AN ANALYSIS OF INTERMODAL RAILROAD-TRUCK FREIGHT TRANSPORTATION FACILITIES AND SERVICES IN MINNESOTA

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EXECUTIVE SUMMARY

INTERMODAL RAILROAD-TRUCK SERVICE DEFINED

Intermodal railroad-truck (IRT) transportation service means that a motor truck(s) provides the short-haul pickup and/or delivery (drayage) part of a haul and a railroad(s) provides the long-haul part. The equipment used includes truck trailers and containers, which are carried on railroad cars.

The potential benefits of IRT for shippers and receivers are that transit time can be reduced and rates may be lower when compared with motor truck service. It may also have the effect of forcing other modes to improve their service and lower their rates. From the standpoint of society as a whole, IRT can lower the prices of goods and can reduce air pollution, energy consumption, highway congestion, and highway deterioration.

In order for the benefits to be received on a large scale, IRT service must be available to shippers and receivers, the quality and cost of IRT service must be competitive with other modes of transportation, and IRT service must be accepted by and used by shippers and receivers.

PURPOSE OF THE STUDY

The general objectives of the study reported on here were to identify the IRT facilities and services available to manufacturers in Minnesota, the extent of use of IRT service by those manufacturers, the characteristics of the users, and the perceptions of users and nonusers about the service and its cost.

METHODOLOGY USED IN THE STUDY

A combination of a mail questionnaire study and personal interviews was used. A random sample of 695 Minnesota manufacturers with fifty or more employees was selected for use in the mail questionnaire study. The return of usable questionnaires was 153, or 22.0 percent, which is considered good for a study of this kind. Ten of the identified users of IRT and ten of the nonusers were interviewed personally on an in-depth basis. Personal interviews were also conducted among executives of six IRT railroad companies and shippers' agents.

CONCLUSIONS

IRT facilities and services are sufficiently available to Minnesota manufacturers and other shippers and receivers in the state, within the limits of IRT service regarding the location of origin and destination points and shipment size. Minnesota is probably served as well as any state is currently being served by IRT.

A fairly large share--about 28.0 per cent--of the manufacturers with fifty or more employees that responded in the study were users of IRT, either on the inbound or outbound side, or both sides. IRT users collectively used IRT service for both inbound and outbound moves and for both domestic and international shipments. Of the nonusers of IRT, only about one-half were acquainted with IRT, indicating a failure of the IRT marketing system to reach potential customers.

Although the users of IRT in the study tended to be somewhat larger than the nonusers, a considerable number of users were very small firms. The size of firm did not appear to be a barrier to use of IRT.

IRT users were located in both urban and rural areas and many were located in very small cities. Most IRT users were located less than 100 miles from an IRT terminal, indicating that nearness to a terminal was very important in determining the ability to use IRT.

The commodities carried outbound by IRT tended to be of low-value per unit of size, although a great variety of different products were involved. The many different materials/parts received via IRT by users tended to be relatively low value parts and components. These data indicate that a broad-based marketing approach in terms of product categories can be taken, but that IRT had difficulty attracting high-value traffic.

IRT users usually shipped via IRT to distant points. The origin points of the things brought into Minnesota by users were widely dispersed, including many long-distance points.

The use of IRT was rather infrequent in terms of the number of shipments in a given period of time, evidence that IRT marketing has not been able to establish a regular, frequent shipping schedule with many of the manufacturers it serves.

Shippers' agents, who perform the basic tasks involved in arranging for IRT service, were very important in arranging IRT service; about two-thirds of the users made use of agents.

Agent salespeople often played an important role in acquainting manufacturers with IRT and getting them to use the service. However, neither agent nor railroad salespeople had reached many of the nonusers.

The principal reason given for using IRT service by Minnesota manufacturers was cost. Availability of equipment and suitability for shipment size were leading secondary reasons given, among many others.

Users of IRT rated IRT higher overall than they rated railroad transportation but considerably below motor truck service. The only aspect of IRT service that was viewed very positively was cost.

Nonusers of IRT rated IRT lower than did users of IRT, rating it only slightly higher than railroad service and substantially below motor truck service. No aspects of IRT were perceived very positively, and some were rated below railroad service. These findings concerning nonusers may indicate that IRT marketing has not done an adequate job of disseminating information about IRT.

IRT users rated drayage companies higher than IRT railroads, and both received higher ratings than the overall IRT service itself. The rating given by users to agents was also higher than their overall perception of IRT. The rating was also higher than the rating given to either IRT drayage companies or IRT railroads. The different ratings given to different parts of the

IRT system imply that users do not view IRT as a fully coordinated integrated service.

When specific traffic lanes involving IRT trailer moves were studied, IRT had a longer transit time when compared with motor trucking on every lane examined, both inbound and outbound and both long-haul and short-haul. IRT did better with rates, having the lowest rate in several situations. The traffic lane comparisons involved only IRT trailer moves. The probable shift to domestic containers may improve the ability of IRT to compete against trucking.

STEPS THAT COULD INCREASE INTERMODAL RAILROAD-TRUCK AVAILABILITY AND TRAFFIC CARRIED

IRT service could be made more available to shippers and receivers by opening more terminals, devising a method to enable the efficient carriage of smaller shipments through some sort of consolidation program, and engaging in a more complete marketing effort to reach the many firms that apparently have not heard of IRT or have distorted impressions of it.

Among the ways in which the market for IRT service could be improved are increasing the use of double-stack service, replacement of conventional trailer service with container service, more complete control of the IRT service chain by the railroad involved, and expanding the use of commodity rates.

STATE POLICY REGARDING INTERMODAL RAILROAD-TRUCK SERVICE

On balance, it appears that IRT has a net positive effect on manufacturers and other shippers, railroads, and society in

general and that it would be in the interest of the state of Minnesota to encourage its development. For example, the state government could help railroads to speed up processing traffic through IRT terminals by improving access roads to terminals, assisting in land acquisition for new terminals or for terminal expansion, and helping to finance terminal expansion, lifting equipment, and new containers to replace trailers.

PART 1
INTRODUCTION

Intermodal railroad-truck (IRT) transportation service means that a motor truck(s) provides the short-haul pickup and/or delivery (drayage) part of a haul and a railroad(s) provides the long-haul or "line-haul" part. The equipment used includes truck trailers and containers, which are carried on railroad cars. IRT combines the door-to-door convenience of trucks with the high-volume, long-haul economies of railroads.

IRT traffic in the United States doubled in the past decade, reaching a total of 6.2 million trailers and containers in 1990, having benefitted from federal regulatory reform, increased international trade, and other developments. However, it still accounts for only a small share of the total intercity freight traffic in the country.

The potential benefits of IRT for shippers and receivers are that transit time can be reduced and rates may be lower when compared with motor truck service. It may also have the effect of forcing other modes to improve their service and lower their rates. From the standpoint of society as a whole, IRT can lower the prices of goods and can reduce air pollution, energy consumption, highway congestion, and highway deterioration.

Because of the relatively small role it plays in the total transportation system, the received benefits of IRT are rather limited so far.

In order for the benefits to be received on a larger scale, IRT service must be available to shippers and receivers, the

quality and cost of IRT service must be competitive with other modes of transportation, and IRT service must be accepted by and used by shippers and receivers. The literature available on these subjects is limited.

The study reported on here was intended to deal with the issues described above by identifying the IRT facilities and services available to manufacturers in Minnesota, the extent of use of IRT service by those manufacturers, the characteristics of the users, and the perceptions of users and nonusers about the service and its cost.

Part II of this report provides an explanation of what IRT consists of and describes its development and present status in the United States. Parts III and IV include a discussion of the purpose of the study and the methodology used. Part V contains the findings of the study. The conclusions of the study can be found in Part VI.

PART 2
INTERMODAL RAILROAD-TRUCK TRANSPORTATION

INTERMODAL RAILROAD-TRUCK SERVICE DEFINED

Intermodal freight transportation occurs when a shipment is moved over the lines of carriers of two or more modes of transportation. Intermodal railroad-truck (IRT) service means that a motor truck(s) provides the short-haul pickup and/or delivery service (drayage) part of the trip and a railroad(s) provides the long-haul or "line-haul" part. The equipment involved includes truck trailers or containers, which are carried on railroad cars.[1] IRT combines the door-to-door convenience of trucks with the high volume, long-haul economies of railroads.

IRT service is an international as well as a domestic form of transportation. The international form generally means that the pickup and delivery by truck at a United States point is followed by or preceded by a rail move to or from a United States seaport where transfer of the trailer or container (usually the latter) is made to or from an ocean vessel. It is in international trade that the container method has flourished the most. More than sixty percent of the world's general cargo deep-sea trade moves in containers aboard containerships.[2]

IRT service is available in every state. However, because of the limited number of intermodal terminals that are operated by railroads, and their consequent long distance from some shippers, some localities and shippers cannot practically use the service, as will be discussed later in the report.

CARRIERS INVOLVED IN INTERMODAL RAILROAD-TRUCK SERVICE

How Intermodal Railroad-Truck Service Works

IRT service usually involves one shipper and one receiver. The pickup trucker picks up the loaded trailer or container and carries it to the railroad's terminal. After placing the trailer onto a railroad car, the railroad then carries it to the destination rail terminal where it is transferred to the delivering trucker which makes the delivery to the consignee. Sometimes the railroad will interchange with another railroad, i.e., when the destination point is not on its own lines, it will transfer the trailer or container to the lines of one or more other railroads for carriage to the destination rail terminal.

Motor Truck Operators

IRT normally involves separately-owned railroad and motor trucking operations. In some cases, where railroads are providing multi-modal service, both the rail service and the motor truck drayage service are provided by the same company. In most cases, however, the drayage portion is provided by an independent motor trucking company. Occasionally, the shipper or receiver will provide local drayage in his or her own vehicles.

Another form of IRT service takes place when a less-than-truckload (LTL) trucking company receives LTL shipments from several shippers, combines them into a trailerload or containerload, moves the trailer or container to a rail terminal, and ships the trailer or container to its destination point by

rail, i.e., the trucking company acts as a shipper in these situations. The use of IRT by LTL truckers has grown so that it was five percent of their total vehicle miles in 1991.[3] The reasons for doing this include their own insufficient long-haul carrying capacity and the desire for lower costs. In recent years, some truckload carriers have also begun to ship their trailers via IRT because of the truck driver shortage, the need to increase utilization of trailers, lower costs, and other reasons.[4] This kind of IRT movement for LTL and truckload trucking companies has increased as IRT service has improved, including the introduction of double-stack service (see below).[5]

Railroads

IRT has become a very important source of revenue for United States railroads. In 1989, it generated about $4.6 billion, or about fifteen percent of total railroad revenues, making it the second most important revenue source. The major railroads most involved in IRT are the Burlington Northern (BN), Conrail, CSX, Norfolk Southern, Santa Fe, Southern Pacific, and Union Pacific. Of the rail carriers, the BN generated the largest number of loads in 1989, amounting to almost sixteen percent of the trailers and containers loaded by the railroads.[6] The BN is the dominant intermodal rail carrier serving Minnesota shippers and receivers. The Soo Line also offers IRT service in Minnesota; the Chicago and Northwestern no longer has an intermodal terminal in the state.

Each of the several railroads has adopted a different strategy regarding IRT relative to trailers versus containers, the use of double-stack (see below), operating IRT through a subsidiary organization, the use of "carless" IRT (see below), and the use of shippers' agents (see below).

Intermodal Operators

In addition to railroads, "intermodal operators" affiliated with ocean carriers are very important in IRT. These are organizations that have long-term agreements with railroads for the latter to carry IRT containers, mainly for international trade purposes. To date, a company affiliated with American President Lines has been the most far reaching and successful intermodal operator.

ADVANTAGES OF INTERMODAL RAILROAD-TRUCK SERVICE

The potential advantages of IRT for the shipper are that transit time may be reduced when compared with all motor truck service and rates may be lower. In addition, because IRT offers an alternative for the shipper and represents competition to other modes of transportation, particularly motor trucking, it can have the effect of improving service and lowering rates offered by other modes.

From society's point of view, IRT can result in lower prices and, by substituting rail transportation for highway transportation, can potentially reduce air pollution, energy consumption, highway congestion, and highway deterioration.

However, although IRT can reduce the amount of long-haul highway traffic, it can increase road traffic in railroad IRT terminal areas where highway-rail connections are made.

DEVELOPMENT OF INTERMODAL RAILROAD-TRUCK SERVICE

Early History

Trailer-on-flatcar (TOFC) or piggyback service, where truck trailers are carried on railroad flat cars, dates from the middle 1920's, but it had limited growth until the 1950's. Containers were carried on railroad cars in domestic service as early as World War I, but containerization or container-on-flatcar (COFC) service also had limited growth until the 1950's. The growth of IRT was rapid in the late 1950's and early 1960's, but levelled off somewhat in the early and middle 1970's and did not reach the traffic volume predicted for it. The container form of IRT had a growth rate less than the trailer form. It eventually received a great boost from the rapid growth of international trade and then the introduction of "double-stack" international service in the 1980's, as will be seen below.[7]

Federal Government Policy

Pre-Regulatory Reform Era

Federal government policy had an important effect on the development of IRT. Because the Interstate Commerce Commission (ICC) was responsible for economic regulation (entry, exit, prices, quality of service, mergers, etc.) of railroads (and

motor trucking companies), it was also responsible for regulation of IRT. IRT was regulated as a rail activity from its inception until the early 1980's.

The ICC eventually approved several categories or plans of IRT service. In the plans the Commission attempted to identify with whom (independent trucking companies, shippers, and freight forwarders) the IRT agreements could be made by a railroad; the ownership of the trailers, trailer chassis, or containers and the ownership of the rail cars; the kind of bill of lading used, the rates that applied and how the parties involved were to be compensated; and whether the service was to be door to door or station to station. By the late 1970's, more than sixty railroads participated in some form of IRT. The plans most frequently used were those under which the trailers, trailer chassis, or containers used and the rail cars were all owned or leased by the railroad. Consequently, a great deal of multi-modal cooperation did not exist.[8]

The problems the service faced at that time were, in addition to the unwillingness of railroads and trucking companies to cooperate and the lack of regulatory authority to require cooperation, the uncertainty concerning the responsibility for loss and damage; the lack of standardization of trailer and container sizes; the lack of standardization of rail cars; the lack of standardization of tie-down methods; the lack of general rules covering the interchange of trailers, trailer chassis, and containers; questions about ownership of trailers, trailer

chassis, and containers; and the opposition from labor unions. Also, the ICC did not aggressively promote the intermodal concept.[9] Shippers often believed that IRT service was not competitive because it was inconsistent and had long transit times and high damage.[10] The total number of trailers and trailer-size containers loaded by United States railroads in 1979 was about 3.3 million.[11]

Regulatory Reform

In 1976, Congress enacted the Railroad Revitalization and Regulatory Reform (4R) Act[12] and, in 1980, passed the Staggers Rail Act.[13] In the latter year, Congress also passed the Motor Carrier Act of 1980.[14] The effect of these three laws and administrative actions taken by the ICC was to substantially reduce economic regulation of the railroad and motor trucking industries, including IRT service.

In 1981, the Commission, using its new exemption power, completely deregulated all railroad and truck service provided by railroads in connection with IRT service, including the trucking part,[15] and, in 1987, the part of the service controlled by independent for-hire motor trucking companies was freed from regulation,[16] with the exception of pickup and delivery service performed by independent motor trucking companies when the traffic moved under the trucking company's rates and bill of lading, a very small part of the total traffic. In 1990, this traffic was also exempted by the ICC.[17]

The intention was that the freedom they would have would enable the carriers to develop the service at a faster pace and that both carriers and shippers would benefit from the resulting improved service. In addition, modification, via the Shipping Act of 1984,[18] of United States economic regulation of ocean transportation regarding single bills of lading and joint rates between ocean carriers and railroads and the use of contract rates by ocean carriers encouraged IRT growth.

These steps allowed the carriers involved to develop and price their services with less government interference. The effect was to encourage the railroads to become much more aggressive and innovative in IRT pricing and to invest in technological improvements in vehicles and vehicle-handling equipment.[19]

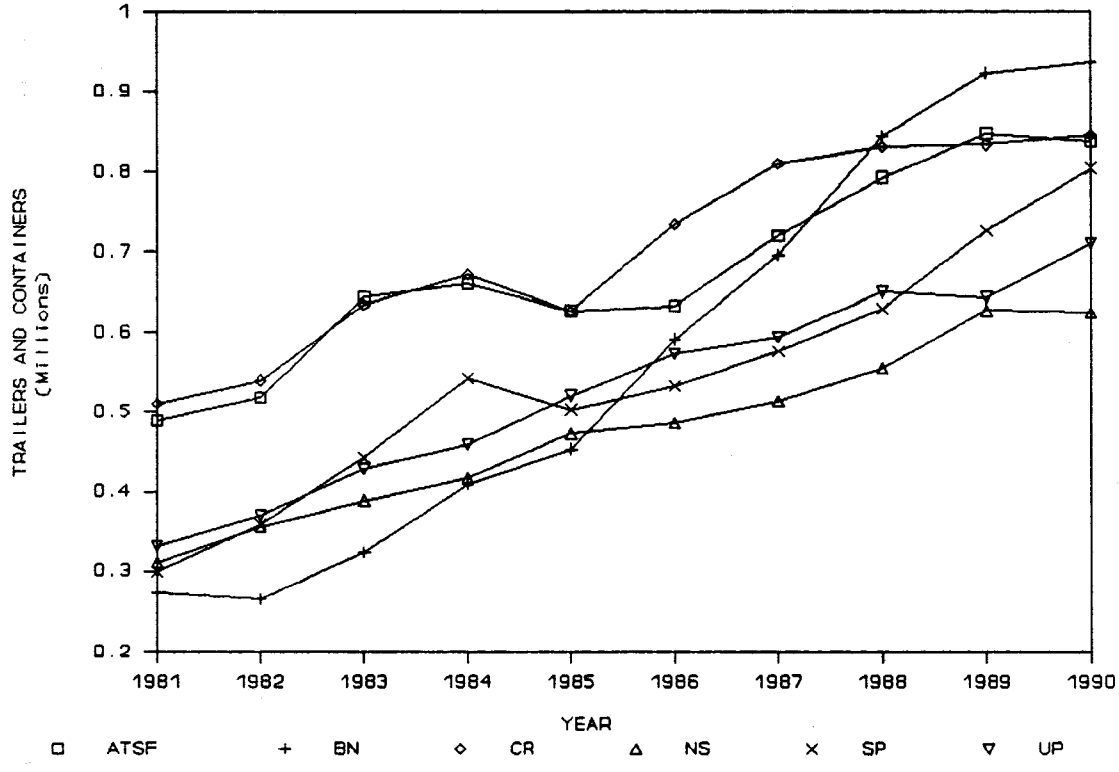
Traffic Carried

Between 1980 and 1990, the number of trailers and trailer size containers loaded by United States railroads increased from 3.0 million units to 6.2 million units, or 106.7 percent. In the 1970-1980 period, the increase had been only 29.5 percent.[20] The IRT traffic trends in the period 1981-1990 for the six largest IRT railroads are shown in Figure 2-1. Note that there has been a generally rising trend in the period.

The growth in IRT traffic can be partly attributed to regulatory reform. IRT also benefitted from increased international trade, most of which is containerized, equipment

Figure 2-1

INTERMODAL TRAFFIC
1981-1990



where: ATSF = Atchison, Topeka and Santa Fe Railway Company,
BN = Burlington Northern Railroad Company,
CR = Consolidated Rail Corporation,
NS = Norfolk Southern Corporation,
SP = Southern Pacific Transportation Company, and
UP = Union Pacific Railroad Corporation.

Sources: Association of American Railroads, CS-54A (Washington: Association of American Railroads, various years); Association of American Railroads, Weekly Railroad Traffic (Washington: Association of American Railroads, various years).

developments, including the advent of double-stack (see below), highway fuel and truck tax increases, and the energy crises of

the 1970's and subsequent sensitivity to energy consumption. More aggressive marketing by carriers and shippers' agents, particularly the latter, also contributed. Much of the increase represented a shift of traffic from rail boxcars to IRT. According to one authority, the main reasons for the large increase in IRT traffic in the 1980's were the cannibalizing of boxcar freight (moving traffic by IRT instead of by boxcar) and the surge in Pacific Rim imports.[21]

Despite the rapid growth during the 1980's, IRT still accounts for a very small share of the total intercity freight traffic in the United States, probably about five percent. And, although IRT has its principal advantage on long hauls, one rail executive stated that it accounts for only 36 percent of all United States long-haul dry-van transportation over 500 miles.[22]

TECHNOLOGICAL CHANGES

Kinds of Changes Made

Since the 1950's, a number of technical improvements have made IRT cheaper than previously and enabled the carriers to serve the customer better. These include a number of changes made in trailers and containers in terms of their size and suitability for specific commodities and in the equipment used to load and unload trailers and containers to and from rail cars. Changes in how the units are attached to the car have also been made. Railroad cars themselves have also changed in terms of their length and basic structure. A typical flat car has grown

from 75 feet in the 1950's to 89 feet. Articulation of cars has also developed (see below). The truck chassis on which containers ride have been improved as well.

Double-Stack Service

Double-Stack Defined

One of the more dramatic rail equipment changes has been the development of "double-stack" service on some railroads. Double-stack allows two layers of containers to be carried on rail cars. It requires a different kind of rail car, new kinds of containers (that can be stacked and locked together), and different handling equipment. Hence a considerable investment is needed.

The cars are a series of platforms that are "welled"--they are lower than the floor of a conventional rail car. They are also often articulated in the sense that each pair of stacked containers rests on a platform of its own that is separated from the next platform. A common version is where five articulated platforms serve as one "car" in a train, each platform sharing wheels with the next platform. "Stand alone" welled platform cars that do not share wheels with other cars are also used for double-stack service.

Development of Double-Stack

The first regular double-stack service was begun in 1984 by American President Lines. It was followed by other ocean carriers and by some railroads.[23] Today it accounts for about

two-thirds of all railroad container movements.[24] Double-stack cars amounted to about 25 percent of total IRT capacity in 1990.[25] Double-stack is available on most main line routes serving larger cities. The basic container size used is 48 feet long and 102 inches wide.

Double-stack has been used for containers only (not for trailers) and mainly in international trade. However, its introduction, according to McKenzie, et al., fostered the use of containers in domestic trade because empty international containers were made available to domestic shippers to move goods westbound. This eventually led to the introduction of domestic-only container service by ocean carriers and railroads.[26] Some of this eventually developed into double-stack all domestic service.

Advantages of Double-Stack

Double-stack has several important advantages over conventional container movements. The reduced train length required to move a given number of containers means that overall capital costs per ton carried are reduced. Train crew cost per carried ton is substantially less. Because the double-stack cars are articulated sets, there are fewer sets of wheels, fewer couplers, and fewer air brake hoses involved, resulting in a large reduction in weight to be moved. This reduces the energy cost per ton of freight carried. Less loss and damage occurs because articulated double-stack cars with five platform have

fewer couplers than a conventional train, thus substantially reducing slack action, a frequent cause of damage to freight, which occurs when a train stretches or "runs out" (accelerates or ascends a grade) or contracts or "runs in" (decelerates or descends a grade).[27]

Disadvantages of Double-Stack

Among the disadvantages of double-stack are its high terminal costs--expensive equipment is required to handle the containers, the need for a large volume of freight because of the large capacity of a double-stack train and the high terminal costs that must be covered,[28] the fact that it is feasible for the customer mainly only on longer hauls in terms of the rates charged (straight trucking can underprice double-stack on shorter hauls),[29] and the fact that double-stack requires higher overhead clearances (as high as 20 feet, 6 inches, depending on the size of the equipment used) than conventional IRT needs, meaning that it cannot be used universally on the railroad system and sometimes expensive modifications must be made to accommodate double-stack trains.

Carless Technology

Carless Technology Defined

Another dramatic development is "carless" technology, where a vehicle can serve as both a truck trailer and as a rail freight car by having two sets of wheels, one for road and one for rail,

the latter retractable or detachable--no separate rail car is required. The potential savings in time and labor when connecting between rail and road are large. Also large are the savings in terminal investment costs because the vehicle can easily be transferred between modes without cranes or other kinds of vehicle handling equipment. More terminals are possible, under such circumstances, bringing IRT service closer to the shipper. The tare weight of the vehicle is less than that of a rail car and conventional trailer or container combined, resulting in less energy consumption per ton of freight carried. Loss and damage can be less than with conventional IRT because the vehicle is handled less and the connections between the vehicles do not have the traditional rail couplers with their accompanying slack action. The vehicles can be run at a faster speed because of their lower center of gravity than is found in conventional rail cars. However, the tare weight of the vehicle is greater than that of a conventional highway trailer when the rail wheels are not detachable, meaning that highway payload capacity is less. Also, the cost of a vehicle is higher than that of a conventional truck trailer. This means that the vehicle needs a higher utilization rate.[30]

Use of Carless Technology

The only commercially used version of carless technology is the RoadRailer, originally invented by the Chesapeake and Ohio railroad in the late 1950's. However, although several railroads

have shown interest in the RoadRailer and several have experimented with it, it is in use only by the Norfolk Southern railroad in its Triple Crown IRT service.[31] Norfolk Southern in 1991 had about 2,000 RoadRailers and planned to add 350 more.[32] The need for a higher rate of utilization when compared with a regular IRT trailer because of the high cost of the vehicle is a problem. The lack of sufficient backhaul traffic to enable high utilization has been a reason for lack of adoption of the RoadRailer idea. At the same time, the cost advantages of double-stack service in high density lane service cannot be matched by the RoadRailer.

Electronic Data Interchange

Electronic data interchange (EDI) between railroads and trucking companies and between them and shippers has been important in helping to reduce the information problem in IRT. Where EDI is used, not only can railroads and trucking companies keep better track of where vehicles are, but shippers can also be provided with accurate up-to-date status information about their shipments.[33]

Trailers Versus Containers

It was noted previously that containers dominate in international IRT. In domestic service, however, most traffic is carried in trailers. Overall, in both international and domestic service, of the 6.2 million IRT units loaded by United States railroads in 1990, 55 percent were trailers and 45 percent were

containers.[34] It has been estimated that domestic containers accounted for only about seven percent of all IRT trailer and container traffic, both international and domestic, in 1989.[35] However, American President Lines, the dominant double-stack operator, reported that domestic shipments accounted for only one-third of the freight carried on its double-stack trains in 1985, but two-thirds in 1990.[36]

There were 16,500 pure domestic containers in the United States in 1989, most of which were 48 feet long.[37] There were 19,000 in 1990.[38] The fact that the trailers used in IRT are becoming old and obsolete may lead to more containerization. The older trailers are forty and 45-feet long and 96 inches wide. New federal and state regulations now permit 45- and 48-foot trailers that are 102 inches wide throughout the country. In many states, 53-foot trailers and containers are allowed at least to some extent. Carriers must decide whether to invest in new trailers or, instead, invest in containers. The forces are strong in support of the latter. The shipper probably has no interest in whether trailers or containers are used. The shipper is concerned only with whether or not the service is as good or better than truckload service and at what cost.[39]

Many experts believe that, in the future, it is likely that containers will to a great degree replace trailers in domestic IRT.[40] The probable growth in domestic double-stack service, because of its economies, will require the use of more containers. The expected continued growth in containerized

foreign trade by United States companies will make more containers available for use some of the time in domestic service. In fact, the availability of international containers on backhaul routes is said to be what started the domestic container revolution.[41] Trailers are most likely to survive in shorter haul and lower volume domestic traffic lanes because double-stack is not practical in those circumstances.[42]

MARKETING INTERMODAL RAILROAD-TRUCK SERVICE

Railroads traditionally have not been marketing oriented. Although they had large sales staffs to sell their services to shippers, prior to regulatory reform the carriers usually did little in the way of sophisticated marketing planning, marketing research, and so on. When IRT developed, the railroads followed the same marketing approach.

