SUMMARY AND CONCLUSIONS

Summarized in Table 3 (for the Kelfield subdivision) are the annual net savings; the distribution of savings between the government, railway, and elevator company; and the increased farm-trucking costs to the producer for each abandonment option. The largest savings are to be gained from complete abandonment without the off-track operation. However, savings from an off-track operation are almost as high in that the savings in branch-line rehabilitation and upgrading costs far exceed the cost of commercial trucking and secondary elevation. A relatively small saving is to be had from partial abandonment with rail service to points considered for an off-track operation.

Producers are likely to incur an increase in farm-trucking costs in all three options but it is, of course, smaller with the off-track operation or the rail line maintained to Handel. The increase in cost to the province or the municipality for road maintenance may also be as high as the producers' increase in farm-trucking cost for the first two options.

The government stands to gain approximately twice as much from any form of branch-line abandonment as the railways or elevator companies. For the most part, the savings are in the rehabilitation and upgrading costs that are avoided if the branch line is abandoned. The cost to the federal government for the establishment of an off-track elevator at Handel as opposed to complete abandonment of the Kelfield subdivision is more than $100 000/year. This would save producers about $29 000/year. This leaves open the alternative of a farm-trucking subsidy, but such a consideration is beyond the scope of this analysis.

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Logistics Strategies for Regional Growth

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This paper analyzes the capability of the logistics system to (a) cope with regional growth and (b) be used as a tool to initiate desired growth. The focus is on small towns and rural areas (STRAs) of regions. Distinctions are made between operational and functional approaches to the analysis of logistics resources. An operational perspective of transportation resources results in the hind-part-before use of operational techniques as the basis for the design of strategies for resource use. This results in considering the transportation system and the transportation activities as ends to themselves. A functional perspective of logistics resources recognizes that transportation is only one subset of a group of related resources that collectively are means to an end. It recognizes that the function of the logistics system is to support the marketing effort of the users who collectively make up the economic infrastructure of regions. It also recognizes that strategies for the use of the system are designed in light of its market-support function and that operating techniques flow from strategies. Problems associated with the operational perspective are discussed as a backdrop for suggested strategies for the logistics system. The strategies suggested are designed to (a) improve the economic and temporal connections between STRAs and their markets and sources of supply and (b) relate the function of the system to certain environmental features.

Logistics resources are significant elements in the management of regional change. The purpose of this paper is to analyze the capability of the logistics system both to cope with change thrust on a region and to initiate desired regional change. The first objective is to relate the functional role of the logistics system to the relevant environmental features that may influence regional change. The second objective is to outline some strategies that will lead to more effective use of logistics resources and thus improve the prospects for strengthening the economic connections of small towns and rural areas (STRAs) with their nodal cities.

The functional approach, rather than an operational approach, is used to emphasize distinctions between the function and activities of the logistics system, to differentiate between economic ends to be

attained and the physical means to those ends, and to separate strategic decisions from operational ones. The focus is on STRAs of regions because logistics problems seem to center on the economic links of STRAs and their nodal cities.

Unfortunately, a significant portion of this paper has to be devoted to correcting misleading and false notions about both logistics and STRAs. Specialists in fields other than logistics have been so misinformed that certain erroneous information about logistics has become a part of the conventional wisdom. Only some of those false notions can be corrected here. Also, for more than 30 years (until recently), some demographers and others have fed the world a steady diet of misinformation about the death of small towns and the emptying of the countryside. The myth has become such a part of the conventional wisdom that at least a token approach to rebutting it is necessary. Otherwise, some may wonder why bother trying to revive a dead horse.

FORCES THAT INFLUENCE REGIONAL CHANGE

The fragile economic connections between nodal cities and their hinterlands are influenced by many environmental pressure points, two of which are population and industrial growth. Logistics factors have a significant influence on the ability of a region to compete in national and world markets. For example, the design of rate structures, the setting of rate levels, and the characteristics of transportation service influence the attractiveness of STRAs as production sites.

The effect of energy and capital resources on the economic connections between nodal cities and STRAs is not an obvious logistics-related factor. However, their relation becomes obvious when it is recognized that transportation is one of the largest consumers of energy resources and a significant consumer of capital resources. Barring the development of major new energy sources or technologies, the energy shortage is permanent. At one time the cost of transportation capital was virtually ignored, but it is now likely to be a critical cost factor for years to come. Furthermore, there are resistances to the flow of capital to the transportation industry. Accordingly, improvements in the effectiveness and efficiency of the use of logistics resources will lessen both the demand for fuel and capital and the costs of operation.

