies; responses were marked by putting the letter of one of the five AChoice Types@ in each of the blank spaces found on the survey.

The fourth section of the survey contained 16 selected reasons for implementing or continuing to use intermodal information technologies. Respondents were asked to indicate their opinions on the importance they placed on each of 16 selected reasons for which they might have implemented or continue to use intermodal information technologies. The fifth section contained information port/firm activities that were being affected by the respondents. Respondents were asked to indicate which activities were mostly affected by the use of intermodal information technologies by selecting one of the five AChoice Types@ on the survey.

Section six was designed to obtain from the respondents information on how well they were satisfied with the use of intermodal information technologies. The seventh section of the survey was designed to detect the obstacles or factors that were preventing or retarding the

implementation of intermodal information technologies. The eighth section was designed to determine how familiar the respondents were with the seven selected categories of intermodal information technologies systems.

Results

This section of the study is designed to provide information obtained from the respondents. This section of the report is divided into seven sections.

Familiarity Level of Intermodal Information Technologies

To access agribusiness, nonagribusiness, and ports= familiarity with certain types of intermodal information technologies, a nine-point scale was used (Table 1). Berry, D=Onofrio, Hall, and Jones (undated) used a similar scaling procedure to provide an assessment of multinational management perceptions of information technology.

Results reveal that agribusiness, nonagribusiness, and ports used several types of information technologies on a daily basis (indicated by an average response of nine). Respondents were most familiar with PCs, Windows, and fax machines. Also, respondents were very familiar with electronic mail, the Internet, and cellular phones. The respondents were least familiar with satellite positioning, personal communication systems, and automatic equipment identification tags.

Sources of Intermodal Information Technologies Knowledge

Using a five-point Likert scaling ranging from Astrongly agree@ to Astrongly disagree,@ respondents were asked to indicate where they heard about new intermodal information technologies (Table 2). As shown in Table 2, respondents received their information about new

Table 1. Intermodal Information Technologies (IIT) Familiarity

	Types of IIT	Type of Respondents: Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Ports	Grand Means
1.	PC	9.00	9.00	9.00	9.00
2.	Windows	9.00	9.00	9.00	9.00
3.	Fax Machines	9.00	9.00	9.00	9.00
4.	Electronic Mail	9.00	8.50	9.00	8.83
5.	Internet	9.00	9.00	8.67	8.92
6.	Electronic Data Interchange	6.00	7.75	6.00	6.58
7.	Satellite Positioning	4.33	4.30	2.00	3.56
8.	Bar Coding	5.75	4.30	4.00	4.80
9.	Electronic Imaging	5.00	4.30	2.67	4.10
10.	Pagers	6.60	5.75	7.00	6.42
11.	Voice Mail	7.80	7.25	6.00	7.17
12.	Cellular Telephones	9.00	8.50	6.67	8.25

Continued

Table 1. Intermodal Information Technologies (IIT) Familiarity (Continued)

	Types of IIT	Type of Respondents: Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Ports	Grand Means
13.	Spreadsheets	8.20	7.75	6.67	7.67
14.	Search Engines	7.80	8.00	7.33	7.75
15.	Databases	8.60	7.75	6.33	7.75
16.	Word Processors	7.50	8.50	6.67	7.64
17.	Local Area Networks	7.80	9.00	5.33	7.45
18.	Electronic Funds Transfer	7.00	6.50	6.00	6.58
19.	Automatic Equipment Identification Tags	1.67	4.30	2.00	2.67
20.	Personal Communication Systems	4.00	4.30	2.00	3.44
21.	Onboard Computers	3.75	6.67	2.00	4.10

Choice Types

1 = I have never head of
2 = I have heard of, but have not used
3 = I have used a little
4 = I use a few times a year
5 = I use about 2 or 3 times a month
6 = I use about once a month
7 = I use about 2 or 3 times a week
8 = I use once a week
9 = I use daily

Table 2. Sources of Intermodal Information Technologies (IIT) Knowledge

	Sources	Type of Respondents: Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Ports	Grand Means
1.	Newspapers	3.00	3.00	2.33	2.77
2.	Magazines	2.50	1.30	2.00	2.00
3.	Work	2.00	1.67	1.67	1.80
4.	News on T.V.	3.00	2.33	1.33	2.30
5.	Friends	2.50	3.00	2.00	2.50
6.	Colleagues	1.25	2.00	3.00	2.00
7.	Textbooks	2.75	3.50	2.33	2.78
8.	Classes	2.75	3.00	3.67	3.11
9.	TV shows/movies	3.75	3.00	3.37	3.50
10.	Internet	2.00	1.30	2.67	2.00

Choice Types

1 = Strongly Agree
2 = Agree
3 = Undecided
4 = Disagree
5 = Strongly Disagree

intermodal information technologies most often from work, magazines, colleagues, and the Internet. These results should not be that surprising considering the large number of people at work who are familiar with computers, telephones, the Internet and magazines. The two items that were reported as sources of knowledge with the highest mean scores were classes and t.v. shows/movies.

Reasons for Implementing or Continuing to Use IIT

The most common reason given by respondents for implementing or continuing to use intermodal information technologies was to reduce paperwork (Table 3) This allows the respondents to reduce the space required for storage and to reduce errors because they are using less personnel to manage their facilities. The second most common reason for implementing intermodal information technologies is to improve operations planning. The respondents were equally concerned with maintaining competitive advantages and increasing office/clerical efficiency.

The least common reasons for implementing or continuing to use intermodal information technologies were examining the sequence of intermodal operations at companies, improving security, and planning the routing of intermodal equipment and cargoes. These results reveal that the respondents were not overly concerned about improving safety, examining the sequence of the operations at their companies and the routing of equipment and cargoes for the implementation, or the continual use of intermodal information technologies.

Table 3. Reasons for implementing or continuing to use intermodal information technologies (IIT)

	Reasons	Type of Respondents: Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Ports	Grand Means
1.	Customer service enhancement	1.40	1.50	1.67	1.50
2.	Improve operations planning	1.20	1.25	1.33	1.25
3.	Improve communications with customers	1.60	1.50	1.67	1.58
4.	Maintain a competitive advantage	1.40	1.25	1.67	1.42
5.	Meet customer requirements	1.60	1.50	1.67	1.58
6.	Reduce costs	1.60	1.00	2.33	1.58
7.	Improve profits	2.00	1.00	3.00	1.92
8.	Reduce paperwork	1.40	1.00	1.00	1.17
9.	Increase office/clerical efficiency	1.60	1.00	1.67	1.42
10.	Improve security	2.80	1.50	3.33	2.50
11.	Improve monitoring of company equipment and drivers	2.20	1.50	--	1.88

Continued

Table 3. Reasons for implementing or continuing to use intermodal information technologies (IIT) (Continued)

	Reasons	Type of Respondents: Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Ports	Grand Means
12.	Manage documentation better	1.80	1.00	2.33	1.67
13.	Improve integration of information	1.70	1.00	2.33	1.67
14.	Measure the performance of carriers and facilitators	2.40	1.75	2.67	2.25
15.	Improve communication with company drivers	2.80	1.50	B	2.22
16.	Identify the best rates and levels of service available from carriers and facilitators	2.60	1.25	300	2.25
17.	Book, issue, account for, and generate reports of freight shipments	1.80	1.25	1.67	1.58
18.	Plan the routing of intermodal equipment and cargoes	2.80	2.00	B	2.44
19.	Examine the sequence of intermodal operations at my company	3.00	2.00	B	2.55
20.	Respond quickly to emergencies or change of operational orders	1.60	1.75	2.00	1.75

Choice Types
1 = Strongly Agree
2 = Agree
3 = Undecided
4 = Disagree
5 = Strongly Disagree

Types of Company/Port Activities Affected by IIT

The respondents were asked to reveal the types of activities being impacted at their facilities. Results reveal that the most common activities affected were gate activity (port only), costing, and billing (Table 4). These results suggest the respondents were using intermodal information technologies to bill clients and to improve the costing activity to reduce errors in expenses so clients could be billed much more efficiently and timely than without the use of intermodal information technologies. The activities least affected by intermodal information activities were dispatching, cargo delivery, freight manifest, vehicle routing, vehicle tracing, and load preparation.

