The Economic Impacts of Candidate Freight Transportation Initiatives in the Kansas City Region

Presented to:

Mid-America Regional Council and Kansas City SmartPort

Submitted by:

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September 21, 2009

KC REGIONAL FREIGHT OUTLOOK

Overview

The Kansas City Regional Freight Outlook (RFO) was prepared to sustain existing momentum and further expand the region's presence in transportation and logistics. The overall vision for the Kansas City RFO is to positively impact and accommodate the growth of freight transportation and logistics in the 18-county study area.

The Mid-America Regional Council and Kansas City SmartPort initiated the Kansas City Regional Freight Outlook. The Kansas City RFO was developed in collaboration with the Kansas and Missouri Departments of Transportations.

The overall study included a series of deliverables focused on identifying freight infrastructure needs and assessing Kansas City's regional transportation advantages, resulting in targeted strategies and messages for the region. The following list details each of the study deliverables:

- Freight Directory: Inventory of the region's 40 freight zones including modes, volumes, existing industries and presence of foreign trade zones
- Business Survey: Summary of 427 survey responses of businesses on freight topics important to the region
- Focus Group Summary: Major findings from five focus groups conducted with the general public, business and elected officials
- Freight Infrastructure Investment Plan: Focuses upon transportation infrastructure by freight mode and provides a set of transportation priorities for the region.
- Regional Freight Assessment: A comparative of assessment of Kansas City against other cities in the U.S. in terms of freight activities and site selection characteristics.
- Freight Flow Analysis: A summary of the volume and value of freight flows in, out and through Kansas City by truck, rail, air and barge.
- Freight and the Environment in Kansas City: A brief white paper on environmental topics related to freight and the region.

Using the data and research from each element, a series of findings are outlined that help inform the Strategic Plan development. This Strategic Plan draws on the data and research completed as part of the overall Kansas City RFO elements related to infrastructure, freight flows and economics to create objectives, strategies, and tactics that support the regional vision. The freight Strategic Plan was created to help the region remain a vital national freight transportation hub attracting freight growth.

Finally, the Kansas City RFO Summary is a culmination of all the work completed on each individual element. The summary provides an overview of the study effort, information on infrastructure and freight flows, as well as, a summary of the surveys and comparative cities analysis. Key recommendations and critical actions are provided to narrow the focus on the near term and help to initiate and maintain the regional vision to positively impact and accommodate the growth of freight transportation and logistics in the 18-county study area.

Two additional documents were prepared for use by MARC and SmartPort:

- The Economic Impacts of Candidate Freight Transportation Initiatives in the Kansas City Region: This white paper evaluates the potential economic impacts of various freight transportation initiatives in the region.
- Marketing and Communications Plan: This plan identifies specific communications objectives to target regional marketing related to transportation and logistics.

The Economic Impacts of Candidate Freight Transportation Initiatives in the Kansas City Region

Center for Transportation Research
The University of Tennessee

September 2009

1. Introduction and Project Summary

Within the scope of a more comprehensive investigation the Mid-America Regional Council and Kansas City SmartPort, as well as both the Kansas and Missouri Departments of Transportation (KDOT, MoDOT) are seeking to evaluate the potential economic impacts of various freight transportation initiatives that may be undertaken within the region. Accordingly, the overall study's primary consultant, TranSystems has contracted with the University of Tennessee's Center for Transportation Research (UT) to provide these analyses.

After careful consideration, SmartPort and MARC identified nine scenarios for evaluation. These include:

- Logistics Park KC: the Allen Group and BNSF intermodal development in Southern Johnson County, Kansas;
- CenterPoint Intermodal Center: the CenterPoint and KCS intermodal development located at the former Richards-Gebaur airbase south of Kansas City, Missouri;
- KCI Intermodal BusinessCentre: air-truck intermodal development near Kansas City International Airport (KCI);
- The combined impacts of the three intermodal projects;
- SmartPort Pre-Clearance Facility: the development of an improved customs facility for the processing of US truck exports to Mexico;
- Track realignments and new double-tracked Missouri River bridge construction for BNSF's "Trans-Con" routing;
- Various Improvements to I-70 through center of the Kansas City Region;
- Improvements to MO-210 east of I-435; and
- The redistribution of highway construction and maintenance funds over a long-range time horizon.

The ability to evaluate the probable economic impacts associated with each scenario directly corresponds to ability to measure the direct transportation-related effects of the proposed initiative. In five of nine cases, the UT study team was able to develop reliable estimates of these direct effects. For two of the remaining four scenarios (the BNSF bridge improvement and I-70 expansion), direct impact estimates are possible, but could not be accomplished in the current setting. In one of the four remaining scenarios (MO-210 improvements), probable direct effects are likely to be almost entirely local, so that regional impacts would likely be minimal. Finally, the last scenario – one involving the substitution of increased maintenance for new roadway construction on a region-wide basis – represents a circumstance that is simply too complex to allow the reliable estimate of the direct impacts needed to estimate broader regional economic effects.

However, this cross-section of analytics leads to one inescapable conclusion – investments in freight-related transportation infrastructures that reduce user costs can make the region more competitive and, in doing so, generate measurable increases in jobs and incomes.

Specific results for economic simulations modeling the probable economic impacts of the first five potential initiatives or "scenarios" are provided herein. For three of the remaining four scenarios (all excluding the MO-210 improvements), ranges of potential impacts are used to frame more generalized discussions of possible, but less precise impact estimates.

Section 2 begins with a summary of the general methodology that underpins all simulations. Section 3 provides specific descriptions and estimation results for the first five simulations. Section 4 contains a description of the remaining four scenarios, a generalized set of economic impacts, and UT study team reflections on how the proposed scenarios might actually affect the broader Kansas City region. Finally, concluding comments are provided in Section 5.

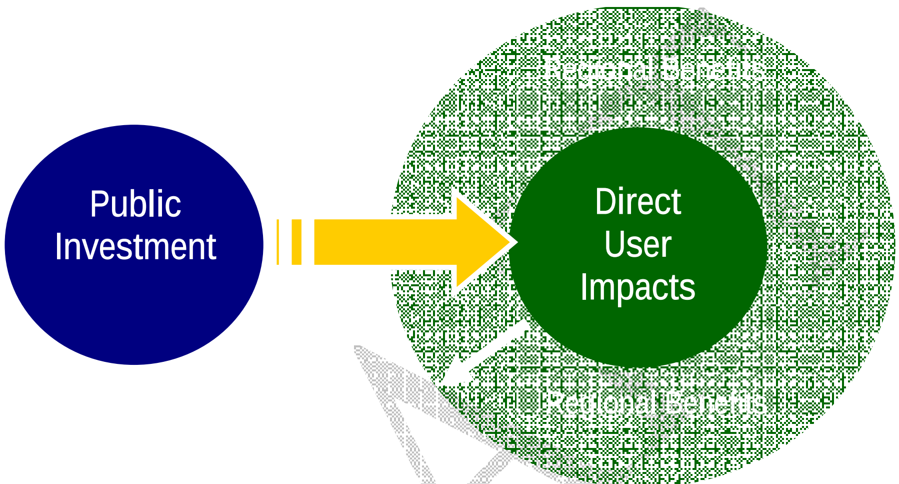
2. General Methodology

Generally, the development of new transportation infrastructure has two potential groups of economic impacts. First, there are direct and nearly immediate effects attributable to the construction of the infrastructure. In some cases, construction expenditures are sufficiently small or of a sufficiently short duration for these impacts to be ignored. In other cases, construction expenditures may be substantial and construction activities may span many years. In these cases, discounting the economic impacts of construction activities may measurably understate the overall effects of the infrastructure initiative.

Unlike the construction effects, the second group of economic impacts is lasting. New transportation infrastructure generally represents new transport capacity. This capacity, in turn, can reduce travel times and improve system reliability and / or increase the overall volume of traffic accommodated by various segments of the subject network. Within a freight setting, these direct impacts allow users to operate more efficiently. These added efficiencies lead to greater levels of overall economic activity within the region. This generalized scenario is depicted in Figure 1.

