

Use of Freight and Business Impact Criteria for Evaluating Transportation Investments

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Prepared by Economic Development Research Group, Inc.
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Motivation. Local, regional and state transportation agencies have traditionally made infrastructure investment and prioritization decisions on the basis of traffic flow needs, while also considering factors such as neighborhood quality of life concerns. These are clearly legitimate and important concerns. In addition, though, there has been a growing recognition of the importance of considering economic development as a factor motivating transportation investment. However, the problem today is that even if the public and decision-makers recognize the importance of transportation infrastructure for their jobs, income and tax base, they need to apply new methods in order to differentiate projects that are particularly critical for business and economic growth.

Overview. This report seeks to address that need by laying out the case for: (a) why it makes sense to give weight to freight movement and critical business routes in the evaluation and prioritization of transportation investments, and (b) how a methodology and process can be implemented to appropriately take consideration of critical freight and business activities in the decision-making process.

Traded Industries. The stability and long-term growth potential of the Portland Region's economy hinges on the health of its "core" or "traded" industries. Generally, traded industries are those selling products to customers outside the region, a process which provides a flow of income coming into the region. Most jobs in the region are attributable to traded industries, or suppliers to those industries, or recipients or worker spending enabled by those industries.

There are many ways to measure these activities, including the tonnage, value and number of vehicles associated with shipments and deliveries, or the number of jobs and income that are generated directly or indirectly by them. The exact list and ranking can vary depending on which measure is used. In terms of the dollar value of net products and services provided to outside customers, the list includes most prominently computer and electronic products, lumber and wood products, printing and publishing products, metal products, wholesale trade, trucking and delivery services, business management and banking credit services.

Vulnerability to Bottlenecks. Traded industries are particularly vulnerable to bottlenecks along key access and delivery routes. That occurs specifically because the products of traded industries are *traded* – i.e., delivered to outside customers. If we examine the modes used by these industries, we see common patterns. First, trucks, "less-than-truckload" (LTL) couriers, and postal shipments are the most heavily utilized modes across much of the range of traded industries, and *all of these modes are highway-based*. Second, basic and heavy manufacturing sectors continue to rely on railroads for a significant portion of freight movement. Third, the two single most important industries to Portland (from an export-base perspective) are heavily reliant

on LTL freight services. This is important because LTL carriers are highly decentralized with large fleets making frequent pickups/deliveries, and are therefore vulnerable to street and highway congestion. Fourth, the computer and electronic manufacturing sector spends a significant amount of its transport budget on air travel. Finally, although trucks dominate, most traded industries depend on more than one mode to meet their transport needs.

It is also important to note that the trucking industry has undergone significant change over the past few decades in response to the internet and communication technology improvements. Trucks are increasingly becoming an integrated part of extensive supply chains and inventory management systems, and this is accomplished with own-account fleets, for-hire haulers, or less-than-truckload courier services such as UPS, FedEx, and DHL.

While recent changes in fuel prices will serve to encourage more use of railroads for long-distance freight movement, they are not expected to change the underlying technology development towards integrated, multi-modal supply chains. For instance, containerization and improved trans-modal technology has greatly reduced “transfer penalties” associated with mode-switching along long-distance shipments. To a significant extent, air, sea and rail shipments tend to also involve trucks for local pickup and delivery. This also means that roadway congestion affecting truck travel times can also have local cost repercussions for use of these other modes.

A series of interviews, conducted as part of earlier Portland regional and Oregon statewide studies, have commonly cited the special consequences of increasing congestion for truck movements. Some firms can adjust by instituting earlier deliveries and shift hours, though that also affects the ability of workers to use public transportation. Other firms adjust by shifting the location of delivery patterns and relying on additional warehouses dispersed further from the city. Yet others adjust by relocating their activities outside the state.

How Freight and Business Factors Can be Evaluated.

Not all transportation bottlenecks and delays are equal; there can be wide variation in the extent of their implications for business retention and expansion. Specifically, the economic stakes (potential for addition or loss of jobs and income in the region) can be particularly large when they affect the viability and competitiveness of freight movement for core “traded industries.” For this reason, there is a need to institute appropriate project evaluation criteria that can distinguish projects with particularly large or important economic consequences.

There is a three-step process that can be used to identify these types of situations. The three steps are:

Step 1: Identify routes and facilities that have a disproportionately large potential for important economic impacts. These are primarily facilities serving traded industries that are: (a) shipping freight products to outside areas, (b) serving tourists who bring in money from outside areas or (c) serving worker and customer travel affecting the productivity of industries that bring in revenue from outside customers.