Satisfaction with IIT

Ports were mostly satisfied with the use of intermodal information technologies because of top management, employees, and benefits in general (Table 5). Results also reveal that agribusiness firms were mostly satisfied because their customers were being satisfied, and the agribusiness respondents have benefited from the use of intermodal information technologies. In the non-agribusiness-respondent sector, the firms felt that the overall firm benefited from the use of intermodal information technologies.

Obstacles Preventing or Retarding the Implementation of IIT

Under the category Obstacles Preventing or Retarding the Implementation of IIT, the greatest concerns of users of intermodal information technologies were difficulty in obtaining technical assistance, rapid evolution of technology, and the lack of awareness of the benefits of IIT (Table 6). These results suggest that manufacturers/distributors need to provide the technical

Table 4. Company/port activities being affected by intermodal information technologies

		Type of Respondents			
	Types of Activities	Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Ports	Grand Means
1.	Billing	1.80	1.50	1.33	1.58
2.	Costing	2.00	1.75	2.00	1.42
3.	Dispatching	2.60	2.00	--	2.33
4.	Gate Activity	--	--	1.33	1.33
5.	Shipment Tracing	2.40	1.75	--	2.11
6.	Cargo Delivery	--	--	2.67	2.67
7.	Vehicle Tracing	3.00	1.75	--	2.44
8.	Freight Manifest	--	--	2.67	2.67
9.	Loading/Unloading	2.20	2.00	2.33	2.17
10.	Vehicle Routing	2.60	2.00	--	2.33
11.	Demurrage Notification	--	--	2.00	2.00

Continued

Table 4. Company/Port activities being affected by intermodal information technologies (Continued)

	Types of Activities	Type of Respondents: Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Ports	Grand Means
12.	Load Preparation	2.40	1.75	2.67	2.25
13.	Answering Customer Calls	2.20	1.75	2.00	2.00

Choice Types

1 = Strongly Agree
2 = Agree
3 = Undecided
4 = Disagree
5 = Strongly Disagree

Table 5. Satisfaction with intermodal information technologies

		Types of Respondents					
	Statements	Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Port	Grand Means[1]	Grand Means[2]	Grand Means[3]
1.	Top management at my firm is satisfied with our use of intermodal information technologies	2.60	1.75	--	2.22	--	--
2.	Top management at my port is satisfied with our use of intermodal information technologies	--	--	1.67	--	1.67	--
3.	Our employees are satisfied with our use of intermodal information technologies	2.60	1.75	1.67	2.22	1.67	2.08
4.	Our customers are satisfied with our use of intermodal information technologies	2.40	1.75	2.00	2.11	2.00	2.08
5.	My firm has benefited greatly from the use of intermodal information technologies	2.40	1.50	--	2.00	--	--

[1]Includes agribusiness and non-agribusiness means
[2]Includes means of ports only
[3]Includes means of all respondents

Continued

Table 5. Satisfaction with intermodal information technologies (Continued)

		Type of Respondents					
	Statements	Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Port	Grand Means[1]	Grand Means[2]	Grand Means[3]
6.	My port has benefited greatly from the use of intermodal information technologies	--	--	1.67	--	1.67	--
7.	My firm sales volume increased after the implementation of intermodal information technologies	3.40	2.50	--	3.00	--	--
8.	My port sales volume increased after the implementation of intermodal information technologies	--	--	3.33	--	3.33	--

[1]Includes agribusiness and non-agribusiness means
[2]Includes means of ports only
[3]Includes means of all respondents

Continued

Table 5. Satisfaction with intermodal information technologies (Continued)

		Type of Respondents					
	Statements	Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Port	Grand Means[1]	Grand Means[2]	Grand Means[3]
9.	Implementation of intermodal information technologies has allowed my company to handle increased business more efficiently	2.66	1.50	--	2.11	--	--
10.	Implementation of intermodal information technologies has allowed my port to handle increased business more efficiently	--	--	2.00	--	2.00	--

[1]Includes agribusiness and non-agribusiness means
[2]Includes means of ports only
[3]Includes means of all respondents

Choice Types
1 = Strongly Agree
2 = Agree
3 = Undecided
4 = Disagree
5 = Strongly Disagree

Table 6. Users: Obstacles preventing or retarding the implementation of intermodal information technologies at my firm/port.

		Types of Respondents			
	Obstacles	Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Ports	Grand Means
1.	High investment cost	2.50	3.67	2.00	2.77
2.	Lack of financial resources	2.50	3.67	4.50	3.33
3.	Rapid evolution of technology	2.75	2.33	1.50	2.33
4.	Lack of awareness of the benefits of intermodal information technologies	3.00	2.67	1.50	2.56
5.	Difficulty in obtaining technical assistance	2.33	2.33	2.00	2.25
6.	Lack of compatibility with technology in use	2.67	2.67	3.50	2.88
7.	Lack of firm personnel training/education	3.33	2.67	--	3.00
8.	Lack of port personnel training/education	--	--	3.50	3.50

Continued

Table 6. Users: Obstacles preventing or retarding the implementation of intermodal information technologies at my firm/port (Continued)

	Obstacles	Type of Respondents: Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Ports	Grand Means
9.	Lack of information on intermodal information technologies	2.67	3.67	2.00	2.88
10.	High operating cost	2.33	3.33	3.50	3.00
11.	Users= resistance	2.00	3.33	3.00	2.75
12.	Lack of product features offered by single manufacturer/vendor	3.00	2.67	3.50	3.00
13.	Lack of cooperation on the part of customers or partners	2.67	3.33	3.50	3.13
14.	High installation cost	2.67	3.67	3.50	3.25

Choice Types

1 = Strongly Agree
2 = Agree
3 = Undecided
4 = Disagree
5 = Strongly Disagree

assistance necessary for firms using IIT. Also, the manufacturers/distributors need to continue to educate their clients about the benefits if IIT, relative to the cost of implementing IIT at firms.

Firms that do not use intermodal information technologies in their operation reveal that information on intermodal information technologies, lack of financial resources, and lack of personnel training/education were the most common obstacles preventing their using IIT (Table 7). These results suggests that marketers need to train/educate management and employees so they can become familiar with the operations of intermodal information technologies. Also, the sellers will be provided with potential users with information on the different funding sources available for those who want to implement intermodal information technologies.