Shippers' Agents

Shippers' Agents Defined

As IRT grew, because rail flat cars often accommodated two truck trailers, a problem was created when a shipper could not provide more than one trailerload at a time. The need to pair up trailers received from different shippers in order to use the space available on a flat car arose. "Shippers' agents," who were usually also involved in other transport-related businesses, began to provide this service for the railroads; they would, in effect, buy the space from the railroad and then try to sell it

to shippers. However, under the Interstate Commerce Act, to be exempt from federal economic regulation, shippers' agents had to confine their operations to either an origin or destination terminal area, not both. This prevented them from providing door-to-door service to shippers.

Increased Use of Agents

As time passed, railroads increasingly relied on agents to match up trailerloads and on other third parties (freight forwarders and shippers' associations)[43] to provide IRT traffic. In order to minimize costs, some railroads eventually began to reduce their own sales forces. With the 1981 deregulation of IRT by the ICC, the restriction against agents operating in more than one origin or destination terminal area was lifted enabling them to supply shippers with complete door-to-door service, regardless of location, and their role in marketing IRT expanded. The agents became "retailers" and the railroads became "wholesalers" of IRT service. In effect, the railroad sells the service to the agent who, in turn, sells it to the shipper. Contracts between the railroad and the agent are often involved.[44]

The unbalanced traffic or empty backhaul problem had a lot to do with the growth of agents in IRT marketing. Because of the imbalance between eastbound import and westbound export freight traffic, ocean carriers and railroads were forced to do something to attract westbound freight in order to minimize the number of

empty containers moved westbound. Agents offered a way to help to do this.

Currently, there are about 150 shippers' agents in the United States (less than in the past--there were between 500 and 600 in 1985). Most of these are small regional or local companies with annual revenues of less than $20 million, but there are several large firms with multiple offices serving large areas with annual revenues of over $200 million. About one-half of the agents account for eighty percent of the total agent traffic.[45] Most shippers' agent business is domestic, although they are sometimes involved in international trade as well. In 1989, it was reported that agents accounted for thirty percent of the domestic and international IRT market served by railroads, fifty percent was accounted for by steamship lines and affiliated intermodal operators, only sixteen percent of the business came directly from shippers, and four percent came from LTL motor trucking companies.[46]

Varying Dependence on Agents

According to McKenzie, the BN, Southern Pacific, Santa Fe, Conrail, and CSX railroads have supported the use of agents.[47] The BN, Minnesota's principal IRT railroad, has elected to sell its domestic IRT service primarily through agents, with the exception of some very large shippers. BN's international IRT service is sold directly to shippers without the use of agents.

Some of the railroads that rely heavily on agents have begun to take more control over the agents' activities in terms of what traffic they will allow them to solicit, how drayage carriers are selected and compensated, how the service is priced to the shipper, and how agents are paid. They have also reduced the number of agents used. For example, some railroads quote IRT rates door to door instead of terminal to terminal (ramp to ramp), pay the agent a fixed fee, and thereby eliminate the agent as a price maker.

Some other railroads, including the Grand Trunk Western and Norfolk Southern, have decided to have direct control over marketing all IRT service (no agents). Still other railroads have a mixed approach, including the Union Pacific, where a joint wholesale and retail marketing approach is used.[48] Even where agents are the main method of selling, the railroad company often maintains control of selling to very large shippers.

The arrangements made between railroads and agents vary from railroad to railroad and sometimes within the same railroad. One kind of arrangement is for the railroad to provide the agent with the rates it wants to receive for the rail (ramp to ramp) part of the service. The railroad may also provide the agent with a list of approved drayage companies that can be used and, perhaps, the rates that the drayage companies charge for the pickup and delivery service they perform. The agent then sells the service to shippers, charging a door-to-door rate which is made up of the rail rate, the drayage company rate, and an amount (a markup) for

the agent. The agent then pays the railroad and the drayage company. The shipper may have no idea what the rail and drayage company shares are. Other arrangements can also be found.

Advantages and Disadvantages for Railroads

The basic advantage of the agent system to the railroad is the elimination of some or all of its direct selling expense and the attendant administrative and other problems associated with it. Because of the large geographic areas that must be covered by a large railroad company, complete coverage of the potential market via direct selling can be very difficult, thus encouraging the use of agents. Agents also improve rail car utilization by pairing up trailers or containers. Moreover, using an agent means that the railroad is able to deal with only a small number of agents rather than a large number of shippers when billing for services rendered and in other matters.

A principal disadvantage to the railroad is that the railroad may become too dependent upon the agents it uses and may find it difficult to control the service provided and the level of rates charged by agents. The railroad must also depend on the agents to aggressively and properly sell the service to shippers, to seek out desirable traffic, and to expand the market by bringing in new customers, which they may not do. The railroad is also cut off from its customers and must depend on the agents to provide the necessary data needed for marketing information reporting, customer analysis, and other purposes. It is not

unusual for a railroad to not know much about what commodities are being carried by its IRT system or who the shippers are.[49]

Advantages and Disadvantages for Shippers

From the shipper's point of view, the agent, by assisting the rail carrier in obtaining full carloads, helps to get faster service for the shipper because the railroad avoids waiting for another trailer or container to fill out a car. However, there is the danger that the shipper will be separated from the carriers and will be kept in the dark as to what service and rate alternatives are available from various carriers and what share of the rate paid goes to the railroad and to the drayage company. Whether or not this is a problem depends on how well the agent keeps the shipper informed. In addition, the door-to-door rate paid by a shipper when using an agent may be higher or lower than what would be paid without the agent. It would be lower if the railroad has minimum volume requirements that the shipper cannot meet when dealing directly with the railroad. It could be the same where this problem does not exist. It could be higher where the agent is taking an excessively large "markup." Because the agent business is usually highly competitive, the chances of mistreatment of shippers in these respects is reduced.

Another negative factor for the shipper is that the agent system complicates the liability for loss and damage issue (see below) because it adds another party to the process. The uncertainty about who is liable for loss and damage can be

increased when another party, the agent, becomes part of a transaction. Finally, for the shipper, drayage company, and railroad, the failure of an agent to pass along freight bill payments received from shippers could be disastrous.

Actually, agents have sometimes proven to be of great benefit to shippers, especially those of small size where the agent provides services in addition to arranging IRT service. They sometimes assist the shipper in determining modes and individual carriers to use, in arranging transportation with non-IRT carriers, in negotiating rates with carriers, in tracing of shipments, in filing claims for loss and damage, and so on, thus relieving the shipper of some of the tasks that traffic managers usually perform. The fact that many agents are also motor truck brokers acting as an arranger of motor truck service for shippers means that a shipper can arrange for straight truck service as well as IRT through the same firm.

The success of agents in IRT is a reflection of the tendency of some shippers to be unconcerned about who actually performs transportation service for them. They are, instead, looking for "seamless" transportation, meaning they do not want to know anything about the move except that it can go from origin to destination quickly, safely, reliably, and inexpensively.[50]

Drayage Companies

Drayage companies ordinarily are not involved in selling IRT service. Instead, they are called upon by railroads or agents to perform service when needed. Usually a highly competitive business, local drayage often suffers from depressed rates and high turnover rates.

Pricing Intermodal Railroad-Truck Service

The traditional way to price most railroad service was to quote rates per unit of weight on individual commodities for each traffic lane (combination of origin and destination points). These are called "commodity rates." The rate per hundred pounds was often different for different commodities, even though the origin and destination points and route travelled were the same. The differences in rates reflected the differences in the characteristics of the commodities, such as their value, susceptibility to loss and damage, and the amount of competition that existed to carry the commodity. A very complicated rate structure resulted from this approach.

In IRT service, rail carriers eventually placed less emphasis on what was being carried, particularly where contracts with agents were involved, and they often quoted rates per trailer or container or per trailer-mile or container-mile (not per unit of weight), with a fixed rate regardless of what was carried in the trailer or container. Rates that disregard the contents of a vehicle are called "freight all kinds" (FAK) rates. This kind of pricing was encouraged by the fact that many

competing truckload carriers had also switched to per trailer or mileage rates, regardless of contents.

Recently, some railroads have determined that the amount of total revenue produced by IRT traffic could be increased if the rates reflected the characteristics of the commodities carried. For example, a higher-value commodity could pay a higher rate than a lower-value commodity. Therefore, they have shifted partly or almost entirely to commodity rates.[51] The rates are quoted on a per-trailer or per-container basis or on a per-mile basis, but they vary over a given traffic lane depending on what is in the unit. Some of the larger truckload carriers have also begun to shift back to commodity rates for the same reason.

Therefore, a mix of FAK and commodity rates is being used by IRT carriers, quoted on a per-trailer or per-container or a per-mile basis. However, the FAK or the commodity rate is not necessarily the same for all shippers that buy the same service. Because the carrier tailors the rate to fit each individual shipper, two or more shippers that ship the same size of trailer or container between the same two points under FAK rates may not pay the same amount per unit moved or per mile. Neither will two shippers that ship the same commodity in the same size trailer or container between the same two points under commodity rates.

COMPETITION FACED BY INTERMODAL RAILROAD-TRUCK CARRIERS

Motor Trucking

Kinds of Motor Truck Operators

The principal competitor of IRT is all truck service. For-hire motor truck service consists of common carriers who serve the general public and contract carriers who have entered into agreements with individual shippers to perform motor truck service for them. Many for-hire carriers today are both common and contract. Private motor carriers are those business firms, such as manufacturers, wholesalers, etc., who have decided to operate their own trucks. All of these forms of motor trucking are potential competitors of IRT.

These carriers can be further categorized by size of shipments carried. Truckload carriers carry shipments that amount to a full truckload. LTL carriers carry smaller less-than-truckload shipments, usually combining the shipments of several shippers into truckload quantities. Because IRT is primarily a truckload or containerload form of transportation, the LTL trucking company is not a direct competitor. In fact, as noted previously, the LTL carrier is sometimes a customer when it decides to build a truckload or containerload out of several LTL shipments and then ship the trailer or container via IRT for the long haul.

For-Hire Truckload Carriers

Reform of economic regulation of interstate for-hire motor trucking in the late 1970's and early 1980's drastically changed the truckload industry. By making entry into the industry more open, reform resulted in an excessive number of truckload carriers. This has led to depressed truckload rates and improved service. Many of the survivors of this chaotic period (which is still not over) have become very efficient, providing high quality service at relatively low rates, and very difficult to compete against. They often have non-union drivers or owner-operators[52] which contributes to their success in controlling costs. They also use high cubic capacity trailers, in order to gain the maximum productivity per driver, and fuel efficient tractors. In addition, they try to concentrate on high traffic density lanes with balanced traffic flows. The larger carriers have vehicle, fuel, and tire purchase arrangements that provide them with low purchase prices.

It is usually assumed that truckload truckers have the advantage over IRT service on shorter hauls of approximately 600 miles or less. This is because the door-to-door transit time is usually less (see below). The cost structure of the two modes is such that there can also be a rate advantage for trucking on short hauls. IRT service must take into account the large terminal expenses, which are high per mile on short hauls, in pricing its service.

On longer hauls, however, where IRT transit time compares more favorably with that of motor trucks, and costs are less per mile, IRT can be more competitive with straight truck service. In fact, it may have both time and cost advantages for the shipper. For example, the success of double-stack west to east service has made it difficult for long-haul truckload truckers and has forced some of them to seek traffic in shorter-haul, lighter density lanes, sometimes in different parts of the country.[53]

The fact that IRT involves both international and domestic freight movements means that there is a close relationship between how importers, exporters, and ocean carriers choose to move their freight to and from ocean ports and the amount of truckload traffic that is available for motor truckers. If, for example, it is decided that international containers brought to the west coast of the United States by ship will be stripped (emptied) at the port and the contents transferred to domestic containers or truck trailers, the truckload carriers have a chance to participate. If, on the other hand, the containers are allowed to stay intact all the way to the destination of the freight in the United States, the chances are that the container will be carried to the final destination by double-stack rail. This would also mean that there will be more empty containers that need to be moved westbound by rail from the interior United States that will compete against the truckload carriers.[54]

Railroad Boxcars

The role of boxcars has declined sharply in recent years, but boxcar service is sometimes competitive with IRT. This leads to the somewhat curious situation in which IRT sometimes competes against another service of the same railroad. Boxcar competition is much less frequent than is competition with truckload motor trucking.

Air Freight

Air freight is a possible competitor of IRT but, as a rule, the kinds of commodities carried in domestic air freight service--very high value and/or emergency shipments--are not amenable to IRT. The same is probably true of international freight where IRT and associated water transportation technically compete with air freight. Water transportation is usually not thought of as a practical competitor of air freight because of the very great differences in transit time that are involved and the limitations of each mode in efficiently carrying the commodities that are suitable for carriage by the other.

SERVICE AS A COMPETITIVE ISSUE

The service issue is highly important to the success or failure of IRT. IRT has certain disadvantages when trying to compete against straight trucking service.

Transit Time

Slow door-to-door transit time is one of the primary disadvantages of IRT. This is caused by several factors. One is that IRT must deal with the two-mode problem and the difficulty of making the connection between modes in a reasonable amount of time. In regard to this, local drayage companies are frequently criticized for not picking up trailers or containers promptly when they are available, thus contributing to the transit time problem.

The need to assemble and disassemble trains and infrequent train scheduling also affect transit time and can contribute to the slow service problem. In addition, the two-mode system often means that a shipment moves "out of line," meaning that it does not make a direct move from door to door but, instead, must go indirectly because it must pass through the railroad terminals at each end. Also, railroad service sometimes involves more circuitous routing when compared with the Interstate Highway System.

Finally, sometimes more than one railroad is involved when the originating railroad interchanges with one or more other railroads, and this slows down the total transit time. The problems of interchanging between railroads are illustrated by the fact that, in some congested large cities, the trailers and containers are sometimes unloaded from the rail cars and hauled by truck tractors to the yard of the connecting railroad, in

order to avoid the delays in moving the units entirely by rail through the area.

The transit time disadvantage is most clearly found in the case of short hauls of less than 600 miles or so.

Loss and Damage

Another service difficulty is associated with damage to freight. Because of the extra handling involved in transferring between road and rail, the impact occurring when cars are switched (coupled), and the slack action in train operation mentioned previously, early IRT service had a poor damage record. Although damage has been reduced significantly in recent years, the damage issue remains a handicap.

Associated with the damage question is the matter of liability for loss and damage assumed by the carriers and the processing of shippers' claims for loss and damage. Because IRT movements involve more than one carrier, determining who is liable for lost or damaged freight can be a problem. For example, sometimes the railroad will only be liable for freight that is on the railroad or "from ramp to ramp," and not for the drayage part of the haul. This means that, when loss or damage occurs, the question of where it occurred becomes important in determining who is to pay the claim. This may be difficult to do. And, since shippers' agents became important in IRT service, the situation has become even more complicated because the question of the agent's liability for loss and damage is raised.

In addition, regulatory reform has allowed both railroads and trucking companies to assume liability for less than the full value of the goods carried under "released value rates." Such rates are commonly used in IRT, sometimes causing considerable ill will among shippers who learn this after loss or damage has occurred.[55] The time consuming and complicated procedures involved in filing claims for loss and damage in a multi-carrier environment are also an issue.[56]

Service of Truckload Carriers

In contrast, truckload motor truck service moves directly from the door of the shipper to the door of the receiver over the shortest highway route, with no out-of-line moves necessary and no delays for interchanging with another carrier. The damage record of motor trucking companies historically has been better than that of railroads because of less handling, no switching, and lack of slack action. Liability for loss and damage is less uncertain because usually only one carrier is involved. Finally, the motor trucking industry, from its inception, has enjoyed a positive reputation in terms of convenience and reliability.

Because of the service differences that exist, truckload carriage has an edge on shorter hauls and with higher value, time-sensitive freight. In regard to the latter, according to one source, the multi-participant structure, the chances for delays, and the difficulty of assigning responsibility for problems under IRT, make it unattractive to shippers of time-

sensitive, high-value general freight. Shippers also prefer truckload service because it affords them a significantly greater number of routes and carriers from which to choose, as well as faster pickup service.[57] The service problem has caused IRT carriers to place great emphasis on price when competing with truckload carriers.

PART 2 ENDNOTES

1) Containerization is the use of a large box made of steel, aluminum, fiberglass, or other durable materials into which the items of a shipment (cartons, crates, bags, etc.) are loaded ("stuffed"), usually at the shipper's door. The container is then turned over to the carrier and is delivered intact to the receiver, usually without being opened en route. In intermodal transportation, the container is carried by two or more carriers of different modes. In domestic surface transportation, containers are often eight feet or eight-and-one-half feet high by eight feet or eight-and-one-half feet wide by ten to 53 feet in length.

2) Thomas F. Dillon, "Containerization: An Idea That Made Sense," Inbound Logistics, April 1991, p. 26. The first containerships were put into service in 1956. Today's largest containerships can carry more than 4,000 TEU's (Twenty-foot Equivalent Units).

3) American Trucking Associations data cited in Standard and Poor's, "Railroads and Trucking, Includes Coal Basis," Industry Surveys (New York: Standard and Poor's Corporation, February 14, 1991), Volume 2, p. R3.

4) See Trailer Train Company, Intermodal Market Survey, December 1989, pp. 26-27.

5) For discussions of the well-publicized arrangement between J.B. Hunt Transport Company and the Santa Fe railroad, see "Santa Fe, J.B. Hunt Joint Venture Targets Coast-Midwest Intermodal Trade," Traffic World, December 18, 1989, p. 7; "Santa Fe Plays It Both Ways," Containerisation Intermodal, May 1991, pp. 45-46; Quantum's Pace Quickens," Railway Age, May 1991, p. 43; and Ira Rosenfeld, "J.B. Hunt-Santa Fe Honeymoon Has Other Carriers Thinking Marriage," Traffic World, June 3, 1991, p. 9. Hunt has also entered into a similar agreement with the Burlington Northern. See Ira Rosenfeld, "J.B. Hunt Finds Northwest Passage Aboard Burlington Northern Trains, Traffic World, July 1, 1991, p. 100 and David Sparkman, "Hunt To Begin 2nd Rail Venture; BN is Partner," Transport Topics, July 1, 1991, p. 1.

6) Standard and Poor's "Railroads and Trucking, Includes Coal Basis Analysis," Industry Surveys (New York: Standard and Poor's Corporation, October 25, 1990), Volume 2, p. R20.

7) The history of IRT is discussed in several publications, including David R. McKenzie, Mark C. North, and Daniel S. Smith, Intermodal Transportation--The Whole Story (Omaha, NE: Simmons-Boardman Books, Inc., 1989), Chapter 2 and Gerhardt Muller, Intermodal Freight Transportation, 2nd. ed. (Westport, CT: Eno Foundation for Transportation, 1989), Chapter 2 and p. 83.

8) Donald V. Harper, Transportation in America: Users, Carriers, Government, 2nd. ed. (Englewood Cliffs, NJ, Prentice-Hall, Inc., 1982), pp. 601-602.

9) Ibid., p. 603.

10) Gerhardt Muller, op. cit., p. 46.

11) Association of American Railroads, Railroad Facts (Washington: Association of American Railroads, 1989), p. 26.

12) Public Law 94-210, 1976.

13) Public Law 96-448, 1980.

14) Public Law 96-296, 1980.

15) Interstate Commerce Commission, Ex Parte Number 230, Sub. 5, Improvement of Trailer on Flatcar and Container on Flatcar Regulation, 46 Fed. Reg. 14348, 32257, 47797 (1981); 364 ICC 731 (1981), upheld in American Trucking Associations v. Interstate Commerce Commission, 656 F. 2d 1115 (1981). The ICC also deregulated intermodal container movements between the United States mainland and Alaska, Hawaii, and Puerto Rico. IRT in Alaska was added to the exemption in 1987.

16) Interstate Commerce Commission, Ex Parte Number 230, Sub. 6, Improvement of Trailer on Flatcar and Container on Flatcar Regulation, 52 Fed. Reg. 23660, 27810 (1987); 31 ICC 2d 869 (1987). See also David M. Cawthorne and Kathleen R. Keeney, "Intermodal Wins Big at ICC, Loses Some at Appeals Court," Traffic World, June 29, 1987, p. 9.

17) Ex Parte 230, Sub 7, Improvement of Trailer on Flatcar and Container on Flatcar Regulation, 54 Fed. Reg. 51745 (1989); 61 ICC 2d 208 (1989), upheld in Central Motor Freight Bureau, Inc. v. ICC, D.C. Circuit No. 90-1008, February 1, 1991.

18) Public Law 98-237, 1984.

19) For a discussion of reform of regulation of IRT, see Gerhardt Muller, op. cit., pp. 26-29.

20) Calculated from Association of American Railroads data.

21) Nat Welch, "The Future Decade," Georgia Anchor Age, Second Quarter 1991, p. 16. See also David R. McKenzie, et al., op. cit., pp. 55-57.

22) Arnold B. McKinnon, "The Challenges of Intermodal Growth," Georgia Anchor Age, Second Quarter 1991, p. 9.

23) The history of double-stack is discussed in U.S. Department of Transportation, Double-Stack Container Systems: Implications for U.S. Railroads and Ports (Springfield, VA: National Technical Information Service, June 1990), pp. 1-13. This study by the Federal Railroad Administration and Maritime Administration assessed the potential for domestic double-stack container transportation and the implications of expanded double-stack systems for railroads, ports, and ocean carriers.

24) Standard and Poor's, October 25, 1990, op. cit., p. R21.

25) U.S. Department of Transportation, op. cit., Executive Summary, p. i-a.

26) David R. McKenzie, op. cit., p. 31.

27) Double-stack is described in David R. McKenzie, op. cit., pp. 28-31 and p. 217. See also, Gerhardt Muller, op. cit., pp. 79-81.

28) The practicality of using double-stack for points that do not meet the normal criteria for double-stack because of their location and the volume of traffic is reviewed in H. Barry Spraggins, "Assessing the Feasibility of Double-Stack Rail Service in Smaller Locations--A Model to Study Double-Stack Potential," Proceedings of Transportation Research Forum, 1990.

29) A study commissioned by the Federal Railroad Administration and the Maritime Administration concluded that double-stack can be fully competitive with motor trucks in dense traffic corridors of 725 miles or more. See U.S. Department of Transportation, op.cit., p. 183. Because most truck movements are less than 750 miles, double-stack may not be able to divert much traffic from the trucking industry because of the cost and time disadvantages double-stack has on such hauls.

30) Gerhardt Muller, op. cit., pp. 50-51.

31) David R. McKenzie, op. cit., pp. 38-40 and Gerhardt Muller, Ibid., pages 49-50. See also James Abbott, "NS Still Bullish on RoadRailer; Other Roads Entertain Doubts," Traffic World, June 12, 1989, p. 14 and Ira Rosenfeld, "Norfolk Southern Loyalty and EC-92 Give RoadRailer a Promising Future," Traffic World, April 22, 1990, p. 10.

32) Arnold B. McKinnon, op.cit., p. 9.

33) Other technical developments in IRT, not discussed here, include the development of containers to carry bulk commodities and refrigerated commodities, consolidation of rail terminals into a few large "hubs," adoption of interchange agreements between carriers of the different modes, developments in leasing of equipment from equipment supply companies, and developments in ocean vessels and ports.

34) Calculated from data provided by Association of American Railroads, Economics and Finance Department.

35) Gerhardt Muller, op. cit., p. 83 and Trailer Train Company, Intermodal Market Survey, December 1989, p. 30.

36) David S. Bearth, "Stack-Train Pioneer Targets TL Trucking," Transport Topics, May 7, 1990, p. 15. The increased use of containers for domestic IRT service by the Santa Fe railroad is discussed in "Santa Fe Plays It Both Ways," Containerisation International, May 1991, p. 41.

37) Trailer Train Company, op. cit., p. 30.

38) David L. Sparkman, "Prediction: The Intermodal Outlook for 1990's," Transport Topics, May 27, 1991, p. 12.

39) John D. Schulz, "Containers to Replace Piggybacks by Year 2000, Intermodal Leaders Say," Traffic World, September 17, 1990, p. 29.

40) Ibid.

41) Ibid.

42) Gerhardt Muller, op. cit., pp. 85-86. The potential for containerization was the subject of a study published in 1986. It concluded that domestic containerization will not recover highly service-sensitive traffic for the railroads because railroads cannot compete with trucks for shipments that depend on custom-tailored, high-speed, door-to-door service. However, railroads can compete for movements that are primarily price-sensitive, and for movements where substantial price reductions can be traded for marginal service reductions. See Daniel S. Smith, "Domestic Containerization: How Big Can It Get?" Proceedings of Transportation Research Forum, 1986, p. 289.

43) A freight forwarder collects small shipments from shippers and consolidates them into large shipments and then buys transportation service from a for-hire carrier. A shippers' association is an organization of shippers and/or receivers who combine their shipments and purchase large-quantity for-hire transportation.

44) Shippers' agents are not really "agents of the shipper." Instead, they are intermediaries between rail carrier and shipper.

45) Trailer Train, op. cit., p. 5.

46) Ibid., pp. 4 and 14.

47) David R. McKenzie, op. cit., p. 210. However, Conrail also has its Conrail Mercury subsidiary which deals directly with shippers for some IRT traffic. See Kurt Hoffman, "Conrail Mercury Uses Truck Know-How on Intermodal; Services and Costs High," Traffic World, May 7, 1990, p. 18.

48) David R. McKenzie, Ibid., pp. 211-212.

49) Railroad dissatisfaction with some agents is discussed in Kurt Hoffman, "Make-It-Or-Break-It Time Nears for Third Parties," Traffic World, June 12, 1989, p. 6 and Hoffman, "Intermodal Agents Face Tough Choices," Distribution, July 1990, p. 68.

50) Thomas E. Dillon, op. cit., p. 27.

51) BN's domestic container service, BN America, is an example of almost complete adoption of commodity rates.

52) Owner-operators or "independent truckers" are persons who own one or more vehicles but do not carry traffic in their own names. Instead, they hire themselves and their vehicle(s) out to a for-hire trucking company and carry under that company's name.

53) John C. Larkin, "Double-Stack is Pushing Truckload Into New Markets," Transport Topics, June 12, 1989, p. 16. See also Roger Gilroy, "Responding to Double-Stack Competition," Transport Topics, May 7, 1990, p. 1 and Standard and Poor's, October 25, 1990, op. cit., p. R43.

54) The status of truckload carriers is discussed in Trailer Train, op. cit., p. 26.

55) Loss and damage in IRT is discussed in David R. McKenzie, op. cit., pp. 258-262.

56) Efforts to improve the claims handling process are discussed in Kurt C. Hoffman, "Intermodal Marketing Agents, Railroads Join Forces to Speed Claims Payments," Traffic World, February 26, 1990, p. 4.

57) Standard and Poor's, October 25, 1990, op. cit., p. R21.

PART 3
PURPOSE OF THE STUDY

ISSUES IN THE DEVELOPMENT OF INTERMODAL RAILROAD-TRUCK SERVICE

As indicated previously, IRT has the potential to provide significant benefits to shippers and receivers of freight and to society as a whole. However, IRT accounts for only a small part of the total freight traffic moved in the United States so the benefits received thus far have been limited. In order for the benefits to be received on a larger scale, (1) IRT service must be available to shippers, (2) the quality and cost of IRT service must be competitive with other modes, and (3) IRT service must be accepted and used by shippers and receivers.

Availability of Service

The availability issue has to do with the IRT physical facilities that are provided by the carriers involved--what are these facilities and where are they? The availability issue also has to do with the origin and destination points served, the commodities that are suitable for carriage by IRT, and whether or not potential shippers and receivers are reached by the IRT marketing system. These factors help to determine whether or not a shipper or receiver will be able to use IRT service.