Step 2: Measure the extent to which sensitive economic activities are affected by those

facilities. The measurement can be done by relying on information from existing regional and statewide travel models, which provide information on origin-destination patterns, locations of intermodal nodes and patterns of vehicle mix and trip purposes. Such information can be used to assess differences among key corridors in terms of five quantitative measures:

Step 3: Estimate the magnitude of potential economic benefit associated with making improvements to those facilities, or the potential economic loss from failure to make proposed improvements. The analysis of potential benefit typically involves consideration of the mechanisms by which proposed transportation projects can affect the regional or state economy. These can include, among others: (a) travel time to intermodal terminals and global gateways, (b) predictability of travel time, (c) size of same-delivery markets, (d) cost competitiveness of shipping rates, (e) access restrictions on truck use

Rating Systems in Other States. Variations on the three-step process are being adopted in a growing number of states. One way to apply this approach is to implement a qualitative “rating system” that can assess alternative transportation investment packages or alternative projects proposed for funding. The qualitative rating system is designed to incorporate each of the different aspects of transportation impact on freight movement and related business productivity. Such an approach can serve to highlight or flag projects involving routes or facilities that have particularly notable impacts on the economy, and then assign them qualitative scores based on the extent to which they do or do not support those desired forms of impact.

This approach can give additional recognition and priority to projects that particularly support improvement in the level of access or quality of access for business delivery markets or related freight flows. They may also give points to projects affecting pre-designated target growth industries or targeted locations for economic development. A scan of the rating systems used by various states (including Wisconsin, Missouri, Ohio, Minnesota and Virginia, and a proposed system in Kansas) as well as countries (such as the UK) shows that there are different priorities and rating factors in each area, but similarity in the general set of factors. The project impact factors recognized by rating systems include:

Transportation Drivers of Economic Impact (Incidence of project or program impact on)

- Multi-modal & intermodal facilities
- Connectivity to key statewide corridors
- Predictability of travel times
- Connectivity or access to global markets
- Concentration of trucks for goods movement
- Competitiveness of shipping rates
- Reduces bottlenecks and truck size or weight impediments
- Supports economic development initiatives
- Supports redevelopment of old industrial areas
- Location in economically distressed area

Economic Growth Outcomes

- Job Creation – supports industry attraction
- Job Retention – supports existing industry
- Public-private participation in funding

As either a substitute or a complement to rating systems, some states have adopted the use of quantitative models that forecast the economic development impact of transportation projects on the basis of business attraction and competitiveness factors. A variety of different models have been implemented in Montana, Indiana, Wisconsin and other states, but they all share a similar set of business impact factors that are sensitive to project impacts on the level of access or quality of access for business delivery markets or related freight flows. Typical of this approach are the factors used by the TREDIS model (used in earlier Portland and Oregon statewide studies, and also used in statewide evaluation by Wisconsin and Maine). These quantitatively measured impact factors, which are listed below, are striking in their similarity to the qualitative impact factors used in rating systems. They include:

- cost of commuting (by industry and by mode)
- cost of freight movement (by industry and by mode)
- breadth of market for same-day delivery markets (2 hour time access ring)
- breadth of market for workforce (45 minute time access ring)
- level of passenger service at closest commercial airport (passengers)
- access drive time to closest airport with scheduled service
- access drive time to closest marine port with scheduled service
- access drive time to closest intermodal (highway-rail) terminal
- access time to international trade gateways
- constraints on particular classes of vehicles, trips or freight

Overall, we can see a range of approaches used in other states for prioritizing and funding decision-making, all of which recognize economic impacts in transportation investment funding and project selection. They can range from qualitative rating systems to quantitative analysis models, and some involve combinations of the two.

Conclusion. In the days before computers, the prioritization of public investments in transportation projects were often made by judgments considering economic development, safety, quality of life and traffic flow needs and opportunities. With the advent of computer models for transportation planning, there was an understandable focusing on available data -- which tended to elevate the importance of daily averages for traffic volumes and traffic speeds without distinguishing types of vehicles or intermodal movements. With increasing development of global markets, which provide both threats and opportunities for the region's economy, there is now a renewed interest in distinguishing the roles of freight flows and peak period bottlenecks in affecting jobs, income and economic competitiveness.

This white paper has shown how these issues of freight movement are of particular relevance and concern for the future of the region's economy. That is not to imply that freight movements and business impacts are more important than other community and social policy considerations. However, it does imply that they are a legitimate and important concern that needs to be recognized and appropriately considered in transportation project investment decisions. Today, a range of qualitative impact rating and quantitative impact estimation methods can be applied to provide information needed for more informed decision-making, in a way that can be responsive to the unique aspects of the regional economic specializations and transportation patterns.