Familiarity Level of IIT Systems

The purpose of this section is to provide information on the familiarity level of different types of IIT systems by users and nonusers of IIT systems. The functions, purposes, technologies and examples of the IIT systems used for this analysis are found in Table 8. Results reveal that respondents were mostly familiar with UPS On-Line Tracking System (Table 9). Results also reveal that respondents were equally most familiar with Federal Express interNetship and Global Positioning Systems (GPS). These systems ranked second to the UPS system. The systems the respondents were least familiar with were OASIS and the Soni Wide TRAKJ. These systems belong to the terminal inventory-management systems and asset location and management systems, respectively.

Table 7. Non-Users: Obstacles preventing or retarding the implementation of intermodal information technologies at firm/port

	Obstacles	Type of Respondents: Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Ports	Grand Means
1.	High investment cost	3.50	3.33	1.75	2.67
2.	Lack of financial resources	2.50	3.33	1.75	2.44
3.	Rapid evolution of technology	3.50	2.67	2.50	2.77
4.	Lack of awareness of the benefits of intermodal information technologies	2.50	2.33	3.00	2.67
5.	Difficulty in obtaining technical assistance	4.50	3.00	3.25	3.44
6.	Lack of compatibility with technology in use	3.50	3.67	2.67	3.22
7.	Lack of firm personnel training/education	3.00	2.33	--	2.60
8.	Lack of port personnel training/education	--	--	3.00	3.00

Continued

Table 7. Non-Users: Obstacles preventing or retarding the implementation of intermodal information technologies at firm/port (Continued)

		Type of Respondents			
	Obstacles	Means of Agribusiness Firms	Means of Non-Agribusiness Firms	Means of Ports	Grand Means
9.	Lack of information on intermodal information technologies	2.50	2.00	2.00	2.11
10.	High operating cost	3.50	3.33	2.50	3.00
11.	Users= resistance	3.50	3.00	2.75	3.00
12.	Lack of product features offered by single manufacturer/vendor	3.50	3.33	2.50	3.00
13.	Lack of cooperation on the part of customers or partners	3.50	3.33	2.50	3.00
14.	High installation cost	3.50	2.67	2.50	2.77

Choice Types

1 = Strongly Agree
2 = Agree
3 = Undecided
4 = Disagree
5 = Strongly Disagree

Table 8. Intermodal information technologies systems used for the study.

1. Shipment Information Systems

Function:	Manage the flow of materials and products from source to user.
Purpose:	The systems are used to optimize the visibility and control of goods (and their conveyances - containers, trucks, ships, etc.) Through a logistics system. Integrated or extended supply chain systems may link suppliers, manufacturers, carriers, distributors, retailers/customers, and consumers/end users.
Technology:	The systems use information management and communications technologies.
Examples:	Ryder Integrated/Logistics i2 Technologies; Federal Express interNetShip; UPS on-line tracking system; Tie Logistics COMAND7; ALK Associates E-trackerJ; DHL Worldwide Package Tracking; Manna Freight=s Freight Tracker.

2. Security Systems

Function:	Monitor the condition of vehicles, containers, and goods during shipment or in storage at terminals.
Purpose:	The systems are used to prevent theft and vandalism of trucks, chassis, containers, and freight.
Technology:	Most systems use sensors coupled to radio frequency transponders, onboard vehicle communication systems, or video surveillance systems. Systems typically are linked to vehicle location and management systems or terminal inventory management systems.
Examples:	Qualcomm TrailerTRACS7; Savi Inside TRAKJ; Maher Terminals Logistics System, Inc. (MTLS) Electronic Security Processing System.

3. Customs Clearance Systems

Function:	Automate the filing, processing, review, and issuance of documents for import and export of goods.
Purpose:	The systems are used to automate transactions, improve customs control, and minimize delays for shippers and receivers.
Technology:	The systems use transaction processing software and communications technology.
Examples:	U.S. Customs Automated Commercial System, Automated Manifest System, Automated Export Reporting System, Automated Export System, and International Trade Data System; Syntra Global Logistics System.

Continued

Table 8. Intermodal information technologies systems used for the study (Continued)

4. Ship Stowage Management Systems
   - Function: Plan and track the location of containers abroad ships.
   - Purpose: The systems are used to maximize stability, minimize handling during loading and off-loading, position refrigerated containers, and isolate hazardous cargo.
   - Technology: The systems use computer models and optimization or expert systems software. Systems typically are linked to booking and terminal inventory management systems.
   - Examples: NAVIS; MTLS Vessel Planning System; Realtime Business Solutions TopX (Terminal Operation Package - Xwindow); August Design GRAIL robotic container-handling facility for Sea-Land Service, Inc.

5. Terminal Inventory Management Systems
   - Function: Track and manage the movement of containers and trailers within port, rail, and truck terminals.
   - Purpose: The systems are used to optimize the use of space in terminals, manage the stacking of containers of different lengths, make efficient use of labor and equipment, and schedule equipment repair and maintenance.
   - Technology: The systems use computer models and optimization or export systems software, RFID devices, GPS receivers for position identification, and mobile inventory vehicles for integrated inventory and equipment location identification. Systems typically are linked to booking and gate clearance systems.
   - Examples: NAVIS; OASIS; APL Seattle Terminal System; Matson Hawaii Terminal System; August Design GRAIL robotic container-handling facility for Sea-Land Service, Inc.; MTLS Container Terminal Management System; Maher Terminals Marine Terminal Automated Management System; APL integrated Port Management and Vessel Planning System at the Port of Los Angeles.

6. Gate Clearance Systems
   - Function: Automate the verification and inspection of drivers, truck tractors, trailers, containers, and chassis moving into and out of marine, rail, air, and truck terminals.
   - Purpose: The systems are used to verify bookings, maintain security, and establish liability for damage.
   - Technology: The systems use automatic vehicle identification (AVI) technology, e.g., GPS, RFID transponders, optical character recognition (OCR) linked to

Table 8. Intermodal information technologies systems used for the study (Continued)

	computerized databases. Systems typically are linked to booking and terminal management systems.
Examples:	Maher Terminals OCR Gate System; Southern Pacific/Santa Fe Los Angeles Terminal OCR System; Port Authority of New York and New Jersey (PANYNJ) Sea-Link card system; APL automated gate clearance system in Los Angeles; Port of Portland electronic shipyard planning system; LA King gate systems.

7. Asset Location and Management Systems (LMS)

Function:	Locate and track a vehicle or container.
Purpose:	The systems are used to estimate time of arrival, minimize out-of-route travel, optimize equipment use, and improve safety and security.
Technology:	Satellite LMS utilize the GPS, geostationary satellites, or low earth orbit (LEO) satellites. Ground-based LMS utilize loran and wireless radio transmitters, dead-reckoning/map-matching computers, or automated equipment identification (AEI) transponders. Some systems are coupled with onboard computers and sensors that monitor vehicle or cargo condition.
Examples:	Ship LMS: GPS; U.S. Coast Guard Vessel Traffic System (VTS); Electronic Chart Display and Information System (ECDIS); Portable Communication, Navigation, and Surveillance System (PCNS) Railcar LMS: Locomotive Automatic Train Control System (ATCS), Amtech railcar AEI tags Truck LMS: Qualcomm OmniTracs, Highway Master Container/Trailer LMS: Orbcomm (untethered trailer system), Qualcomm Trailer TRANS7, Savi WideTRAKJ Chassis LMS: Amtech, Hughes, Mark IV, etc., AEI tags

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Sources: Cambridge Systematics Inc., Challenges and Opportunities for an ITS/Intermodal Freight Program, Final Report, in association with VZM/TranSystems, February 1999.