This figure depicts public investments in transportation leading to direct impacts for infrastructure users. In most freight contexts, these direct take the form of shipper savings. However, as business activity increases, this leads to additional economic activity within the community. Firms spend more with local businesses to secure additional materials and other inputs. New workers spend wages with local vendors and local businesses increase their activities by increasing inventories and their own workforces. This multiplicative effect extends through many rounds until the overall impact of the direct effects is exhausted.

Figure1.



Based on this general scenario, each specific analysis must include three tasks. These include:

- Definition of the appropriate study region;
- Identification of direct user impacts; and
- Simulation of the multiplicative region-wide economic impacts.

Each analytical element is discussed below.

Study Region Definition Even considering their network relation, an infrastructure improvement in Kansas City is unlikely to produce effects in Denver or St. Louis. At the same time, network and commercial interdependencies ensure that the impacts of a subject project will extend well beyond its specific location. Accordingly, one of the first analytical tasks is to identify the appropriate study region.

To facilitate comparisons the same study region was used for each scenario. It includes both Kansas City, Missouri and Kansas City, Kansas, as well as several additional Kansas counties and in Missouri. From an analytical standpoint there is little or no harm in this uniform geographic description. However, readers should realize that, in some cases, the geographic distribution of estimated impacts may not be uniform across the study region, but will instead depend on greater network configuration and on the proximity of other necessary productive inputs such as labor, intermediate goods, and other utilities.

Identification of Direct Impacts Many aspects of impact analysis are relatively mechanical and require little judgment on the part of the analyst. However, the validity of the entire process rests squarely on the accurate evaluation of the probable direct impacts for direct infrastructure users. Moreover, the nature and magnitude of these direct effects vary widely from one scenario to another. As a consequence, the vast majority of project time dedicated to this portion of the overall study has been spent researching the probable direct effects.

In most cases, the starting point is an evaluation of reduced user costs. In the case of passenger transport, benefits accrue in the form of increased time for labor or leisure and/or in the accommodation of larger numbers of passengers within any given time period.

The same general principle governs the calculation of benefits for freight users. Reduced transit times lead to reductions in capital, fuel, and labor costs. Improved reliability leads to increased travel headways (fewer trips) and reduced inventory holding times. Finally, much like passenger transport infrastructure improvements that yield increased freight capacity can also increase the overall level of commerce that can be accommodated within a region.

As Sections 3 and 4 will describe, each of the subject scenarios have different characteristics, so that anticipating the potential direct impacts on network users was generally different in each case.

3. *Estimated Results, Scenarios 1 - 5*

As noted in the introduction, the UT study team was able to generate estimates of the probable direct transportation impacts attributable to the first five regional scenarios. These direct effects generally reflect the observed effects of similar initiatives that have been pursued in other regions of the US. However, where possible these observed impacts were modified to reflect differences in both economic and demographic compositions.

3.1 Logistics Park KC

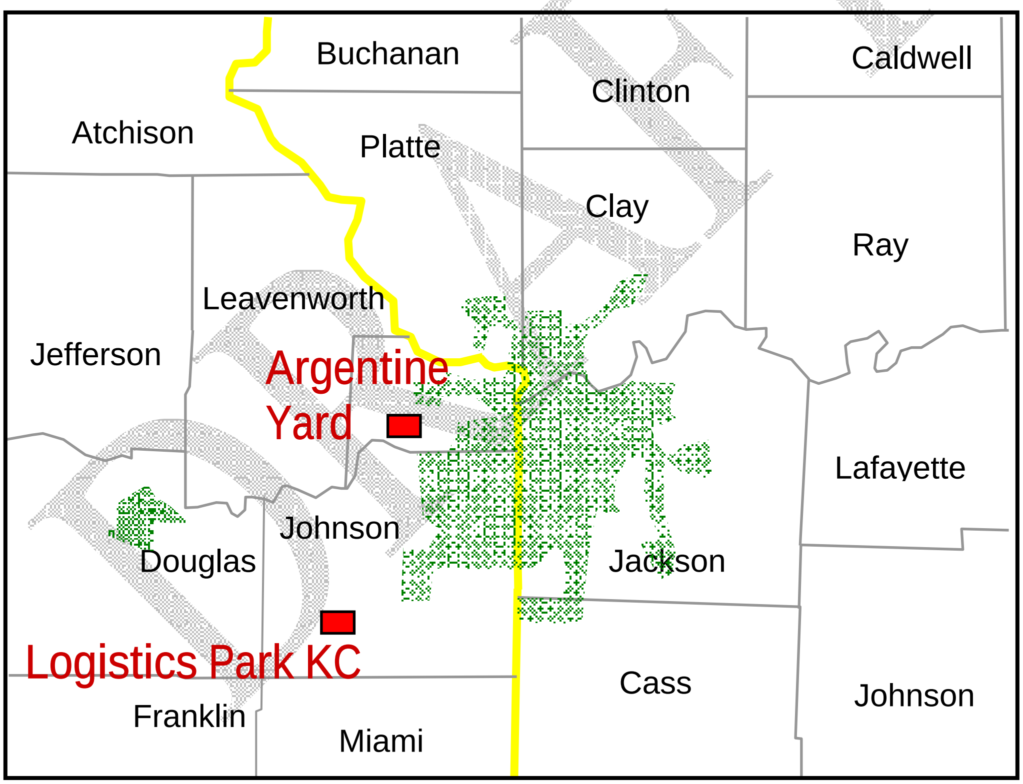
Scenario Description This scenario involves the development of a truck-rail intermodal facility by the BNSF Railway in Southern Johnson County, Kansas with associated development by the Allen Group. At full build-out the facility will be capable of accomplishing approximately 600,000 lifts per year.[1] This facility will replace the current BNSF intermodal operations at Argentine Yard and follows the current model of intermodal development under which facilities are built outside of, but proximal to major metro areas. Site locations are depicted in Figure 2.

[1] Intermodal capacity is alternately described as either “lifts” or Twenty-foot-Equivalent Units (TEUs). A lift is precisely as it sounds, it is the mechanized movement of a container or trailer to or from a rail car, regardless of the size of the equipment. A TEU is a more uniform measure of throughput that does account for unit size. Because most international containers are 40 feet in length and most trailers are 53 feet in length, a lift is generally considered to represent two TEUs.

Modeling Strategy A new facility, like the one planned for Southern Johnson County, can have a number of regional impacts. First, by introducing new efficiencies, it can lower transport costs for existing regional shippers who currently rely on intermodal service. This, in turn, makes these shippers more competitive and broadens their market reach. As importantly, the development of new, modern, and more cost effective facilities can attract significant new distribution centers and light manufacturers from other areas within a multi-state region This latter set of effects can lead to significant new investments and construction expenditures.

The modeling strategy used reflects all three impacts. Within the simulation, current user costs were reduced by roughly 1.5 percent to reflect both the actual per-unit cost reductions and the projected volume at full build-out. At the same time, distribution, wholesale trade, and transportation employment was increased to reflect the predicted relocation of economic activity to the study region. Finally, estimated investment in real property improvements was used to simulate private construction activity over the 15-year time horizon.[2]

Figure2.



Estimated Outcomes Simulation estimates over the 15-year time horizon are provided in Table 1. The REMI simulation software used to generate these results provides three basic geographic

[2] Estimated investment and employment was based on data from a variety of sources, including BNSF estimates, independent assessments of the BNSF influence at its Alliance facility near Fort Worth, the impact of Union Pacific developments near Memphis, and the economic impacts of a number of Norfolk Southern developments throughout the eastern US.

disaggregations – the Kansas City metro area, metro areas outside the city boundaries in the state of Kansas, and metro areas outside Kansas City within Missouri. As might be expected, the impacts of the planned facility fall primarily in Kansas, outside of the city proper by a ratio of approximately two-to-one.