Intermodal Terminals

An important aspect of the facilities issue has to do with the fact that IRT involves two modes and a connecting point between them--a railroad intermodal terminal or "hub." Because

of cost and other considerations, the number of terminals must be limited in number. Where they are located becomes extremely important in determining availability of the service to potential users because the availability depends in part on how far away they are from the hub. The transit time and the cost of the service increases as the distance of the customer from the hub increases. The problem of distance from a hub may not exist at one end of the haul, but it may at the other end, i.e., the shipper may have good access to an IRT hub, but the receiver may not, or vice versa. Therefore, it is possible, that, although IRT may be technically available to all shippers and receivers in the country, in a practical sense it is not--some are just too far away from an intermodal terminal for IRT to be a practical choice for them--the transit time would be too long and the cost too high.

This problem has become more of an issue in recent years as some IRT railroads have, for efficiency and other reasons, consolidated or reduced the number of intermodal terminals they operate. Obviously, the smaller the number of hubs, the smaller the number of shippers and receivers that can practically use the service.

Origin and Destination Points

As alluded to above an aspect of the service availability question is the matter of what origin and destination points are served by IRT railroads and drayage truck operators. For example, a given shipper may be located close enough to a hub to

use outbound IRT service but the shipment's destination point is not served by IRT or, it can be served only by a time-consuming interchange among two or more IRT railroads, making it impractical time-wise for the shipper. Other examples of origin and/or destination point problems could be cited. The point is that, not all combinations of origin and destination points (traffic lanes) are available to users in a practical sense.

Commodities and Size of Shipments

Two other aspects of the availability issue are the kind of commodities to be carried and the size of shipments. IRT is generally thought of as a practical alternative mainly for general freight (non-bulk) that moves in full trailerload or containerload lots. This rules out a large part of the freight moved in the United States.

Shipper/Receiver Awareness

Finally, an availability issue is whether or not an individual shipper or receiver is made aware of the benefits of IRT service by the IRT marketing system. Obviously, if potential customers are never contacted, directly or indirectly, by the marketing system, in a sense the service has not been made available to them because they do not know of its benefits. In fact, they may not know it exists at all.

Quality and Cost of Service

Quality of Service

In order to be used extensively, IRT service must be of sufficient quality to be competitive with other modes. The quality of service issue has been touched on in a previous section and some disadvantages of IRT that exist in some situations were reviewed. If the quality of service in terms of transit time, availability of equipment, frequency of service, reliability of service, loss and damage, communication of information, or other factors is not high enough, then the service will not be used enough for the potential benefits of IRT to occur. The quality of service issue is a relative matter, because it is usually measured in terms of what competing trucking can provide.

Cost of Service

The approach used by carriers when pricing IRT service was alluded to previously. Because users of transportation are often very price conscious, pricing has always been an important factor in the marketing of transportation services in the United States. The shipper or receiver may take into account a number of factors when making the transportation decision, but price probably always plays a part, and very often a large part. The potential customer often weighs price against quality of service before making a decision. Where IRT has a service disadvantage, price often becomes the main selling point, in anticipation that the

customer will consider price to be more important than service. In other situations the IRT carriers may not need to stress price as much. In any event, IRT prices must be competitive and appropriate in order for the service to be used by shippers and receivers.

Extent of Use by Shippers and Receivers

The final and most important determinant of the extent to which shippers, receivers, and society benefit from IRT service is whether or not it is used by potential customers. This, of course, depends upon the availability, quality of service, and price factors mentioned above, and as well as upon the perception of IRT by shippers and receivers. Related to the extent of use is the issue of the characteristics of the firms that can be expected to be IRT customers, in terms of their size, kinds of products shipped and received, and their location (which is also related to the availability issue discussed above.)

OBJECTIVES OF THE STUDY

The study discussed in this report was intended to deal with the issues described above by identifying the IRT facilities and services available to manufacturers in Minnesota, the extent of use of IRT service by those manufacturers, and their perceptions about the service. Several specific objectives were included.

Objective one of the study was to identify the IRT physical facilities (carriers and terminals) that serve manufacturers in Minnesota.

Objective two was to identify the IRT services available to manufacturers in Minnesota, including origin and destination points served and commodities carried.

Objective three was to measure the degree of use made of IRT transportation by manufacturers in Minnesota and the reasons for using IRT service by size of firm, kind of products manufactured, kinds of commodities transported, and origin and destination points involved.

Objective four was to determine the degree of exposure Minnesota manufacturers have had to the sales efforts of IRT carriers via their direct selling or through the use of shippers' agents.

Objective five was to determine how the quality (availability of equipment, transit time, etc.) and cost (rates paid) of IRT service are perceived by Minnesota manufacturers when compared with truckload carriers.

Objective six was to determine the perceptions that Minnesota manufacturers have of IRT railroads, shippers' agents, and motor truck drayage operators.

Objective seven was to determine whether or not greater use of IRT service by Minnesota manufacturers should be encouraged and, if so, make recommendations to carriers and to the state government concerning how the availability and use of IRT service in Minnesota could be increased.

WHY MINNESOTA MANUFACTURERS?

Manufacturers were studied because they represent a large part of the current and potential IRT market, recognizing, however, that other kinds of firms, including various kinds of distributors, are also current or potential users of the service. Also, information useful in identifying manufacturers was more readily available than for other business activities.

A single state was used as the area to study because it enabled the researchers to include a wide variety of kinds and sizes of manufacturers in a relatively small sample that a wider-area, perhaps national, study would not permit--the size of a respectable sample would have been too large. In addition, confining the study to one state enabled the researchers to use a sample that represented the entire manufacturing population in the state. Wider-area studies, particularly those done on a national basis, often are forced to use membership directories of transportation or logistics organizations to identify firms to study. In addition to making it difficult to focus on a single kind of firm (such as manufacturers), this approach introduces biases connected with size of firm (larger firms tend to belong) and attitudes and practices concerning the issue studied (members can tend to have different attitudes and practices than non-members).[1]

Minnesota was selected as the state to study for convenience reasons and the value of the researchers' previous knowledge about the state's industry and its transportation system. It was

also selected because it is an "average" kind of state in terms of its population and geographic size, kinds of industries located there, and size of firms. Minnesota also has an important IRT railroad--the BN--serving the state with a major hub located in St. Paul. Another factor was that the state government had demonstrated an interest in the effects of intermodal transportation on shippers, carriers, and society in general.

The study was conducted between September, 1990 and September, 1991.

PART 3 ENDNOTE

1) Several limited studies have been made by others of the IRT market, usually on a national basis. These were done by consulting firms, trade magazines, carriers, and equipment companies and were reported on at industry conferences and/or in trade magazines. Using mail or telephone techniques, they surveyed shippers on several issues, sometimes including perceptions about IRT service and costs and modal choice criteria used. Examples include Arthur D. Little and Opinion Research Corporation, Intermodal: U.S.A. Assessment, 1989-1994, June 15, 1989; Trailer Train Company, Intermodal Market Survey, December 1989; "Intermodalism: Much Improved, But Much to Go," Transportation and Distribution, April 1988; and studies by Temple, Barker, and Sloane.

PART 4
METHODOLOGY USED IN THE STUDY

LITERATURE SEARCH

An extensive search of the literature was made to determine what information was available on the development of IRT, the carriers involved, the amount and kind of traffic carried, the marketing of IRT, competitors of IRT, and the market for IRT service. The literature search also served to verify the fact that a study of the kind reported on here had not already been done.

MAIL QUESTIONNAIRE STUDY

A combination of a mail questionnaire study and personal interviews conducted in the winter, spring, and summer of 1991 was used to identify the extent of use of IRT by Minnesota manufacturers and to provide the other information necessary to reach the objectives of the study.

The Mail Sample

Mail questionnaires were sent to companies that had manufacturing facilities in Minnesota. They were randomly selected from the Minnesota Directory of Manufacturers[1] which purports to include all manufacturers in the state.

The selection of manufacturers to include in the mail sample was based upon only one criterion--the size of firm as indicated in the directory. Experience indicated that very small firms are less likely to be users of IRT than larger firms and less likely

to be willing to participate in studies of the kind conducted. Therefore, it was decided that manufacturers with less than fifty employees would not be included in the mail sample and they were removed from the universe before the random selection was made. Except for this size limitation, there was no attempt to select manufacturers on the basis of whether or not they were likely users of IRT or the kinds of products manufactured or other criteria. The idea was that the study would provide a representative picture of the use of IRT by all of the Minnesota manufacturers with fifty or more employees.

The Mail Questionnaire

The questionnaire (see Appendix) was dual-purpose in that it could be completed by both IRT users and non-users. The first eleven questions were common to both groups of respondents. The remaining questions were directed to either users or non-users, not both. This part amounted to four questions for non-users of IRT, and twelve questions for users. Most questions could be answered with a check mark or circle, with space for comments provided.

In cases where responses were not usable because the firm turned out not to be a manufacturer and in cases where the firm could not be found or was out of business, when possible a replacement firm was substituted on the mailing list without disturbing the random character of the list.

Questionnaire Returns

Of the 700 firms on the modified mailing list, five turned out to be ineligible for the study because they were not manufacturers or they were out of business or could not be found. This left a balance of 695 eligible firms that received the questionnaire. This was 55.2 percent of the 1,259 manufacturers in Minnesota with fifty or more employees. Of the 695, 153 returned a usable completed questionnaire. This return rate of 22.0 percent is considered to be good for a study of this kind, especially since many small firms were included in the mailing. The 153 returns were 12.2 percent of all the manufacturers in Minnesota with fifty or more employees.

Because a random sample was used, each manufacturer with at least fifty employees had an equal chance of being on the mailing list, thereby eliminating bias caused by size of firm, kinds of products manufactured, location, and so on. However, there is a deficiency that is found in all mail surveys caused by the fact that it is not known how the non-respondents would have answered the questions. A bias may be caused by the fact that IRT users may have been more likely to respond than non-users, thereby causing an under representation of non-users. However, the letter accompanying the questionnaire and the questionnaire itself encouraged all mail questionnaire recipients to respond, whether or not they were IRT users. The fact that so many non-users did respond (110 firms) indicates that this problem was minimized.

In addition, a comparison was made of the firms that returned the mail questionnaires with the total universe of 1,259 manufacturers with fifty or more employees. The comparison was made on the basis of the number of employees in the firms in the two groups. This chi-square test revealed that the hypothesis that the responding firms had the same distribution as the total population in terms of the number of employees they had could not be rejected with 90 percent confidence, i.e., the distribution among the responding firms was similar to that among the firms in the total population. This tends to indicate that the responding firms did not have different characteristics than the population as a whole and that the results of the study are probably representative of the whole population.

Characteristics of Respondents

Size of Firms

A wide variety of firm sizes, as measured by annual sales and number of employees, were in the study, with smaller firms accounting for a substantial share of the total. The size of firms is discussed in some detail in the findings section of the report.

Location of Firms

The geographic dispersion of the 153 responding firms was good; the overall geographic distribution approximated the distribution of the state's population. The location of the

responding firms is discussed in the findings section of the report.

Fields of Respondents

The fields worked in and/or the titles of the persons that filled out the mail questionnaire included chairman (1), chief executive officer (1), president (19), executive vice president (1), vice president (2), vice president and general manager (3), vice president--distribution (1), vice president--finance (1), vice president--flour division (1), vice president--manufacturing (1), vice president--materials (1), vice president--operations (4), vice president--purchasing (1), general manager (9), managing director (1), treasurer (1), controller (3), accounting supervisor (1), administrative assistant (2), assistant traffic manager (1), department supervisor (1), division manager (1), plant manager (6), production coordinator (1), warehouse manager (1), and manager or director of assets (1), business unit (1), customer service (1), distribution (4), distribution and transportation (1), human resources development (1), inventory control (1), logistics (2), manufacturing (2), manufacturing services (2), materials (9), operations (6), production and inventory control (1), purchasing (9), purchasing and transportation (1), sales (1), shipping (6), transportation (36), and transportation and distribution (2). One person was not identified as to title.

Products Produced

A wide variety of products were produced by the 151 firms that provided product information. The products produced and the materials/parts used by the responding companies are discussed in the findings section of the report.

PERSONAL INTERVIEWS

Carriers and Shippers' Agents

A series of in-depth personal interviews were conducted among executives of six IRT railroad companies and shippers' agents. The purpose was to identify the IRT carriers and terminal facilities that serve Minnesota, the IRT services (origin and destination points served, intermodal plans used, etc.) available to Minnesota manufacturers, commodities moved, transit times and costs involved, the role of agents in selling IRT service and arrangements made between carriers and agents, and other aspects of IRT service. In some cases, multiple interviews were held with personnel of the same company. The companies interviewed were selected on the basis of their importance in the IRT industry.

Manufacturers

After the mail questionnaires were returned from manufacturers, twenty of the mail respondents were interviewed personally. The purpose of the personal interviews was to discuss in considerable depth the material covered in the mail questionnaire and to verify and, in some cases, clarify the

information provided in the mail survey, as well as to obtain information missing on the returned mail questionnaire. Some additional information not asked for in the mail questionnaire that would contribute to the overall effectiveness of the study was also obtained.

The number twenty was chosen because it provided a reasonable representation of the 153 responses received in the mail study. There were also time and money limitations on what could be done.

Of the twenty firms, ten were IRT users and ten were not. They were selected on the basis of their size, kind of products produced, and their location (metropolitan area versus non-metropolitan area and distance from an IRT hub), with variety as the objective. The products produced by the firms involved in the personal interviews were air compressors, cleaners and paints, conveyor systems, corrugated packaging, electronic assemblies, electric motors and generators, extruded film, frozen potatoes, glass products, hair care products, hardwood moldings, health and beauty aids, outdoor electrical outlets, plastic parts and resins, paper, pumps, sales displays, sprayers, storage equipment, and tables. The personal interviews were very useful in gaining a more complete picture of the situation regarding IRT in Minnesota.

In addition to the ten personal interviews among users of IRT, the other 33 users that returned a mail questionnaire were contacted by telephone. Also telephoned were the 57 firms that

had returned a mail questionnaire and had indicated that they had prior acquaintance with IRT but had not used it. The purpose of the calls was to verify the firms' use or non-use of IRT and, in the case of non-users, why they did not use IRT. The telephone calls provided considerable useful information and did not reveal any problems in interpretation of the questions in the mail questionnaire.

PART 4 ENDNOTE

1) Minnesota Directory of Manufacturers, 1991 ed. (Burnsville, Minnesota: National Information Systems, Inc., 1991).

PART 5
FINDINGS OF THE STUDY

INTERMODAL RAILROAD-TRUCK FACILITIES AND SERVICES IN MINNESOTA

Railroads in Minnesota

There are about 4,800 miles of railroad line in Minnesota.[1] The three largest railroads in the state, the BN, the Soo Line, and the Chicago and Northwestern (CNW), account for about 75 percent of the state's rail mileage.[2] The remaining railroads are small regional and local carriers.

Of the Minnesota railroads, the BN and the Soo Line provide IRT service in the state. The CNW formerly provided IRT service in Minnesota, but no longer does so, although it has a substantial IRT service elsewhere on its system.

In terms of line mileage, the BN is the largest railroad in the country and in the state. Serving nineteen states and two Canadian provinces, it has about 23,500 line miles overall extending from Seattle, Washington to Mobile, Alabama, and about 1,940 in Minnesota. The map in Figure 5-1 shows the BN's route system.

The Soo Line is wholly owned and operated by CP Rail System (Canadian Pacific). It has 5,800 line miles in the northern and central parts of the United States extending from eastern Montana to Kansas City, Chicago, Louisville, and Detroit, with 1,350 miles in Minnesota. A map showing the Soo Line's route system is in Figure 5-2.

Figure 5-1

Burlington Northern System Map

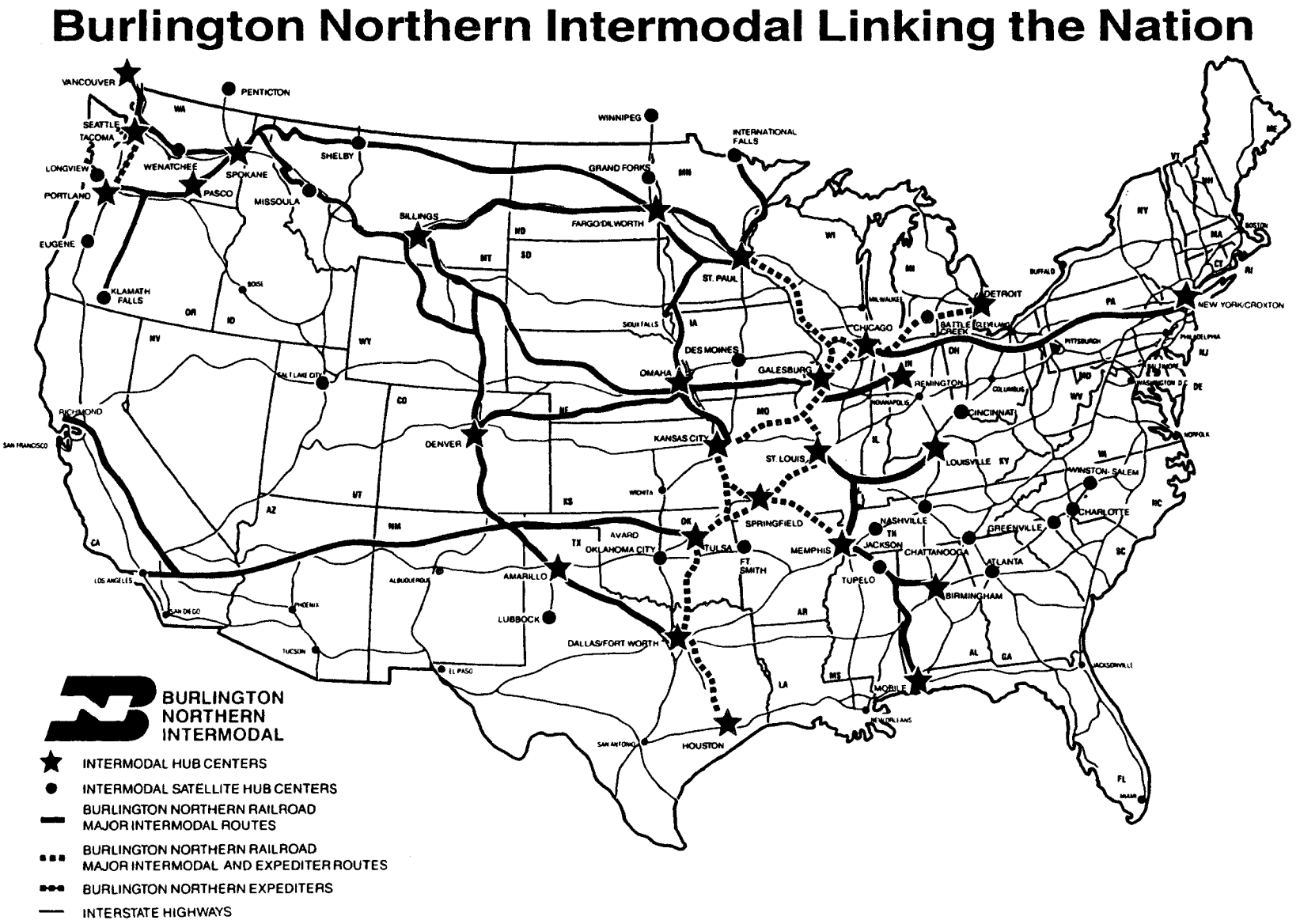


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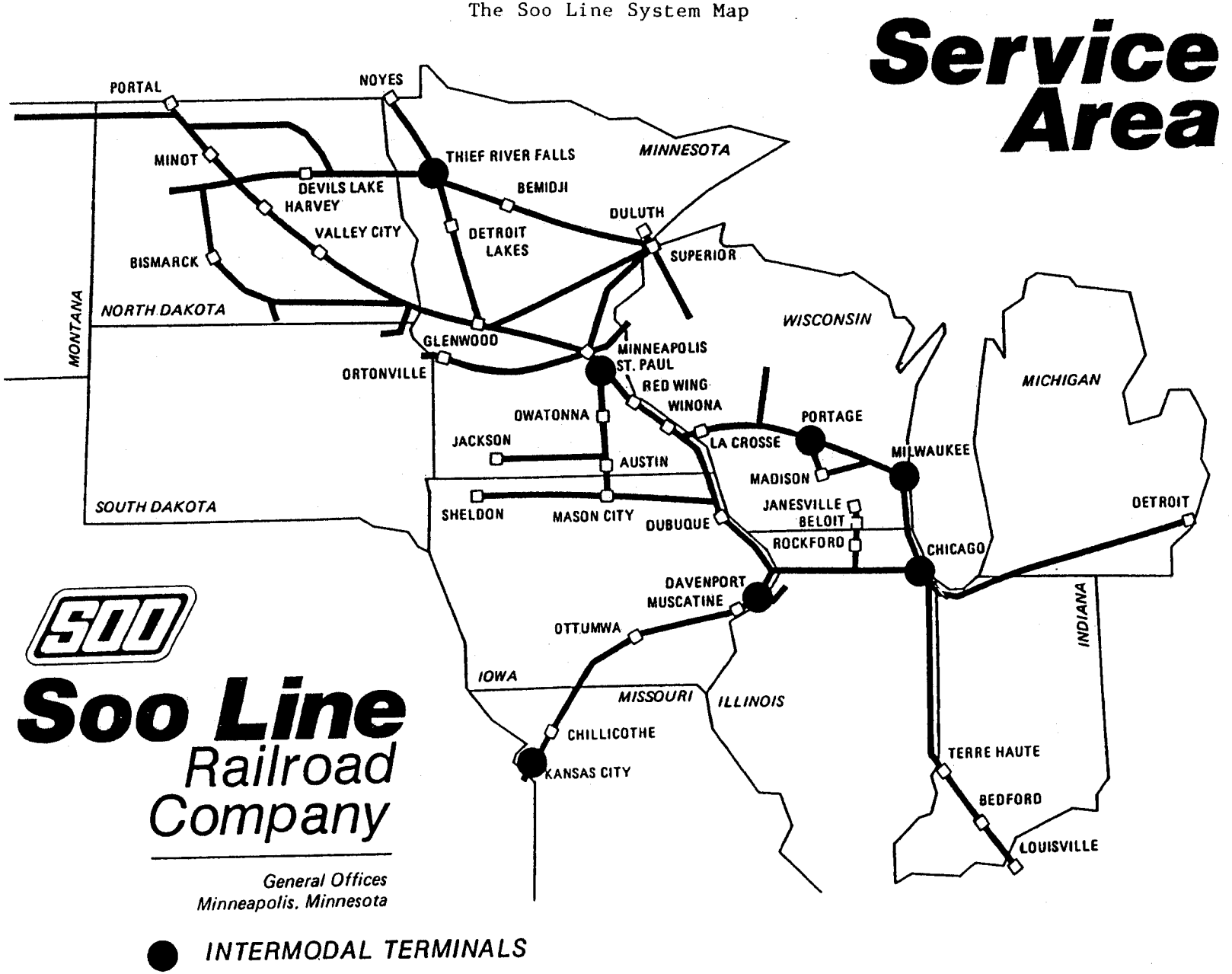
Figure 5-2

The Soo Line System Map



The CNW operates over 6,400 miles of line in the central part of the country extending from Illinois to Wyoming. It has 550 miles in Minnesota.

Intermodal Railroad-Truck Terminals in Minnesota

There are six IRT terminals available to Minnesota manufacturers. Their locations are shown in Figure 5-3.

Burlington Northern

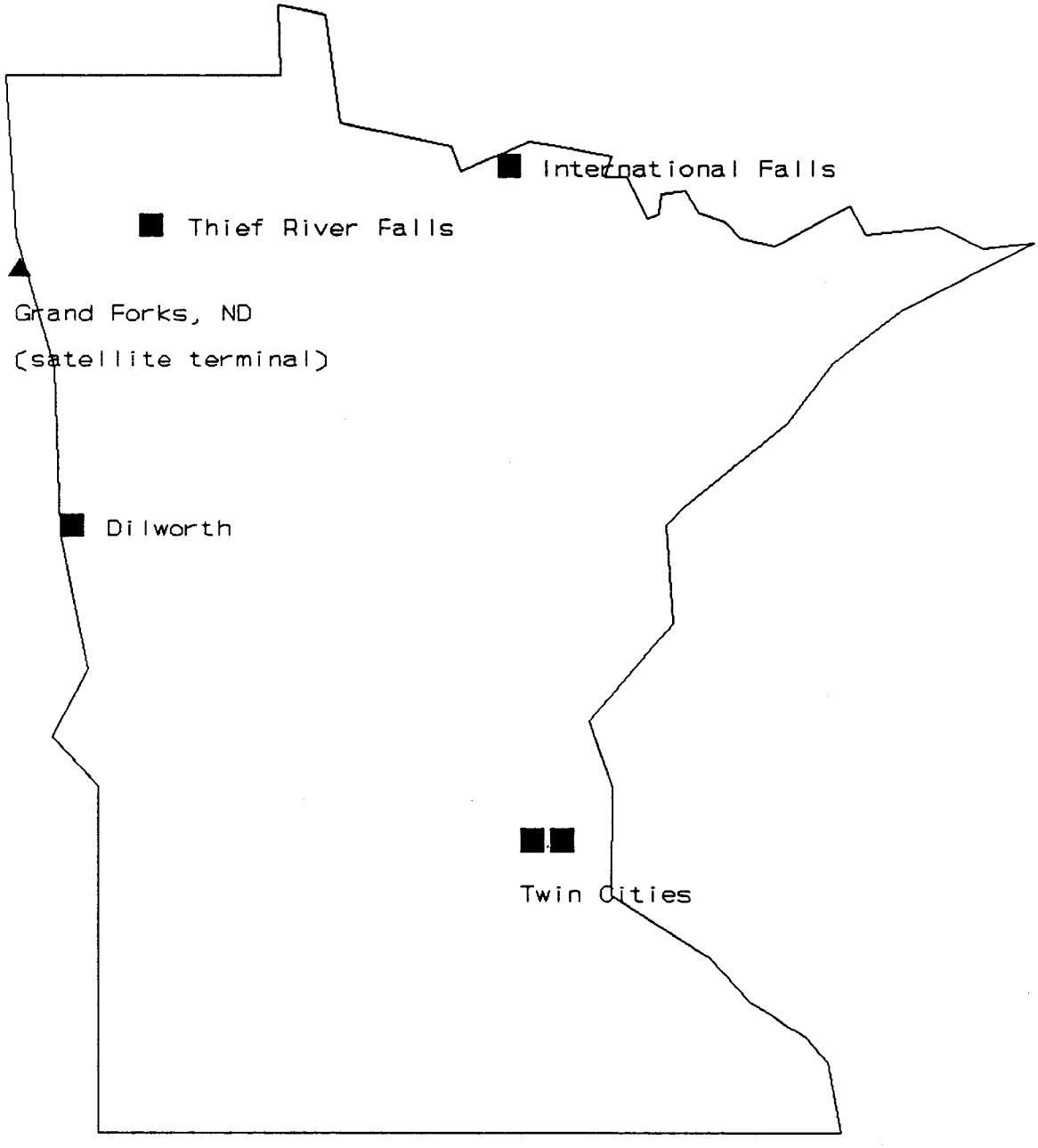
The largest and most important IRT terminal in Minnesota in terms of traffic volume is the BN's Midway terminal at Pierce Butler Route and Snelling Avenue in St. Paul. It is one of 26 major IRT hubs on the BN system. It consists of eighty "working car spots," i.e., the number of 89-foot IRT cars that can be accommodated at one time.