Table 9. Familiarity of intermodal information technologies systems

Types of Systems	Means of IIT Agribusiness Firms	Means of IIT Ports	Means of Non IIT Ports	Means of IIT Non-Agri Business Firms	Means of Non IIT Non Agribusiness Firms	Grand Means
A. Shipment Information Systems						
1. Ryder Integrated/Logistics Technologies	3.25	2.50	2.50	3.00	4.00	3.08
2. Federal Express interNetShip	2.20	3.00	2.50	1.50	2.00	2.13
3. UPS on-line tacking system	1.60	2.00	2.50	1.75	1.50	1.80
4. Tie Logistics Command7	3.40	3.50	2.50	3.25	4.00	3.33
5. ALK Associates E-tackerJ	4.00	3.50	2.50	3.50	4.00	3.57
6. DHL Worldwide Package Tracking	3.00	2.50	2.50	2.75	2.00	2.47
7. Manna Freight=s Freight Tracker	4.00	2.50	2.50	3.50	4.00	3.43
8. Other	--	--	--	3.00	--	3.00
B. Security Systems						
1. Qualcomm Trailer TRACS7	3.00	3.50	2.50	2.25	4.50	2.80

Continued

Table 9. Familiarity of intermodal information technologies systems (Continued)

Types of Systems	Means of IIT Agribusiness Firms	Means of IIT Ports	Means of Non IIT Ports	Means of IIT Non-Agri Business Firms	Means of Non IIT Non Agribusiness Firms	Grand Means
	Types of Respondents					
2. Savi Inside TRAKJ	4.00	3.50	2.50	3.69	4.50	3.69
3. Maher Terminals Logistics Systems, Inc. (MTLS) Electronic Security Processing System	3.50	2.00	2.50	3.67	4.50	3.31
C. Customs Clearance Systems						
1. U.S. Customs Automated Commercial System	3.50	2.00	2.50	3.25	4.50	3.21
2. U.S. Customs Manifest System	3.50	2.00	2.50	2.75	4.50	3.07
3. U.S. Customs Automated Export Reporting System	3.50	2.00	2.50	3.25	4.50	3.21
4. U.S. Customs Automated Export System	3.50	2.00	.50	3.67	4.50	3.31
5. U.S. Customs International Trade Data System	3.50	2.00	2.50	3.67	4.50	3.31
6. Syntra Global Logistics System	3.50	2.50	2.50	4.00	4.50	3.46
D. Ship Storage Management Systems						
1. NAVIS	2.275	2.50	2.50	4.50	3.00	3.00
2. MTLS Vessel Planning System	2.50	3.50	2.50	4.50	4.50	3.33
3. Realtime Business Solutions Top X (Terminal Operation Package - X Window)	2.50	3.50	2.50	4.50	4.50	3.33

Continued

Table 9. Familiarity of intermodal information technologies systems (Continued)

Types of Systems	Means of IIT Agribusiness Firms	Means of IIT Ports	Means of Non IIT Ports	Means of IIT Non-Agri Business Firms	Means of Non IIT Non Agribusiness Firms	Grand Means
	Types of Respondents					
4. Other	1.00	--	--	--	--	1.00
1. NAVIS	2.40	2.50	2.50	4.50	3.00	2.85
2. OASIS	4.00	3.50	2.50	4.50	4.50	3.85
3. Container Terminal Management System Advanced Management	3.25	2.50	2.50	4.50	4.50	2.42
4. Maher Terminals Marina Terminal Automated Management System	2.80	2.00	2.50	4.50	4.50	3.15
5. Other	1.00	--	--	--	--	1.00
F. Gate Clearance Systems						
1. Maher Terminals OCR Gate System	3.25	2.00	2.50	4.50	4.50	3.33
2. Cosmos General Cargo System	3.25	3.50	2.50	4.50	4.50	3.58
3. Mainsail Management SystemJ	4.00	3.50	2.50	4.50	4.50	3.67
G. Asset Location and Management Systems (LMS)						
a. Ship LMS						
1. GPS	1.20	1.50	4.00	1.50	4.50	2.13

Continued

Table 9. Familiarity of intermodal information technologies systems (Continued)

Types of Systems	Means of IIT Agribusiness Firms	Means of IIT Ports	Means of Non IIT Ports	Means of IIT Non-Agri Business Firms	Means of Non IIT Non Agribusiness Firms	Grand Means
2. U.S. Coast Guard Vessel Traffic System (VTS)	3.20	1.50	2.50	2.33	4.50	2.86
3. Electronic Chart Display and Information Systems (ECDIS)	4.00	3.00	2.50	2.33	4.50	3.31
4. Portable Communication, Navigation and Surveillance Systems (PCNS)	4.00	3.50	2.50	2.67	4.50	3.46
b. Railcar LMS						
1. Locomotive Automatic Train Control Systems (CATCS)	3.40	3.00	2.50	3.67	4.50	3.69
2. Amtech Railcar AEI tags	3.25	3.50	2.50	3.00	4.50	3.58
3. Other	4.00	--	--	--	--	4.00
c. Truck LMS						
1. Qualcomm OmniTracs	3.40	2.50	2.50	2.50	4.50	3.54
2. Highway Master	4.00	2.50	2.50	3.00	4.50	3.67
3. Other	--	3.00	--	--	--	3.00
d. Container/Trailer LMS						
1. Orbcomm Trailer System	3.50	3.50	2.50	3.50	4.50	3.50

Continued

Table 9. Familiarity of intermodal information technologies systems (Continued)

Types of Systems	Means of IIT Agribusiness Firms	Means of IIT Ports	Means of Non IIT Ports	Means of IIT Non-Agri Business Firms	Means of Non IIT Non Agribusiness Firms	Grand Means
			Type of Respondents			
2. Qualcomm Trailer TRANS7	3.50	3.50	2.50	2.50	4.50	3.07
3. Sarri Wide TRAKJ	4.00	3.50	2.50	4.50	4.50	3.83
e. Chassis LMS						
1. Amtech Chassis AEI tags	3.50	2.50	2.50	3.33	4.50	3.31
2. Hughes Chassis AEI tags	3.50	3.50	2.50	3.33	4.50	3.46
3. Mark IV Chassis AEI tags	3.50	3.50	2.50	3.33	4.50	3.46
4. Other	--	3.00	--	--	--	3.00

Choice Types

1 = Strongly Agree
2 = Agree
3 = Undecided
4 = Disagree
5 = Strongly Disagree

Summary and Conclusions

The general objective of this study was to assess the use, adoption, benefits, and impact of intermodal information technologies on intermodal ports and terminals serving agribusiness firms physically located at port sites in Mississippi. To accomplish the objective, secondary and primary data and information were used. Although this study has a small sample size, its results do provide insight into the use, satisfaction, and obstacles preventing the increased use of intermodal information technologies. Also, findings from this analysis can prove useful in continued analyses of these data and in the development of future research projects.

Results from this study reveal that agribusiness firms and ports are most familiar with PCs, Windows applications, and fax machines. Information on new information technologies was obtained from work, colleagues, and magazine articles. These finds suggest that the work place, colleagues at work, and magazines with data and information on intermodal information technologies are the key sources of knowledge about technologies.