Readers will note that annual salary figures are relatively high. This reflects two factors. First, the wages paid to employees in the directly affected sectors (wholesale trade, transportation, and warehousing) are high compared to the overall regional wage. Second, unlike alternative simulation software packages, REMI wage estimates include monetized employee benefits.

Estimating fiscal impacts for all affected jurisdictions based on actual tax structures is well beyond the scope of the current analysis. Still, the increased economic activity will have a measurable impact on local and state revenue streams. In order to capture an estimate of these effects that is, at least, correct to an order of magnitude, average effective local and state tax rates for Missouri and Kansas were combined to generate an income-based value that was then applied to estimated income effects.

Table 1.

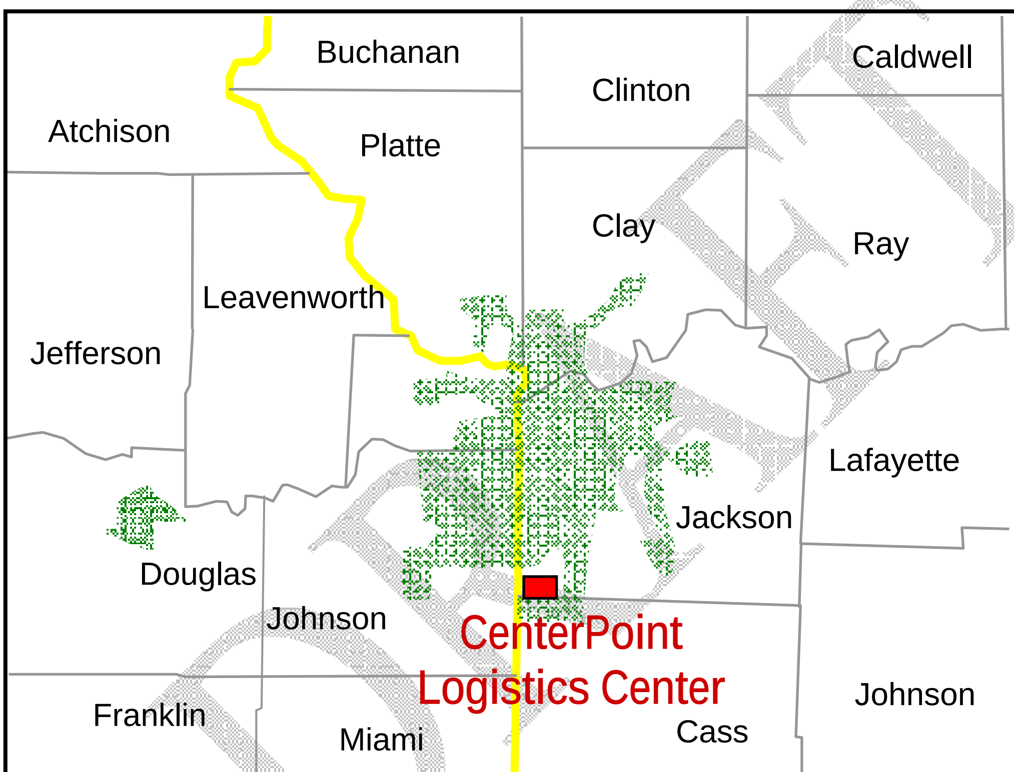
Year[3]	*Employment*	*Personal Income*	*Regional Output*	*Income per Job*	*State and Local Revenues*
2010	2,651	164,036,100	389,279,700	61,877	11,496,994
2011	2,999	187,294,950	455,383,800	62,452	13,306,276
2012	3,266	208,105,500	515,367,150	63,719	14,879,743
2013	3,465	227,691,900	564,333,150	65,712	16,137,663
2014	3,629	244,830,000	612,075,000	67,465	17,322,100
2015	3,754	255,847,350	654,920,250	68,153	18,354,005
2016	3,862	268,088,850	692,868,900	69,417	19,264,178
2017	3,955	281,554,500	730,817,550	71,190	20,153,351
2018	4,040	292,571,850	768,766,200	72,419	21,031,324
2019	4,118	302,365,050	803,042,400	73,425	21,826,048
2020	4,188	314,606,550	838,542,750	75,121	22,634,055
2021	4,257	323,175,600	872,818,950	75,916	23,416,179
2022	4,321	332,968,800	908,319,300	77,058	24,215,786
2023	4,383	343,986,150	943,819,650	78,482	25,012,593
2024	4,440	355,003,500	978,095,850	79,956	25,777,917
PV-3%		3,179,433,688	8,271,960,365		228,252,170

[3] Current plans call for the opening of the intermodal facility in 2014. However, all scenarios were given a 2010 start date and a 15 year time horizon in order to facilitate side-by-side comparisons.

3.2 CenterPoint Intermodal Center

Scenario Description This scenario involves the development of a truck-rail intermodal facility by the Kansas City Southern and CenterPoint at the former Richards-Gebaur Airbase immediately south of Kansas City, Missouri. At full build-out the facility will be capable of accomplishing approximately 150,000 lifts per year. This facility replaced the current KCS intermodal in downtown Kansas City, MO and follows the current model of intermodal development under which facilities are built outside of, but proximal to major metro areas. The new site location is depicted in Figure 3.

Figure 3.



Modeling Strategy As noted in the facility description, the modeling strategy used reflects all three impacts. Within the simulation, current user costs were reduced by roughly 0.67 percent to reflect both the actual per-unit cost reductions and the projected volume at full build-out. At the same time, distribution, wholesale trade, and transportation employment was increased to reflect the predicted relocation of economic activity to the study region. Finally, estimated investment in real property improvements was used to simulate private construction activity over the 15-year time horizon.[4]

[4] Estimated investment and employment was based on data from a variety of sources, including BNSF estimates, independent assessments of the BNSF influence at its Alliance facility near Fort Worth, the impact of Union Pacific developments near Memphis, and the economic impacts of a number of Norfolk Southern developments throughout the eastern US.

Estimated Outcomes Simulation estimates over the 15-year time horizon are provided in Table 2. The REMI simulation software used to generate these results provides three basic geographic disaggregation – the Kansas City metro area, metro areas outside the city boundaries in the state of Kansas, and metro areas outside Kansas City within Missouri. As might be expected, the impacts of the planned facility fall primarily in Missouri, both inside and outside of the city.

Table 2.

Year	*Employment*	*Personal Income*	*Output*	*Income per Job*	*State and Local Revenues*
2010	652	37,948,650	95,483,700	58,203	2,673,544
2011	716	44,069,400	105,276,900	61,549	2,947,753
2012	761	47,741,850	117,518,400	62,736	3,290,515
2013	791	52,638,450	123,639,150	66,547	3,461,896
2014	811	55,086,750	132,208,200	67,924	3,701,830
2015	827	56,310,900	138,328,950	68,091	3,873,211
2016	840	57,535,050	143,225,550	68,494	4,010,315
2017	852	59,983,350	149,346,300	70,403	4,181,696
2018	865	63,655,800	155,467,050	73,591	4,353,077
2019	875	63,655,800	162,811,950	72,749	4,558,735
2020	886	67,328,250	167,708,550	75,991	4,695,839
2021	899	67,328,250	173,829,300	74,892	4,867,220
2022	910	69,776,550	181,174,200	76,678	5,072,878
2023	922	72,224,850	187,294,950	78,335	5,244,259
2024	934	75,897,300	193,415,700	81,260	5,415,640
PV 3%		693,646,563	1,728,294,610		48,392,249