Regional shifts and resource shortages are the environmental factors used as symbols to show the capability of the logistics system to respond to and influence regional change.

FUNCTIONAL NATURE OF LOGISTICS RESOURCES

Broadening Concepts

To provide a stronger foundation for later analyses and recommendations, it is important to differentiate between functional and operational considerations, logistics and transportation, and marketing and distribution channels.

Functional and Operational Considerations

Strategic planners usually begin their work by asking the question, What business are we in? If properly framed, the answer is in terms of the function of the business rather than in terms of the product produced or the activity engaged in. Transportation is not the function of carriers; it is an activity that involves several tasks that result in the movement of goods for users. Also, since movement is only one of several activities in the total marketing process, shippers and receivers want more than just transportation. They want support for their marketing effort. Thus, the function of transportation is to provide marketing support.

An operational perspective, so widely used in both regional and business analyses, has a tendency to encourage narrow thinking about both opportunities and threats. For example, it encourages a perspective of the entire logistics system as a group of discrete entities to be viewed in terms of tasks they perform, such as moving goods from here to over there and storing goods here or there. In turn, these perspectives cause the activities to be viewed as ends to themselves.

The functional approach reduces the potential for confusing functions with activities and tasks, ends with means, strategies with tactics, and concepts with techniques. Further, it broadens the horizons of the analyst and opens more options for using logistics resources as a system rather than using the several elements individually.

Logistics and Transportation

The words logistics and logistics resources are used not only because of their functional orientation but also because they are much more inclusive than transportation and distribution and other activity-descriptive terms. Transportation implies activities and facilities related to movement. Distribution implies activities and facilities related to holding or storage activities that involve an outbound dissemination of goods.

Logistics resources include all of these things and more. For example, included among the logistics resources are the facilities, activities, and concepts related to planning, implementing, and controlling the effective and efficient flow of materials, both inbound and outbound. Specifically implied as resources are the managerial and technical expertise of the people charged with the responsibility of bringing the concepts and facilities together as a system to implement the logistics function.

Marketing and Distribution Channels

The commonly used term channel of distribution suffers from the same disabilities as the term distribution, only on a larger scale. First, it implies a continually outward movement or distribution from the mine, forest, land, or sea to the manufacturer, wholesaler, retailer, or consumer and, finally, to the dump or recycling center. The implication is that only needs for distribution to some company or area are considered and that needs for acquisition from a company or area are the same as distribution to some company or area. Second, it implies tht the several intermediaries in the channel are discrete entities when they actually constitute a continuum in the flow of goods from mines to beyond the ultimate users. Third, the flow of communication about wants and needs of channel members is likely to be limited to immediate trading partners adjacent to one another in the channel. Those firms that have integrated some or all of these activities do not suffer from these disabilities.

The term marketing channel implies an integrated view of the function of the channel that is to support the marketing efforts of its members as goods and services flow through the system. Also, it implies that channel intermediaries do not confuse activities with functions or means with ends. The vitality of the production, marketing, and consumption institutions--the members of the market-

ing channel--determines the vitality of the region.

Strategic Nature of Logistics Resources

It can be inferred from some of the comments above that the strategic role of the logistics system in economic development has gone relatively unnoticed by regional analysts and economic developers. However, the strategic power of the system as used by carriers and businesses has a strong influence on geographic concentration of factories, on defining the economic hinterlands of nodal cities, on extending or delineating trade territories of businesses, on turning otherwise uneconomical location points into favorable locations, and on speeding up the settlement of the western half of our country for agricultural and extractive enterprises while discouraging industrial development.

Despite all of the evidence of the strategic importance of transportation rate systems and services to economic development, regional strategists have given it little attention. Most have viewed the physical aspects of transportation as necessary parts of the infrastructure and have assigned it the operational role of performing a task. Some did not understand the complexities of the rate structure; thus, their analyses were faulty. For example, some attributed an operational role to the transportation system by dwelling on the costs incurred by for-hire carriers rather than by dealing with rates charged or the cost of private transportation (1, pp. 84-86), the presence of facilities to provide access in the city or region (2, p. 513), and the speed and flexibility of motor transportation (3, p. 25). Also, some apparently did not understand the rate structure because they made it possible for the reader to infer that they were writing about railroad class rates (1, p. 103; 3, p. 4). A number of other regional scholars made the same kinds of errors.