As can be seen in Figure 5-1, the BN also operates an IRT terminal at Dilworth, Minnesota, on the border near Fargo, North Dakota. The Dilworth yard has seventeen working car spots. The two BN terminals generally serve two different geographic areas in the state, with some blurring of the dividing line.

In addition, a new IRT terminal with nine working car spots opened in 1990 at International Falls primarily to serve paper mills there. It is owned by a paper company and operated by its own railroad subsidiary. Intermodal traffic is moved from the yard by the Duluth, Winnipeg, and Western Railroad (owned by the Canadian National Railroad) to Superior, Wisconsin where it is transferred to the BN.

Figure 5-3

LOCATION OF INTERMODAL TERMINALS
IN OR NEAR MINNESOTA



Finally, there is a BN "satellite" terminal at Grand Forks, North Dakota, on the Minnesota border, which is serviced by highway from the Dilworth terminal. This means that it has no direct IRT service but trailers and containers can be moved by the BN to and from Grand Forks by highway from and to the Dilworth yard near Fargo.

In the early 1980's, the BN operated 130 TOFC-COFC terminals; nearly all were TOFC ramps where trailers were driven on to and off of the flatcars. BN offered very little container service. Since that time, the BN has increased its participation in containerization and has reduced the number of IRT terminals to 26 large hub centers and 24 satellite terminals, many of which have mechanized loading and unloading procedures.[3] The hub centers are large linkage points between truck and rail where trailers and containers are placed on or taken off rail cars. They also serve as points where blocks of IRT cars are received from various points and consolidated into a complete train destined to some other hub, or where trains or blocks of IRT cars are broken up to be dispatched elsewhere on the BN system. The hubs are intended to serve an area of 250 miles around each hub.

In recent years the BN has shown interest in bringing IRT service closer to customers by adding more terminals (in contrast to its previous policy of reducing the number of terminals). An example is the intended establishment of an IRT terminal at Duluth, which would bring IRT service closer to shippers and receivers in northeastern Minnesota.

The Soo Line

The Soo Line has seven IRT terminals in the United States. The main Soo Line IRT terminal or hub in Minnesota is the Shoreham yard located in northeast Minneapolis where a new IRT facility was opened in 1990. The Shoreham site replaced the Soo Line's Warner Road IRT facility near downtown St. Paul which was sold to the city for riverfront redevelopment purposes. The capacity of the Shoreham yard is 43 89-foot car spots.

Another Soo Line IRT terminal facility is located at Thief River Falls in northwestern Minnesota where bags of Red River Valley seasonal agricultural commodities[4] are loaded into containers for export to other countries. The capacity of the yard is seven 89-foot working car spots.

Access to Intermodal Railroad-Truck Service in Minnesota

IRT service is nominally available everywhere in the state of Minnesota but not in practice. This is because of the cost and time involved in drayage to and from the limited number of intermodal terminals and the problem of out-of-line hauls to and from some parts of the state.

As to the cost and time of drayage, the opinions of experienced IRT executives vary as to what is the practical service area from a hub, ranging up to 250 miles, with about 100 miles being the most likely limit. The fact that there are BN IRT terminals near Fargo and at Grand Forks and a Soo Line terminal at Thief River Falls means that some firms in the

northwestern part of the state have access to IRT service that they otherwise would not have because of distance from the Twin Cities hubs. The new intermodal terminal at International Falls is an example of a situation where IRT is a more feasible alternative than would be the case without it.

The out-of-line problem is another barrier to access. Areas in Minnesota that would involve an impractical out-of-line haul when using a Twin Cities IRT hub would most likely include the southwestern and southeastern parts of the state, at least for some shipments (depending on the location of the origin or destination point outside of Minnesota). For example, a shipper in Marshall, in southwestern Minnesota, would probably find it difficult to effectively use IRT service for shipments to Denver because of the need to move a trailer or container northeast to the Twin Cities and then west to Denver. The same problem could exist for a shipper in Winona, in southeastern Minnesota, who wants to make a shipment to Indianapolis. The move would have to be northwest to the Twin Cities and then southeast to Indianapolis.

Intermodal Railroad-Truck Services Provided in Minnesota

Burlington Northern

The nation's largest IRT railroad, the BN carried over 937,000 trailers and trailer-size containers on its total system in 1990,[5] providing nationwide domestic and international IRT service. The company serves the 100 largest transportation

corridors from its 26 hub centers, either directly or via interchange agreements with other railroads.

The BN operates more than fifty "dedicated" or "Expediter" IRT trains, meaning that they carry only IRT traffic. These trains offer the advantage that, because less switching and classifying of cars takes place, the transit time is improved and damage to freight is reduced. Dedicated service is available at the St. Paul hub (see the map in Figure 5-1).

BN Minnesota service includes conventional domestic TOFC and COFC service and both domestic and international double-stack container service. Much of the international double-stack traffic moves through the ports of Portland, Seattle, and Los Angeles (the latter through an agreement with the Santa Fe railroad). Trains containing double-stack loads from Chicago and from the west coast stop at the Midway yard, picking up and delivering both domestic and international double-stack loads.

Most domestic IRT service provided by the BN and other carriers in the past has been in trailers, not containers. In 1989, BN established a new domestic containerized service, called BN America (BNA), which is intended to eventually convert its domestic TOFC and COFC service to double-stack containerized moves, using 48-foot containers. BN controls the service door to door although agents are used to make customer contact. Still in the process of adding routes to this system, in 1990 BNA handled 100,000 containers, most of which were not double-stack. A considerable amount of BN's domestic IRT traffic is still handled

outside of the BNA system. This is expected to change over time as BNA adds more lanes.

The Soo Line

Although the Soo Line serves a relatively small geographic area, it can interchange IRT traffic with other railroads to provide nationwide and international service. Much of the interchanging takes place in Chicago. In 1990, the Soo Line carried almost 122,000 trailers and trailer-size containers on its system.[6] Most domestic traffic was carried in trailers. Most Minnesota traffic to and from the east and southeast moves via Chicago. Traffic to and from the west is routed through Kansas City or through western Canada. About two-thirds of the Soo Line's IRT traffic to and from Minnesota is international.

The company does not provide double-stack service to Minnesota customers, although the Soo Line has double-stack service between Chicago and Kansas City, where it interchanges traffic with the Southern Pacific railroad.

American President Distribution Services

American President Distribution Services (APDS) is a division of American President Companies (APC) and is responsible for selling APC IRT service. American President Lines (APL), an ocean carrier, is also a subsidiary of APC. APC and APDS do not operate any railroads. Instead, they contract with United States railroads to provide the rail part of their service. They are an

example of an ocean carrier participating in IRT directly and are referred to as an "intermodal operator" in the industry.

APC and APDS offer double-stack service in Minnesota but they usually do not use Minnesota IRT hubs. Instead, the traffic is trucked to or from Chicago by another APC subsidiary, American President Trucking (APT). At Chicago, the containers are placed on or removed from rail cars. Both domestic and international shipments are moved this way. Occasionally, APDS uses the Soo Line for the Minnesota-Chicago segment. APT performs short-haul and long-haul straight trucking service for the general public which is not associated with the IRT service as well. APDS also arranges conventional IRT service as a shippers' agent.

Drayage Services

For BN's domestic IRT service, drayage is provided by for-hire trucking companies that are under contract with BN and on an approved list. The shippers' agents that sell BN's IRT service select from the approved list the individual drayage carriers they want to use to serve a particular shipper or receiver. In BN's international IRT service, agents do not participate and BN itself selects the drayage carriers.

The Soo Line deals with its agents on a ramp-to-ramp basis only and relies on the agents to select the drayage companies to use in IRT service from a list approved by the railroad.

In addition to using its affiliated company, APT, APDS uses local for-hire trucking companies to perform local pickup and delivery service for non-double-stack movements. Local drayage

companies provide about seventy percent of its drayage service; the rest is provided by APT.

There is a sufficient supply of drayage carriers available throughout the areas in Minnesota where IRT is a practical alternative for shippers and receivers. Actually, a relatively small number is used. One shippers' agent reported that it used three Minnesota drayage companies regularly. Another reported use of seven or eight in the state. Drayage companies frequently used in Minnesota include A and H Cartage, Inc., Aladdin Intermodal, BarOle Trucking, Inc., Maier's Transport and Warehouse, MCU Intermodal, Inc., Mercury Dispatch, Six Transfer Company, Spicer Trucking, Track Transport, and Wenberg Transfer.

Equipment

IRT service makes use of a wide variety of equipment. There are up to thirty varieties of IRT rail cars, while trailers and containers range from twenty to 53 feet in length and can be for dry cargo, refrigerated cargo, or even bulk cargo. There is a variety of truck chassis lengths for containerloads.

The BN uses a mixture of owned and leased trailers and containers. The rail cars that are used in BN's IRT service are owned or leased by the BN or are obtained from Trailer Train Company, a railroad industry owned car company. Some double-stack equipment is provided by ocean carriers.

The Soo Line does not own any IRT equipment and leases less than 100 trailers used in IRT service. Instead, it relies on a

container pool for containers and Trailer Train for rail cars. Double-stack equipment is usually provided by ocean carriers.

APC and APDS operate many trailers and containers of various types and sizes as well as truck chassis and double-stack rail cars used in IRT service. The equipment is acquired in a variety of ways.

Other ocean carriers and some shippers also have their own or leased trailers and containers that are used in both domestic and international IRT service. LTL truckers also own or lease the trailers and containers they ship in IRT service. Shippers' agents ordinarily do not get involved in providing equipment.

All carriers and agents consulted agreed that the supply of IRT equipment in Minnesota is adequate, although the supply of trailers gets tight for outbound shipments in the fall of the year when Christmas traffic is heavy. Otherwise, equipment supply has not been a problem.

Minnesota Traffic Volume

The total number of loaded IRT units moved to or from Minnesota intermodal terminals per year is about 195,000 trailers and containers. About 36.0 percent of this is made up of international traffic.[7] The BN accounts for a large part of the IRT traffic originated or terminated in Minnesota, amounting to about 140,000 trailers and containers per year. BN's IRT traffic to or from Minnesota is about 75 percent domestic and 25 percent international.

The Soo Line IRT traffic to or from its two Minnesota intermodal terminals amounts to about 47,000 units per year. About 69 percent of the Soo Line's IRT traffic is international.

APDS moves about 7,500 trailers and containers per year to or from Minnesota, most of which is domestic traffic.

There is an imbalance between IRT traffic moving outbound from Minnesota and IRT traffic moving inbound to Minnesota, with outbound exceeding inbound. The outbound traffic is about 56 percent of the total number of IRT loads moved per year; inbound traffic is about 44 percent. A reason for this is the natural imbalance caused by Minnesota sending out more goods than it brings in. In addition, a major cause of the IRT traffic imbalance is the nature of motor truck competition. IRT inbound rates are often too high to successfully compete against trucks because much of the truck traffic moving to Minnesota is backhaul traffic, i.e., truckers are trying to return to Minnesota after making deliveries in other parts of the country. The truckers offer low rates in order to attract backhaul traffic. They also offer good transit time, thus making it difficult for IRT. On the outbound side, however, truck rates are relatively high because outbound moves are a "fronthaul" for many of the truckers that are domiciled in Minnesota.

Kinds of Traffic Carried

Data concerning the specific commodities carried into and out of Minnesota via IRT is difficult to obtain. This is because the railroads rely primarily on shippers' agents to make customer

contact and sell the service. Therefore, the agents may know who the customers are and what is being shipped, but the line-haul railroad does not necessarily know unless it makes an effort to do so. In addition, where FAK rates are used, neither the agents nor the railroads involved have a strong interest in knowing what is being carried because the contents of the trailer or container do not affect the rates being charged.

The result of this is that the railroads have incomplete knowledge of what is being carried and the agents, although having more information, know only about what they themselves arrange for and, even in those cases, may not know what is being moved when FAK rates are used. Finally, there are no adequate published sources on commodity movements.

In any event, the data below regarding commodities moved via IRT into and out of Minnesota are based on specific information given by agents and railroads, where it existed, and on conjectures made by these parties where specific information was not available.

The largest customers of IRT in Minnesota are the United States Postal Service (USPS) and United Parcel Service (UPS). Following these are large manufacturing firms, large distribution companies, and LTL trucking companies. In addition, many other firms of all sizes are users of IRT, some of them small companies offering only two or three IRT loads per year.

Some examples of outbound commodities moved (other than the traffic provided by USPS and UPS) cited by carriers and agents

include agricultural commodities, bags, bottles, canned goods, chemicals, flour, food stuffs, hides, logs, lumber products, meat products, paper, printed materials, roofing, telephone equipment, and used computer parts. Examples of inbound commodities include, aside from USPS and UPS traffic, apparel, automobile parts, canned goods, carpeting, fresh fruits and vegetables, furniture, hardware items, lumber, mushrooms, nuts, rum, tiles, tomato paste, video tapes, and tires. A shippers' agent remarked that "just about everything" moves in IRT service, with the exception of very high value commodities and bulk freight. The commodities moved via IRT by the manufacturers included in the study reported on here are described in a later section of the report.

In the opinion of some IRT executives, IRT is not suitable for "time-sensitive" freight, defined as freight that needs fast service. This is because of the time disadvantage that IRT has, at least over shorter hauls, when competing with trucking. However, "time-sensitive" is also sometimes taken to mean that the freight must arrive consistently on-time, even though it is not necessary that the transit time be short. For example, in just-in-time systems, the crucial factor is delivering consistently on time, regardless of what the transit time itself is. This latter kind of time-sensitive traffic can be carried successfully by IRT. The fact that most IRT trains are scheduled to leave at specific set times with cutoff times for accepting freight for them is an indication that there is an attempt made

to regularize and be consistent regarding delivery time. An agent reported that eighty percent of the shipments he arranges specify an exact delivery time with time "windows" set forth in the agreement. Another agent gave the example of a five-day transit time from the Twin Cities to Miami, Florida in which, although the transit time was not very fast, the consistency factor led to the use of IRT by the shipper.

Shippers' Agents

An important part of the IRT system are shippers' agents, upon whom some railroads rely very heavily to arrange service with shippers and receivers. Both the BN and the Soo Line have used agents extensively to sell their IRT service.

The BN uses agents to sell its domestic IRT service, with some exceptions for very large customers where the railroad deals directly with the customers. The BN has annual contracts with the agents that contain various provisions regarding the time of payment to the BN, incentives related to the amount of traffic generated, and other issues.

In non-BNA domestic service, i.e., conventional TOFC and COFC service, the BN provides the agents with the appropriate FAK ramp-to-ramp rates per trailer or container, by traffic lanes. The BN also provides the agents with a list of approved drayage companies and the per-trailer/container and per-mile drayage rates that have been agreed upon.[8] The agent, then, when arranging service with a customer, selects a drayage company and

charges the customer a door-to-door rate that will include the amount the agent must pay the BN and the drayage company plus a margin to cover the agent's other costs and profit. The agent collects from the customer and pays the drayage company and the BN. The agents usually file the loss and damage claims with the BN on behalf of the customer, and they usually have an EDI connection with the BN.

On BNA traffic, the process is somewhat different in that the BN sets the per-container rates door to door, not ramp to ramp, and the rates are usually commodity rates, rather than FAK rates. The agent must use the door-to-door rates, considerably limiting its pricing role. The agent is paid a flat fee per transaction. The agent selects the drayage carrier who is paid a rate previously agreed upon with the BN.

The BN sells international IRT service directly without using agents.

At the Soo Line, the railroad relies on agents for domestic traffic (with some exceptions when the customer asks for direct dealing) but not for international movements. The arrangement with the agents is the same as it is with the BN on non-BNA traffic, i.e., ramp-to-ramp FAK or commodity rates per trailer or container are set by the Soo Line and the agent selects a drayage company from an approved list and sets the door-to-door price. The agents normally process claims for loss and damage and have EDI connections with the Soo Line.

The shippers' agent business is highly competitive and there is a sufficient supply of them for the carriers and shippers in Minnesota to use. As noted earlier, there are about 150 shippers' agents in the United States. There are about fifteen with home offices in Minnesota. Some of these have only one office. Others have multiple offices around the country. In addition, some large agent companies based elsewhere have offices in Minnesota. Agents with multiple offices have an advantage on hauls inbound to Minnesota because their out-of-state offices have a chance to arrange such movements. The one-office agent must rely heavily on arranging outbound traffic.

The agents that are based in Minnesota vary in size ranging up to about 10,000 loads per year and $30 million per year in annual sales. Some of them are truck brokers in addition to their agent work.

Among the agents serving Minnesota are Alliance Shippers, Inc., C. H. Robinson Company, Commerce Express, Inc., Dispatch Freight Services, Expert Freight, Inc., GST Corporation, Hub City, ITCO, King Shipping, Mark VII, Network Transportation, Railvan, Inc., Translink Freight Services, and Twin Modal, Inc. APDS also operates as a shippers' agent in addition to representing APC's double-stack service.

The fact that the two Minnesota railroads rely heavily on agents means that they have very limited sales forces in connection with their IRT service. At the Soo Line, for example, there is only one salesperson for the company's entire system.

His main function is to select reliable agents and to maintain good working relationships with them.

EXTENT OF USE OF INTERMODAL RAILROAD-TRUCK SERVICE BY MINNESOTA MANUFACTURERS

Of the 153 manufacturers responding to the survey, 43 (28.1 percent) reported that they used IRT service for either inbound domestic shipments, inbound international shipments, outbound domestic shipments, outbound international shipments, or some combination of the four. Generalizing this result to all Minnesota manufacturers requires the use of a binomial confidence interval.[9] At a 95 percent confidence level, the true percentage of Minnesota manufacturers using IRT was somewhere between 21.0 percent and 35.3 percent. At an even higher confidence level (99 percent), the range was from 18.7 percent to 37.5 percent. The implication is that the percentage of Minnesota manufacturing firms using IRT was most likely between one-fifth and one-third of all Minnesota manufacturing firms.

The remaining 110 (71.9 percent) of the 153 responding manufacturers indicated that they did not use IRT service. Of these 110 nonusers, 57 (62.0 percent) stated that they were acquainted with IRT, while 35 (38.0 percent) stated that they were not (eighteen did not answer the question). Thus, although IRT service was used by only 28.0 percent of manufacturers, a much larger percentage of firms were familiar with the service. Indeed, even if all those not responding to the familiarity question were unacquainted with the service, approximately one-

half of all nonusers were aware of IRT. Be that as it may, a substantial portion (at least about one-third) of manufacturers were unfamiliar with IRT--the implication being that IRT marketing efforts have not introduced IRT service to all potential users.

SIZE OF USERS AND NONUSERS OF INTERMODAL RAILROAD-TRUCK SERVICE

In terms of size, three different measures can be used: total annual sales revenue of the facility, number of employees at the facility, and annual transportation costs. All three are considered below, and, with each measure, it was found that larger manufacturing firms were more likely to use IRT than smaller firms.

Annual Sales

With regard to annual sales, IRT users tended to be relatively larger than their nonuser counterparts. Table 5-1 gives the breakdown of users by annual sales. Of the 40 users responding, 38 (95.0 percent) had annual sales of $10 million or more, with fourteen (35.0 percent) having sales of $100 million or more. For comparison, Table 5-1 also gives the annual sales figures for nonusers. Of the 99 nonusers responding, 55 (55.6 percent) had annual sales of $10 million or more, with eight (8.1 percent) having sales of $100 million or more. Using a chi-square test, the null hypothesis that use/nonuse of IRT and annual sales are independent can be rejected with 99 percent confidence. One caveat, due to the limited number of data

Table 5-1

Annual Sales of Respondents

Sales	Users	Nonusers
$499,999 and under	0	3
$500,000 to $999,999	0	0
$1 million to $9,999,999	2	41
$10 million to $24,999,999	8	25
$25 million to $49,999,999	7	16
$50 million to $99,999,999	9	6
$100 million and over	14	8
Total	40	99

points, the chi-square test may not be a valid test of independence; nevertheless, a cursory inspection of the results does seem to indicate a relationship between use/nonuse and sales. Therefore, the use/nonuse of IRT was related to annual sales, and it can be concluded that IRT users tended to have higher sales.

Number of Employees

Regarding the number of employees, IRT users again tended to be relatively larger than IRT nonusers. Table 5-2 shows the size of user and nonuser firms in terms of number of employees. Of the 42 users responding to the question, 36 (85.7 percent) employed 100 or more people. In comparison, with all 110 nonusers responding, 64 (59.1 percent) employed 100 or more. The null hypothesis that use/nonuse of IRT and number of employees are independent can be rejected with 99 percent confidence using

Table 5-2

Number of Employees of Respondents

Employees	Users	Nonusers
50 and under	2	12
50 to 74	1	24
75 to 99	3	9
100 to 249	15	33
250 to 499	6	24
500 to 999	7	3
1000 to 1999	6	3
2000 and over	2	2
Total	42	110

a chi-square test. Again, the chi-square test may not be a valid test of independence due to the limited number of data points; however, perusal of the results does seem to indicate a relationship between use/nonuse and the number of employees. Hence, the use/nonuse of IRT was related to employment, and it can be concluded that IRT users tended to have more employees.

Annual Transportation Costs

Using annual transportation costs as a measure of size, this measure can be broken down into inbound and outbound costs. In both cases, IRT users tended to be relatively larger than nonusers.

Analyzing inbound transportation costs first, Table 5-3 shows the annual inbound transportation costs for both users and nonusers of IRT. Of the 43 users and 110 nonusers, 40 users and

Table 5-3

Annual Inbound Transportation Costs of Respondents

Inbound Transportation Costs	Users	Nonusers
$24,999 and under	2	23
$25,000 to $49,000	3	20
$50,000 to $99,999	3	14
$100,000 to $249,999	3	20
$250,000 to $499,999	3	7
$500,000 to $999,999	5	6
$1 million to $4,999,999	11	9
$5 million to $9,999,999	8	0
$10 million to $19,999,999	2	0
$20 million to $49,999,999	0	0
$50 million and over	0	0
Total	40	99

99 nonusers responded to the question. Thirty-two (80.0 percent) users had annual inbound transportation costs of $100,000 or more, with 21 (52.5 percent) having annual costs of $1 million or more. In contrast, 42 (42.4 percent) nonusers had annual inbound transportation costs of $100,000 or more, with nine (9.1 percent) having costs of $1 million or more. Using a chi-square test, the null hypothesis that use/nonuse of IRT and inbound transportation costs are independent can be rejected with 99 percent confidence. Again, the question of the validity of the chi-square test is present due to the limited number of data points; however, inspection of the results seems to indicate a relationship. Therefore, the use/nonuse of IRT was related to inbound

Table 5-4

Annual Outbound Transportation Costs of Respondents

Outbound Transportation Costs	Users	Nonusers
$24,999 and under	0	17
$25,000 to $49,000	2	17
$50,000 to $99,999	2	10
$100,000 to $249,999	2	10
$250,000 to $499,999	2	16
$500,000 to $999,999	7	15
$1 million to $4,999,999	15	13
$5 million to $9,999,999	6	2
$10 million to $19,999,999	3	1
$20 million to $49,999,999	2	0
$50 million and over	0	0
Total	41	101

transportation costs, and it can be concluded that IRT users tended to have higher inbound transportation costs.

Now considering outbound transportation costs, Table 5-4 provides the responses of both IRT users and IRT nonusers. Of the 41 users reporting, 37 (90.2 percent) had annual outbound transportation costs of $100,000 or more, with 26 (63.4 percent) having costs of $1 million or more. Of the 101 nonusers reporting, 57 (56.4 percent) had annual costs of $100,000 or more, with sixteen (15.8 percent) having costs of $1 million or more. The null hypothesis that use/nonuse of IRT and outbound transportation costs are independent can be rejected with 99 percent confidence when using a chi-square test. Again, the

question of the validity is present due to the limited number of data points; however, inspection of the results seems to indicate a relationship. Thus, the use/nonuse of IRT was related to outbound transportation costs, and it can be concluded that IRT users tended to have higher outbound transportation costs.

Conclusions Regarding Size of Users and Nonusers of Intermodal Railroad-Truck Service

When using annual sales, number of employees, and annual transportation costs (either inbound or outbound) as measures of facility size, it was found that size and use/nonuse of IRT were not independent; hence, a relationship between the two existed. Regardless of the size measure employed, IRT users tended to be larger than their nonuser counterparts.

LOCATION OF USERS AND NONUSERS OF INTERMODAL RAILROAD-TRUCK SERVICE

Figure 5-4 contains a map showing the location of users and nonusers of IRT, with the Twin Cities Metropolitan Area as the base point.

Users of IRT were divided almost evenly between those located within the seven-county Minneapolis-St. Paul Metropolitan Area[10] and those located outside the Twin Cities Area. Of the 43 users, 23 (53.5 percent) of them were located in the Twin Cities Area; the other twenty (46.5 percent) were located outside the Area.

Further classification of the users located outside the Twin Cities Area shows that users tended to be in specific geographic

Figure 5-4

LOCATION OF USERS AND NONUSERS BY GEOGRAPHIC REGION

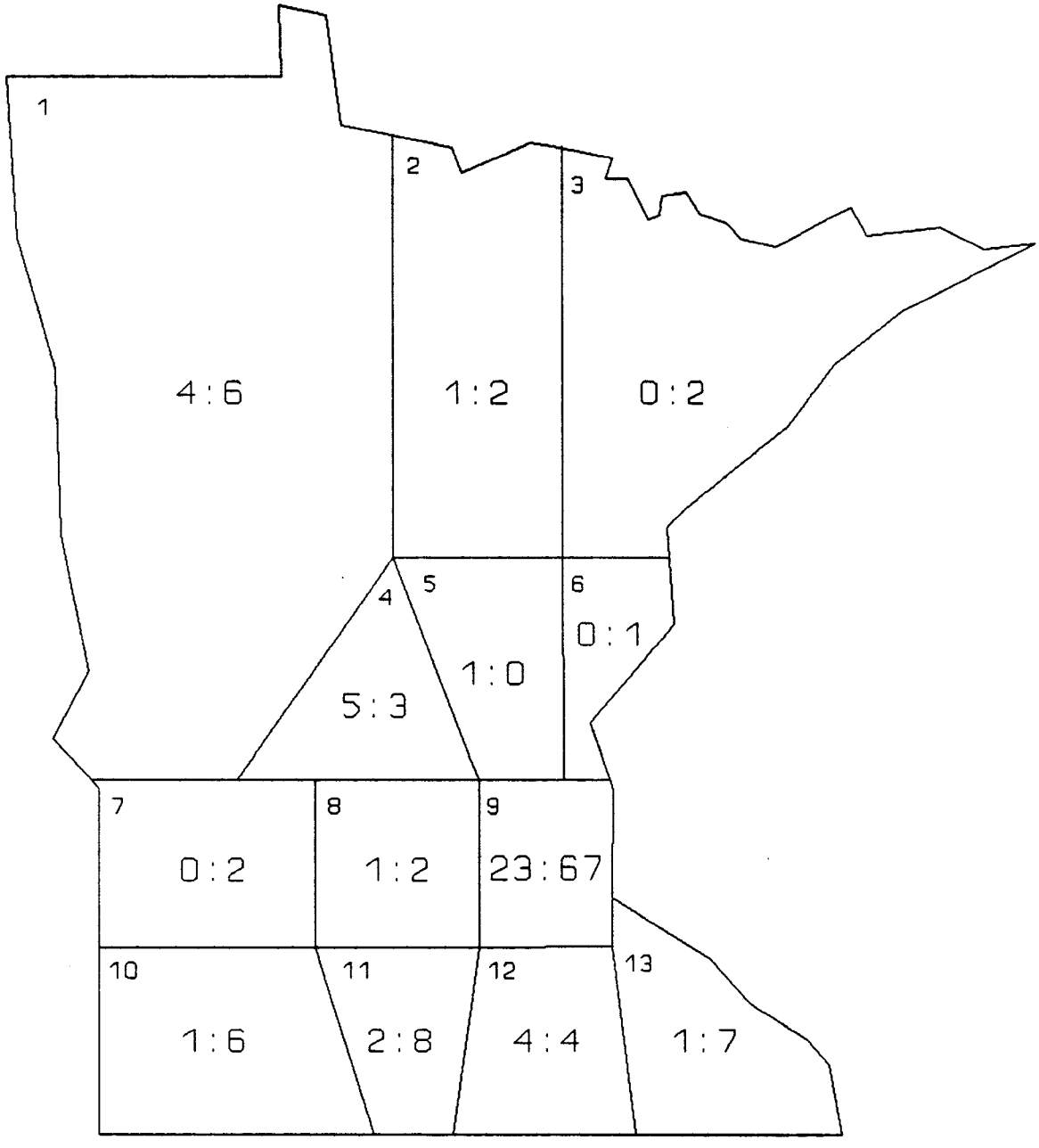


Figure 5-4 (continued)

N:M = number of users reporting:number of nonusers reporting

and: 1 = far northwest Minnesota (Brainerd-Crookston),
2 = far north Minnesota (Hibbing-International Falls),
3 = far northeast Minnesota (Duluth-Grand Marais),
4 = near northwest Minnesota (Little Falls-St. Cloud),
5 = near north Minnesota (Aitkin-Elk River),
6 = near northeast Minnesota (Cambridge-Pine City),
7 = far west Minnesota (Marshall-Ortonville),
8 = near west Minnesota (Gaylord-Litchfield),
9 = Twin Cities (Minneapolis-St. Paul),
10 = far southwest Minnesota (Fairmont-Worthington),
11 = near southwest Minnesota (Mankato-New Ulm),
12 = south Minnesota (Albert Lea-Owatonna), and
13 = southeast Minnesota (Rochester-Winona).