3.3 KCI Intermodal BusinessCentre

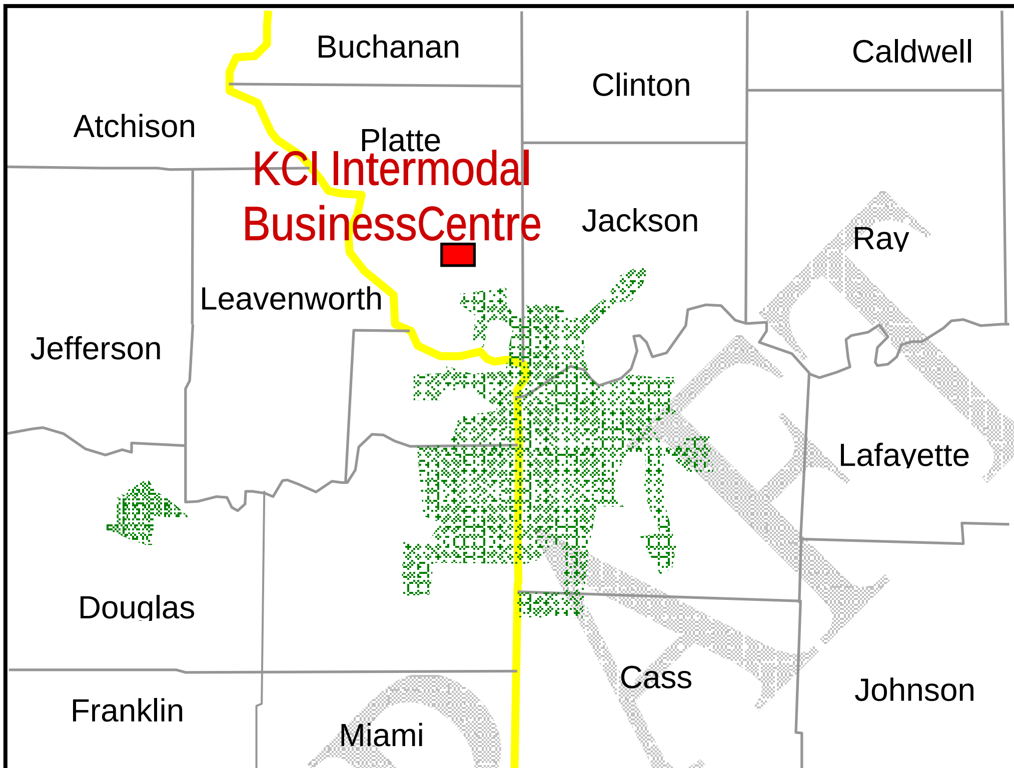
Scenario Description Kansas City International Airport (FAA=KMCI, or simply KCI) is located approximately 21 miles north of Kansas City, Missouri. The facility's location relative to the greater region is illustrated in Figure 4. KCI ranks 35th and 42nd respectively among US airports in terms of passenger and air cargo activity.[5]

Like many medium-sized metropolitan areas, Kansas City is seeking to increase the economic role played by its airports and surrounding areas. Accordingly, the City of Kansas City, MO, is engaged in a number of activities on or near KCI controlled properties designed to increase the commercial importance of freight operations.

[5] 2008 FAA rankings. There are 2248 primary, commercial service and general aviation airports for passenger service. Kansas City is in the primary category with 374 other airports. Passenger rankings are based on total enplanements. There are 121 qualifying cargo airports. Cargo rankings are based on landed weight.

Development plans are organized into several phases. Phase I of the planned KCI developments is located on approximately 800 acres of airport property and will initially include a nearly 500,000 square feet warehouse with office space.

Figure 4.



Modeling Strategy and Estimated Outcomes The KCI Intermodal BusinessCentre likely to attract two types of tenants – firms that rely directly on access to air cargo services and firms that do not directly use airfreight, but still benefit by close proximity to an international airport facility. The analysis of the anticipated impacts attempts to account for the activities of both types of user.

Nationally, airfreight volumes are divisible into two components. First, there is a traditional component of airfreight traffic that is immediately correlated with the magnitude of regional population. This traffic is associated with the local production and consumption of high-valued or perishable commodities. The other component of airfreight is not population dependent, but instead is traceable to the location decisions of large scale express and air cargo forwarder operations. Nationally, there are only a handful of such operations (i.e., Memphis, LAX, JFK, Indianapolis, Louisville).

From a modeling standpoint it is impossible to predict whether or not KCI will, one day, attract a "superhub" capable of generating the airfreight volumes evidenced at other such facilities. However, it is possible to compare current airfreight volumes with the volumes predicted by observed regional populations in order to predict "normal" expansions in airfreight activity.

The study team assembled a dataset consisting of 70 non-superhub commercial airports that had measurable volumes of air cargo activity in 2007. Data included these volumes along with a number of other economic and demographic variables specific to each airport location. 2007 airfreight volumes were regressed against relevant variables in order to develop a predictive statistical model. Based on this tool and the characteristics of the metropolitan Kansas City area, the model predicts that new commercial opportunities proximal to KCI could result in a nearly immediate 10 – 20 percent increase in annual airfreight traffic.

The predicted increases in airfreight activity will occupy some portion of the Phase I developments. We assume that the remainder of these facilities will be occupied (albeit more slowly) by ground freight users who nonetheless benefit by close proximity to airport facilities and actual airfreight users.[6] REMI simulations were based on direct employment increases predicted for Phase I developments based on square footage and employment for similar developments and probable occupancy rates across the 15-year time horizon. The simulation results are reported in Table 3.

Table 3.

Year	*Employment*	*Personal Income*	*Output*	*Income per Job*	*State and Local Revenues*
2010	635	21,814,353	66,250,998	34,353	1,855,028
2011	810	42,820,767	131,694,057	52,877	3,687,434
2012	1,218	66,250,998	203,600,628	54,407	5,700,818
2013	1,630	91,297,107	277,931,016	56,004	7,782,068
2014	2,049	117,151,155	357,916,977	57,185	10,021,675
2015	2,472	143,005,203	441,134,694	57,857	12,351,771
2016	2,907	172,091,007	530,007,984	59,206	14,840,224
2017	3,338	201,176,811	623,728,908	60,264	17,464,409
2018	3,776	231,878,493	722,297,466	61,411	20,224,329
2019	4,217	262,580,175	825,713,658	62,261	23,119,982
2020	4,664	296,513,613	933,977,484	63,581	26,151,370
2021	5,121	329,639,112	1,049,512,761	64,371	29,386,357
2022	5,580	365,188,428	1,169,895,672	65,442	32,757,079
2023	6,047	402,353,622	1,297,550,034	66,539	36,331,401
2024	6,519	440,326,755	1,431,667,908	67,547	40,086,701
PV 3%		2,338,661,332	7,375,455,525		206,512,755

[6] This usage pattern is readily observed across all modes of transport. For example, a large (sometimes even dominant) share of firms locating near rail-truck intermodal facilities are not intermodal customers. However, they are engaged in activities that benefit from proximity to other firms that are direct rail-truck customers.

3.4 Combined Regional Intermodal Developments

Scenario Description In the cases of the two rail-truck intermodal facilities discussed above, it was necessary to net out existing activity in order to isolate the impacts of the new developments. Because the KCI Intermodal BusinessCentre development is not intended to replace existing facilities, no such effort was necessary. Still, one may ask whether the three intermodal initiatives are truly independent in nature or whether some degree of interdependence may limit the aggregate magnitude of the projected economic impacts to something less than the sum of the three separate projects.

The answers to these questions are important. First, given the model and geographic differences of the services associated with the three facilities; there is little chance of competitive overlap, so that, at the very least, the three may be viewed as truly independent. However, the sum of the three sets of impacts may, in fact, represent a lower limit of their aggregate effects. If there are scale or scope economies owing to a larger total volume of distribution activity in a region, the individual facilities may actually complement each other so that the aggregate economic impacts may exceed the sum of the projections offered above.