On the other hand, there were those who showed both a good understanding of the strategic role of transportation in regional development and an understanding of the rate structures and service capabilities of the carriers (4, pp. 106-113; 5, p. 19; 6). To attribute and document possible reasons for the narrow view and to counter them is far beyond the scope of this paper. Instead, a positive approach will be taken that emphasizes how the system can be used as a strategic force to help accomplish certain objectives related to economic development and resource use.

An understanding of the conceptual base of the logistics system requires knowledge of the ways in which the structure of the system can be translated into regional development strategies as well as into ratemaking and operating practices of the industry to support those strategies. With this conceptual understanding and the perceptual view of the system as a means to an end, the true function of the system emerges as a support function for the production and consumption systems. In other words, its function is to support the marketing effort of those involved in the marketing channel; i.e., raw-material suppliers, manufacturing companies, wholesalers, retailers, and others.

LOGISTICS AND REGIONAL ECONOMIC ENVIRONMENT

Generalizations in this part of the paper are made in the context of those types of industries for which logistics considerations are important in location decisions.

Logistics in Location of Industry

The only problem with taking an operational view of logistics resources in regional development is that such a view is irrelevant. By and large it focuses on facilities, rail class rates, distance to markets, and sources of supply. This is a facilities view that is concerned with the physical connections between and among regions. The functional approach is concerned with the economic connections of regions and embraces an environmental view of logistics resources. Although the facilities view considers the transportation elements of the environment to be fixed, the environmental view recognizes the need for facilities but concentrates on their strategic use and assumes that all of their strategic elements are variable.

Facilities and Service

The factors that impinge on the location of industry are typically listed as nearness to market, raw materials, and fuel supply; availability of an adequate labor pool; and availability of transportation. These factors do not truly explain the location decision. They imply that the geographic or physical juxtaposition of market, raw materials, fuel, and distribution facilities determine the location of industry. In short, it is implied that distance and things are the location ingredients. This is a quantitatively based listing of the number of transportation companies, miles of track and highway, and distance to markets. Everyone acknowledges that facilities are necessary parts of the regional infrastructure, i.e., roads, rails, terminals, transportation companies, pricing systems, and the like. Because some location theorists do not understand the rail-rate system, they assume that there is a pattern of rates that makes distance and transportation rates proportional (1, p. 103) and/or that the structure of class rates is the structure of all rates (3, p. 4).

By and large, all regions have the necessary facilities; thus, decisionmakers who consider locations for their firms are concerned with the qualitative aspects of the logistics environment. They are concerned about such factors as (a) the quality of the service of the transportation companies, (b) the price of service from suppliers and to markets, (c) the time required to receive and deliver goods, (d) managerial flexibility of logistics-related companies in meeting wants and needs of the company, and (e) other qualitative factors that relate to the functioning of the logistics system as distinct from its operations or availability. The facilities view that centers on availability has little, if any, strategic importance. It is the planned use that is important. As Wilfred Owen said (6, p. 19), "Transport, then, is a necessary but not sufficient condition for economic development."

The abandonment of branch rail lines is increasing and will probably increase more under a law passed in 1976. These abandonments will affect the facilities and services of STRAs more than they will metropolitan areas. One study of 10 branch-line abandonments showed that only two communities felt any significant adverse effects (7). Even so, the long-run loss in opportunity is almost certain to be high because the mere presence of rail facilities is desirable for many firms. Later, suggested methods of lessening the bad effects of abandonment will be mentioned.

Proximity Considerations

Distance is the factor that many location theorists

use to determine a region's proximity to raw materials, markets, and fuel. Certainly, physical proximity is one factor, but both economic proximity and temporal proximity are more important. Distance is primarily a factor in the carriers' cost structures and is only one factor in transportation rates. However, to the user it is mostly an irrelevant factor compared with the other two. If all rates were class rates and thus proportional to distance (as some location theorists assume them to be), physical proximity and economic proximity would be the same. However, class rates move only a small proportion of goods moved by rail.

Before the Interstate Commerce Commission stopped publishing the figures 20-25 years ago, only about 5 percent of the tonnage moved by rail moved on class rates, and that figure has probably fallen. Rates based on exceptions to the classification and commodity rates do not necessarily conform to any particular pattern. The rates on a given commodity among three pairs of points at different distances apart may actually vary inversely with distance, depending on the type of rate available, as shown in the example below:

1. A-B: 300 miles, rate of 100, only class rates available;
2. C-D: 400 miles, rate of 75, exception rates available; and
3. E-F: 500 miles, rate of 50, commodity rates available.