Note: regions are based on their location relative to the Twin Cities, in addition, cities in parentheses give an indication of the range of the region.

regions. Three non-Twin Cities regions with sizable user populations were the near northwestern region of Minnesota (five users), the far northwestern region (four), and the southern region (four).

The geographic breakdown of users supports the notion that users of IRT tended to be located relatively close to IRT terminals. Indeed, the five regions with the greatest number of users were all relatively close to IRT terminals, while regions removed from the terminals had few, if any, users. In terms of actual distances, of the twenty non-Twin Cities users, six (30.0 percent) were located more than 100 miles from an IRT terminal (Dilworth, Grand Forks, International Falls, Minneapolis-St. Paul, or Thief River Falls). Only one user (5.0 percent) was located more than 132 miles from a terminal.

There tended to be more nonusers within the seven-county Minneapolis-St. Paul Metropolitan Area than outside of it. Of

the 110 nonusers, 67 (60.9 percent) were within the Twin Cities Area, while 43 (39.1 percent) were outside of the Area.

The geographic breakdown of nonusers indicates that nonusers of IRT tended to be more dispersed and farther from IRT terminals. Of the 43 non-Twin Cities nonusers, eighteen (41.9 percent) were located more than 100 miles from an IRT terminal. Seven (16.3 percent) were located more than 132 miles from a terminal. Since a larger proportion of nonusers than users was located more than 100 miles from a terminal, the finding that users were more likely to be located close to an IRT terminal, thereby minimizing drayage time and cost, was confirmed.

The importance of distance from an IRT terminal was demonstrated by comments made by users of IRT. A manufacturer of plastic and packaging products indicated that IRT service was acceptable from a cost standpoint if freight can move from a point on a main railroad line to another similar point (minimal drayage distance); otherwise, cost becomes a problem. A manufacturer of packaging materials, located approximately 75 miles from the nearest IRT terminal, said that, in order for outbound IRT to be feasible, the receiver would have to be located near an IRT terminal. On the other hand, a manufacturer of air compressors, located more than 132 miles from an IRT terminal, was a successful user of IRT, and the distance from the terminal was not a problem.

The populations of the seventeen cities where the twenty non-Twin Cities users were located ranged from 1,216 to 42,568.

Ten (58.8 percent) of these cities had a population of less than 10,000 and seven (41.2 percent) had less than 5,000. An examination of the populations of the cities where non-Twin Cities nonusers of IRT were located showed a similar pattern. Therefore, access to IRT service was not determined by the size of the location. Instead, distance from an IRT terminal appears to have been the critical factor.

PRINCIPAL PRODUCTS PRODUCED AND MATERIALS/PARTS ACQUIRED BY USERS AND NONUSERS OF INTERMODAL RAILROAD-TRUCK SERVICE AND THEIR CORRESPONDING ORIGIN AND DESTINATION POINTS[11]

Principal Products Produced by Users and Nonusers of Intermodal Railroad-Truck Service

Users of IRT were asked to indicate the principal products they manufactured. With all 43 users responding, they reported manufacturing a wide variety of products--Table 5-5 shows their responses. Five product types were identified as being most frequently produced by IRT users. Four (9.3 percent) IRT users produced paper and related products, four (9.3 percent) produced printed matter and related products, three (7.0 percent) produced building materials and supplies, three (7.0 percent) produced materials handling equipment, and three (7.0 percent) produced packaging. The implication is that many users tended to be involved in the manufacturing of various wood-based products. Another implication is that the goods produced tended to be of relatively low value per size unit.

Table 5-5

Principal Products Produced by Respondents

Product Type	Users	Nonusers
Aerators	0	1
Agricultural machinery	0	2
Air conditioners, humidifiers, and related products	2	3
Aluminum parts and components	0	1
Animal feed	0	1
Asphalt	0	1
Automotive products and accessories	1	1
Biological products	0	1
Building materials and supplies	3	0
Candy	0	1
Cardboard products	2	0
Chemicals and allied products	2	1
Clothing	0	1
Computer software	0	2
Computers and related peripherals	1	7
Dairy products	2	0
Diplomas, trophies, and awards	0	1
Doors	0	1
Electric motors	0	2
Electronic components and assemblies	0	15
Fasteners	1	0
Filters and related products	1	0
Fireplaces	0	1
Fitness equipment	0	1
Food ingredients	2	1
Food products, except meats	2	3
Fragrances	1	0
Generators	0	2
Glass products and components	1	0
Hearing aids	0	2
Insulation	0	1
Lubricants	1	0
Machine parts and assemblies	0	5
Machine tools	0	3
Materials handling equipment	3	1
Meat products	2	1
Medical supplies and related products	0	5
Metal assemblies and fabrications	0	6
Office furniture	2	0
Office supplies and related products	0	2
Optical components	0	1
Packaging	3	0
Paint	1	0
Paper and related products	4	1
Personal care products	1	1
Plastic and related products and assemblies	2	6
Pneumatic controls	1	1
Precision instruments	0	1
Printed matter and related products	4	1
Printing machinery and supplies	0	1

Table 5-5 (continued)

Product Type	Users	Nonusers
Pumps	1	1
Railroad equipment	0	1
Recreational vehicles	2	0
Regulators and valves	0	2
Rubber and related products	0	2
Sprayers	0	1
Steel	1	1
Steel fabrications	0	3
Storage tanks	0	2
Store displays and fixtures	0	2
Telecommunications	0	2
Vacuum cleaners	0	1
Waste processing equipment	1	0
Water purification equipment	1	0
Windows	0	2
Wire and related products	1	0
Wood products and assemblies	2	6
Total	54	115
Number responding	43	108

Note: a producer of one product type may have manufactured other product types as well, causing double counting.

Nonusers also reported that they manufactured a wide variety of products. Table 5-5 shows the responses for the 108 nonusers reporting. Five product types were identified as being most frequently produced by nonusers. Fifteen (13.9 percent) nonusers produced electronic components and assemblies, seven (6.5 percent) produced computers and related peripherals, six (5.6 percent) produced metal assemblies and fabrications, six (5.6 percent) produced plastic and related products and assemblies, and six (5.6 percent) produced wood products and assemblies. The implications are that many nonusers tended to be involved in the manufacturing of various electronic-based products and that the

products produced tended to be relatively high in value per unit of size.

In comparison, users of IRT tended to produce goods that were larger in size and had a lower value per unit of size than those produced by nonusers.

Principal Materials/Parts Acquired by Users and Nonusers of Intermodal Railroad-Truck Service

Users of IRT were asked to name the principal inbound materials/parts used in their manufacturing processes. The 43 users reported that they received a wide variety of raw materials and parts--Table 5-6 provides their responses. Six material types were identified as being most frequently acquired by IRT users. Eleven (25.6 percent) IRT users used chemicals and allied products, six (14.0 percent) used paper and related products, six (14.0 percent) used steel fabrications, six (14.0 percent) used wood products and assemblies, four (9.3 percent) used fasteners, and four (9.3 percent) used steel. With the exception that the materials seem to be rather unprocessed, no general conclusions can be drawn because the most frequently used raw materials and parts had little in common.

Nonusers also reported a wide variety of raw materials and parts used in their production processes. Table 5-6 provides the responses for the 109 nonusers answering the question. Six material types were identified as being most frequently acquired by nonusers. Thirty-one (28.4 percent) nonusers used steel, 24 (22.0 percent) used chemicals and allied

Table 5-6

Principal Materials/Parts Acquired by Respondents

Material/Part Type	Users	Nonusers
Agricultural commodities	1	1
Aluminum parts and components	0	6
Automotive products and accessories	1	0
Bearings	1	3
Blood	0	1
Brick and ceramics	0	1
Candy	1	0
Cardboard products	0	4
Castings	1	3
Chemicals and allied products	11	24
Clay	1	1
Compressors and related machinery	0	2
Computers and related peripherals	0	1
Dairy products	2	1
Dried leaves	1	0
Electric motors	2	8
Electronic components and assemblies	1	18
Engines	3	0
Fasteners	4	4
Feed ingredients	0	1
Fiberglass and fiberglass products and assemblies	0	3
Film	0	1
Food ingredients	2	2
Forgings	1	2
Gaskets	0	1
Glass products and components	2	5
Hardware	1	3
Hydraulic components	1	4
Ink	2	2
Insulation	0	1
Laminations	0	3
Leather	1	0
Livestock	2	1
Machine parts and assemblies	2	9
Meat products	1	0
Medical supplied and related products	0	2
Metal assemblies and fabrications	3	4
Minerals	1	4
Non-ferrous metals	2	14
Optical components	0	2
Packaging	2	7
Paint	0	2
Paper and related products	6	8
Petroleum products	0	1
Plastic and related products and assemblies	3	17
Pneumatic controls	0	1
Power supplies	0	1
Precision instruments	0	2
Pumps	1	0
Regulators and valves	0	2

Table 5-6 (continued)

Material/Part Type	Users	Nonusers
Rubber and related products	3	4
Sheet metal and related fabrications	0	4
Snowmobile tracks	1	0
Starch	2	0
Steel	4	31
Steel fabrications	6	8
Textiles	2	3
Transmissions	1	0
Vinyl parts and components	1	3
Wax	0	2
Windows	0	1
Wire and related products	3	6
Wood products and assemblies	6	10
Total	92	255
Number responding	43	109

Note: a receiver of one material type may have received other material types as well, causing double counting.

products, eighteen (16.5 percent) used electronic components and assemblies, seventeen (15.6 percent) used plastic and related products and assemblies, fourteen (12.8 percent) used non-ferrous metals, and ten (9.2 percent) used wood products and assemblies. With the exception that the materials seem to be rather unprocessed, no general conclusions can be drawn because the most frequently used raw materials and parts had little in common.

Therefore, the raw materials and parts used by users and nonusers tended to be similar.

Destination Points of Products Produced by Users and Nonusers of Intermodal Railroad-Truck Service

The 43 users of IRT reported that they shipped their products, via all transportation modes (not just IRT), to a wide variety of locations; Table 5-7 shows their responses. Six

Table 5-7

Destination Points of Principal Products

Destination	Users	Nonusers
Specific Regions:		
Alabama	1	2
Alaska	1	0
Arizona	1	0
Arkansas	3	0
California	2	6
Canada	7	17
Colorado	3	1
Finland	0	1
Florida	1	1
Georgia	2	1
Illinois	4	6
India	0	1
Indiana	3	2
Iowa	7	3
Japan	3	0
Kansas	4	1
Kentucky	3	0
Korea	1	2
Louisiana	2	0
Mexico	3	3
Michigan	3	3
Minnesota	10	20
Mississippi	1	0
Missouri	2	2
Montana	1	0
Nebraska	3	3
New Jersey	0	1
New Mexico	1	1
New York	1	1
North Carolina	2	2
North Dakota	5	1
Ohio	2	0
Oklahoma	2	1
Oregon	1	2
Pennsylvania	0	1
Portugal	0	1
Puerto Rico	0	2
South Carolina	2	2
South Dakota	5	1
Tennessee	1	1
Texas	2	4
Utah	2	0
Virginia	1	0
Washington	2	2
West Virginia	1	0
Wisconsin	8	5
Wyoming	2	0

Table 5-7 (continued)

Destination	Users	Nonusers
General Regions:		
Europe	2	4
Far east	3	0
Midwest	3	7
Northeast	1	0
South America	0	1
United States	30	47
World-wide	22	35
Total	172	197
Number responding	43	106

Note: a producer may have shipped products to more than one region, causing double counting.

regions were identified as being most frequently shipped to by IRT users. Ten (23.3 percent) IRT users shipped to destination points within Minnesota, eight (18.6 percent) shipped to Wisconsin, seven (16.3 percent) to Canada, seven (16.3 percent) to Iowa, five (11.6 percent) to North Dakota, and five (11.6 percent) to South Dakota. The implication is that many IRT users tended to distribute their products to points relatively close to or within Minnesota.

Nonusers reported that they shipped their products to a wide variety of locations as well. Table 5-7 shows the responses for the 106 nonusers reporting. Six regions were identified as being most frequently shipped to by nonusers. Twenty (18.9 percent) IRT nonusers shipped to destination points within Minnesota, seventeen (16.0 percent) shipped to Canada, six (5.7 percent) to California, six (5.7 percent) to Illinois, five (4.7 percent) to

Wisconsin, and four (3.8 percent) to Texas. Thus, shipments made by nonusers tended to be geographically dispersed.

These destination points, identified by both users and nonusers, indicated ample opportunities for the use of IRT service. When comparing IRT users with nonusers, it was found that users tended to distribute their products to areas closer to Minnesota than nonusers did.

Origin Points of Materials/Parts Acquired by Users and Nonusers of Intermodal Railroad-Truck Service

Regarding raw materials and/or parts, users of IRT reported that they received shipments, via all modes of transportation, from a wide variety of locations. Table 5-8 provides the responses for all 43 users. Five regions were identified as being most frequently received from. Twenty-six (60.4 percent) IRT users received from origin points within Minnesota, twenty (46.5 percent) from Illinois, ten (23.3 percent) from Canada, ten (23.3 percent) from Indiana, and nine (20.9 percent) from Texas. The points were more dispersed than was found with user outbound shipments, but they were still relatively close to Minnesota.

Nonusers also reported that they received raw materials and/or parts from a wide variety of locations. For the 106 nonusers reporting, Table 5-8 provides their responses. Six regions were identified as being most frequently received from. Sixty-four (60.4 percent) nonusers received from origin points within Minnesota, 39 (36.8 percent) from Illinois, eighteen (17.0 percent) from Ohio, fourteen (13.2 percent) from Pennsylvania,

Table 5-8

Origin Points of Principal Materials/Parts

Origin	Users	Nonusers
Specific Regions:		
Alabama	4	2
Arizona	1	0
Arkansas	1	3
California	5	12
Canada	10	5
China	1	1
Delaware	1	0
Denmark	1	1
England	1	1
Florida	1	1
Georgia	8	1
Germany	1	2
Idaho	0	1
Illinois	20	39
Indiana	10	10
Iowa	5	8
Japan	4	4
Kansas	4	1
Kentucky	2	2
Korea	1	1
Louisiana	1	3
Massachusetts	1	4
Mexico	2	0
Michigan	7	13
Minnesota	26	64
Mississippi	1	1
Missouri	6	8
Montana	1	1
Nebraska	0	3
New Hampshire	1	1
New Jersey	0	5
New Mexico	1	0
New York	5	6
North Carolina	6	1
North Dakota	0	2
Ohio	5	18
Oklahoma	2	2
Oregon	1	2
Pennsylvania	3	14
Rhode Island	0	2
South Carolina	0	2
South Dakota	0	2
Sweden	1	0
Taiwan	0	1
Tennessee	3	5
Texas	9	10
Utah	0	1
Vermont	0	1
Virginia	2	2
Washington	1	3

Table 5-8 (continued)

Origin	Users	Nonusers
West Virginia	1	1
Wisconsin	8	13
Wyoming	0	11
General Regions:		
Far east	1	0
Midwest	1	4
United States	19	25
World-wide	1	3
Total	198	329
Number responding	43	106

Note: a receiver may have received materials from more than one region, causing double counting.

thirteen (12.3 percent) from Michigan, and thirteen (12.3 percent) from Wisconsin. The pattern was less geographically dispersed than was found with nonuser outbound shipments.

Therefore, the study indicated that users and nonusers tended to receive materials from about the same locations.

Conclusions Regarding Products and Points Associated With Users and Nonusers of Intermodal Railroad-Truck Service[12]

There seemed to be a marked distinction between users and nonusers of IRT in regard to products produced and destination points. However, there did not seem to be a difference between users and nonusers in regard to materials and parts received and their origin points.

Users generally produced relatively lower-value items that were often distributed to or close to Minnesota, but distant destinations were also involved. Nonusers generally produced higher-value items that were distributed to destinations both

near by and far from Minnesota. These results to some degree conform with economic geography theory in that lower-value items were produced close to their point of consumption to minimize transportation costs, but higher-value items were not because transportation costs were of minor significance. The results also gave some indication as to why certain manufacturers use IRT. Producers of lower-value goods when shipping long distances seek low cost forms of transportation since transport costs represent a significant portion of total costs. Because IRT is traditionally considered to be a lower cost (and lower service) method of transportation, IRT is used by these producers. On the other hand, since producers of higher-value goods need not concern themselves as much with transport costs, IRT is less likely to be used in favor of higher service modes.

For both users and nonusers, a variety of materials and parts were received with no major differences apparent. The origin points were widely dispersed for both groups of respondents with some tendency to receive from points close to or moderately close to Minnesota. These findings provided no rationale as to why some manufacturers received materials via IRT and some did not.

CONTROL OF TRANSPORTATION BY USERS AND NONUSERS OF INTERMODAL RAILROAD-TRUCK SERVICE

To determine whether Minnesota manufacturers select their transportation modes or whether the selection is made by others, respondents were asked to indicate who decided on the kind of

transportation used. The results of this question provided evidence as to whether Minnesota manufacturers made the decision to use or not use IRT service. The findings indicated that manufacturers, both users and nonusers, tended to select the modes used, both inbound and outbound.

Of the 39 responding IRT users (four did not respond), 31 (79.5 percent) stated that they decided on the mode used for inbound transportation at least some of the time, while eighteen (46.2 percent) stated that suppliers made the decision at least part of the time. In other words, 21 (53.9 percent) users had exclusive control of inbound modal choice, ten (25.6 percent) shared control with their suppliers, and eight (20.5 percent) had no control. On the outbound side, 37 users responded (six did not). Of these, 32 (86.5 percent) stated that they decided on the mode or shared the decision, while twenty (54.1 percent) said that customers decided or shared the decision. Thus, seventeen (46.0 percent) users had exclusive control of outbound modal choice, fifteen (40.5 percent) shared control with their customers, and five (13.5 percent) had no control.

Of the 110 nonusers, 106 responded to the inbound question--83 (78.3 percent) stated that they chose or shared in choosing the mode used, and 51 (48.1 percent) stated that the supplier made or shared in the decision. Thus, 55 (51.9 percent) nonusers had exclusive control of inbound modal choice, 28 (26.4 percent) nonusers shared control with their suppliers, and 23 (21.7 percent) had no control. On the outbound side, 107 nonusers

responded to the question. 84 (78.5 percent) noted that they decided on the method used at least part of the time, and 56 (52.3 percent) noted that the customer decided at least part of the time. Hence, 51 (47.7 percent) nonusers had exclusive control of outbound modal choice, 33 (30.8 percent) nonusers shared control with their customers, and 23 (21.5 percent) had no control.

Both users and nonusers tended to make the transportation mode decision. For both inbound and outbound shipments, about three-fourths of the responding Minnesota manufacturers controlled transportation at least part of the time. On the other hand, approximately one-half of the responding manufacturers allowed others (suppliers and/or customers) to control transportation at least part of the time as well.

MODES OF TRANSPORTATION USED BY USERS AND NONUSERS OF INTERMODAL RAILROAD-TRUCK SERVICE

Table 5-9 shows the percentage of inbound and outbound tonnage carried by each mode for the average IRT user and nonuser.

Higher proportions of tonnage both inbound and outbound were transported by intermodal, railroad, water, and truckload for the average IRT user than for the average nonuser. On the other hand, lower proportions of tonnage both inbound and outbound were moved by air and LTL for the average user than for the average nonuser. For only one mode, pipeline, was the proportion the same, because neither users nor nonusers used it.

Table 5-9

Proportion of Traffic Carried by Various Modes*

Mode	Users		Nonusers	
	Percentage of Inbound Tonnage	Percentage of Outbound Tonnage	Percentage of Inbound Tonnage	Percentage of Outbound Tonnage
Intermodal truck-rail	3.84	6.00	0.00	0.00
Railroad	21.37	4.91	2.57	0.56
Pipeline	0.00	0.00	0.00	0.00
Water	0.96	0.61	0.15	0.04
Air	0.69	3.29	7.33	12.28
Truckload	44.26	54.36	36.22	35.76
Less than truckload	28.88	30.83	53.73	51.36
Number responding	29	33	87	87

*Average percentages reported by those users and nonusers that answered the question.

Intermodal, air, and truckload tonnage proportions for the average user were substantially larger for outbound shipments than for inbound shipments, while the railroad proportion was smaller for outbound shipments. The LTL proportion was about the same for inbound and outbound. For the average nonuser, the air tonnage proportion was substantially larger for outbound shipments than for inbound shipments, while the railroad proportion was much smaller for outbound than for inbound shipments. The shares carried by water, truckload, and LTL carriers were about the same for inbound and outbound.

To strengthen these observations, a chi-square test was used to determine whether or not the use of IRT was significantly related to the allocation of traffic between modes. The null hypothesis that use/nonuse of IRT and the percentage of inbound traffic carried by each transportation mode were independent can be rejected at a 99 percent confidence level. A similar rejection can be made for outbound traffic with 99 percent confidence. Thus, based on the well-known Bonferroni inequality,[13] the null hypothesis that use/nonuse of IRT was independent of both the percentage of inbound traffic and the percentage of outbound traffic carried by each transportation mode can be rejected with at least 98 percent confidence. Thus, from the chi-square tests and inspection of the results, it can be concluded that, in general, users of IRT relied upon transportation modes that move larger quantities than did their nonuser counterparts. This was found to be the case for both inbound and outbound movements.

DOMESTIC AND INTERNATIONAL CHARACTERISTICS OF INTERMODAL RAILROAD-TRUCK TRAFFIC

Of the 41 IRT users responding (two of the 43 users did not indicate their specific uses of IRT service), 28 used IRT for inbound shipments and 37 used IRT for outbound shipments. Twelve of the 41 used IRT for inbound domestic shipments, twenty for inbound international shipments, thirty for outbound domestic shipments, and 28 for outbound international shipments. Additional detail regarding the specific uses is shown in Table

Table 5-10

Domestic and International Use of IRT Service

Specific Use of Intermodal Railroad-Truck Service	Number of Manufactures Reporting Use
Inbound domestic shipments only	3
Inbound international shipments only	1
Outbound domestic shipments only	5
Outbound international shipments only	1
Inbound domestic and inbound international shipments	0
Inbound domestic and outbound domestic shipments	3
Inbound domestic and outbound international shipments	1
Inbound international and outbound domestic shipments	1
Inbound international and outbound international shipments	5
Outbound domestic and outbound international shipments	7
Inbound domestic, inbound international, and outbound domestic shipments	0
Inbound domestic, inbound international, and outbound international shipments	0
Inbound domestic, outbound domestic, and outbound international shipments	1
Inbound international, outbound domestic, and outbound international shipments	9
Inbound domestic, inbound international, outbound domestic, and outbound international shipments	4
Total	41

5-10. Thirty-one users employed IRT for more than one shipment type--the two most frequently mentioned combinations were inbound international, outbound domestic, and outbound international shipments (9), and outbound domestic and outbound international shipments (7).

These results indicated that IRT users tended to use IRT for multiple shipment types. Indeed, 24 users employed IRT for both inbound and outbound shipments of one type or the other. Another conclusion is that the use of IRT tended to be greater on the outbound side than on the inbound side; this conforms with the finding presented earlier that outbound IRT traffic from Minnesota exceeds inbound IRT traffic. The data in Table 5-10 also indicated that international IRT was used extensively by Minnesota manufacturers, both inbound and outbound.

COMMODITIES CARRIED AND POINTS INVOLVED IN INTERMODAL RAILROAD-TRUCK SERVICE

Commodities Carried in Intermodal Railroad-Truck Service

IRT users were asked to list the three most important commodities that were carried inbound and outbound in IRT service.

Not surprisingly, the products shipped via IRT tended to be similar to the principal products mentioned above as being produced by IRT users. Table 5-11 shows the responses for the 34 users reporting. In some cases, the number of firms naming a certain product category was greater than the number reporting it as a principal product produced because a respondent(s) did not list the product as a principal product. For example, only four users reported producing paper and related products, but six reported shipping this product type via IRT. Four product types were most frequently identified by users as being important in outbound IRT. Six (17.6 percent) users named paper and related products, three (8.8 percent) named plastic and related products and assemblies, three (8.8 percent) named wood products and assemblies, and two (5.9 percent) named chemicals and allied products. These data indicated that the goods shipped via IRT tended to be of relatively low value per size unit.

The materials received via IRT also tended to be similar to the principal items mentioned earlier as being received by IRT

Table 5-11

Principal Products Shipped Via IRT Service

Product Type	Number of Manufacturers Reporting
Agricultural commodities	1
Automotive products and accessories	1
Building materials and supplies	1
Candy	1
Castings	1
Chemicals and allied products	2
Cleaners and home products	1
Dairy products	1
Doors	1
Folding tables and stages	1
Fragrances	1
Glass products and components	1
Materials handling equipment	1
Meat products	1
Medical supplies and related products	1
Non-ferrous metals	1
Office furniture	1
Packaging	1
Paint	1
Paper and related products	6
Personal care products	1
Plastic and related products and assemblies	3
Pumps	1
Recreational vehicles	1
Regulators and valves	1
Snowmobile parts	1
Steel fabrications	1
Windows	1
Wood products and assemblies	3
Total	39
Number responding	34

Note: a producer of one product type may have manufactured other product types as well, causing double counting.

users--Table 5-12 shows the responses provided by the 27 users reporting. Five material types were most frequently identified by users as important IRT commodities. Six (22.2 percent) IRT users named steel fabrications, four (14.8 percent) named machine parts and assemblies, three (11.1 percent) named agricultural commodities, three (11.1 percent) named paper and related

Table 5-12

Principal Materials/Parts Received Via IRT Service

Material/Part Type	Number of Manufacturers Reporting
Agricultural commodities	3
Automotive products and accessories	1
Baskets	1
Brick and ceramics	1
Building materials and supplies	1
Candles	1
Clothing	1
Electric motors	2
Electronic components and assemblies	2
Food ingredients	1
Food products, except meat	1
Lubricants	1
Machine parts and assemblies	4
Machine tools	1
Machinery	2
Minerals	1
Paper and related products	3
Plastic and related products and assemblies	1
Printed matter and related products	1
Pumps	2
Snowmobile parts	1
Snowmobile tracks	2
Starch	1
Steel	1
Steel fabrications	6
Textiles	1
Transmissions	1
Wire and related products	1
Wood products and assemblies	3
Total	48
Number responding	27

Note: a receiver of one material type may have received other material types as well, causing double counting.

products, and three (11.1 percent) named wood products and assemblies. With the exception of agricultural commodities, the materials received via IRT tended to be parts and subcomponents.