BNSF and KCS Truck-Rail Operations Figure 5 depicts the relevant portions of the intermodal networks currently operated by BNSF and the KCS. BNSF is oriented to move traffic between Pacific coast origins and destinations and facilities in the Midwest and Southeast. On the other hand, KCS intermodal operations are more north-south in nature. Based on traffic service matrixes, the only two Kansas City market served by both carriers is the market between Kansas City and the Dallas-Fort Worth area. At approximately 550 miles distant, these cities are nearly too close together to constitute a traditional intermodal truck-rail market.[7]

KCI Intermodal BusinessCentre While it is increasingly popular to co-locate rail-truck and airfreight intermodal facilities, the advantage of doing so rests on the distribution complementarities alluded to above rather than any sort of transportation-related functionalities. Indeed rail-truck intermodal rarely either complements or substitutes in the actual provision of freight transportation. Air cargo is typically comprised of small-volume, low-bulk, high-valued or perishable goods that are not reasonably transported by either rail or long-distance trucking.[8]

Mode-Interdependent Distribution Cost Impacts As noted above, even when transport modes offer differing services to distinct sets of customers, there are often cost advantages of co-locating mode-specific sites near each other. This is due to the “clustering” that often surrounds light manufacturing. Consider, for example, an auto parts manufacturer located in a subject region. Vehicle components have traditionally been an important source of rail-truck intermodal traffic, so that it would not be unusual for this type of firm to locate a facility near a rail-truck facility. However, very few such firms manufacture the full range of sub-components that are

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[7] Shipments over a distance of less than 500 miles are nearly always considered too short for truck-rail intermodal service to be competitive with direct truck service.

[8] Typical air cargo commodities might include cut flowers, pharmaceuticals and other medical products, highly perishable foods or high-end apparel items.

used to develop final products. Thus, it is certainly possible that a sub-component manufacturer will locate near the vehicle parts producer. While the vehicle parts manufacturer may never use airfreight, it is certainly possible that the subcomponent producer does. Hence, the entire manufacturing process is made more efficient if airfreight and truck-rail intermodal are both available.

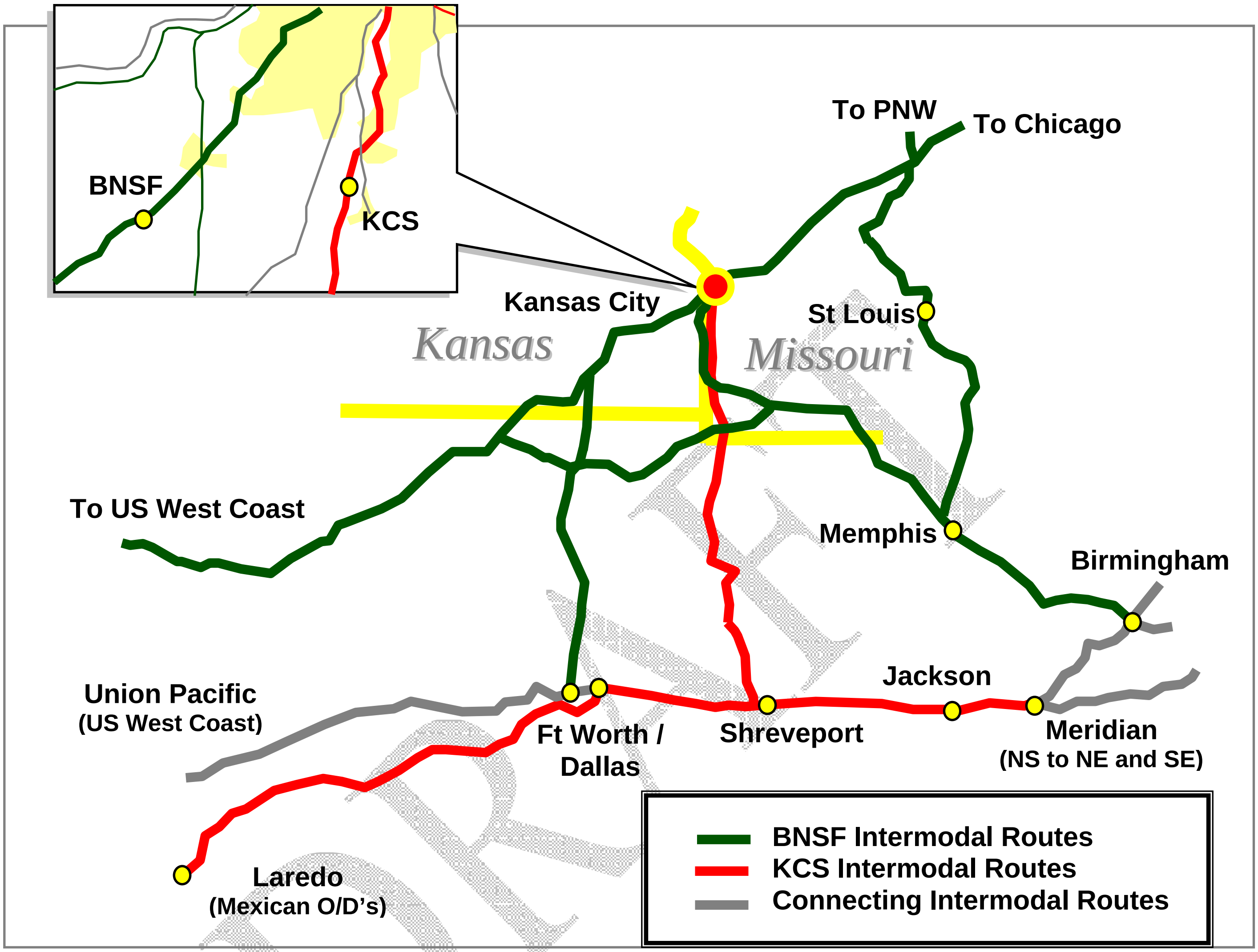
These sorts of cost complementarities are difficult to anticipate in an aggregated setting and, therefore, play no role in the results presented here. However, their existence in specific settings is well documented, so that the sum of the estimated impacts, again, reflects a lower bound on the magnitude of the combined economic effects anticipated from the development of the three facilities.

Estimated Outcomes Table 4 provides sums for the various economic outcomes predicted within the individual economic analyses. At the end of the 15-year planning horizon, the greater region is predicted to enjoy nearly 12 thousand new jobs with total annual incomes of nearly $900 million. Moreover, the present values of the local and state tax revenues attributable to this additional activity are estimated to be nearly $500 million.

Table 4.

Year	*Employment*	*Personal Income*	*Output*	*Income per Job*	*State and Local Revenues*
2010	3,938	223,799,103	551,014,398	51,478	16,025,566
2011	4,525	274,185,117	692,354,757	58,959	19,941,463
2012	5,245	322,098,348	836,486,178	60,287	23,871,076
2013	5,886	371,627,457	965,903,316	62,754	27,381,628
2014	6,489	417,067,905	1,102,200,177	64,191	31,045,605
2015	7,053	455,163,453	1,234,383,894	64,700	34,578,987
2016	7,609	497,714,907	1,366,102,434	65,706	38,114,717
2017	8,145	542,714,661	1,503,892,758	67,286	41,799,457
2018	8,681	588,106,143	1,646,530,716	69,140	45,608,730
2019	9,210	628,601,025	1,791,568,008	69,478	49,504,765
2020	9,738	678,448,413	1,940,228,784	71,564	53,481,264
2021	10,277	720,142,962	2,096,161,011	71,726	57,669,757
2022	10,811	767,933,778	2,259,389,172	73,059	62,045,742
2023	11,352	818,564,622	2,428,664,634	74,452	66,588,253
2024	11,893	871,227,555	2,603,179,458	76,254	71,280,258
PV 3%		6,211,741,583	17,375,710,500		483,157,174

Figure 5.



BNSF
KCS
To PNW
To Chicago
Kansas City
Kansas
St Louis
Missouri
To US West Coast
Memphis
Birmingham
Jackson
Union Pacific
(US West Coast)
Ft Worth /
Dallas
Shreveport
Meridian
(NS to NE and SE)
Laredo
(Mexican O/D's)
BNSF Intermodal Routes
KCS Intermodal Routes
Connecting Intermodal Routes

3.5 SmartPort Pre-Clearance Facility

Scenario Description Among potential transport related projects under consideration is a plan to significantly improve the efficiency with which US truck-based exports to Mexico are processed. This would be accomplished by the creation of a customs pre-clearance facility within the greater Kansas City region. Currently, the study team is unaware of the specific location of the proposed facility. Accordingly, simulation impacts are spread equally across the three REMI sub-regions.