The most common activities affected by ports and firms responding to the survey reveal are gate activity (port only) and costing and billing. These results may suggest that firms use intermodal information technologies to improve the billing and costing activities of their facilities.

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Appendix

date

Dear :

I am working on a project titled AThe Use of Intermodal Information Technologies by Intermodal Ports and Terminals Serving Agriculture in Mississippi.@ The purpose of this study is to assess the use, adoption, benefits, and impacts of information technologies on intermodal ports and terminals serving agribusiness firms in Mississippi. To help in the completion of the project I need the following information on each of the industry/firm that is physically located on your port site:

1. Name of Industry/Firm
2. Physical Address
3. Name of Chief Executive Officer
4. Telephone Number
5. Fax Number
6. Line of Business

Also, please send me a copy of your most recent published Port Handbook.

I am thanking you in advance for your time and effort with my request and continued support.

Sincerely,

Albert J. Allen
Professor/Agricultural Economist

AJA:vm

date

Dear :

Recently I faxed you a letter asking you to provide selected information attributes on the firms that are physically located on your port site but I have not received that information from you. I would appreciate your agreeing to take a few moments from your busy schedule and provide the information to me as soon as possible, if you have not already done so. I am faxing the original letter I sent you just in case yours has been misplaced. Again thanks for your help and continued support.

Sincerely,

Albert J. Allen
Professor/Agricultural Economist

AJA:vm

date

Dear :

The Department of Agricultural Economics at Mississippi State University is conducting a survey on the use of intermodal information technologies in the intermodal movement of freight by Mississippi ports. The purpose of this study is to provide information on the profile and general characteristics of Mississippi ports which are either using or not using intermodal information technologies to gain better control of operational costs, identify new and emerging markets, and manage more efficiently personnel, time, and assets such as equipment.

We are seeking to identify what encourages ports to implement or continue to use intermodal information based technologies and whether or not it has proven worthwhile to invest in these types of technologies. We seek your help in obtaining accurate information on your port=s profile, your reasons for implementing intermodal information based technologies, your satisfaction with intermodal information based technologies, and general features of intermodal information based technologies. You have been identified as a potential contributor to this research project.

The research will provide a better understanding of how intermodal information technologies relate to the port industry in Mississippi as a whole and will provide insight to their relevance and application to your port and industry. With the information obtained from the survey, you can compare your port business with the state averages of intermodal information based technologies. The evaluation of the reasons for implementing intermodal information based technologies should prove useful to your firm in the context of today=s increasingly competitive global economy. Your answers will also help ports that are considering implementing intermodal information technologies at their ports.

Your reply will be held in strict confidence and all information you provide will be kept strictly confidential. The answers you provide will be added in with other responses into a combined database so that no individual port=s response can be identified. Therefore, no one will be able to extract individual business information from the combined published data.

You will not receive any unsolicited promotional inquiries based directly on your participation in this study, nor will you or your port be directly associated with your response. As might be expected, your participation in this study is fully voluntary. Also, you may refuse to answer any specific question that we have asked of you or your port. If you are unable to

complete the questionnaire by the stated deadline, we will send you a follow-up letter asking you to complete the survey for us.

To help us analyze the data, we would appreciate your agreeing to complete and return the enclosed survey to us on or before October 20, 2000. A stamped, self-addressed envelope is included for your use in returning the completed survey. If you are unable to personally fill out the questionnaire, would you forward it to someone within your port who could complete it? The questionnaire should take approximately 30 to 35 minutes to complete. We are thanking you in advance for taking time to participate in this research project. If you should have any questions about this research project, please feel free to contact Allen or Couvillion at the address below. For additional information regarding human participation in research, please feel free to contact the MSU Regulatory Compliance Office at 662-325-0994.

Albert J. Allen or Warren C. Couvillion
Department of Agricultural Economics
P.O. Box 5187
Mississippi State University
Mississippi State, MS 39762
Phone: 662-325-2883 or 662-325-2886
FAX: 662-325-6614
E-mail: allen@agecon.msstate.edu or couvillion@agecon.msstate.edu
OR
Tracy Smart Arwood
Regulatory Compliance Administrator
Mississippi State University
PO. Box 6156
Mississippi State, MS 39762
Phone: 662-325-3994
FAX: 662-325-3803
E-mail: tarwood@spa.msstate.edu

Sincerely,

Albert J. Allen

Warren C. Couvillion
Professors/Agricultural Economics

AJA:vm
Enclosures (2)

date

Dear :

Recently we sent you a survey asking your opinions about the impact of intermodal information technologies on your firm but we have not received your response. We would appreciate your agreeing to take a few moments from your busy schedule to complete and return the survey to us on or before November 30, 2000, if you have not already done so. We have enclosed a copy of the survey and a stamped, self-addressed envelope just in case yours has been misplaced. Your response is very important for an accurate analysis of the impact of intermodal information technologies on firms in Mississippi. Let me reassure you that your reply will be kept strictly confidential and your participation in this study is fully voluntary.

Again, thanks for your cooperation. We sincerely appreciate your assistance and continued support in our work.

If you have any difficulty or questions with the survey, please contact:

Albert J. Allen or Warren C. Couvillion
Department of Agricultural Economics
P.O. Box 5187
Mississippi State University
Mississippi State, MS 39762
Phone: (662) 325-2883 or (662) 325-2886
FAX: (662) 325-6614
E-mail: allen@agecon.msstate.edu or
couvillion@agecon.msstate.edu

Sincerely,

Albert J. Allen
Professor/Agricultural Economist

AJA:vm
Enclosures (2)

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Intermodal Information Systems Based Technologies Survey

Please note: For the purpose of this survey, intermodal information technologies are defined as technologies involved in acquiring, storing, processing, and distributing data and information by electronic means (including radio, television, telephone, and computers) between two or more different modes of transportation in such a way that all parts of the freight transportation process are efficiently connected, seamless, coordinated, flexible, and continuous.

Section A. Port Profile

1. Name of Port _____
2. Mailing Address _____
3. Name of Person Filling in Questionnaire _____
4. E-mail Address _____
5. Title of Person Filling in Questionnaire _____
6. How long have you been in current business?_____Year(s)
   In Mississippi_____ Year(s) Other _____
   (Please specify years and location(s)
7. What was your port=s gross revenues in 1999? (Please check the appropriate category).
   a. Less than $3 million _____
   b. $4 - 10 million _____
   c. $11 - 30 million _____
   d. $31 - 50 million _____
   e. $51 - 100 million _____
   f. $101 - 500 million _____
   g. Greater than $500 million _____
8. What was your port=s total tonnage handled in 1999? (Please check the appropriate category).

Short tons (000's)

   a. Less than 2,500 _____
   b. 2,500 - 4,999 _____
   c. 5,000 - 9,999 _____
   d. Greater than 10,000 _____

9. What is the approximate total number of employees at your port?
   Office/Clerical _____ Management Team _____ Marketing/Sales _____ Computer Analysts _____ Others (please specify)_____
10. What are the three major products that your port handles?
    1. _____2. _____ 3. _____
11. Do you use Intermodal Information Systems based technologies at your port?
    Yes _____, No _____
    If yes, please continue to sections B, C, D, E, F, and H of the questionnaire. If no, please fill out Section G of the questionnaire. **(Yellow Page)**

Section B. Intermodal Information Technologies Familiarity
Please indicate how familiar you are with the following types of intermodal information technologies by placing the letter of one of the nine AChoice Types@ in each of the blank spaces below.