In general, although the products most frequently mentioned as being important in IRT service, both outbound and inbound,

tended to be of lower value, IRT was used to move a wide variety of different commodities of various values.

Points Involved in Intermodal Railroad-Truck Service

Whereas IRT users reported that overall they often shipped to Minnesota or regions close to Minnesota, they shipped via IRT primarily to regions a great distance form Minnesota. For the 29 users reporting, Table 5-13 gives their responses. Five regions were identified as being the most important destination points shipped to via IRT. Six (20.7 percent) named California, five (17.2 percent) named Canada, five (17.2 per cent) named Maryland, five (17.2 percent) named Texas, and four (13.8 percent) named New York. These results indicated that IRT tended to be used to transport products long distances.

Users received materials via IRT primarily from regions a great distance from Minnesota; the 21 users reporting said that in general they received from regions far from Minnesota (see Table 5-14). Four regions were identified most often as being the most important origin points for IRT movements. Seven (33.3 percent) named California, four (19.0 percent) named Washington, three (14.3 percent) named Canada, and three (14.3 percent) named New York. The indication is that IRT tended to be used to receive materials and parts from far away areas.

Conclusions Regarding Commodities Carried and Points Involved in Intermodal Railroad-Truck Service

IRT often was used to carry relatively low-value outbound products and inbound materials/parts over great distances. These

Table 5-13

Principal Destination Points in IRT Service

Destination	Number of Manufacturers Reporting
Specific Regions:	
Alaska	1
Australia	2
California	6
Canada	5
Florida	3
Georgia	1
Germany	1
Hong Kong	3
Illinois	2
Japan	3
Korea	1
Louisiana	1
Malaysia	1
Maryland	5
Massachusetts	2
Mexico	1
Mississippi	2
Missouri	1
New Jersey	2
New York	4
Oregon	1
Pennsylvania	3
Philippines	1
Saudi Arabia	1
Tennessee	1
Texas	5
Washington	3
General Regions:	
Europe	2
United States	2
Total	66
Number responding	29

Note: a producer may have shipped products to more than one region, causing double counting.

results can be compared to the results reported above that described certain general characteristics of IRT users as they related to the products produced, the materials received, and the origin and destination points of shipments. Although, the

Table 5-14

Principal Origin Points in IRT Service

Origin	Number of Manufacturers Reporting
Specific Regions:	
Alabama	1
California	7
Canada	3
Denmark	1
Georgia	2
Hong Kong	1
Illinois	2
Italy	2
Japan	1
Korea	1
Maryland	1
Massachusetts	1
Missouri	1
New York	3
Philippines	1
Taiwan	1
Tennessee	1
Texas	2
Washington	4
General Region:	
Europe	1
Total	37
Number responding	21

Note: a receiver may have received materials from more than one region, causing double counting.

products produced and the materials received did not seem to differ when IRT service was used, the origin and destination points did. In general, users often received from and shipped to points close to Minnesota; however, when users employed IRT, the origin and destination points were considerably farther away from Minnesota.

Table 5-15

Frequency of Use of IRT Service

Frequency	Inbound	Outbound
Five or more shipments per week	0	7
One to four shipments per week	7	6
One to three shipments per month	9	11
Less than twelve shipments per year	9	12
Total	25	36

FREQUENCY OF USE OF INTERMODAL RAILROAD-TRUCK SERVICE

IRT users were asked to indicate the frequency of use of IRT service. Table 5-15 shows the answers provided by the responding users--25 inbound and 36 outbound. It was found that the use of IRT was rather infrequent. On the inbound side, only approximately one-quarter of the IRT users received at least one IRT shipment per week. The remainder were relatively infrequent users of IRT--half of the remainder received only one to three shipments per month and the other half received less than twelve per year. The frequency was somewhat higher on the outbound side, with about one-fifth shipping via IRT five or more times per week and approximately another one-fifth doing so between one and four times per week. However, about one-third made only one to three shipments per month and one-third used IRT less than twelve times per year. This indicates that, although a fairly large proportion of Minnesota manufacturers used IRT (28.1 percent of the respondents in the study), their frequency of use was not encouraging.

In addition, the frequency of use tended to be the same for both inbound and outbound shipments. Using a chi-square test, the null hypothesis that inbound/outbound use of IRT and frequency of use are independent cannot be rejected at a 90 percent level. Once again, due to the limited number of data points, the chi-square test may not be a valid test of independence, but inspection of the results seems to indicate that independence exists. Therefore, whether IRT was used for inbound or outbound shipments had no effect on the frequency of use, both were used with relative infrequency.

SIZE OF TRAILERS AND CONTAINERS USED IN INTERMODAL RAILROAD-TRUCK SERVICE

IRT users were asked to indicate the size and type of intermodal units used in IRT service; Table 5-16 gives their responses. Based on responses from 37 IRT users, the tendency to use containers for small loads and trailers for large loads was apparent. While only eleven responses were received for trailers of forty feet or less, 43 responses were received for containers of forty feet or less. On the other hand, 44 responses were received for trailers of 45 feet or more, whereas only nine responses were received for containers of 45 feet or more.

Certain types of intermodal units were mentioned most often as being used, further confirming the tendency toward using small containers and large trailers. Twenty-three (62.2 percent) users named forty-foot containers, 21 (56.8 percent) named 45-foot

Table 5-16

Size of Intermodal Units Used in IRT Service

Size	Trailers	Containers
10 foot	0	0
20 foot	3	18
28 foot	1	1
30 foot	0	1
40 foot	7	23
45 foot	21	4
48 foot	19	5
50 foot	1	0
53 foot	3	0
Total	55	52
Number responding	37	

Note: a user may have used multiple intermodal unit sizes and types, causing double counting.

trailers, 19 (51.4 percent) named 48-foot trailers, and 18 (48.6 percent) named twenty-foot containers.

HOW USERS AND NONUSERS BECAME AWARE OF INTERMODAL RAILROAD-TRUCK SERVICE

With 37 of 43 responding, users of IRT indicated that they became familiar with IRT service through a variety of sources. Four sources were most frequently mentioned.[14] Twenty-four users were introduced to IRT by third party salespersons, sixteen by a trade magazine, sixteen by word-of-mouth, and fifteen by suppliers and/or customers. Other means of introducing users to IRT included: mail literature from a third party (9), mail literature from a railroad (7), a drayage company salesperson

(6), an industry meeting (6), mail literature from a drayage company (6), a railroad salesperson (6), and upper level company management (3).

Nonusers were asked if they had ever been called upon regarding IRT service. The answers indicated that most nonusers have had limited contact, if any, with IRT salespersons. Eighteen nonusers had been called upon by a railroad salesperson with regard to IRT, 71 had not, and twelve did not know (nine nonusers did not answer this question). Thirty nonusers had been visited by a third party salesperson with regard to IRT, 57 had not, and eighteen did not know (five did not answer). Forty-six nonusers had been called upon by a drayage company salesperson regarding IRT, 43 had not, and thirteen did not know (eight did not answer). Only with regard to drayage carriers was the number of those responding that they had been contacted by a salesperson greater than the number of those responding that they had not. This is an indication that railroads and third parties have yet to make contact with many potential shippers. The high level (about ten percent) of "don't know" responses for each salesperson type indicates that, in those cases, if contact had been made, the salesperson did not make a lasting impression.

The IRT user responses imply that salespersons, especially third party salespersons, often played an important role in acquainting manufacturing firms with IRT and attracting them to use the service. According to nonusers, however, although drayage company salespersons had been fairly active in calling

upon nonusers, the other salespersons had not saturated the market with information on IRT. This may have contributed to the fact that only 57 of the 110 nonusers were acquainted with IRT, as noted earlier.

That the IRT marketing system has not reached some potential users is evidenced by the comment of a small manufacturer of electronic components, a nonuser of IRT, to the effect that it had no knowledge of IRT. The company had never been called upon by a shippers' agent, a drayage company, or a railroad about IRT service. Another nonuser of IRT, a manufacturer of hearing aids, said that it would like to know more about intermodal. In the words of the respondent, "It's a new term to me."

WHY INTERMODAL RAILROAD-TRUCK SERVICE IS USED

IRT users indicated that IRT service was used for numerous reasons. Seven reasons were more frequently mentioned than the others by the 39 users responding (four did not answer).[15] Thirty-one used IRT service because of cost, fourteen because of availability at origin point(s), thirteen because of availability of equipment, thirteen because of suitability for shipment size(s), twelve because of availability at destination point(s), eleven because of a request by a supplier and/or a customer, and ten because of suitability for the commodity(s) to be carried. The overwhelming reason for using IRT was cost; however, availability and suitability of the service were important reasons as well.

Other reasons given for using IRT included: transit time (6), directness of service (4), reliability of service (4), amount of handling (3), equipment free time for loading/unloading (3), pickup/delivery times (3), communication, i.e. tracing, notification (2), amount of loss and damage (1), and frequency of service (1).

As noted above, the cost factor was very important to the users of IRT service. Cost was often weighed against the transit time disadvantage. A user of IRT that manufactured health and beauty aids said that cost was the main reason it used IRT, saving the company $50 to $100 per IRT load when compared with truck rates. An IRT user that manufactured cleaners and paints said that the principal reason for using outbound IRT was the 25 percent difference in cost per load when compared with trucking. However, the IRT transit time was double the truck time.

Several IRT users stated that the cost advantage of IRT was dependent upon the length of the haul. The manufacturer of health and beauty aids, referred to above, said that the haul had to be at least 800 to 900 miles long to result in any cost saving when compared with motor truck service. A manufacturer of packaging materials said that IRT does not compete well against trucking on the shorter hauls, i.e., 500 to 1,000 miles. A manufacturer of paper said that IRT is no longer price competitive under 700 miles and probably will not be competitive under 1,000 miles in the near future. Another IRT user, a manufacturer of packaging materials, said that IRT resulted in

lower costs generally when the distances were greater than 800 to 1,000 miles. However, when the difference between the IRT and motor truck costs was less than $200 per load, the company used motor trucking anyway because of better transit time. A large manufacturer of architectural and automobile glass reported that, although IRT rates were sometimes lower than truck rates, the time factor and the fact that heavier packaging and more bracing are required tends to nullify the cost saving made in the rates.

USER AND NONUSER PERCEPTIONS OF INTERMODAL RAILROAD-TRUCK SERVICE

IRT users were asked to indicate their perceptions of IRT, railroad, and motor truck service in regard to factors they were familiar with on a scale of one to five, with one equal to poor and five equal to excellent. Table 5-17 shows the average IRT user perception of the three modes. Overall, users tended to rate IRT service as slightly above average (3.10). Moreover, no user rated IRT service as poor. This is not surprising since, if IRT service were thought to be poor, the shipper would simply not use IRT. Users rated IRT service higher overall than railroad service (2.50) but lower than motor truck service (4.17). No IRT users rated railroad service as excellent nor did any rate motor truck service poor or fair. In general then, IRT service tended to be perceived by IRT users as somewhere in between the good service that motor carriers provide and the fair service that railroads provide.

Table 5-17

Average IRT User Perception* of Transportation Service

	Intermodal	Railroad	Motor Truck
Availability at origin point(s)	3.24 (1, 5, 33)#	2.52 (1, 5, 25)#	4.51 (3, 5, 39)#
Availability at destination point(s)	3.17 (2, 5, 30)	2.43 (1, 5, 23)	4.51 (3, 5, 37)
Availability of equipment	3.50 (2, 5, 30)	2.70 (1, 5, 23)	4.41 (3, 5, 37)
Equipment free time for loading/ unloading	2.67 (1, 5, 27)	2.60 (1, 4, 25)	3.94 (2, 5, 34)
Suitability for commodity(s) to be carried	3.44 (1, 5, 32)	3.38 (1, 5, 24)	4.35 (3, 5, 37)
Suitability for shipment size(s)	3.55 (1, 5, 31)	3.58 (1, 5, 24)	4.17 (3, 5, 36)
Reliability of service	2.84 (1, 5, 32)	2.50 (1, 5, 26)	4.08 (2, 5, 38)
Directness of service	3.03 (1, 5, 30)	2.64 (1, 5, 25)	4.34 (2, 5, 35)
Frequency of service	3.03 (1, 5, 31)	2.48 (1, 5, 25)	4.42 (3, 5, 33)
Amount of handling	3.61 (2, 5, 28)	3.48 (1, 5, 23)	3.67 (1, 5, 33)
Pickup/delivery times	3.10 (1, 5, 31)	2.65 (1, 4, 23)	4.00 (2, 5, 38)
Transit time	2.61 (1, 4, 31)	2.30 (1, 4, 27)	4.08 (3, 5, 36)
Cost	4.03 (2, 5, 33)	3.63 (2, 5, 27)	3.22 (1, 4, 37)
Amount of loss and damage	3.42 (2, 5, 31)	3.27 (1, 5, 26)	3.83 (3, 5, 36)
Processing of loss and damage claims	2.50 (1, 4, 24)	2.26 (1, 4, 23)	3.47 (2, 5, 34)
Communication	2.86 (1, 5, 29)	2.52 (1, 5, 25)	4.00 (2, 5, 37)
After sale service	3.32 (2, 5, 22)	2.45 (1, 5, 20)	3.84 (2, 5, 31)
Overall perception	3.10 (2, 5, 31)	2.50 (1, 4, 24)	4.17 (3, 5, 36)

*All perceptions are on a scale of 1 to 5, where 1 = poor, 2 = fair, 3 = average, 4 = good, 5 = excellent.

#The numbers in parentheses are the minimum perception, the maximum perception, and the number of IRT users indicating a perception regarding the item, respectively.

Certain aspects of IRT service were perceived positively by IRT users. The perception that IRT users had of IRT cost was especially good (4.03). Indeed, their perception of IRT cost was better than their perceptions of either railroad (3.63) or motor carrier (3.22) costs. That IRT cost was perceived to be better than the cost of motor carriage is not surprising since trucking is often considered to be a high cost mode. That IRT cost was perceived to be better than the cost of railroad carriage is surprising since railroading is often considered to be a low cost mode.

On the other hand, certain aspects of IRT service were unfavorably perceived. The processing of loss and damage claims received the lowest perception rating of all intermodal service aspects (2.50). Because transfers between railroads and drayage carriers make it difficult to determine exactly where freight was damaged, making it difficult to collect on a claim, it is not surprising that claim processing was perceived poorly. Another service factor that received a low rating was transit time (2.61). Due primarily to terminal operations such as ramping, deramping, switching, and connection delays, transit time of IRT service was not perceived well.

The transit time problem was alluded to by several IRT users when discussing the benefits of IRT, pointing out that the shipper has to weigh the cost savings against excessive transit time. For example, a manufacturer of plastic and packaging products that used IRT for outbound movements said it could not

use IRT for inbound shipments because they are part of a JIT system and IRT does not fit "hand in hand" with JIT needs, especially where short lead times are involved.

A producer of meat products said that IRT was used if the rate was favorable and transit time was not an important factor. An IRT user that manufactured air compressors stated that IRT rates were lower than truck rates and it can be used successfully by the company because the firm does not have "a tight schedule" as some other companies have and it could "put up with" the delays that occur at the drayage-railroad connections.

However, several users commented that transit time when using double-stack service is almost identical to that offered by motor trucking.

Associated with the transit time issue are the reliability and frequency of IRT service. A manufacturer of air compressors complained that IRT service was not consistent and the shipper must ship on the "right day" (the day the train leaves) or it will not get good service in terms of overall transit time. A large manufacturer of architectural and automobile glass stated that the timing of movements in IRT service is not good enough for their inbound JIT system and there are often delays at drayage-railroad connecting points. A user of IRT that manufactured cleaners and paints did not use IRT for inbound movements because it used JIT production--IRT was not reliable enough for that kind of system.

While cost was the only aspect of IRT rated by users higher than motor truck, a second aspect was rated almost equal to trucking--the amount of handling was perceived by users to be only marginally poorer for IRT than for motor truck (3.61 versus 3.67, respectively). This is not surprising since IRT units are rarely opened once they leave the shipper's dock, although the vehicle itself is handled more often than a motor truck vehicle.

Only one aspect of IRT service was rated by users lower than railroad: suitability for shipment size(s) (3.55 versus 3.58). This is a confusing result since the rating for this factor in regard to motor trucking was quite high (4.17). If motor truck is suitable for many shipment sizes, it would seem to follow that IRT would also be suitable because of its use of the same size highway trailers. The reason for the low rating may lie in the fact that many units transported via IRT are smaller than those regularly in use by motor carriers and railroads. Recalling from above that the sizes used most often in IRT service were twenty-foot, 45-foot, and 48-foot vehicles, if users prefer shipping in larger volumes, such as in fifty-foot, 53-foot, or larger vehicles (in rail cars), IRT vehicle sizes would then be a problem. The other problem related to shipment size could be that IRT is geared primarily to full vehicle-load traffic and, therefore, LTL shippers would find it difficult to use.

The size shipment issue was commented on by several respondents, usually stating that their shipment sizes were too small to make use of IRT. Some of these were involved in JIT

where shipments were small and frequent. A different problem was mentioned by a manufacturer of glass that used IRT for some parts of its traffic. Its outbound shipments had to be loaded and unloaded from above and open-top trailers or containers where necessary. This ruled out the use of IRT.

Two aspects of IRT service were rated only slightly higher than railroad service. One was suitability for the commodity(s) to be carried (3.44 versus 3.38). This may be an extension of the suitability for shipment size(s) issue. The other was equipment free time for loading/unloading (2.67 versus 2.60).

The IRT amount of loss and damage factor received a perception rating of 3.42, while railroad received 3.27 and motor truck received 3.83, i.e., IRT was perceived to be slightly better than rail but inferior to motor trucking. This means that, although IRT has greatly improved in the loss and damage area, the negative loss and damage reputation that IRT once deserved has not been completely overcome, and IRT service in this respect was not perceived to be as good as it was in motor trucking.

The other service factors listed in Table 5-17 but not discussed here followed the pattern of IRT being perceived as being better than railroad but not as good as motor truck. These factors included availability at origin and destination points, availability of equipment, reliability of service, directness of service, frequency of service, pickup/delivery times, communication, and after sale service.

Nonusers of IRT were also asked to indicate their perceptions concerning IRT, railroad, and motor truck service. Table 5-18 shows the average IRT nonuser perception of the three modes. Overall, nonusers tended to rate IRT service as slightly above fair (2.18). Moreover, no nonuser rated IRT service as excellent. This is not surprising since the respondents were nonusers. In regard to the overall perception of the three modes, nonusers rated IRT service higher than railroad service (1.97) but lower than motor truck service (4.08). No nonusers rated railroad service as excellent nor did any rate motor truck service poor. In general then, IRT service tended to be perceived by IRT nonusers as somewhere between the good service that motor carriers provide and the fair service that railroads provide.

No aspects of IRT were perceived very positively by nonusers. The highest rating given to IRT, and the only rating above average, was cost (3.17). Interestingly, nonusers had a more favorable perception of motor truck costs (3.38) than of railroad costs (3.13). No aspect of IRT service had better nonuser perceptions than those received by motor truck service, and some factors had lower perceptions than railroad service. Those that had lower perceptions than rail included suitability for the commodity(s) to be carried (2.30 versus 2.56) and suitability for shipment size(s) (2.33 versus 2.69). Shipment size was a reason mentioned by some nonusers for not using IRT. A manufacturer of molded plastic parts said that IRT was not used

Table 5-18

Average IRT Nonuser Perception* of Transportation Service

	Intermodal	Railroad	Motor Truck
Availability at origin point(s)	2.46 (1, 5, 33)#	1.93 (1, 5, 44)#	4.42 (3, 5, 89)#
Availability at destination point(s)	2.43 (1, 4, 28)	1.95 (1, 5, 37)	4.37 (3, 5, 83)
Availability of equipment	2.43 (1, 5, 28)	2.08 (1, 4, 38)	4.28 (3, 5, 82)
Equipment free time for loading/ unloading	2.42 (1, 5, 24)	2.21 (1, 5, 33)	3.91 (1, 5, 74)
Suitability for commodity(s) to be carried	2.30 (1, 5, 30)	2.56 (1, 5, 39)	4.11 (1, 5, 87)
Suitability for shipment size(s)	2.33 (1, 5, 30)	2.69 (1, 5, 39)	4.22 (1, 5, 88)
Reliability of service	2.39 (1, 5, 28)	2.14 (1, 5, 37)	4.05 (3, 5, 87)
Directness of service	1.88 (1, 5, 26)	1.78 (1, 4, 36)	4.08 (2, 5, 84)
Frequency of service	2.09 (1, 4, 23)	1.97 (1, 4, 34)	4.29 (2, 5, 85)
Amount of handling	2.64 (1, 5, 25)	2.28 (1, 4, 29)	3.63 (2, 5, 78)
Pickup/delivery times	2.25 (1, 5, 24)	1.90 (1, 5, 31)	4.07 (2, 5, 86)
Transit time	2.00 (1, 4, 26)	1.97 (1, 5, 35)	3.86 (2, 5, 86)
Cost	3.17 (1, 5, 24)	3.13 (1, 5, 30)	3.38 (1, 5, 86)
Amount of loss and damage	2.92 (1, 5, 24)	2.35 (1, 4, 31)	3.81 (2, 5, 85)
Processing of loss and damage claims	2.56 (1, 4, 16)	2.23 (1, 4, 26)	3.43 (1, 5, 77)
Communication	2.71 (1, 5, 17)	2.44 (1, 5, 27)	3.93 (1, 5, 83)
After sale service	2.43 (1, 5, 14)	2.38 (1, 5, 21)	3.58 (1, 5, 71)
Overall perception	2.18 (1, 4, 28)	1.97 (1, 4, 38)	4.08 (2, 5, 80)

*All perceptions are on a scale of 1 to 5, where 1 = poor, 2 = fair, 3 = average, 4 = good, 5 = excellent.

#The numbers in parentheses are the minimum perception, the maximum perception, and the number of IRT nonusers indicating a perception regarding the item, respectively.

because the shipments were too small, were too light in weight, averaging 250 to 300 pounds, and were shipped to a wide variety of geographic points so that consolidation was not possible. On the inbound side, shipments were small and came from geographically dispersed sources, thereby making it difficult to have full containerloads. A manufacturer of electric motors and generators offered a different size reason for not using IRT; the products moved were too large and cumbersome and had to loaded and unloaded by overhead cranes making use of open-top trailers or containers which railroads refuse to handle.

Further, no aspect of IRT service was perceived by IRT nonusers as only slightly inferior to motor truck service, but many were perceived as only marginally better than railroad service. Those aspects with ratings slightly better than railroad service included: after sale service (2.43 versus 2.38), cost, directness of service (1.88 versus 1.78), and transit time (2.00 versus 1.97). In general, IRT nonusers seemed to associate IRT service with railroad service and, because they had unfavorable perceptions about railroad service, their perceptions about IRT service were also poor.

In regard to transit time, several nonusers of IRT commented that, although IRT rates are sometimes favorable, the long transit time made it impossible to use. A manufacturer of hardwood moldings had a positive impression of IRT, saying that IRT providers are willing to go the extra mile to provide satisfactory service and IRT rates are comparable to truck rates,

but the drawback was excessive time in transit. A manufacturer of point of sale equipment said that IRT transit time was too long, IRT was not suitable for time-sensitive JIT shipments, and it was neither dependable nor timely.

Although IRT has had a difficult time overcoming a poor loss and damage reputation, nonusers of IRT did not seem to stress the issues of amount of loss and damage and processing of loss and damage claims, viewing them no more harshly than most of the other service factors in Table 5-18 and somewhat better than some.

The other service factors in Table 5-18--availability at origin point(s), availability at destination point(s), availability of equipment, reliability of service, frequency of service, amount of handling, pickup/delivery time, and communication--were perceived by nonusers such that railroads were the worst, while IRT was in the middle, and motor truck was the best.

In follow-up telephone calls to nonusers, the most frequently mentioned reasons for not using IRT service were that the size of shipment was too small for IRT, the length of haul was too short, IRT service reliability was poor, the product was highly sensitive to loss and damage, IRT transit time was too long, specialized equipment was needed, IRT service was not available, and the product was not suitable for IRT because of its perishability, very small unit size, or other physical characteristic. In a personal interview, a manufacturer of hair

care products said that it did not use IRT because it does not provide good service, transit times are too long, and it offers no way to keep the company's products from freezing. The respondent said that, although the IRT rates are attractive, the main factor to consider in the transportation decision is service.

Comparing user and nonuser perceptions, the overall IRT nonusers' perception of IRT service was substantially lower than the users' perception. Indeed, nonusers tended to have much lower perceptions of both IRT and railroads and a slightly lower perception of motor truck. The only aspect of IRT service that nonusers perceived higher than users was the processing of loss and damage claims, and the difference in perception between the two groups was slight. The only other aspects of IRT service that nonusers and users had somewhat similar perceptions about were communication and equipment free time for loading/unloading.

Assuming that the IRT users' perceptions of intermodal service were the more realistic because users had actual experience with IRT, nonusers had unjustifiably low perceptions of IRT service. If this is true, it reinforces the findings discussed above that IRT marketing has not done an adequate job of disseminating information about IRT. Nevertheless, even if the users' perceptions were more realistic, intermodal service still has a long way to go to be service competitive with motor carriage in the opinions of prospective users, although cost does offset some of the service disadvantage.

Table 5-19

Average IRT User Perception* of Railroad and Drayage Carrier Performing Intermodal Service

	Railroad	Drayage Company
Overall perception	3.38 (2, 5, 24, 10)#	3.69 (2, 5, 29, 6)#

*All perceptions are on a scale of 1 to 5, where 1 = poor, 2 = fair, 3 = average, 4 = good, 5 = excellent.

#The numbers in parentheses are the minimum perception, the maximum perception, the number of IRT users that provided a rating, and the number of IRT users responding "don't know" to the question, respectively.

EVALUATION OF INTERMODAL RAILROADS AND DRAYAGE CARRIERS BY USERS

IRT users were asked to rate the railroads and the drayage companies that performed IRT services for them on the same five-point scale as discussed above. The results shown in Table 5-19 indicate that drayage companies were rated higher than railroads (3.69 versus 3.38), and both had higher ratings than the overall perception of IRT by users (3.10) discussed above. The implication is that a "reverse synergy" must be at work if, by combining the two carrier types (rail and drayage), the resulting service had a lower perception than either of the two had individually. Thus, the seamless IRT transportation system, referred to earlier, has not yet been achieved.

Problems with drayage companies are sometimes offered as a reason for IRT not having a greater acceptability among shippers. However, as noted above, the IRT users gave drayage companies a fairly high overall rating and only two respondents made negative comments. A manufacturer of glass located approximately 75 miles from an IRT terminal said that it used its own private truck

fleet to provide container drayage because of the high cost and unreliability of for-hire drayage companies--"They just don't care." A manufacturer of health and beauty aid products, located near an IRT terminal, said that drayage companies are concerned only about their part of the haul and not about the rest of it. The same respondent said that railroads also have that attitude, indicating that a seamless system has not developed in the opinion of that respondent.