The chief advantage attributable to the development of such a facility comes through tremendous reductions in export processing times. Reduced processing times lower firm costs in a variety of ways. First, exporters would incur markedly lower inventory holding costs while goods are in transit. As importantly, quicker processing also lowers costs for transportation providers. Capital costs associated with equipment usage are made lower. Staging areas for shipments awaiting processing can be made smaller. And carrier labor costs should also be reduced.

Modeling Strategies Preparation of the REMI inputs required the evaluation of three questions. First, it was necessary to determine the volume of Mexican traffic that could reasonably be affected by the development of the proposed facility. Next, it was necessary to estimate cargo values in order to calculate reductions in inventory holding costs. Finally, the calculation of remaining cost savings required an estimation of per-unit handling costs and an evaluation of how those costs would be affected by more expeditious processing.

Trans-Border import and export data as relayed through the US Department of Transportation's Freight Analysis Framework were used to accomplish a number of these tasks. Truck volumes between the study region and Mexican destinations were isolated. For the purpose of the current analysis all rail or rail-truck combinations were excluded. This provided both applicable shipment volumes and an estimate of average cargo values. Finally, reductions in other handling costs were estimated based on the capital and labor costs incurred at domestic processing facilities.

Estimates provided by SmartPort suggest that processing times for Mexican shipments can be reduced from nine to as few as three days through the development of the proposed regional facility. This will result in substantial reductions (roughly 40 percent) in shipping costs for affected traffic. However, these movements represent only about three percent of the total freight handled within the study region, so that the aggregate impact of the proposed improvements would yield a 0.69 percent reduction in total warehousing and distribution costs within the area. This is the value that was used as an input within the REMI economic simulation

Estimated Outcomes **T**able 5 provides sums for the various economic outcomes predicted within the simulation. Again, for those firms dependent on trade with Mexico, the impacts are substantial. However, Mexican trade as a proportion of regional commerce is relatively small at present, so that the overall impact magnitudes are relatively small.[9]

[9] There are two important points worth noting. First, the estimated impacts are based on current trade volumes and do not reflect any projected change in the importance of Mexican trade. Second, and perhaps more importantly, the

Table 5.

Year	Employment	Personal Income	Output	Income per Job	State and Local Revenues
2010	191	13,874,394	29,379,600	72,641	822,629
2011	266	16,322,816	41,621,100	61,364	1,165,391
2012	330	19,587,379	55,086,750	59,356	1,542,429
2013	382	22,035,802	63,655,800	57,685	1,782,362
2014	427	24,484,224	74,673,150	57,340	2,090,848
2015	464	26,116,506	83,242,200	56,286	2,330,782
2016	495	27,748,787	90,587,100	56,058	2,536,439
2017	522	30,197,210	97,932,000	57,849	2,742,096
2018	546	31,829,491	104,052,750	58,296	2,913,477
2019	566	32,645,632	110,173,500	57,678	3,084,858
2020	584	35,094,055	116,294,250	60,093	3,256,239
2021	601	35,910,195	122,415,000	59,751	3,427,620
2022	616	36,726,336	127,311,600	59,621	3,564,725
2023	631	38,358,618	133,432,350	60,790	3,736,106
2024	645	39,990,899	138,328,950	62,001	3,873,211
PV 3%		331,015,086	1,055,112,724		29,543,156

4. Remaining Scenarios 6 - 9

Scenarios 1 – 5 may require refinement and revisions, but the basic data inputs in hand are sufficient to reasonably approximate the economic impacts that would likely be attributable to the proposed projects. For a variety of reasons, this is not true of the remaining four scenarios. As noted, in two of four cases (the BNSF bridge and I-70 improvements), the inability to perform more precise simulations directly owes to limited resources rather than an inadequacy of available analytical techniques. In the case of the proposed MO-210 improvements, economic impacts, while quite real, are likely to be very localized and, therefore, unobservable on a regional basis. Finally, the last scenario, involving the substitution of maintenance for new roadway construction, is simply too complex to be manageable within the current setting.

Faced with these limitations there are three analytical choices. First, it would be possible to contrive simulation inputs and attribute a level of precision to them that is not valid. Alternatively, the remaining four scenarios could be given no treatment within the current analysis. The third option – the one selected here – is to present a plausible range of generic simulation results and simply discuss the remaining four scenarios within this context. Thus, the analysis provides *some* information to ongoing discussions without pretending to be overly reliable.

estimated impacts do not reflect the competitive advantage that the proposed facility might provide the Kansas City region relative to other Mexican gateways throughout the Midwest.

The most basic source of region-wide economic impacts lies in the way that proposed initiatives will affect the costs directly incurred by transportation users within the region. In the case of freight users, these cost reductions are realized in the form of lower transportation, warehousing and distribution costs.

Accordingly, in order to provide a context for the remaining four scenarios, REMI simulations were executed for the baseline case and for three representative alternatives. These alternatives reflect an aggregate reduction of freight, warehousing, and distribution costs of 1.0, 2.5, and 5.0 percent, spread evenly across the REMI subregions that comprise the greater Kansas City regional economic model. These generic simulations further assume that the cost reductions reflect a one-time productivity improvement that occurs at the beginning of the simulation time horizon. Summaries of simulation results are provided in Tables 6-8.

Table 6 (1.0 Percent Cost Reduction)

Year	*Employment*	*Personal Income*	*Output*	*Income per Job*	*State and Local Revenues*
2010	196	18,362,250	28,155,450	93,685	830,586
2011	288	23,258,850	42,845,250	80,760	1,263,935
2012	364	28,155,450	56,310,900	77,350	1,661,172
2013	424	31,827,900	66,104,100	75,066	1,950,071
2014	475	35,500,350	77,121,450	74,738	2,275,083
2015	519	37,948,650	85,690,500	73,119	2,527,870
2016	557	40,396,950	93,035,400	72,526	2,744,544
2017	588	44,069,400	100,380,300	74,948	2,961,219
2018	616	46,517,700	107,725,200	75,516	3,177,893
2019	640	48,966,000	113,845,950	76,509	3,358,456
2020	660	51,414,300	119,966,700	77,900	3,539,018
2021	679	52,638,450	124,863,300	77,523	3,683,467
2022	695	55,086,750	130,984,050	79,262	3,864,029
2023	711	57,535,050	135,880,650	80,921	4,008,479
2024	726	59,983,350	142,001,400	82,622	4,189,041
PV 3%		484,034,998	1,082,853,502		31,944,178

Table 7 (2.5 Percent Cost Reduction)

Year	*Employment*	*Personal Income*	*Output*	*Income per Job*	*State and Local Revenues*
2010	490	46,517,700	193,530,770	94,934	5,709,158
2011	721	58,759,200	200,143,628	81,497	5,904,237
2012	912	69,776,550	206,707,521	76,509	6,097,872
2013	1,066	80,793,900	213,396,276	75,792	6,295,190
2014	1,193	89,362,950	220,702,004	74,906	6,510,709
2015	1,305	96,707,850	228,050,576	74,106	6,727,492
2016	1,401	104,052,750	235,544,822	74,270	6,948,572
2017	1,481	111,397,650	243,185,967	75,218	7,173,986
2018	1,551	117,518,400	250,358,261	75,769	7,385,569
2019	1,611	123,639,150	257,615,023	76,747	7,599,643
2020	1,663	129,759,900	264,699,179	78,028	7,808,626
2021	1,710	134,656,500	271,900,853	78,746	8,021,075
2022	1,752	139,553,100	279,146,597	79,654	8,234,825
2023	1,792	145,673,850	286,430,289	81,291	8,449,694
2024	1,828	150,570,450	293,758,051	82,369	8,665,863
PV 3%		1,225,043,836	2,853,676,171		84,183,447

Table 8 (5.0 Percent Cost Reduction)