1. PC _____
2. Windows _____
3. Fax Machines _____
4. Electronic Mail _____
5. Internet _____
6. Electronic Data Interchange (EDI _____
7. Satellite Positioning _____
8. Bar Coding _____
9. Electronic Imaging _____
10. Pagers _____
11. Voice Mail _____
12. Cellular Telephones _____
13. Spreadsheets _____
14. Search Engines _____
15. Databases _____
16. Word Processors _____
17. Local Area Networks _____
18. Electronic Funds Transfer _____
19. Automatic Equipment Identification (AEI) Tags _____
20. Personal Communication Systems _____
21. Onboard Computers _____
22. Other(s) (please specify) _____

Choice Types

A = I have never heard of
B = I have heard of, but have not used
C = I have used a little
D = I use a few times a year
E = I use about 2 or 3 times a month
F = I use about once a month
G = I use about 2 or 3 times a week
H = I use once a week
I = I use daily
J = Other (please specify) _____

On the following pages are listed some statements concerning Intermodal Information Systems based technologies. The choices you make in answering are:

Strongly Agree - Means you feel strongly in favor of this statement
Agree - Means you are in favor of this statement
Undecided - Means you are not sure or do not know about this statement
Disagree - Means you are not in favor of this statement
Strongly Disagree - Means you feel strongly against this statement

Please read each statement carefully and then place the letter of one of the five choices given. Do not spend too much time on any one statement. Use the last page for any comments you may wish to make.

Section C. Sources of Intermodal Information Technologies Knowledge. Please indicate below where you hear about current or new intermodal information technologies by putting the letter of one of the five AChoice Types@ in each of the blank spaces below.

1. Newspapers _____
2. Magazines _____
3. Work _____
4. News on TV _____
5. Friends _____
6. Colleagues _____
7. Textbooks _____
8. Classes _____
9. TV shows/movies _____
10. Internet _____
11. Other(s) (please specify) _____

_____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

Section D. Reasons for Implementing or Continuing To Use Intermodal Information Technologies. Please place the letter of one of the five AChoice Types@ in each of the blank spaces below.

1. Customer service enhancement _____
2. Improve operations planning _____
3. Improve communications with customers _____
4. Maintain a competitive advantage _____
5. Meet customer requirements _____
6. Reduce costs _____
7. Improve profits _____
8. Reduce paperwork _____
9. Increase office/clerical efficiency _____
10. Improve security _____
11. Manage documentation better _____
12. Improve integration of information _____
13. Measure the performance of carriers and facilitators _____
14. Identify the best rates and levels of service available from carriers and facilitators _____
15. Book, issue, account for, and generate reports of freight shipments _____
16. Respond quickly to emergencies or change of operational orders _____
17. Other(s) (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

Section E. Port Activities Being Affected By Intermodal Information Technologies. Please place the letter of one of the five AChoice Types@ in each of the blank spaces below.

1. Billing _____
2. Costing _____
3. Gate Activity _____
4. Cargo Delivery _____
5. Freight Manifest _____
6. Loading/Unloading _____
7. Demurrage Notification _____
8. Load Preparation _____
9. Answering Customer Calls _____
10. Other(s) (please specify)_____
_____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

Section F. Satisfaction With Intermodal Information Technologies. Please place the letter of one of the five AChoice Types@ in each of the blank spaces below.

1. Top management at my port is satisfied with our use of intermodal information technologies _____.
2. Our employees are satisfied with our use of intermodal information technologies _____.
3. Our customers are satisfied with our use of intermodal information technologies _____.
4. My port has benefitted greatly from the use of intermodal information technologies _____.
5. My port sales volume increased after the implementation of intermodal information technologies _____.
6. Implementation of intermodal information technologies has allowed my port to handle increased business more efficiently _____.

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

Section G. Obstacles Preventing or Retarding the Implementation of Intermodal Information Technologies At My Port. Please put the letter of one of the five AChoice Types@ in each of the blank spaces below.

1. High investment cost _____.
2. Lack of financial resources _____.
3. Rapid evolution of technology _____.
4. Lack of awareness of the benefits of intermodal information technologies _____.
5. Difficulty in obtaining technical assistance _____.
6. Lack of compatibility with technology in use _____.
7. Lack of port personnel training/education _____.
8. Lack of information on intermodal information technologies _____.
9. High operating cost _____.
10. Users= Resistance _____.
11. Lack of product features offered by single manufacturer/vendor _____.
12. Lack of cooperation on the part of customers or partners _____.
13. High installation cost _____.
14. Other(s) (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

Section H. Familiarity of Intermodal Information Technologies System. The following systems are divided in several categories, we would like for you to answer them by putting letter of one of the five AChoice Types@ in each of the blank spaces below.

A. Shipment Information Systems: Manage the flow of materials and products from source to user. These systems use information management and communications technologies.

I am familiar with the following types of shipment information systems:

1. Ryder Integrated/Logistics Technologies _____
2. .Federal Express interNetShip _____
3. UPS on-line tracking system _____
4. Tie Logistics COMMAND7 _____
5. ALK Associates E-trackerJ _____
6. DHL Worldwide Package Tracking _____
7. Manna Freight=s Freight Tracker _____
8. Other(s) (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

B. Security Systems: Monitor the conditions of vehicles, containers, and goods during shipment or in storage at terminals. These systems are used to prevent theft and vandalism of trucks, chassis, containers and freight.

I am familiar with the following types of security systems:

1. Qualcomm TrailerTRACS7 _____
2. Savi InsideTRAKJ _____
3. Maher Terminals Logistics Systems, Inc. (MTLS) Electronic Security Processing System _____
4. Other(s) (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

C. Customs Clearance Systems: Automate the filing, processing, review, and issuance of documents for import and export of goods. The systems are used to automate transactions, improve customs control, and minimize delays for shippers and receivers. These systems use transaction processing software and communications technology.

I am familiar with the following types of customs clearance systems:

1. U.S. Customs Automated Commercial System _____

2. U.S. Customs Manifest System _____
3. U.S. Customs Automated Export Reporting System _____
4. U.S. Customs Automated Export System _____
5. U.S. Customs International Trade Data System _____
6. Syntra Global Logistics System _____
7. Other(s) (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

D. **Ship Storage Management Systems**: Plan and track the location of containers aboard ships. The systems are used to maximize stability, minimize handling during loading and off-loading, position refrigerated containers, and isolate hazardous cargo.

I am familiar with the following types of ship storage management systems:

1. NAVIS _____
2. MTLS Vessel Planning System _____
3. Realtime Business Solutions Top X (Terminal Operation Package - Xwindow) _____
4. Other (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

E. Terminal Inventory Management Systems: Track and manage the movement of containers and trailers within port, rail, and truck terminals. The systems are used to optimize the use of space in terminals, manage the stocking of containers of different lengths, make efficient use of labor and equipment, and schedule equipment repair and maintenance.