Physically, A and B are closer together than either of the other two pairs of points; economically E and F are closer. A third measure of proximity--temporal proximity--shows that all three pairs of points are, for all practical purposes, the same time-distance apart; i.e., overnight delivery between all three pairs of points is feasible. Certainly, the cost to the carriers is not even considered; only the cost to the company that pays for the transportation is considered. If that company sells at uniform delivered prices, then to the buyer of the goods neither the distance, type of rate, nor the rate charged is of any significance.

If the E-F distance is changed to 1500 miles, the points still may be overnight apart by air. If air shipments are not feasible, the use of strategically located warehouses can provide overnight service. It is also important from a strategic viewpoint to note that it is possible to negotiate with carriers to change the environmental quality of a given location. This can be done through the introduction of commodity or exception rates between A and B, commodity rates between C and D (or make additional exceptions), and to lower commodity rates between E and F--all of which would change the economic relations among the three pairs of points. Also, air freight or distribution centers can change temporal relations among the points. In other words, all of these constants are variable except distance, and distance is an irrelevant factor to all but the carrier.

Nearness to market, raw materials, and fuel take on new meaning when viewed in the strategic context of cost and time. Thus, it is not just the facilities that are important but the use of those facilities. Several of the types of strategic adjustments in facility use will be mentioned later.

Carrier Capacity and Environmental Considerations

The capacity of the transportation system has three basic facets: (a) right-of-way and terminal facilities, (b) power units and freight-carrying vehicles, and (c) extent to which the cube- and/or weight-carrying capacity of the vehicles are used.

The most difficult of these facets of the system to cope with is rail rights-of-way. To improve the deteriorated facilities will require huge amounts of capital that the railroads do not have and, for the most part, cannot obtain except from current earnings. Earnings for the industry and for most carriers are too low to provide the capital necessary for extensive refurbishing. Outside capital for these purposes is both scarce and expensive.

Terminal facilities for rail and motor carriers are a different matter. Outside capital can be obtained for both by arranging for private investors to build and lease to the carriers the needed piggyback and motor carrier terminals so long as current cash flow can cover payments. Of course, there is strong competition from other industries for the scarce and expensive investment capital, but that is a general economic problem not confined to the transportation industry.

Power units and freight-carrying vehicles do not pose the same long-term problems that rights-of-way and terminals pose. The numbers of these units can be expanded reasonably quickly to meet the demand for them. Again, the carriers can resort to leasing these units as they have been doing for several years. This method of acquisition does not require the carriers to raise large sums, but it does require them to have sufficient cash flow to support payments. Again, carriers have to compete with other industries for scarce capital.

The effective capacity of the rail-car fleet can be increased by the strategic use of the rate system. During World War II, the car fleet was effectively increased by increasing the minimum weight required for a shipment to qualify for carload rates. Although this would have obvious effects on shippers, it would encourage them to ship more at one time. A careful application of incentive rates for heavier loading could make this approach either more attractive or less unattractive for shippers. Many rail rates are structured this way now, but a greater use of incentive rates would reduce the need for some unknown number of new cars.

This approach has limited feasibility for motor carriers. One reason is that most of their shipments and tonnage shipped weigh substantially less than 10 000 lb. Another is that, in most truckload-type shipments, the trailer is loaded to either weight- or cube-carrying capacity.

The imbalance in directional flow of traffic--especially between STRAs and their major central cities--is another facet of the capacity problem. The carriers' problems with small towns center on excess capacity. Trucks often make daily trips or only a few trips per week to many towns of less than 50 000 in population. Typically, trucks that go to the smaller towns will be loaded to much less than full capacity. Of course, this does not hold in those instances where large inbound shipments are made to a local industry. The outbound vehicles often have hardly any loads at all. As for railroad capacity, since STRAs receive so few carload shipments, providing service is very costly to the railroads. As with the motor carriers, outbound capacity is hardly used at all.

The logistics environment of STRAs can be substantially improved by the strategic use of both incentive-type backhaul rates and satellite-distribution centers. These strategies will be mentioned later. There is plenty of unused transportation capacity in STRAs. Adjustments in ratemaking strategy and in carrier and distribution center managerial strategy can improve the logistics environment for both carriers and regions. Acquiring new capacity in the form of vehicles is complicated by

current capital shortages and high costs. Otherwise, expanding and contracting this kind of capacity poses no problems because of the widespread and growing use of equipment leases. Improving rail right-of-way is the most vexing problem of all.