A relatively large number of IRT users answered "don't know" to the rating question (ten or 29.4 percent for railroads and six or 17.1 percent for drayage). This suggests that many users do not deal directly with railroads and/or drayage companies; a third party may be working on behalf of the carriers, thus removing the direct contact between the shipper and the railroads and drayage carriers. (Recall that the role of agents in IRT was discussed earlier in the report.)

THE ROLE OF THIRD PARTIES

Parties Used in Arranging Intermodal Railroad-Truck Service

That third parties are important in arranging IRT service was confirmed by users. According to 34 users (nine did not answer), 23 (67.6 percent) used third party salespersons to obtain IRT service, four (11.8 percent) used drayage company salespersons, and three (8.9 percent) used railroad salespersons, while one used an unspecified "other". Three users did not know who they used to arrange IRT service. Even if these four users

for which no specific answers were given used railroad or drayage company salespersons, third parties arranged an extremely large portion (approximately two-thirds) of the IRT service used.

Services Performed for Users by Third Parties

Third parties perform numerous services. Based on information supplied by 28 responding IRT users (fifteen did not answer; some, of course, because they did not use third parties), seven services were frequently performed for users by third parties. These services were: providing rate information (28), making contact with the railroads (26), providing tracing information (26), providing service information (25), negotiating rates with the railroads (23), contacting the drayage company (22), and providing notification information (20). Other services provided by third parties included: assuming liability for loss and damage (13), processing loss and damage claims (12), and providing cargo insurance (11). In general, third parties tended to perform the basic tasks involved in arranging for IRT service. This may help to explain why nonusers had a lower overall perception of IRT than users did. Since many nonusers had never been contacted by third parties, they may tend to see IRT as an unnecessarily complex form of transportation when, in reality, a third party can be relied upon to make the arrangements. On the other hand, less than half of the third parties dealt with loss and damage issues. This provides insight as to why IRT users have a lower perception of IRT processing of loss and damage claims than nonusers have.

Table 5-20

Average IRT User Perception* of Third Party Performing Intermodal Service

	Third Party
Overall perception	3.86 (2, 5, 29, 4)#

*All perceptions are on a scale of 1 to 5, where 1 = poor, 2 = fair, 3 = average, 4 = good, 5 = excellent.

#The numbers in parentheses are the minimum perception, the maximum perception, the number of IRT users rating third parties, and the number of IRT users responding "don't know" to the question, respectively.

Evaluation of Third Parties by Users

Users were asked to rate the third party(s) that performed IRT services for them on the same five-point scale discussed earlier. Table 5-20 shows the results. The rating for third parties (3.86) was higher than the overall perception of IRT by its users (3.10). Note that this rating was also higher than the ratings for either railroads or drayage companies. This strengthens the conclusion that intermodal transportation has not yet become seamless.

COMPARISON OF INTERMODAL RAILROAD-TRUCK AND MOTOR TRUCK SERVICE AND RATES

A traffic lane connects an origin point with a destination point, such as Duluth, Minnesota with Dallas, Texas. Traffic lanes differ in terms of their distances, the kinds and volume of traffic that move over a lane, the balance of the traffic that moves in the two directions, the operating conditions, and so on. Carrier managers often think in terms of traffic lanes and their associated characteristics when they decide on the quantity and

quality of service to offer, the rates that should be charged, and other matters.

Lanes and Factors Compared

In order to compare IRT transit times and rates with those of truckload carriers, information was obtained through the personal interviews as to the transit times provided and rates charged on 24 traffic lanes for both IRT service and contract carrier truckload service. The comparisons were for domestic dry van 45-foot and 48-foot single trailerloads (no containers). The lanes studied were selected in order to include various lengths of haul as well as service to and from different parts of the state of Minnesota and various parts of the United States.

The transit times studied were the average door-to-door times established by the carriers in their schedules and/or those obtained from the records and experiences of third parties.

The rates studied were freight all kinds (FAK) rates per trailer-mile that were paid by third parties (agents and brokers) to the carriers. The rates paid to the third parties by the shippers or receivers (beneficial owners) of the loads carried were higher than the rates compared in the study because the former included the "markups" taken by the third parties. One agent in the study said that, on IRT service, the average markup was about eight percent. A broker reported an average markup of ten to twelve percent on straight contract truck shipments. The third parties often charge different percentage markups depending on the individual circumstances surrounding each move. Thus, the

markup can vary considerably from situation to situation so that it is not possible to make rate comparisons involving rates actually paid by beneficial owners of the goods shipped without studying individual transactions between shippers and third parties or between shippers and carriers; there is no standardization involved. Aside from the difficulty involved in making such a study, the results would not be generalizable. By using the rates quoted to third parties by carriers, the variability associated with rates quoted to individual shippers is avoided.

Tables 5-21 and 5-22 contain the comparisons between IRT and contract carrier truckload transit times and rates for 45-foot and 48-foot trailers on 24 traffic lanes where the origin or destination points were in Minnesota. The first section in Table 5-21 shows long-haul (650 miles or more) lanes that had the Twin Cities Metropolitan Area of Minneapolis and St. Paul as the origin point. The second section of the table shows short-haul lanes (less than 650 miles) with the Twin Cities as the origin point. The third section of Table 5-21 shows long-haul lanes where non-Twin Cities Minnesota communities (outstate Minnesota) were the origin points. The map in Figure 5-5 shows the points included in the table.

Table 5-21

Comparisons of Door-to-Door Railroad-Truck and Contract Motor Truck Transit Times and Rates Outbound From Minnesota (Trailers)*

			Railroad-Truck		Motor Truck	
Origin Point	Destination Point	Distance (Miles)#	Transit Time (Days)@	Rate/Mile&	Transit Time (Days)	Rate/Mile&
Lanes of 650 miles or more--Twin Cities origin point						
Twin Cities	Atlanta GA	1121	4	.92 45' 1.18 48'	2	1.10 45' 1.10 48'
Twin Cities	Boston MA	1390	5	1.21 45' 1.41 48'	3	1.40 45' 1.40 48'
Twin Cities	Buffalo NY	949	4	1.13 45' 1.41 48'	2	1.40 45' 1.40 48'
Twin Cities	Charlotte NC	1151	4	.99 45' 1.14 48'	2	1.10 45' 1.10 48'
Twin Cities	Dallas TX	949	4	.90 45' 1.05 48'	2	1.10 45' 1.10 48'
Twin Cities	Denver CO	920	3	1.27 45' 1.61 48'	2	1.30 45' 1.30 48'
Twin Cities	Detroit MI	685	2	1.06 45' 1.35 48'	1	1.10 45' 1.10 48'
Twin Cities	Los Angeles CA	1857	7	.91 45' 1.13 48'	3	1.20 45' 1.20 48'
Twin Cities	Miami FL	1769	4	.93 45' 1.20 48'	3	1.20 45' 1.20 48'
Twin Cities	Newark NJ	1200	3	1.17 45' 1.34 48'	2	1.40 45' 1.40 48'
Twin Cities	Seattle WA	1653	3	.98 45' NA 48'	2	1.20 45' 1.20 48'
Lanes of less than 650 miles--Twin Cities origin point						
Twin Cities	Ft. Wayne IN	540	2	1.23 45' 1.42 48'	1	1.00 45' 1.00 48'
Twin Cities	Milwaukee WI	337	2	1.43 45' 1.75 48'	1	1.00 45' 1.00 48'
Twin Cities	Omaha NE	380	3	1.73 45' 2.38 48'	1	1.00 45' 1.00 48'
Twin Cities	St. Louis MO	630	2	1.02 45' 1.39 48'	1	1.00 45' 1.00 48'

Table 5-21 (continued)

Origin Point	Destination Point	Distance (Miles)#	Railroad-Truck Transit Time (Days)@	Railroad-Truck Rate/Mile&	Motor Truck Transit Time (Days)	Motor Truck Rate/Mile&
Lanes of 650 miles or more--non-Twin Cities origin points						
Duluth	Atlanta GA	1268	4	1.04 45' 1.23 48'	2	1.00 45' 1.00 48'
Litchfield	Atlanta GA	1196	4	.90 45' 1.09 48'	2	1.00 45' 1.00 48'
Owatonna	Atlanta GA	1187	4	1.01 45' 1.22 48'	2	1.00 45' 1.00 48'
Worthington	Atlanta GA	1301	4	1.11 45' 1.30 48'	2	1.00 45' 1.00 48'
St. Cloud	Boston MA	1463	5	1.19 45' 1.32 48'	3	1.50 45' 1.50 48'
Winona	Boston MA	1500	5	1.39 45' 1.55 48'	3	1.50 45' 1.50 48'
Albert Lea	Dallas TX	1048	4	1.14 45' NA 48'	2	1.00 45' 1.00 48'
Albert Lea	Los Angeles CA	1956	7	.99 45' 1.25 48'	3	1.10 45' 1.10 48'
Marshall	Seattle WA	1807	3	1.20 45' NA 48'	2	1.20 45' 1.20 48'

*45-foot and 48-foot trailers, as indicated.

#Highway miles.

@IRT transit times exclude the extra drayage time required to serve non-Twin Cities points in Minnesota.

&Rates are per trailer-mile without regard to what is contained in the trailer, i.e., freight all kinds (FAK) rates.

NA = Not available.

Table 5-22

Comparisons of Door-to-Door Railroad-Truck and Contract Motor Truck Transit Times and Rates Inbound To Minnesota (Trailers)*

			Railroad-Truck		Motor Truck	
Origin Point	Destination Point	Distance (Miles)#	Transit Time (Days)@	Rate/Mile&	Transit Time (Days)	Rate/Mile&
Lanes of 650 miles or more--Twin Cities destination point						
Atlanta GA	Twin Cities	1121	4	.85 45' 1.01 48'	2	.85 45' .85 48'
Boston MA	Twin Cities	1390	5	.86 45' .96 48'	3	.75 45' .75 48'
Buffalo NY	Twin Cities	949	4	.97 45' 1.14 48'	2	.78 45' .78 48'
Charlotte NC	Twin Cities	1151	4	.94 45' 1.08 48'	2	.85 45' .85 48'
Dallas TX	Twin Cities	949	4	.80 45' .89 48'	2	.85 45' .85 48'
Denver CO	Twin Cities	920	3	.89 45' 1.05 48'	2	.78 45' .78 48'
Detroit MI	Twin Cities	685	2	1.09 45' 1.34 48'	1	.90 45' .90 48'
Los Angeles CA	Twin Cities	1857	7	.75 45' 1.01 48'	3	.83 45' .83 48'
Miami FL	Twin Cities	1769	4	.62 45' .72 48'	3	.78 45' .78 48'
Newark NJ	Twin Cities	1200	3	.83 45' .91 48'	2	.80 45' .80 48'
Seattle WA	Twin Cities	1653	3	.75 45' .99 48'	2	.83 45' .83 48'
Lanes of less than 650 miles--Twin Cities destination point						
Ft. Wayne IN	Twin Cities	540	2	1.25 45' 1.31 48'	1	.85 45' .85 48'
Milwaukee WI	Twin Cities	337	2	1.54 45' 1.86 48'	1	.95 45' .95 48'
Omaha NE	Twin Cities	380	2	1.42 45' 1.99 48'	1	.95 45' .95 48'
St. Louis MO	Twin Cities	630	2	1.21 45' 1.65 48'	1	.87 45' .87 48'

Table 5-22 (continued)

Origin Point	Destination Point	Distance (Miles)[#]	Railroad-Truck Transit Time (Days)[@]	Railroad-Truck Rate/Mile[&]	Motor Truck Transit Time (Days)	Motor Truck Rate/Mile[&]
Lanes of 650 miles or more--non-Twin Cities destination points						
Atlanta GA	Duluth	1268	4	.99 45' 1.05 48'	2	.85 45' .85 48'
Atlanta GA	Litchfield	1196	4	.85 45' .92 48'	2	.85 45' .85 48'
Atlanta GA	Owatonna	1187	4	.96 45' 1.03 48'	2	.85 45' .85 48'
Atlanta GA	Worthington	1301	4	1.06 45' 1.12 48'	2	.85 45' .85 48'
Boston MA	St. Cloud	1463	5	.86 45' .90 48'	3	.75 45' .75 48'
Boston MA	Winona	1500	5	1.02 45' 1.07 48'	3	.75 45' .75 48'
Dallas TX	Albert Lea	1048	4	.97 45' NA 48'	2	.85 45' .85 48'
Los Angeles CA	Albert Lea	1956	7	.82 45' .97 48'	3	.75 45' .75 48'
Seattle WA	Marshall	1807	3	.96 45' NA 48'	2	.80 45' .80 48'

*45-foot and 48-foot trailers, as indicated.

#Highway miles.

@IRT transit times exclude the extra drayage time required to serve non-Twin Cities points in Minnesota.

&Rates are per trailer-mile without regard to what is contained in the trailer, i.e., freight all kinds (FAK) rates.

NA = Not available.

Figure 5-5

LOCATION OF MINNESOTA POINTS
FOR LANE COMPARISONS

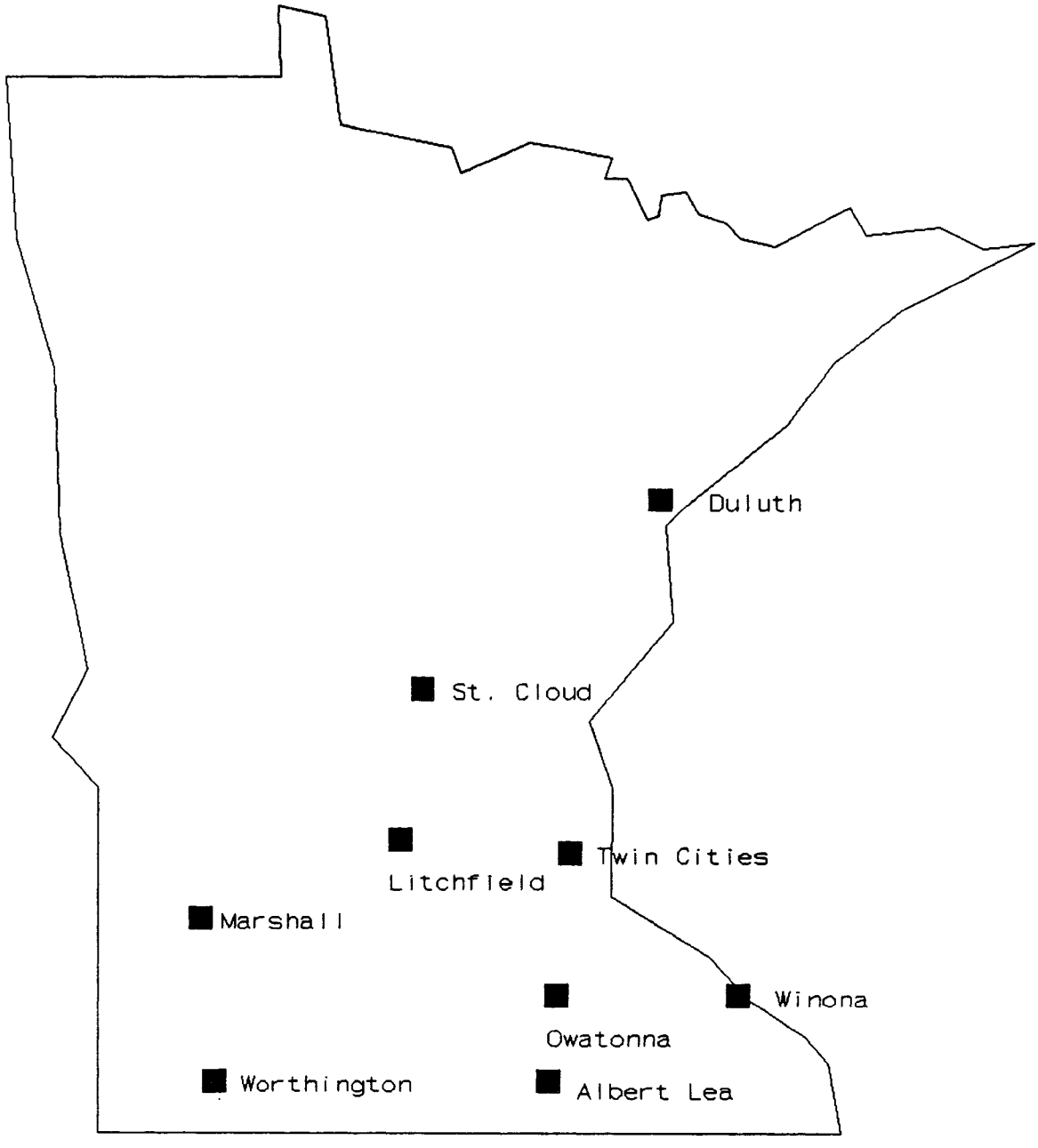


Table 5-22 provides the same information as shown in Table 5-21 for lanes where Minnesota points were the destinations of the shipments.

Outbound From Minnesota

Long Hauls

In Table 5-21, it can be seen that when the Twin Cities area was the origin point and the length of haul was 650 miles or more, straight truckload service had the best door-to-door transit time on all the lanes for both 45-foot and 48-foot trailers.

However, IRT had the lowest rate on all eleven lanes for 45-foot trailers, while IRT had the lowest rate on three of the ten lanes where 48-foot trailers were used.[16] Truckers had the lowest rates on four lanes, while there was no real difference in the rates charged by the two modes on three of the lanes studied.

The table shows that for hauls of 650 miles or more from Minnesota origin points outside of the Twin Cities, straight trucking had the best transit time on all nine lanes. This is despite the fact that the extra drayage time required to provide IRT service from non-Twin Cities points was not included in the transit time shown. This extra transit time would range from one and one-half hours to four hours, depending on the origin point.

Regarding rates charged from outstate Minnesota origin points, the table shows that, of the nine lanes, IRT had the lowest rates on 45-foot trailers on four lanes, full truckload

service had the lowest rates on three lanes, and the rates were about the same on two of the lanes. For 48-foot trailers, IRT had the rate advantage on one of the seven lanes; straight trucking had the lowest rates on the other six lanes. Thus, the IRT rates were less competitive on the outstate origin-point lanes than on the Twin Cities origin-point lanes. This is at least partly caused by the additional cost involved in moving the trailers to the rail terminal in the Twin Cities.

Short Hauls

When hauls of less than 650 miles from the Twin Cities were examined, it was found that IRT transit time was greater on all four of the lanes studied, as shown in Table 5-21.

The table also shows that the IRT short-haul rates from the Twin Cities were higher on all four lanes studied for both 45-foot and 48-foot trailers.

Inbound To Minnesota

Long Hauls

The same service pattern was found where the inbound movements to Minnesota destination points were compared. IRT service was at a transit time disadvantage on all of the eleven lanes of 650 miles or more where the Twin Cities was the destination point and on all of the nine lanes where the destination points were outside of the Twin Cities.

As to the rates charged, whereas IRT had the rate advantage on many outbound long hauls, the IRT rates were much less

competitive on the long-haul movements inbound to Minnesota. IRT rates for 45-foot trailers were lower than competing motor truck rates on only four of the eleven long-haul lanes where the Twin Cities was the destination point. The rates were the same on one lane and trucking had the lower rates on the other six lanes. Trucking had the edge for 48-foot trailers on ten of the eleven lanes where the destination point was the Twin Cities.

Where non-Twin Cities points were the long-haul destinations, IRT rates for 45-foot trailers were higher than truck rates on eight of the nine lanes; there was one lane where the rates were equal. IRT rates were higher on all seven lanes for 48-foot trailers.

Depressed backhaul truck rates are probably a contributor to the inbound rate situation. In fact, with only one exception (Detroit-Twin Cities) the inbound IRT and truck rates were lower than the corresponding outbound rates for both 45-foot and 48-foot trailers on the long-haul lanes to the Twin Cities and to non-Twin Cities points.

Short Hauls

When short hauls of less than 650 miles inbound to the Twin Cities were considered, the truck rates were lower on all four lanes for both sizes of trailers, as they were for the outbound moves on those lanes. The inbound motor truck rates were also lower than the corresponding outbound truck rates on all four lanes. The inbound IRT rates, however, when compared with outbound IRT rates, were lower only on the Fort Wayne lane for

48-foot trailers and on the Omaha lane for both 45-foot and 48-foot trailers. The IRT rates were actually higher inbound than outbound in all the other cases. The difference between the inbound IRT and inbound motor truck rates was substantial on all four short-haul lanes.

Conclusions About Lane Comparisons

This analysis shows that IRT was at a disadvantage transit-time-wise on every lane examined, both inbound and outbound and both long-haul and short-haul. IRT did better with rates, having the lowest rate in some situations.

IRT service needs to offset the time disadvantage in some way in order to be competitive by providing better service in other ways, such as loss and damage and, possibly, the amount of liability assumed, as well as information services and other aspects of customer service. The problems in doing so are numerous.

The other way in which the transit time disadvantage can be offset is through lower rates than provided by motor trucking. It is probable that IRT would not have grown as much in Minnesota or elsewhere if it had not been for the rate advantage it has on some lanes. IRT rates have been lower than truck rates on certain lanes studied, primarily on long-haul outbound lanes where the Twin Cities is the origin point and especially on 45-foot trailers. IRT has not done as well in this regard on long-haul outbound lanes where the origin points are in outlying Minnesota and it has not done well at all on inbound long-haul

lanes, regardless of the destination point in Minnesota. And, IRT has been completely unable to compete rate-wise on the short hauls studied.

The traffic lane comparison study appears to indicate that, unless dramatic change takes place in the IRT service and rates provided or in the nature of the competition faced, domestic IRT service in Minnesota will probably remain predominantly an outbound long-haul service with the Twin Cities as the principal origin point. It should be remembered, however, that the traffic lane comparison involved only IRT trailer moves, which still dominate domestic IRT service. The probable shift to containers may improve the ability of IRT to compete against trucking, both service-wise and rate-wise, especially if domestic double-stack service becomes more important. In addition, the future probable growth in international container traffic, especially double-stack, could have an important positive impact on IRT's ability to compete more effectively against motor trucking.

PART 5 ENDNOTES

1) Association of American Railroads, Railroad Facts (Washington: Association of American Railroads, 1989), p. 43.

2) Minnesota Department of Transportation.

3) Using lifting equipment to load and unload trailers and containers as opposed to the drive-on and drive-off system.

4) Including edible beans, seeds (sunflower, flax, millet, rye), wheat, lentils, soybeans, peas, and popcorn.

5) Association of American Railroads.

6) Association of American Railroads.

7) Minnesota's international IRT traffic involves mainly Canada and Mexico and east and west coast ocean ports.

8) There is a flat rate per-trailer/container within each of the three layers of the Twin Cities commercial zone and a mileage rate per unit beyond the zone.

9) The binomial confidence interval is equal to:

$$\hat{p} \pm z_{\alpha/2} \sqrt{\frac{\hat{p}(1-\hat{p})}{n-1}}$$

10) The seven Minnesota counties included within the Twin Cities Metropolitan Area are Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington.

11) In the discussion that follows, all mention of products, materials and parts, destination points, and origin points related to IRT users includes both IRT and non-IRT activities with no attempt made to distinguish between the two. A discussion of commodities carried via IRT and origin and destination points is provided in a later section of the report.

12) The reader is reminded that this discussion regarding products, materials and parts, destination points, and origin points includes both IRT and non-IRT activities of IRT users with no attempt made to separate the two.

13) For more on the Bonferroni inequality, see any standard probability text such as Sheldon M. Ross, Introduction to Probability Models, 4th. ed. (Boston: Academic Press, Inc., 1989), chapter 1.

14) A user may have been introduced to IRT service through more than one method, causing double counting.

15) A user may have used IRT service for multiple reasons, causing double counting.

16) Truckers in the study did not distinguish between 45-foot and 48-foot trailers when setting rates.

PART 6
CONCLUSIONS

POTENTIAL EFFECTS OF INTERMODAL RAILROAD-TRUCK SERVICE

The potential advantages of IRT for manufacturers and other shippers are that transit time may be reduced and rates may be lower when compared with motor truck service. It may also have the effect of forcing other modes to improve their service and lower their rates. IRT promises also to improve the circumstances of local drayage companies by providing a market for them. The down side for trucking is that growth in IRT traffic comes primarily at the expense of over-the-road trucking companies. However, IRT can benefit LTL and truckload truckers that choose to ship their trailers and containers by rail. As to railroads, those that participate in IRT service have the opportunity to participate in traffic that they cannot participate in with conventional railroad service. The IRT commodities carried offer the possibility of paying higher rates than much of other railroad traffic, provided the rates are not forced down to unremunerative levels by truck competition.

From a societal point of view, IRT can result in lower prices of goods. It can reduce air pollution, energy consumption, highway congestion, and highway deterioration. However, these benefits accrue mainly on the line-haul part of an IRT move, i.e., the railroad part. A different result occurs in connection with the drayage part. Air pollution, energy consumption, highway congestion, and highway deterioration are

not reduced. In fact, on the roads that connect shippers with an IRT terminal and in the immediate vicinity of IRT terminals (especially the large hubs), air pollution, highway congestion, and road deterioration increase. Research is needed to more-specifically identify the societal benefits and drawbacks of IRT in these latter areas.

OBJECTIVES OF THE STUDY

In order for the benefits of IRT to be received on a wide scale by shippers and receivers and society in general, (1) IRT service must be available to shippers, (2) the quality and cost of IRT service must be competitive with other modes, and (3) the service must be accepted and used by shippers and receivers. The study reported on here was intended to deal with these issues by identifying the IRT facilities and services available to manufacturers in Minnesota, the extent of use of IRT by those manufacturers, and their perceptions about the carriers, agents, and the service provided.

Are the results of the study generalizable to the rest of the United States, i.e., are the Minnesota results similar to what would have been found elsewhere in the country? As noted previously, Minnesota is a rather typical state in terms of its population and geographic size, kinds of industries, and size of firms. The problem is that, although Minnesota is a representative state, IRT service itself is probably not uniform throughout the country in its geographic coverage or quality, thus making generalization difficult. Because of the presence of

a major IRT railroad in Minnesota, and its apparent dedication to IRT, the service provided to Minnesota manufacturers is probably at a relatively high level. The state also has a very well established and reliable intrastate trucking network to provide drayage service. Therefore, if generalizations are to be made, they should be made to areas in the country that also have relatively high IRT service levels.

AVAILABILITY OF SERVICE

For Minnesota manufacturers, IRT service is available from two railroads--the BN and the Soo Line--and one intermodal operator. There are six IRT terminals (one of which is across the border at Grand Forks, North Dakota). IRT service is nominally available everywhere in the state but, in practice, is not because of the cost and time involved in draying to and from the limited number of IRT terminals for some users and the problem of out-of-line hauls that sometimes occurs, necessitated by the terminal location relative to where the shipper or receiver is located. Both drawbacks mean that IRT service is really not available in a practical sense to some manufacturers in the state.

The IRT service provided by the two Minnesota railroads and the intermodal operator is nationwide and international, either directly or via interchange with another railroad(s). The latter arrangement, however, is a limiting factor when it slows down the door-to-door transit time, perhaps making the service unacceptable to the shipper. The main IRT routes or lanes used

by the BN and Soo Line, where their service is the best time-wise, do not include large areas of the country so that the better service is not available to or from those areas.

Drayage carrier service is available in sufficient supply to shippers and receivers throughout the state. There is a sufficient supply of shippers' agents for the Minnesota carriers and shippers to use.

Because IRT is mainly a full-vehicle load method of transportation, its availability is limited for LTL shippers.

The kind of traffic that can be carried by IRT to and from Minnesota is very broad. The data show a great variety of different commodities being carried via IRT.

Therefore, IRT facilities and services are sufficiently available to Minnesota manufacturers and other shippers and receivers in the state, within the practical limits of IRT service regarding the location of the origin and destination points in the state and elsewhere in the country and shipment size. Minnesota is probably served as well as any state is currently being served by IRT. The fact remains, however, that a number of manufacturers in the state are denied IRT service because of their location, shipment size, or the location of their customers/suppliers.