I am familiar with the following types of terminal inventory management systems:

1. NAVIS _____
2. OASIS _____
3. MTLS Container Terminal Management System _____
4. Maher Terminals Marine Terminal Automated Management System _____
5. Other(s) (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

F. **Gate Clearance Systems**: Automate the verification and inspection of drivers, truck tractors, trailers, containers, and chassis moving into and out of marine, rail, air, and truck terminals. The systems are used to verify booking, maintain security, and establish liability for damage.

I am familiar with the following types of gate clearance systems:

1. Maher Terminals OCR Gate System _____
2. Cosmos General Cargo System _____
3. Mainsail Terminal Management SystemJ _____
4. Other (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

G. Asset Location and Management Systems (LMS): Locate and track a vehicle or container. The systems are used to estimate time of arrival, minimize out-of-route travel, optimize equipment use, and improve safety and security.

I am familiar with the following types of asset location and management systems:

a. Ship LMS
   1. GPS _____
   2. U.S. Coast Guard Vessel Traffic System (VTS) _____
   3. Electronic Chart Display and Information Systems (ECDIS) _____
   4. Portable Communication, Navigation and Surveillance Systems (PCNS) _____
   5. Other(s) (please specify) _____

b. Railcar LMS
   1. Locomotive Automatic Train Control Systems (CATCS) _____
   2. Amtech railcar AEI tags _____
   3. Other(s) (please specify) _____

c. Truck LMS
   1. Qualcomm OmniTracs
   4. Highway Master
   3. Other(s) (please specify) _____

d. Container/Trailer LMS
   1. Orbcomm Trailer System _____
   2. Qualcomm Trailer TRANS7 _____
   3. Savi WideTRAKJ _____
   4. Other(s) (please specify) _____

e. Chassis LMS
   1. Amtech Chassis AEI tags _____
   2. Hughes Chassis AEI tags _____
   3. Mark IV Chassis AEI tags _____
   4. Other(s) (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

8. Other System(s) (Please Specify) _____

COMMENTS:

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Intermodal Information Systems Based Technologies Survey

Please note: For the purpose of this survey, intermodal information technologies are defined as technologies involved in acquiring, storing, processing, and distributing data and information by electronic means (including radio, television, telephone, and computers) between two or more different modes of transportation in such a way that all parts of the freight transportation process are efficiently connected, seamless, coordinated, flexible, and continuous.

Section A. Company Profile

1. Name of Firm _____
2. Mailing Address _____
3. Name of Person Filling in Questionnaire _____
4. E-mail Address _____
5. Title of Person Filling in Questionnaire _____
6. How long has your firm been in current business?_____Year(s)
   In Mississippi_____ Year(s) Other _____
   (Please specify years and location(s)
7. What was your company=s current sales volume in 1999? (Please check the appropriate category)
   a. Mississippi Sales Volume
   1. $0 - 3 million _____
   2. $4 - 10 million _____
   3. $11 - 30 million _____
   4. $31 - 50 million _____
   5. $51 - 100 million _____
   6. $101 - 500 million _____
   7. Greater than $500 million _____
   b. Out-of-Mississippi Sales Volume
   1. $0 - 3 million _____
   2. $4 - 10 million _____
   3. $11 - 30 million _____
   4. $31 - 50 million _____
   5. $51 - 100 million _____
   6. $101 - 500 million _____
   7. Greater than $500 million _____
8. What is the approximate total number of employees at your company?
   Office/Clerical _____ Management Team _____ Marketing/Sales _____ Computer Analysts _____ Others (please specify)_____
9. Is your business primarily manufacturing, wholesaling, retailing, warehousing, or some other type? (Please check the appropriate blank space below).
   Manufacturing ___ Wholesaling ___ Retailing ___ Warehousing ___ Other (please specify) ___

10. What are the three major products that your company manufactures or distributes?
    1. _____ 2. _____ 3. _____
11. Do you use Intermodal Information Systems based technologies at your company?
    Yes _____, No _____
    If yes, please continue to sections B, C, D, E, F, and H of the questionnaire. If no, please fill out Section G of the questionnaire (**Yellow Page**)

Section B. Intermodal Information Technologies Familiarity

Please indicate how familiar you are with the following types of intermodal information technologies by placing the letter of one of the nine AChoice Types@ in each of the blank spaces below.

1. PC _____
2. Windows _____
3. Fax Machines _____
4. Electronic Mail _____
5. Internet _____
6. Electronic Data Interchange (EDI _____
7. Satellite Positioning _____
8. Bar Coding _____
9. Electronic Imaging _____
10. Pagers _____
11. Voice Mail _____
12. Cellular Telephones _____
13. Spreadsheets _____
14. Search Engines _____
15. Databases _____
16. Word Processors _____
17. Local Area Networks _____
18. Electronic Funds Transfer _____
19. Automatic Equipment Identification (AEI) Tags _____
20. Personal Communication Systems _____
21. Onboard Computers _____
22. Other(s) (please specify) _____

Choice Types

A = I have never heard of
B = I have heard of, but have not used
C = I have used a little
D = I use a few times a year
E = I use about 2 or 3 times a month
F = I use about once a month
G = I use about 2 or 3 times a week
H = I use once a week
I = I use daily
J = Other (please specify) _____

On the following pages are listed some statements concerning Intermodal Information Systems based technologies. The choices you make in answering are:

Strongly Agree - Means you feel strongly in favor of this statement
Agree - Means you are in favor of this statement
Undecided - Means you are not sure or do not know about this statement
Disagree - Means you are not in favor of this statement
Strongly Disagree - Means you feel strongly against this statement

Please read each statement carefully and then place the letter of one of the five choices given. Do not spend too much time on any one statement. Use the last page for any comments you may wish to make.

Section C. Sources of Intermodal Information Technologies Knowledge. Please indicate below where you hear about new intermodal information technologies by putting the letter of one of the five AChoice Types@ in each of the blank spaces below.

1. Newspapers _____
2. Magazines _____
3. Work _____
4. News on TV _____
5. Friends _____
6. Colleagues _____
7. Textbooks _____
8. Classes _____
9. TV shows/movies _____
10. Internet _____
11. Other(s) (please specify) _____
_____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

Section D. Reasons for Implementing or Continuing To Use Intermodal Information Technologies. Please place the letter of one of the five AChoice Types@ in each of the blank spaces below.

1. Customer service enhancement _____
2. Improve operations planning _____
3. Improve communications with customers _____
4. Maintain a competitive advantage _____
5. Meet customer requirements _____
6. Reduce costs _____
7. Improve profits _____
8. Reduce paperwork _____
9. Increase office/clerical efficiency _____
10. Improve security _____
11. Improve monitoring of company equipment and drivers _____
12. Manage documentation better _____
13. Improve integration of information _____
14. Measure the performance of carriers and facilitators _____
15. Improve communication with company drivers _____
16. Identify the best rates and levels of service available from carriers and facilitators _____
17. Book, issue, account for, and generate reports of freight shipments _____
18. Plan the routing of intermodal equipment and cargoes _____

19.Examine the sequence of intermodal operations at my company _____
20.Respond quickly to emergencies or change of operational orders _____
21.Other(s) (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

Section E. Company Activities Being Affected By Intermodal Information Technologies. Please place the letter of one of the five AChoice Types@ in each of the blank spaces below.

