

The Demand for Transportation Services In a Growing Economy

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• THE IMPORTANT ROLE of transportation in the growth of an economy has been frequently documented. During the first stage of this country's development, water transportation, for example, was clearly a major force. There was the early clustering of economic activity around seaports; later, canals were dug to link sources of vital raw materials with industrial areas and the seaports. And, of course, the building of the transcontinental railroads ushered in a major expansion for the U. S. economy during the nineteenth century. More recently, the development of a highway system, pipelines, and air transport has provided easier access to all parts of the United States. Again, significant economic development can be linked to this change in transportation technology. In short, transportation has played a significant role in stimulating the economic development of the United States and shaping the particular form it has taken.

The major theme of this paper, however, is that in an advanced economy like that of the United States, this causal relationship has changed, and this change in the interaction between economic development and transportation has great significance for the transportation industries. The nature of this change and some of its implications will be briefly outlined. More specifically, it will be argued that a level of development has been reached in the United States where causation is reversed. That is, there is now a relatively high level of per capita income and a relatively ubiquitous supply of transportation in all areas of the United States; and as a result, most future economic growth can be expected to be rooted in forces exogenous to the transportation industry.

As future transportation requirements will be intimately linked to this growth, the future development of the economy must be anticipated in planning future transportation systems. Chief among the forces that will shape future transportation requirements are a changing industrial mix, an increased discretionary element in people's budgets, and the complementary nature of transportation.

With regard to the first of these—the changing product-mix of the economy—several points should be made. First, as the economy grows, the labor and capital component of output increases relative to the raw-material input; and because labor and capital are mobile, industry is finding it less and less necessary to be tied to particular geographic areas. This trend is accelerated because the present transportation systems provide good access to most areas. Consequently, it can be expected that industry will become more mobile, and that it will locate closer to its markets rather than to its sources of raw materials. This change will be a major factor that must be taken into account in planning for new transportation facilities.

A second aspect of the changing product-mix is that as incomes have gone up, the demand for services has increased more than that for goods. That is, one now buys relatively more packaging along with foods, more personal services, more recreational activities, etc. These service activities tend to be consumer-oriented and therefore highly related to residential patterns.

A short but revealing way to summarize these developments is to point out that both these trends in the product-mix of the economy lead to the expectation that employment patterns will be much more highly dispersed than they have been in the past. The impact of this on journey-to-work patterns is clear.

A major feature of an advanced economy is that its population is relatively better

off with respect to per capita income; in fact, per capita income is widely used as an index of economic development. When people's per capita income rises, the discretionary element in their budgets becomes more important. Stating this another way, people in an underdeveloped country exhaust most of their income in meeting the basic requirements of food, shelter, and clothing; in the poorest countries, they may not even meet these basic needs. As people become wealthier, they can start demanding more quality in these items, and thus open up room for individual preferences to express themselves. That is, some would rather spend more income on housing services, whereas others prefer to spend it on clothing or a particular form of transportation, etc.; this flexibility may be called the discretionary element within the budget.

Because of this trend, it is important to know more about consumer preferences than was known in the past in order to make decisions with regard to transportation services; for example, vehicle design or highway planning. It is clear that rising per capita income is making quality of service more and more important. Today there is less need to seek the minimum cost method of moving people; rather, given people's wants and desires, what the most desirable transportation system is must be anticipated.

From the evidence to date it may be concluded that most Americans want higher quality in their transportation systems, in that they are willing to pay for such advantages as privacy, flexibility, and time-saving. In the 1930's consumers allocated about 9 percent of their total expenditures to transportation; in the late 1950's (with higher per capita income) they allocated 12 percent (Table 1). However, these preferences (simple enough when seen as a list) are full of implications; these preferences must be understood much better than they are now if the desirable characteristics of future transportation systems are to be forecast correctly. How much are people willing to spend on additional privacy or time-saving? Or, conversely, how much cheaper would a system have to be to induce people to give up some privacy or flexibility?