EXTENT OF USE OF INTERMODAL RAILROAD-TRUCK SERVICE

A fairly large share--about 28.0 percent--of the manufacturers with fifty or more employees that responded in the study were users of IRT. With a confidence level of 90.0

percent, the range was from 21.0 to 35.3 percent. Of the nonusers of IRT in the study, only about one-half were acquainted with IRT, indicating a failure of the IRT marketing system to reach potential customers. If Minnesota manufacturers have no acquaintance with IRT, they are effectively removed them from the market.

CHARACTERISTICS OF USERS OF INTERMODAL RAILROAD-TRUCK SERVICE

Size of Users

Although, as measured by annual sales, number of employees, and the amount of transportation costs, users of IRT tended to be somewhat larger than non-users in the study, a considerable number of users were very small firms. Therefore, size of firm does not appear to be a barrier to use of IRT. Location and other factors are more important.

Location of Users

IRT users were located in both urban and rural areas and many were located in cities of less than 5,000 in population. A more important factor in determining use of IRT was distance from an IRT terminal. Most IRT users were located less than 100 miles from an IRT terminal; only one of 43 was located more than 132 miles away. These results probably reflect the distance problem, referred to above.

Control of Transportation by Users

Both users and nonusers of IRT in the study tended to make the transportation decision, as opposed to having customers/ suppliers make the decision. However, about one-half of the respondents shared responsibility with customers/suppliers. Because the respondents in the study tended to have transportation control, solely or in a shared situation, they are the ones to be contacted about moving their traffic.

CHARACTER OF USE OF INTERMODAL RAILROAD-TRUCK SERVICE

Other Modes of Transportation Used

Larger proportions of tonnage, both inbound and outbound, were transported by IRT, railroad, water, and truckload for the average IRT user than for the average nonuser. On the other hand, smaller proportions of tonnage, both inbound and outbound, were moved by air and LTL for the average user than for the average nonuser. This is evidence that the market for IRT service lies among those firms that move larger shipments.

Domestic and International Movements

IRT users collectively used the service for both inbound and outbound moves and for both domestic and international shipments. Given that Minnesota's foreign trade is a small part of its total economic effort, international IRT is much more important than one would expect, or, on the other hand, domestic IRT is less important than one would expect. This is especially true of

inbound domestic IRT. IRT marketing efforts have an obvious opportunity in the domestic market.

Commodities Carried

Although a great variety of products produced were shipped via IRT by Minnesota manufacturers, they tended to be of relatively lower-value per unit of size. Examples were paper, plastic products, wood products, and chemicals. The many different materials/parts received via IRT by users tended to be relatively lower value parts and components, including such things as steel fabrications, machine parts and assemblies, and paper. The products moved inbound and outbound via IRT by users were similar to their general shipments.

These data indicate that, when marketing IRT service, a broad-based approach in terms of product categories can be taken, but it should be recognized that IRT had difficulty attracting high-value traffic.

Destination and Origin Points Involved

IRT users usually shipped via IRT to distant points, including areas such as California and Maryland. Distances were longer than for their shipments in general. The origin points of the goods brought into Minnesota by users were widely dispersed, including many long-distance points, for example, Washington and New York.

Frequency of Use

The use of IRT by the users in the study was rather infrequent. On the inbound side, only about one-quarter received at least one IRT shipment per week. The frequency was somewhat better on the outbound side. However, about one-third made only one to three shipments per month and one-third used IRT less than twelve times per year. This indicates that, although a fairly large proportion of Minnesota manufacturers used IRT, their frequency of use was not encouraging. This is evidence that the number of users alone is not enough to measure the IRT market and that IRT marketing, although it may have had some success in getting many manufacturers to use IRT, has not been able to establish a regular, frequent shipping schedule with many of them.

Size of Trailers and Containers Used

The most popular trailer and container size among users of IRT was forty feet for both vehicles. Overall, the containers used tended to be smaller (many less than forty feet) than the trailers used. The implication of this is that providers of IRT service must take into account preferred container sizes as they replace trailers with containers for domestic service. On the other hand, IRT marketing can take this as an opportunity to upgrade the shipper to larger-size shipments using lower rates to encourage this step.

Use of Shippers' Agents

Agents were very important in arranging IRT service; about two-thirds of the users made use of agents. This indicates that IRT railroads have succeeded in turning much of their marketing efforts over to someone else. Agents tended to perform the basic tasks involved in arranging for IRT service.

USER ATTITUDES CONCERNING INTERMODAL RAILROAD-TRUCK SERVICE

How Users Became Aware of Intermodal Service

Agent salespeople often played an important role in acquainting manufacturers with IRT and getting them to use the service. However, trade magazines, word-of-mouth, and suppliers/ customers were also important. Railroad salespersons were relatively unimportant in this effort. These data indicate that railroads have become extremely dependent on agents and other methods of marketing IRT and that serious thought should be given as to what should be done in this area in the future.

At the same time, the evidence gathered from nonusers of IRT shows that neither railroad nor agent salespeople have been reaching many of those firms (although drayage companies had been fairly active), some of which must be potential shippers. That only 57 of 110 nonusers in the study were acquainted with IRT is, therefore, not surprising.

Why Intermodal Service Was Used

The principal reason given for using IRT service by Minnesota manufacturers was cost. It was mentioned much more

frequently than any other reason; at least twice as often. Availability of the service at the origin point(s), availability of equipment, and suitability for shipment size(s) were the leading secondary reasons given, among numerous others. Therefore, despite efforts to improve IRT service, cost remains a primary determinant of its use. This means that the carriers must continue to strive for more efficiency and lower cost while, at the same time, looking for ways to improve IRT service so that it does not have to be sold only on a cost basis.

User and Nonuser Perceptions of Intermodal Service

Overall, users of IRT perceived IRT as being slightly above average. They rated it higher overall than they rated railroad transportation but considerably lower than motor truck service. The only aspect of IRT service that was perceived very positively by users was cost (see above). In fact, it was the only factor rated higher than the corresponding motor trucking rating. At the same time, highly negative perceptions existed in connection with processing of loss and damage claims and transit time, when compared with motor trucking. Other service factors that were not well perceived when compared with the other modes included suitability for shipment size, suitability for the commodity, and equipment free time for loading/unloading. Loss and damage was perceived to be slightly better than railroad but considerably inferior to motor trucking, meaning that the negative loss and damage reputation that IRT once deserved has not been completely overcome.

Overall, nonusers of IRT rated IRT lower than did users of IRT, rating it slightly above fair, only a little higher than railroad service, but substantially below motor truck service. No aspects of IRT service were perceived very positively, and some were rated below railroad service. In the minds of nonusers, IRT has a long way to go to be service competitive with motor trucking.

These findings may indicate that IRT marketing has not done an adequate job of disseminating information about IRT, and that a huge educational job will be required to expand the market.

Evaluation of Intermodal Railroads, Drayage Companies, and Agents

IRT users rated drayage companies higher than IRT railroads, and both had higher ratings than the overall IRT service they received, hardly a seamless system. Many users were not able to provide the ratings for drayage companies and IRT railroads, probably because they were working with an agent, thus not having direct contact with the carriers.

The rating given by users to agents was also higher than their overall perception of IRT. The rating was also higher than the rating given to IRT drayage companies or IRT railroads, evidence, again, that a seamless IRT system does not exist in the minds of the users.

COMPARISON OF INTERMODAL RAILROAD-TRUCK AND MOTOR TRUCK SERVICE AND RATES

When specific traffic lanes involving IRT trailer moves were studied, IRT had a longer transit time when compared with motor

trucking on every lane examined, both inbound and outbound and both long-haul and short-haul. IRT did better with rates, having the lowest rate in several situations.

IRT service needs to offset the time disadvantage in some way in order to be competitive by providing better service in other ways, such as in loss and damage or information services or in other aspects of customer service. The problems in doing so are numerous.

The other way in which the transit time disadvantage can be offset is through lower rates than provided by motor trucking. Indeed, IRT rates were lower than truck rates on certain lanes studied, primarily on long-haul outbound lanes where the Twin Cities was the origin point.

The traffic lane comparison involved only IRT trailer moves, which still dominate domestic IRT service. The probable shift to domestic containers, and the continued growth of international container traffic, especially double-stack, may improve the ability of IRT to compete against trucking, both service-wise and rate-wise, especially where double-stack service is involved.

STEPS THAT COULD INCREASE INTERMODAL RAILROAD-TRUCK AVAILABILITY AND TRAFFIC CARRIED

Negative Factors

IRT accounts for a very small proportion of total intercity freight traffic in the United States, probably about five percent, thereby limiting the overall positive impact it can have on shippers, receivers, carriers, and society as a whole.

Although there are positive things associated with IRT, in particular, the expected growth in international traffic, there are important negative factors that must be dealt with if IRT is to grow substantially in the future.

The problems of IRT revealed in the study were discussed above. Mention was made of the lack of availability of IRT service to many potential customers, the low frequency of use of IRT, the main attraction of IRT often being low cost, not service, and the lack of knowledge about IRT among potential users. The study showed that the perception of IRT in the minds of shippers and receivers was still not very good; many of them were critical of the service provided and many either did not use IRT or used it only for lower-value and non-time-sensitive goods. The study indicated that the transit time disadvantage of IRT was serious and must be compensated for by low rates in order to attract traffic. The multi-party nature of IRT (railroad, agent, drayage company) caused management and image problems; users often did not view IRT as a seamless service.

Suggestions for Improvement

IRT carriers could make IRT service more available to shippers and receivers in several ways. The location (distance from an IRT terminal) problem could be reduced by opening more terminals, i.e., bringing the service closer to the potential customer. Devising a method to enable the efficient carriage of

smaller shipments via some sort of consolidation program would make the service available to shippers whose shipments currently are too small for IRT carriage. Finally, if a manufacturer or other business firm is not made aware of IRT, or has erroneous negative information about it, service has become unavailable to that firm because it will not be used. The solution is obvious. A more complete marketing effort could reach the many firms that apparently never heard of IRT or have distorted impressions of it.

What can be done to improve the market for IRT service? Expansion of double-stack service could be a major factor in increasing the amount of traffic carried by IRT in the future. Its principal future impact will probably be on domestic service where it has had a limited presence until now. However, double-stack cannot be relied on entirely to grow IRT traffic because it is, for practical reasons, limited to high density lanes and longer hauls.

Replacement of conventional domestic TOFC by containers in single-stack (as well as double-stack) service could result in a more efficient operation and, thereby, attract more traffic.

The use of shippers' agents by railroads to market domestic IRT service to shippers has generally been beneficial to railroads and shippers. However, sub-optimization within the system can occur, where railroads, agents, and drayage companies attempt to optimize their own position and not think enough about optimizing the overall service provided to the customer.

Although independent, the companies should operate as a blended/ integrated seamless entity.[1] More complete control of the system from door-to-door by the railroad may help to improve the situation. There was evidence in the study that some railroads have decided to take more control, sometimes with greater supervision of agents' activities and sometimes reducing the number of agents used.

Commodity rates could be used to make IRT more profitable and to expand the market. The use of FAK rates has already been reduced as railroads returned, at least partly, to the use of traditional commodity rates. It makes sense from a net income perspective to do this because it enables the carrier to take advantage of the differences between the transportation characteristics of different commodities carried. It not only enables a greater revenue contribution but also lowers rates in some instances, which can attract a larger volume of traffic.

Other things that IRT carriers could do to expand the market include, first, providing more frequent service. One train or less service per day is the same as lengthening the transit time to certain shippers, since, if a shipper barely misses the cutoff time for a daily train, the transit time has increased by one day. Second, add guaranteed delivery times with financial penalties for non-performance on a door-to-door, not a ramp-to-ramp, basis. This would require railroads to be more concerned about who the drayage carriers are and what their capabilities are. Third, further develop the business received from LTL

truckers, where they ship their trailers via IRT; do the same for truckload truckers, an IRT business that has been limited to date.

STATE POLICY REGARDING INTERMODAL RAILROAD-TRUCK SERVICE

The potential benefits and drawbacks of IRT to manufacturers and other shippers, trucking companies, railroads, and society in general were discussed above. Although some of the social benefits (such as energy savings) of IRT occur mainly in connection with the long-haul (rail) part of a haul, most of which is not within the borders of the state of Minnesota, major benefits can accrue to Minnesota shippers, receivers, and consumers. Should further development of IRT be encouraged by the state?

On balance, it appears that IRT has a net positive effect both within and outside of Minnesota, and it appears, therefore, to be in the interest of the state government to encourage its development. It is assumed here that the problems of energy consumption, air pollution, highway congestion, and road deterioration associated with roads that connect with IRT terminals and in the immediate terminal area itself are more than offset by the benefits of IRT.

What can a state do to encourage further development of IRT service within its borders? A major problem is that IRT is basically an interstate service and, as such, state government is limited by the federal constitution as to what it can do in terms of regulation and other areas; its authority is confined to

strictly intrastate matters. In addition, a state cannot use its tax or other powers in such a way as to discriminate against carriers operating in interstate commerce. For example, a lower highway user tax for intrastate truckers than paid by long-haul interstate truckers would probably be judged unjustly discriminatory against the latter. Different size and weight limits for the two kinds of carriers would present the same problem.

Given these limitations, what can a state do? There are several things that could be considered.

(1) A state could help to improve IRT transit time by helping railroads to speed up processing freight through IRT terminals by improving access roads to terminals, assisting in land acquisition (by expediting the process) for new terminals or terminal expansion, and helping to finance terminal expansion, lifting equipment, and new containers to replace trailers. The forms that financial assistance could take include direct grants, direct low cost loans, and guarantee of loans made by private lenders.

(2) An important limiting factor in the growth of IRT is the distance that many shippers and receivers are from an IRT terminal. A solution could be to increase the number of terminals. The state could assist the railroads in doing this by aiding in land acquisition and helping to finance terminal construction and operating equipment.

(3) The road system that connects IRT terminals with the shippers and receivers around the state is to a degree controlled and financed by the state government. The more important roads that serve this purpose could be identified and the state could ensure that these are adequate for IRT use.

(4) Regulatory restrictions on intrastate drayage companies could be reduced to the absolute minimum in order to encourage competition and efficiency in the industry.

(5) Finally, the state could finance research intended to help develop new technology in the IRT industry regarding rail cars, containers, truck chassis, lifting equipment, communications systems, terminal procedures, and train scheduling.

Therefore, although the state must play a limited role in making IRT service more attractive to the shipping public, it can do some things in the areas of promotion and research.

PART 6 ENDNOTE

1) McNeil Porter, President of CSX Intermodal, cited in "Intermodal Partners Should Share Profits, Porter Says," Transport Topics, April 29, 1991, p. 1.

APPENDIX

The mail questionnaire used in the study, as well as the letter of introduction accompanying it, are shown in the pages that follow. The questionnaire sent out was printed on three different paper colors: white, green, and yellow. Due to external limitations, the reproduction provided herein is displayed entirely on white paper, although each page is marked as to its original color.

UNIVERSITY OF MINNESOTA

Twin Cities Campus

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Carlson School of Management

1235 Management and Economics
271 19th Avenue South
Minneapolis, MN 55455-0413
612-624-5055

March 27, 1991

Name
Position
Company
Street Address
City, State, Zip Code

Dear Name:

We are engaged in a study of intermodal rail-truck freight transportation facilities and services in Minnesota, the purpose of which is to determine what intermodal facilities and services are available and the extent of their use by Minnesota manufacturers. The study is financed by the Center for Transportation Studies of the University and is not supported in any way by any other organization, group, or individual.

Part of the study involves mail questionnaires to be completed by representatives of a selected group of manufacturers and we would very much like to include your company in this phase of the study. Enclosed is a questionnaire containing questions about the use of intermodal transportation by your firm. We would like the questionnaire filled out even if your firm is not involved in intermodal transportation. Your responses are just as valuable to us as those received from intermodal users. Please note that it is necessary for you to fill out only that part of the questionnaire that pertains to your firm. Also, most of the questions can be answered quickly by merely checking or circling the appropriate answer, although your comments are welcome on all questions and space is provided for that purpose.

The name of the person who fills out the questionnaire and the name of your firm will not be used in any publications that appear as a result of this study. All information and opinions obtained will be held in the strictest confidence.

The results of this study can be of benefit to manufacturers and other shippers and we hope that you will want to take this opportunity to be represented. We urge you (or someone you designate) to fill out the questionnaire and return it to us in the enclosed, stamped envelope as soon as it is convenient for you to do so.

If you have questions or need further information, please call us (collect if long distance).

Very truly yours,

Donald V. Harper
Professor of Logistics Management
612-624-5833

Philip T. Evers
Research Assistant
612-625-5574

WHITE

University of Minnesota
Carlson School of Management
Intermodal Questionnaire

March 27, 1991
CONFIDENTIAL

IN THIS QUESTIONNAIRE, THE TERM "INTERMODAL" MEANS INTERMODAL MOTOR TRUCK-RAILROAD SERVICE, I.E., BOTH MOTOR TRUCK AND RAILROAD SERVICE ARE USED ON THE SAME HAUL, WITH EITHER CONTAINERS OR TRUCK TRAILERS CARRIED ON A RAILROAD CAR. THE MOTOR TRUCK SERVICE MAY PRECEDE OR FOLLOW THE RAILROAD PART OF THE HAUL. THIS SERVICE IS SOMETIMES REFERRED TO AS CONTAINER-ON-FLATCAR OR TRAILER-ON-FLATCAR SERVICE.

PLEASE FILL IN YOUR ANSWER OR INDICATE YOUR ANSWER WITH A CHECK OR CIRCLE.

1. Company name_____

2. Name and title of person completing questionnaire:

   Name_____

   Title_____

3. Site of the production facility at which you are located:

   _____

PLEASE ANSWER THE REMAINING QUESTIONS ONLY FOR THE PRODUCTION FACILITY NAMED IN QUESTION 3 ABOVE.

4. Total annual sales revenue of this production facility:

$ 0 - 499,999_____	$ 1 million - 9,999,999_____	$ 25 million - 49,999,999_____	$ 100 million and over_____
$ 500,000 - 999,999_____	$10 million - 24,999,999_____	$ 50 million - 99,999,999_____	

5. Number of employees at this facility:

under 50	_____	100 - 249	_____	1000 - 1999	_____
50 - 74	_____	250 - 499	_____	2000 and over	_____
75 - 99	_____	500 - 999	_____		

6. Principal products manufactured:

Product	Destination Point(s)
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

7. Principal inbound materials/parts used in your manufacturing:

Raw Material/Part	Origin Point(s)
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

8. Approximate annual inbound transportation costs (include both company operated and for-hire transportation):

$ 0 - 24,999 _____	$ 100,000 - 249,999 _____	$ 1 million - 4,999,999 _____	$ 20 million - 49,999,999 _____
$ 25,000 - 49,999 _____	$ 250,000 - 499,999 _____	$ 5 million - 9,999,999 _____	$ 50 million and over _____
$ 50,000 - 99,999 _____	$ 500,000 - 999,999 _____	$10 million - 19,999,999 _____	

9. Approximate annual outbound transportation costs (include both company operated and for-hire transportation):

$ 0 - 24,999 _____	$ 100,000 - 249,999 _____	$ 1 million - 4,999,999 _____	$ 20 million - 49,999,999 _____
$ 25,000 - 49,999 _____	$ 250,000 - 499,999 _____	$ 5 million - 9,999,999 _____	$ 50 million and over _____
$ 50,000 - 99,999 _____	$ 500,000 - 999,999 _____	$10 million - 19,999,999 _____	

10. Indicate the proportion of your facility's intercity traffic carried by:

	Percentage of Inbound Tonnage	Percentage of Outbound Tonnage
Intermodal truck-rail.....	_____	_____
Railroad.....	_____	_____
Pipeline.....	_____	_____
Water.....	_____	_____
Air.....	_____	_____
Truckload (TL)		
Common carrier.....	_____	_____
Contract carrier.....	_____	_____
Supplier's/customer's private.....	_____	_____
Your company's private.....	_____	_____
Less than truckload (LTL)		
Common carrier.....	_____	_____
Contract carrier.....	_____	_____
Supplier's/customer's private.....	_____	_____
Your company's private.....	_____	_____
Don't know.....	_____	_____
	100%	100%

11. Use of intermodal transportation:

Your facility does not use intermodal transportation _____

Your facility uses intermodal transportation for (check all that apply):

Inbound international shipments _____	Inbound domestic shipments (includes Hawaii & Alaska) _____
Outbound international shipments _____	Outbound domestic shipments (includes Hawaii & Alaska) _____
Don't know _____	

IF YOUR FACILITY **DOES NOT USE INTERMODAL TRANSPORTATION**, PLEASE COMPLETE ONLY THE PORTION OF THE QUESTIONNAIRE FOUND ON THE **GREEN PAGES**. THIS INFORMATION WILL HELP US TO COMPARE USERS AND NON-USERS OF INTERMODAL TRANSPORTATION.

IF YOUR FACILITY **USES INTERMODAL TRANSPORTATION FOR INBOUND OR OUTBOUND SHIPMENTS**, PLEASE COMPLETE ONLY THE PORTION OF THE QUESTIONNAIRE FOUND ON THE **YELLOW PAGES**. THIS INFORMATION WILL HELP US TO COMPARE USERS AND NON-USERS OF INTERMODAL TRANSPORTATION.

QUESTIONNAIRE FOR FACILITIES
NOT USING INTERMODAL TRANSPORTATION

12. In your facility, who decides on the kind of transportation to be used?

	Inbound	Outbound
Our company	_____	_____
Supplier/customer	_____	_____
Don't know	_____	_____

Comments:

13. Is your facility acquainted with intermodal transportation service? Yes _____ No _____ Don't know _____

14. What is your perception of intercity intermodal, railroad, and motor truck transportation service? Please answer only for those items that you are familiar with. Circle the appropriate number (1 = poor, 2 = fair, 3 = average, 4 = good, 5 = excellent).

	Intermodal	Railroad	Motor Truck
Availability at origin point(s)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Availability at destination point(s)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Availability of equipment	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Equipment free time for loading/unloading	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Suitability for commodity(s) to be carried	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Suitability for shipment size(s)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Reliability of service	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Directness of service	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Frequency of service	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Amount of handling	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Pickup/delivery times	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Transit time	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Cost	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Amount of loss and damage	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Processing of loss & damage claims	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Communication (tracing, notification)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
After sale service	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Other (please explain)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Overall perception	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Not acquainted with the service	_____	_____	_____

Comments:

15. Has your facility ever been called upon by the following regarding intermodal service?

	Yes	No	Don't Know
Railroad salesperson	____	____	____
Third party (agent) salesperson	____	____	____
Drayage company (local trucker) salesperson	____	____	____

Comments:

Do you have any other comments about intermodal transportation?

Thank you for your cooperation

If you would like to receive a summary of the results of this study, check here _____.

QUESTIONNAIRE FOR FACILITIES
USING INTERMODAL TRANSPORTATION

12. In your facility, who decides on the kind of transportation to be used?

	Inbound	Outbound
Our company	_____	_____
Supplier/customer	_____	_____
Don't know	_____	_____

Comments:

13. How did your facility learn about the availability of intermodal service (check all that apply)?

Trade magazine	_____	Railroad salesperson	_____
Word-of-mouth	_____	Third party (agent) salesperson	_____
Industry meeting	_____	Drayage company (local trucker) salesperson	_____
Mail literature from railroad	_____	Upper level company management	_____
Mail literature from third party (agent)	_____	Supplier/customer	_____
Mail literature from drayage company (local trucker)	_____	Other (please explain)	_____
		Don't know	_____

Comments:

14. Why does your facility use intermodal service (check all that apply)?

Availability at origin point(s)	_____	Pickup/delivery times	_____
Availability at destination point(s)	_____	Transit time	_____
Availability of equipment	_____	Cost	_____
Equipment free time for loading/unloading	_____	Amount of loss and damage	_____
Suitability for commodity(s) to be carried	_____	Processing of loss & damage claims	_____
Suitability for shipment size(s)	_____	Communication (tracing, notification)	_____
Reliability of service	_____	After sale service	_____
Directness of service	_____	Requested by supplier/customer	_____
Frequency of service	_____	Other (please explain)	_____
Amount of handling	_____	Don't know	_____

Comments:

15. What is your perception of intercity intermodal, railroad, and motor truck transportation service? Please answer only for those items that you are familiar with. Circle the appropriate number (1 = poor, 2 = fair, 3 = average, 4 = good, 5 = excellent).

	Intermodal	Railroad	Motor Truck
Availability at origin point(s)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Availability at destination point(s)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Availability of equipment	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Equipment free time for loading/unloading	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Suitability for commodity(s) to be carried	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Suitability for shipment size(s)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Reliability of service	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Directness of service	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Frequency of service	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Amount of handling	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Pickup/delivery times	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Transit time	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Cost	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Amount of loss and damage	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Processing of loss & damage claims	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Communication (tracing, notification)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
After sale service	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Other (please explain)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Overall perception	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Not acquainted with the service	_____	_____	_____

Comments:

16. How do you rate the intermodal railroads and drayage companies (local truckers) that serve your facility? Circle the appropriate number (1 = poor, 2 = fair, 3 = average, 4 = good, 5 = excellent).

Intermodal railroads	1 2 3 4 5	Intermodal drayage companies	1 2 3 4 5
Don't know	_____	Don't know	_____

Comments:

17. When arranging for intermodal service, with whom do you usually deal (check only one)?

Railroad salesperson	_____	Drayage company (local trucker) salesperson	_____
Third party (agent) salesperson	_____	Other (please explain)	_____
Don't know	_____		

Comments:

18. What services are performed for your facility by a third party (agent) (check all that apply)?

Makes contact with railroad	_____	Assumes liability for loss & damage	_____
Makes contact with drayage company (local trucker)	_____	Processes loss and damage claims	_____
Provides rate information	_____	Provides cargo insurance	_____
Provides service information	_____	Negotiates rates with railroads	_____
Provides tracing information	_____	Other (please explain)	_____
Provides notification information	_____		

Comments:

19. How do you rate the third party(s) (agent) that you deal with? Circle the appropriate number (1 = poor, 2 = fair, 3 = average, 4 = good, 5 = excellent).

1 2 3 4 5

Don't know _____

Comments:

20. List the three most important commodities that are carried inbound and outbound in the intermodal service that your facility uses.

Inbound	Outbound
_____	_____
_____	_____
_____	_____
Inbound intermodal not used _____	Outbound intermodal not used _____
Don't know _____	Don't know _____

Comments:

21. List the three most important origin and destination points that are involved in your facility's use of intermodal service.

Origin Points	Destination Points
_____	_____
_____	_____
_____	_____
Inbound intermodal not used _____	Outbound intermodal not used _____
Don't know _____	Don't know _____

Comments:

22. What size intermodal trailers/containers does your facility usually use (check all that apply)?

	Trailers	Containers
10 foot	_____	_____
20 foot	_____	_____
28 foot	_____	_____
30 foot	_____	_____
40 foot	_____	_____
45 foot	_____	_____
48 foot	_____	_____
50 foot	_____	_____
53 foot	_____	_____
Other (please explain)	_____	_____

Don't know _____

Comments:

23. How often does your facility make use of intermodal service?

	Inbound	Outbound
Five or more shipments per week	_____	_____
One to four shipments per week	_____	_____
Three or less shipments per month	_____	_____
One shipment per month	_____	_____
Less than twelve shipments per year	_____	_____
Don't know	_____	_____

Comments:

Do you have any other comments about intermodal transportation?

Thank you for your cooperation.

If you would like to receive a summary of the results of this study, check here _____.