1. Billing _____
2. Costing _____
3. Dispatching _____
4. Shipment Tracing _____
5. Vehicle Tracing _____
6. Loading/Unloading _____
7. Vehicle Routing _____
8. Load Preparation _____
9. Answering Customer Calls _____
10. Other(s) (please specify)_____
_____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

Section F. Satisfaction With Intermodal Information Technologies. Please place the letter of one of the five AChoice Types@ in each of the blank spaces below.

1. Top management at my firm is satisfied with our use of intermodal information technologies _____.
2. Our employees are satisfied with our use of intermodal information technologies _____.
3. Our customers are satisfied with our use of intermodal information technologies _____.
4. My firm has benefited greatly from the use of intermodal information technologies _____.
5. My firm sales volume increased after the implementation of intermodal information technologies _____.
6. Implementation of intermodal information technologies has allowed my company to handle increased business more efficiently _____.

Choice Types

A = Strongly Agree
B = Agree
D = Disagree
E = Strongly Disagree

C = Undecided

Section G. Obstacles Preventing or Retarding the Implementation of Intermodal Information Technologies At My Firm. Please put the letter of one of the five AChoice Types@ in each of the blank spaces below.

15. High investment cost _____.
16. Lack of financial resources _____.
17. Rapid evolution of technology _____.
18. Lack of awareness of the benefits of intermodal information technologies _____.
19. Difficulty in obtaining technical assistance _____.
20. Lack of compatibility with technology in use _____.
21. Lack of firm personnel training/education _____.
22. Lack of information on intermodal information technologies _____.
23. High operating cost _____.
24. Users= Resistance _____.
25. Lack of product features offered by single manufacturer/vendor _____.
26. Lack of cooperation on the part of customers or partners _____.
27. High installation cost _____.
28. Other(s) (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

Section H. Familiarity of Intermodal Information Technologies System. The following systems are divided in several categories, we would like for you to answer them by putting letter of one of the five AChoice Types@ in each of the blank spaces below.

A. Shipment Information Systems: Manage the flow of materials and products from source to user. These systems use information management and communications technologies.

I am familiar with the following types of shipment information systems:

2. Ryder Integrated/Logistics i2 Technologies _____
2 Federal Express interNetShip _____
4. UPS on-line tracking system _____
4. Tie Logistics COMMAND7 _____
6. ALK Associates E-trackerJ _____
6. DHL Worldwide Package Tracking _____
8. Manna Freight=s Freight Tracker _____
9. Other(s) (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

B. Security Systems: Monitor the conditions of vehicles, containers, and goods during shipment or in storage at terminals. These systems are used to prevent theft and vandalism of trucks, chassis, containers and freight.

I am familiar with the following types of security systems:

5. Qualcomm TrailerTRACS7 _____
6. Savi InsideTRAKJ _____
7. Maher Terminals Logistics Systems, Inc. (MTLS) Electronic Security Processing System _____
8. Other(s) (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

C. Customs Clearance Systems: Automate the filing, processing, review, and issuance of documents for import and export of goods. The systems are used to automate transactions, improve customs control, and minimize delays for shippers and receivers. These systems use transaction processing software and communications technology.

I am familiar with the following types of customs clearance systems:

8. U.S. Customs Automated Commercial System _____
9. U.S. Customs Manifest System _____
10. U.S. Customs Automated Export Reporting System _____
11. U.S. Customs Automated Export System _____
12. U.S. Customs International Trade Data System _____
13. Syntra Global Logistics System _____
14. Other(s) (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

D. Ship Storage Management Systems: Plan and track the location of containers aboard ships. The systems are used to maximize stability, minimize handling during loading and off-loading, position refrigerated containers, and isolate hazardous cargo.

I am familiar with the following types of ship storage management systems:

5. NAVIS _____
6. MTLS Vessel Planning System _____
7. Realtime Business Solutions Top X (Terminal Operation Package - Xwindow) _____
8. Other (please specify) _____

Choice Types

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

E. Terminal Inventory Management Systems: Track and manage the movement of containers and trailers within port, rail, and truck terminals. The systems are used to optimize the use of space in terminals, manage the stocking of containers of different lengths, make efficient use of labor and equipment, and schedule equipment repair and maintenance.

I am familiar with the following types of terminal inventory management systems:

6. NAVIS _____
7. OASIS _____
8. MTLS Container Terminal Management System _____
9. Maher Terminals Marine Terminal Automated Management System _____
10. Other(s) (please specify) _____

Choice Types

A = Strongly Agree
D = Disagree

B = Agree **E** = Strongly Disagree
C = Undecided

F. **Gate Clearance Systems**: Automate the verification and inspection of drivers, truck tractors, trailers, containers, and chassis moving into and out of marine, rail, air, and truck terminals. The systems are used to verify booking, maintain security, and establish liability for damage.

I am familiar with the following types of gate clearance systems:

5. Maher Terminals OCR Gate System _____
6. Cosmos General Cargo System _____
7. Mainsail Terminal Management SystemJ _____
8. Other (please specify) _____

Choice Types
A = Strongly Agree **D** = Disagree
B = Agree **E** = Strongly Disagree
C = Undecided

G. Asset Location and Management Systems (LMS): Locate and track a vehicle or container. The systems are used to estimate time of arrival, minimize out-of-route travel, optimize equipment use, and improve safety and security.

I am familiar with the following types of asset location and management systems:

a. Ship LMS
   1. GPS _____
   2. U.S. Coast Guard Vessel Traffic System (VTS) _____
   3. Electronic Chart Display and Information Systems (ECDIS) _____
   4. Portable Communication, Navigation and Surveillance Systems (PCNS) _____
   5. Other(s) (please specify) _____

b. Railcar LMS
   1. Locomotive Automatic Train Control Systems (CATCS) _____
   2. Amtech railcar AEI tags _____
   3. Other(s) (please specify) _____

c. Truck LMS
   1. Qualcomm OmniTracs
   2. Highway Master
   3. Other(s) (please specify) _____

d. Container/Trailer LMS
   1. Orbcomm Trailer System _____
   2. Qualcomm Trailer TRANS7 _____

3. Savi WideTRAKJ _____
4. Other(s) (please specify) _____

e. Chassis LMS
   1. Amtech Chassis AEI tags _____
   2. Hughes Chassis AEI tags _____
   3. Mark IV Chassis AEI tags _____
   4. Other(s) (please specify) _____

Choice Types

A =	Strongly Agree	**D** =	Disagree
B =	Agree	**E** =	Strongly Disagree
C =	Undecided		

H. Other System(s) **(Please Specify)** _____

General Comments:

Appendix Table 1. Budget for the study

CATEGORIES	APPROVED BUDGET	COMMITTED TO DATE
Faculty Salaries	5,532.00	5,061.64
Administrative Staff Salaries	--	--
Other Staff Salaries	--	--
Student Salaries	4,000.00	4,000.00
Staff Benefits	2,637.00	2,897.59
Total Salaries and Benefits	12,169.00	11,959.23
Scholarships	--	--
Permanent Equipment	--	--
Expendable Property & Supplies	470.00	172.00
Domestic Travel	1,500.00	1,659.92
Foreign Travel	--	--
Other Direct Costs (Specify) B Registration	50.00	360.00
Total Direct Costs	14,189.00	14,151.13
Facilities & Administrative (Indirect) Costs	3,753.00	2,298.77
TOTAL COSTS	17,942.00	16,449.90
Federal Share	14,450.00	
Matching Share	3,492.00	