Year	*Employment*	*Personal Income*	*Output*	*Income per Job*	*State and Local Revenues*
2010	986	93,035,400	142,001,400	94,356	4,189,041
2011	1,451	117,518,400	216,674,550	80,991	6,391,899
2012	1,836	140,777,250	284,002,800	76,676	8,378,083
2013	2,149	161,587,800	339,089,550	75,192	10,003,142
2014	2,407	178,725,900	388,055,550	74,253	11,447,639
2015	2,635	194,639,850	433,349,100	73,867	12,783,798
2016	2,829	209,329,650	473,746,050	73,994	13,975,508
2017	2,993	224,019,450	511,694,700	74,848	15,094,994
2018	3,134	237,485,100	545,970,900	75,777	16,106,142
2019	3,257	249,726,600	579,022,950	76,674	17,081,177
2020	3,362	261,968,100	608,402,550	77,920	17,947,875
2021	3,459	271,761,300	637,782,150	78,566	18,814,573
2022	3,546	282,778,650	665,937,600	79,746	19,645,159
2023	3,626	292,571,850	694,093,050	80,687	20,475,745
2024	3,699	303,589,200	721,024,350	82,073	21,270,218
PV 3%		2,466,260,463	5,501,365,707		162,290,288

4.1 BNSF Missouri River Bridge Crossing

Scenario Description BNSF operates one of the few truly long-distance high-speed US intermodal routes over its trackage between Chicago and southern California. Moreover, Kansas City serves as the only major metropolitan intermodal terminal along this route. Within the railroad industry the BNSF route is simply referred to as the "Transcon," reflecting the role it plays as a land-bridge between California and the east coast.

With only two exceptions, the Transcon is fully double tracked throughout its length. One of these exceptions is its Missouri River crossing near Kansas City at Sibley, Missouri.[10] This crossing and the surrounding Kansas City regional rail network are depicted in Figure 6, while the overall Transcon routing is pictured in Figure 7. The proposal assumed for this analysis is for the Kansas City area to participate in a public private partnership with BNSF and other affected jurisdiction that would result in the probable relocation of trackage and the construction of a multi-track bridge over the Missouri River.

Modeling Issues The situation presented by this proposed project is vastly more far reaching than the proposals that motivate Scenarios 1 – 5. The Transcon is a significant asset for the Kansas City region and improvements in train performance along its route would, no doubt, benefit the metro Kansas City area. However, the vast majority of current Transcon traffic has neither its origin nor destination within the region, so that affected freight flows to and from Kansas City (and associated benefits) would likely be quite small. On the other hand, the planned facility in Southern Johnson County, Kansas is also on the Transcon and will provide BNSF with significant new capacity. Therefore, accurately evaluating the benefits to the Kansas City region will require the consideration of projected BNSF traffic flows to and from the new intermodal facility.

Discussion Tables 6-8 reflect a wide range of potential regional economic impacts and, absent additional data, there is little way to point to one set of outcomes as more likely than another. The one point that is largely unarguable is that whatever the impacts are to the Kansas City region they will represent only a small subset of the total benefits that will likely accrue to the proposed bridge replacement and other improvements. Accordingly, balanced public policy demands that this initiative be supported by a wide range of entities and jurisdictions. From a practical standpoint, numerous jurisdictions spread across a broad geographical area are often best represented by the federal government. Therefore, it would seem that this project should only be embraced by regional planners if the federal government is a strong partner in the development process.

[10] The other single-track portion of the Transcon is an approximately 100 mile segment in New Mexico.

Figure 6.

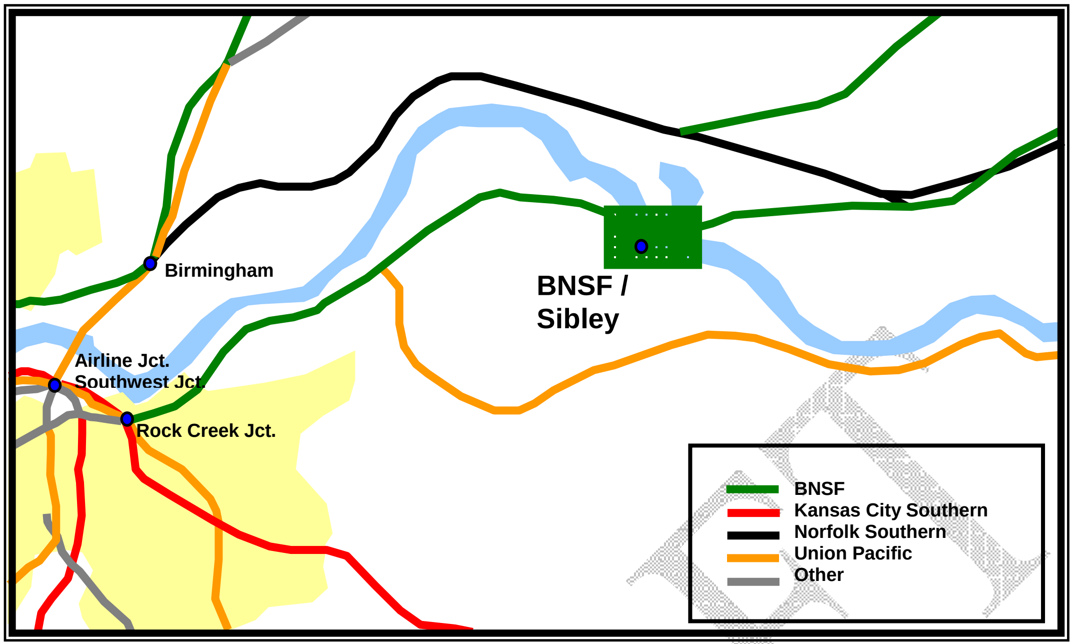
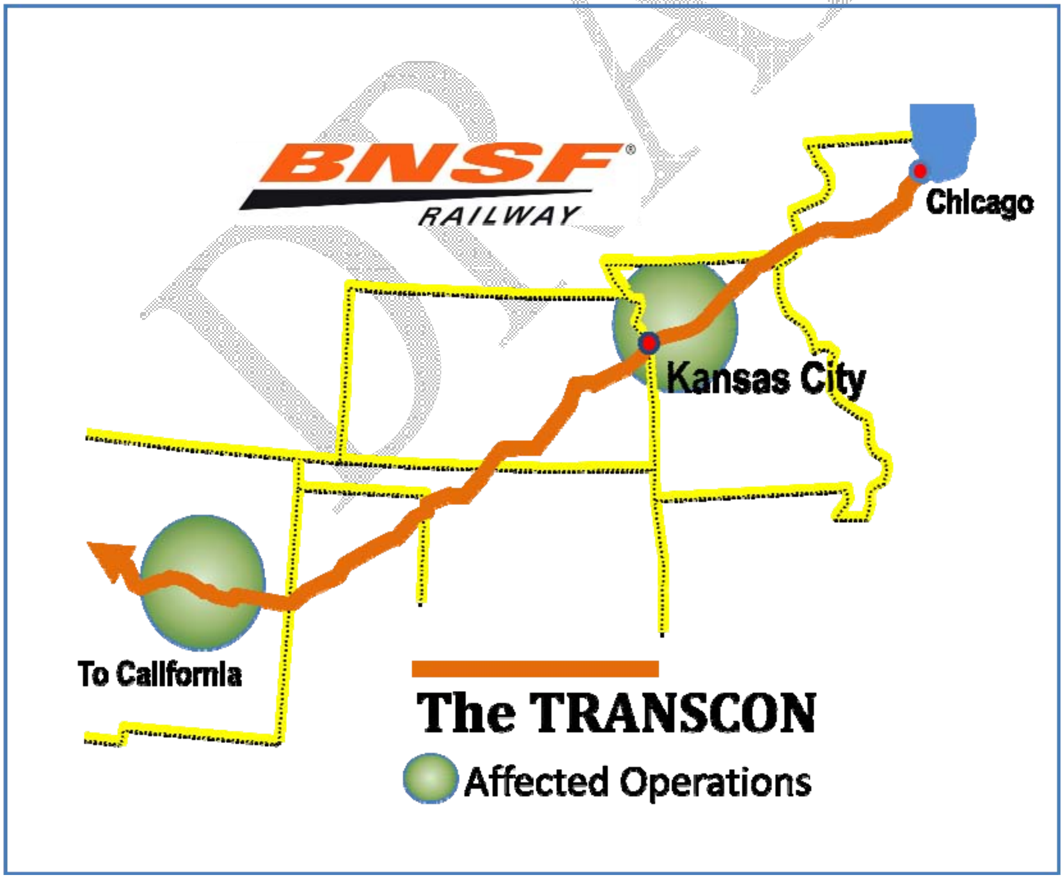


Figure 7.