Implications of Capital and Energy Shortages

Shortages and high prices for both fuel and capital are likely to continue for at least several more years. The most obvious implication of these shortages is that carriers will use these scarce resources where returns to them are highest. This means, of course, where load concentrations are both the highest and the physical distance from their terminals is the shortest. Logically, outlying cities will be the first to have service reduced or eliminated, given present distribution patterns and other environmental circumstances and conditions. These are the cities that now have relatively poor service because of their location and relatively poor use of capacity by carriers in serving them.

The impact of this can be reduced in the long run by encouraging what appears to be a trend of industry to locate in STRAs. In the short run the impact can be reduced, as mentioned above, by modification of present logistics strategies related to rate structures and warehouse location, among other things. The logistics-related objective of encouraging the apparent trend to STRA locations and of redesigning logistics strategies would be to encourage the creation of small concentrations of economic activity in the STRAs.

The effect on logistics of attaining the objectives would have two facets. The first is the diffusion of what in many cases appears to be an overconcentration in metropolitan areas and the diseconomies of scale of operations that flow partly from congestion. The other facet is the opposite side of that coin. It would help STRAs reach the threshold of size where the economies of scale would become operative. At worst, it would diminish the diseconomies of scale that result from small size. Not only would capacity of the system be used more fully, which would result in the consequent better use of capital and fuel resources, but also other nontransportation objectives related to growth would be attained.

Writing in the context of underdeveloped countries, Owen made this same point when he said (6, p. 53), "Traffic projections are too often based on what may be expected to happen rather than on what can be made to happen. The first approach is guessing the future, while the second is planning it." By accepting the environment as it is and assuming all variables constant and unchangeable, the logistics system can do little to cope with and manage the impending changes that involve capital and fuel shortages and regional relocation and growth. It can only react to those changes as they act on the system. This reaction is almost certain to be the negative one of dropping areas of low concentration individually.

The system can be encouraged to take a positive posture by assuming the environmental constants as variables and by seeking to change them. By recognizing the functional aspects of the system and its strategic role, managers of the system can use it as an instrument to cope with and manage change. Some of these strategies for a capital- and fuel-shortage economy will be outlined in a later section.

REGIONAL CHANGE AND LOGISTICS STRATEGIES

Small Towns

One of the most significant characteristics of regional change is the vitality of STRAs. Population in towns of 50 000 or less has increased absolutely in every size group in every decade since 1910. The four size groups are 2500-5000, 5000-10 000, 10 000-25 000, and 25 000-50 000. Furthermore, the percentage of the U.S. population in all but the 2500-5000 group has also increased. That group showed small relative declines in 1930, 1960, and 1970 (1980 data are not yet readily available). In addition, the percentage of total U.S. population in these small towns has risen every decade until in 1970 they accounted for nearly 30 percent of the nation's people. Between 1960 and 1970, the U.S. population increased 13.3 percent while that of towns of 50 000 or less increased 20.7 percent (8,9).

Business Week (10) reports that, from 1970 to 1980, for the first time in history, more people moved to rural areas than away from them and that the bulk of Americans who are moving to new areas are headed for small towns. Newsweek (11) reports census findings that, for the first time since 1820, rural and small towns are growing faster than the cities and suburbs.

Small Towns as Markets for Industrial Goods

The movement of goods to small towns that are used in further production provide another clue to their vitality. The Census of Transportation divided the country into production areas (PAs). The top 25 PAs (1-25) contained the largest standard metropolitan statistical areas (SMSAs). PA 30 included all SMSAs not included in PAs 1-25. PA 50 included all non-SMSA places. An earlier study (12) tabulated the percentage of total tonnage of many industrial products used in further production that were shipped from PAs 1-25 and that were destined for PA 50 (non-SMSA towns). (Note that the time and cost to bring these 1968 figures up to date for this paper would far exceed the benefit.) The percentage of total shipments of selected industrial commodity groups that were destined for PA 50 is shown below:

Commodity Group	Percentage
Special industrial machinery	36.3
General industrial machinery	29.5
Industrial chemicals	27.8
Containers, boxes, etc.	26.0
Electronic components	24.6
Nonferrous basic shapes	24.1
Miscellaneous machinery and parts	17.7

Although these figures are not conclusive, they are indicative of the vitality that small towns have enjoyed at least since the early 1960s.