A third major force is that of the complementary nature of transportation. In a relatively advanced economy like that of the United States, people are buying goods that by their very nature increase the demand for transportation services. Chief among these is individual home ownership—certainly one of the strongest desires and goals of the society. In 1900, 35 percent of the U. S. population owned homes, while

TABLE 1
PERCENTAGE DISTRIBUTION OF PERSONAL CONSUMPTION EXPENDITURES^a

Year	Distribution of Personal Consumption Expenditures (%)							
	Total Consumption Expenditure	Housing & Household Op.			Clothing and Shoes	Food and Alcohol	Trans. and Travel ^b	Other Goods and Services
		Total	Housing	Housing Operation				
1930-34	100.0	30.8	16.4	14.4	10.8	24.9	8.5	24.9
1935-39	100.0	27.7	13.1	14.6	10.5	29.0	9.4	23.4
1940-44	100.0	26.0	11.7	14.3	12.2	31.7	7.1	23.0
1945-49	100.0	24.7	9.9	14.8	11.7	32.2	9.2	22.2
1950-54	100.0	26.9	11.5	15.4	9.7	28.5	12.2	22.7
1955-59	100.0	27.7	12.5	15.2	9.0	26.0	12.6	24.7

^a "Housing Statistics, Annual Data, March 1960." Housing and Home Finance Agency, Washington, D. C., Table A-35, p. 38.

^b Includes automobiles and parts, gasoline, and oil, as well as other modes of transportation.

65 percent rented. By 1957, 60 percent of the population owned homes. The 1957 data by income groups show that over 83 percent of the families with incomes above \$10,000 owned homes in 1957. In short, home ownership has increased rapidly and will probably continue to do so as the society becomes wealthier. Among other things, this desire leads to a low-density residential pattern.

Low-density residential patterns mean, in turn, that the demand for transportation services goes up and the mode of travel will probably change. Investigation of the trip-making behavior of Detroit workers indicates that people who live in one-family dwellings are much more likely to drive to work than those who live in multiple dwelling units. One of the challenges today is how to provide an efficient public transportation system in the face of low residential densities and more dispersed employment.

Also, the demand for recreational activities is growing rapidly. Shorter work weeks and higher incomes allow families to spend significantly more on recreational activities, which again may require new transportation facilities. Much more needs to be known about the distribution of these activities. For example, if such cultural activities as theaters, concert halls, and museums are concentrated, as one would expect them to be, one sort of transportation demand is generated. If they are dispersed, like such outdoor recreations as camping and boating, there is another type of transportation problem.

Certainly the time pattern of transportation demands will be altered as recreational activities increase, and the peaks in transportation demands could change. It has been reported that there are greater traffic peaks on the George Washington Bridge on week ends than during the early morning and evening journey-to-work hours which are usually thought of as creating the peak demand on the transportation system.

What is argued, therefore, is that when an economy reaches an income level like that of the United States, and develops as extensive a transportation system, the nature of causation between economic development and transportation changes drastically: whereas advances in transportation technology once drove and fostered economic development, in time the growth of the economy becomes largely independent of changes in its transportation system.

If this basic hypothesis is accepted, certain lines of study take on urgency within the transportation industries. First of all, it is important for the transportation industries to devote a significant effort to understanding how the economy will change over time. With regard to the changing industrial mix, there is clear evidence that industry will be less raw-material oriented, and a greater proportion of the output of the economy will be in service activities. The locational patterns and habits of these industries should therefore be understood because they will increasingly affect the employment distribution of the economy, and thus journey-to-work patterns.

Secondly, much more needs to be known about consumer preferences than was necessary in the past, in view of rising per capita incomes and the increasing discretionary element in household expenditure patterns. As mentioned before, consumers are clearly asking for higher quality in their transportation service; but how to define "higher quality" is an important piece of unfinished business. Safety, speed, flexibility, and privacy, at least, are known to be aspects of quality; what needs to be done now is to measure their relative worth to consumers, if consumer preferences are going to be considered in designing new transportation systems. And finally, increasing home ownership and rapidly expanding recreational activities are also important because of their complementary nature to transportation. By studying their growth, much will be learned about future transportation requirements.

By way of summary, in assessing the relative merits of alternative transportation investments, it is important to consider fundamentally the trends discussed. If the prognosis is correct, the success of future transportation systems will depend to a greater degree than in the past on consumer preferences—notoriously capricious, but not without some regularity. A major challenge facing everyone concerned with planning new transportation systems, particularly urban transportation systems, is identifying these preferences and forecasting their future effects.