Industrial Expansion to Small Towns

A third clue that the economic base of small towns has been building for a long time is provided by a study nearly 20 years old (13). It showed that, of 1300 companies, 611 (47 percent) said they had moved or expanded between 1955 and 1959. Expansions were traced of firms that originally were located in the cities, suburbs, and STRAs and that expanded to each of the three types of locations. The percentage of firms moving to STRAs from each type of location is shown below:

Item	Percent
City to STRA	23
Suburb to STRA	6
STRA to STRA	12
Total	41

Although 41 percent of the expansions were to STRAs, 48 percent of the respondents reported their loca-

tions to be in STRAs while 25 percent were in cities and 27 percent in suburbs. Thus, STRAs seem to be exerting a pull for firms that seek expansion. The study indicated that the pull seemed to be the greatest for the standard industrial classification groups that employ large numbers of people. These were large firms that had an average of 349 employees. Seven different industries represented by 607 firms had an average of 482 employees. The range was an average of 167 employees of 119 firms in fabricated metal products to an average of 956 employees of 20 firms in miscellaneous business services. Again, while not conclusive, these figures are indicative of the vitality and attractiveness of STRAs in the late 1950s.

Small Towns and Logistics System

The older studies mentioned above that concern STRA population, STRAs as markets for industrial goods, and the industrial expansion to STRAs are indicative of the enduring vitality of STRAs. The 1981 Business Week and Newsweek reports on the 1980 census findings and other observations are other indicators. As mentioned earlier, Owen (6) commented that, while transportation is a necessary condition for economic development, in itself it is not a sufficient condition. For what follows, three points should be kept in mind. Voltaire: All generalizations, including this one, are false. Constantin: The only safe generalization that can be made about transportation rates is that no safe generalization can be made about transportation rates. Schiller: Against stupidity, the gods themselves struggle in vain.

STRAs have had the physical connections with their nodal cities, and through them with the rest of the country. Generally speaking, the physical connections have been third rate when compared with those of most SMSAs. The economic connections have been third rate at best and probably fourth rate. Many STRAs are located on branch lines of railroads. Most of those that are physically on main lines are effectively on branch lines because they are served indirectly from their nodal cities by local or switching trains just as if they were on branch lines. Conceptually, the same situation applies to motor truck service.

The economic connections are at least just as bad. These are high-cost areas for transportation companies to serve compared with nodal cities. A shipment that originates in the STRA and is destined to an STRA typically receives about twice the service of one that involves a movement only between SMSAs. For example, certain tasks at SMSA origin and destination terminals need to be performed for SMSA to SMSA terminals. Approximately those same tasks need to be performed at the origin STRA at both intermediate SMSAs and at the destination STRA. Also, cost of movement between SMSAs is spread over much more traffic than it is between SMSAs and STRAs.

Typically, the rail-rate structure, which was designed for operational reasons, does not reflect these additional costs. In fact, the rate on a movement STRA-SMSA-SMSA-STRA may be exactly the same as for the SMSA-SMSA movement. In these cases, rates for all points within a very large area--anywhere from several dozen miles to several score miles and, in some cases, several hundred miles--are grouped in such a way that the rates from some central city apply to all towns in that region. The same types of groupings may apply to destination points. Sometimes arbitraries are added to and from the rate from the basic city. But these are usually stated in terms of cents per hundred pounds as if weight were of some significance in the cost.

Motor carrier rates are similarly improperly made. Many of these rates, maybe even most, are made on the basis of distance. This is especially true for motor carrier class rates that move most of the less-than-volume shipments. Accordingly, a 400-mile shipment from SMSA to SMSA will pay the same rate as the same shipment from STRA-SMSA-SMSA-STRA. As if that was not bad enough, three (or more) carriers may be involved. Revenue is often (perhaps typically) divided among the three carriers according to the proportion of distance each moves the shipment.

The point is that costs of extra transportation tasks and the lighter-traffic density are not taken into account in either rate structures or rate levels. In one sense, STRAs are getting a free ride at the expense of the central cities and the carriers. This places a heavy financial burden on the carriers that serve STRAs, with the result often being a lower quality of service. The problem is compounded when the basically light traffic between STRAs and SMSAs is divided among two or more carriers. Despite all of these difficulties, the STRAs not only survive, they thrive and grow. The difficulties can be traced to managerial dedication to an operational view of the transportation system and the devising of strategies to make transportation operations more efficient. This is the reverse of the functional view of the logistics system. From the functional perspective, the facilities are viewed in light of their marketing-support function.

Logistics Strategies

Logistics strategies can be very influential in helping a region cope with growth and can be very valuable as tools in helping initiate desired growth. Growth has taken place in the STRA portions of regions despite certain resistances. The fact that they have had transportation services at least partly subsidized by carriers and central cities may have had some positive influence in their vitality. Other than rail rights-of-way and, in some cases, rail services, the transportation facilities are mostly in place and are relatively easy to expand; thus, most of the comments below relate to strategies for the intangible logistics resources. Warehousing facilities, on the other hand, are generally not available in STRAs; thus, some attention is given to them as strategic elements. Because background material has been provided for these strategies, in most cases a listing of the strategies will suffice.

1. Create small-town shippers associations--Associations are cooperatives historically set up in larger towns and with spotty records of success. The nature of several strategies suggests that some firm or other organization will have to set up operations to design and implement them. There is no reason that existing carriers or entrepreneurs in STRAs cannot create the company. Shippers associations are suggested as an expedient because the potential users would be the beneficiaries of the service.

2. Warehousing facilities--It is a fair generalization that public general-merchandise warehouses or distribution centers cannot be economically located in STRAs, other things remaining the same. However, those other things may be wired around or strategically adapted to enable a satellite facility to be established with several activities in mind. One activity could be as a partial substitute for abandoned rail service. To make the plan operable, receivers and shippers of freight would have to

arrange for goods to be shipped piggyback to and from the area through the shippers association. A second activity could be to serve as a consolidated terminal facility for carriers to drop off and pick up shipments and have local deliveries made by the terminal. A third activity would actually be a small public warehouse operated as something of a satellite of a central-city warehouse. A fourth activity, related to the others, would be to consolidate freight as backhaul for carriers to central cities.

3. Discriminatory rail rates--Adjustments should be sought for rail rates that discriminate against shippers or receivers of freight in a given area or that place them at a competitive disadvantage.

4. Special rates--Arrangements should be made for special rates that would encourage such companies as food wholesalers to use common carriers in STRAs instead of their own vehicles. This is actually a marketing situation that holds promise for carriers to help use their excess capacity. It also holds promise for wholesalers who may prefer to divert their fuel and capital resources used in STRA deliveries to other uses.

5. Backhaul rates--A carefully designed system of rates from STRAs to central cities should be designed. This system would encourage firms to locate in STRAs and provide additional use for the greatly underused capacity. These must be designed with care because they could backfire and in effect be so attractive that empty vehicles would have to be sent to STRAs to cover the shipments.

6. Incentive rates--Incentive rates are rates that provide incentives to shippers to make larger shipments. They lower the shippers' costs and increase carriers' profits if they are properly designed. Other types of incentive rates are multiple-car and trainload rates. These could, in the long run, help remove imbalances in the directional flow of traffic.

7. Restructure rates--Restructuring rates involves designing a rate structure that will both cover the special costs of serving STRAs and enable the carriers to make a profit. This may involve higher rates and thus may deter some firms from locating in the area.

8. Restructure carrier routes--Some STRAs are served by too many motor carriers, and none can profit. By some means or other, the number of these carriers should be reduced. Incentive and contract rates would accomplish part of this. Trading of routes with other carriers or pooling of freight by carriers would also accomplish this.

9. Encourage one-man-one-truck companies--One-man-one-truck companies could serve as assembly and distribution carriers only in the STRA.

There would be several effects of these approaches to managing change by adapting concepts and strategies related to the transportation system. Some of these effects would include the following:

1. Existing motor and rail capacity to and from small towns would be more fully used;
2. The burden on congested transportation facilities in metropolitan areas would be reduced;
3. To the extent that these two impacts are felt, the demand for capital for expansion would be reduced as would the demand for fuel for operation;
4. Because of better capacity use, small towns and cities are not as likely to suffer reduced service as capital and fuel become more scarce and expensive;
5. Small towns and cities would become more attractive to local entrepreneurs and expanding and migrating industries and thus help combat the unemployment problem in these areas; also, they would deter migration to the cities; and
6. To the extent that the transportation burden on the major cities is reduced, or its rate of growth as a burden decreased, congestion and air, thermal, and noise pollution would be diminished.

CONCLUSIONS

Several conclusions are drawn from the context of the purpose and objectives stated in the beginning of this paper. First, business institutions in the marketing channel are the bases for economic growth in regions. The function of logistics resources is to support the marketing effort of those institutions in order to strengthen their ties to each other. This strengthening process also facilitates the economic unification and integration of spatially separated places. Accordingly, the marketing-support function of logistics applies equally to businesses and regions. Second, while the presence of roads, airports, carriers, and other facilities and facilitating agencies provides physical access, it does not ensure economic integration of STRAs and the rest of the economic world.

Third, preoccupation with the operational role of logistics resources, rather than with their functional role, tends to cause confusion of means with ends and tactics with strategy in the use of the resources. Fourth, concern for physical proximity as a concept of spatial separation is largely a result of an operational view of logistics resources, and that concept is often irrelevant as a factor in evaluating regional connections. The appropriate factors are economic and temporal proximity with physical proximity as a subset.

Fifth, for more than 30 years STRAs have shown amazing economic vitality and growth despite resistances to that growth, including logistics-related resistances. Sixth, strategies can be designed for the effective and efficient use of logistics resources and thus improve economic and temporal connnections of STRAs. The strength and profitability of carriers and other facilitating agencies should figure importantly in the design of these strategies. Seventh, the creation of cooperative shippers associations in small towns would provide a corporate vehicle to design and implement the strategies. The encouragement of individual entrepreneurial efforts would accomplish the same thing. Eighth, the improved effectiveness and efficiency of the logistics resources would lead to conservation of scarce capital and fuel resources by improving the effectiveness and efficiency of their use.

Finally, in keeping with the purpose of this paper, it can be concluded that the logistics system has proved itself capable of coping with changes thrust on STRAs, despite the difficulties it has labored under as a result of managerial preoccupation with operations. A shift to a functional approach will improve its usefulness as a tool both in initiating desired change and coping with it.

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Abridgment

Impact of Transportation on Regional Development

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The objective of this study was to examine the relation between transportation costs and level of service and regional economic development to determine whether public expenditures on transportation infrastructure and freight rate subsidies can be expected to stimulate industrial development in a region. To fulfill this objective, the importance of 13 factors, which enter the decision to locate in a particular region, was rated by a sample of industrial firms in the Atlantic region of Canada. Five transportation-related factors were assessed among other location factors to determine their relative importance in attracting industry to the region. Industrial location has been used as a proxy for regional economic development in this study, as has been done in previous studies elsewhere. A part of the study traced the developments in location theory and empirical studies that have been concerned with the relation between transportation and regional development. An empirical approach was developed by using the location factor preference indices model to assess the subjective ratings of the plant-location factors for the industries contained in the sample. This model provides a numerical analysis of the subjective survey data.

This study investigates the relation of transportation and regional economic development by using the case of the Atlantic region of Canada. This focus must not be confused with transportation as a component of a regional economy, which is indisputably of vital importance. Instead, this paper deals specifically with the role of public expenditures to improve transportation costs, service, and infrastructure as a policy instrument to enhance economic development.

The contribution of this paper is twofold. On one hand, a method of analysis of location factors is presented that is empirical, regionally case-specific, and easily undertaken. By including transportation factors among other location factors, the degree of importance of transportation in regional development can be determined. On the other hand, the location factor preference indices (FPI) model analysis, as developed, is applied to the Atlantic-region case; in this case, the contribution of the research is a clearer understanding of the relative importance of selected industrial location factors in the region for input to regional development and transportation policy. This research attempted to fulfill a need for an uncomplicated and inexpensive method of assessing transportation in the context of regional economic development.

LOCATION THEORY AND ANALYSIS: HISTORICAL DEVELOPMENTS

The premise that transportation costs are the major deterrent that affects industrial location in a particular area has persisted since the early theoretical works of Frederich and Weber (1). The formal location theory that emerged was a classical economic theory with typical classical assumptions. It assumed, either explicitly or implicitly, such things as economic rationality, complete information concerning source of materials, size of markets, production mix, transportation rates, and complete factor mobility. This static model was further simplified by assuming transportation costs proportional to distance and holding everything but transportation costs constant. The obvious solution determined by using this plant-location model is to choose a site that minimizes transportation costs.

Major works by such authors as Hoover, Losch, and Isard added some realism by relaxing some of the assumptions, such as product homogeneity, perfect competition, freight rate linearity, and the homogeneous distribution of economic factors. All of the works, however, maintained the unquestioned basic