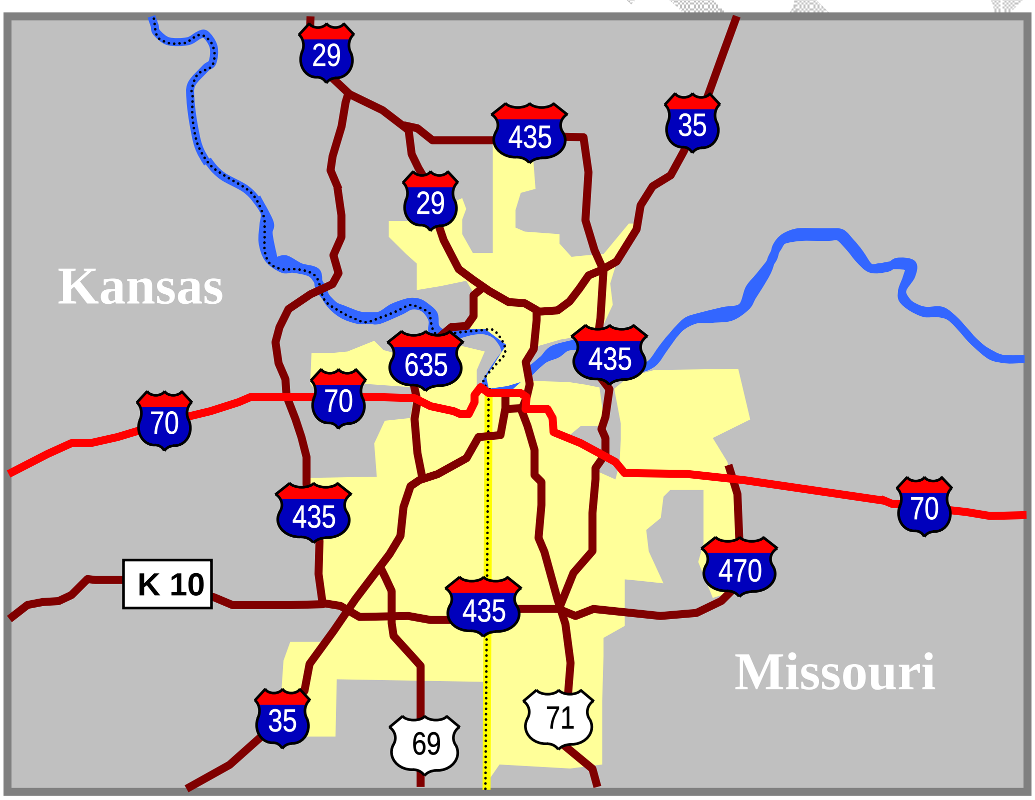


4.2 I-70 Improvements

Scenario Description With one terminus in the Washington, DC area and the other in west-central Utah, Interstate 70 is one of the nation's most heavily traveled east-west corridors, connecting Pittsburg, Columbus, Indianapolis, St. Louis, Kansas City, and Denver along its route. In addition to its long-distance role, I-70 also plays a major transit role in most of the metro areas through which it passes. Figure 8 illustrates I-70's path through the greater Kansas City region along with other major Interstate and expressway routings in the area.

Within the metro area, I-70 is subject to heavy traffic congestion, particularly during peak commute times. The subject scenario involves multiple infrastructure improvements designed to improve capacity along this route and, in doing so relieve observed congestion.

Figure 8.



Direct Improvement Impacts Significant capacity improvements to I-70 will potentially affect two distinct sets of users – passenger vehicle operators and those operating commercial vehicles through the region. In the case of passenger vehicle traffic, user benefits may accrue both in the form of expedited traffic flows and increased flow volumes. To the extent that it is possible to estimate these outcomes, they could be easily translated into monetized inputs suitable for inclusion within economic simulations.

A more difficult issue arises in an attempt to assess the impact of proposed I-70 improvements on freight operations within the area. Survey information suggests that many (if not most) freight users are well aware of commuter related congestion patterns. Moreover, both local and pass-through traffic generators routinely time operations to avoid peak use periods, often operating through the area during late night and early morning hours. To the extent that proposed improvements mitigate peak period congestion, these improvements will lead to marked improvements in passenger vehicle flows. However, unless freight users revert to daytime use of I-70, they may be largely unaffected.

Assuming, however, that freight traffic does revert to daytime traffic patterns, this should generate cost savings for users. Night time operations typically require wage differentials for drivers and other associated labor. Moreover, to the extent that customers are not oriented to late-hour pick-ups and deliveries, carrier equipment and drivers may sit idle for significant periods prior to being able to complete operations.

Impact Discussion As in the case of the BNSF rail bridge, capacity improvements to I-70 will benefit both local and transient users. Still, the fact that relief will be most prevalent during peak commute periods suggests that a larger rather than smaller share of the resulting benefits will accrue to local users – users who, for the most part, are operating passenger vehicles.

The range of economic impacts summarized in Tables 6-8 was generated by simulating increased productivity and lower operating costs for freight users. Therefore, given the nature of the direct impacts anticipated in association with the I-70 improvements, the impacts depicted within these tables is only modestly relevant. However, assuming that freight users are, to some degree, benefitted by the improvements, the resulting impacts are likely much more closely resemble the effects near the lower end of the portrayed range.

4.3 MO-210 Improvements

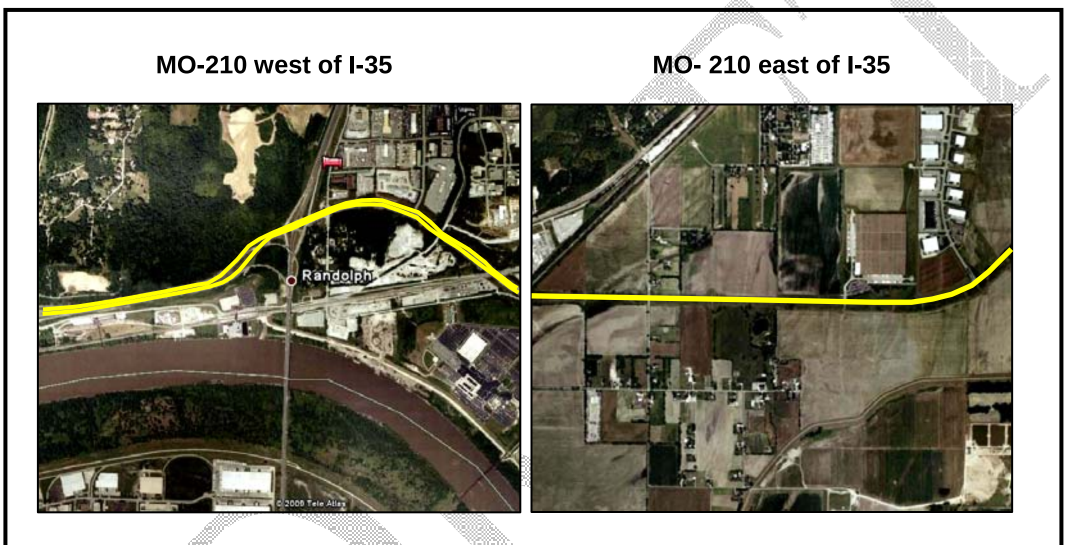
Scenario Description Figure 9 depicts two sections of MO- 210. The left-hand panel illustrates the roadway and surrounding economic activity in an area between I-29 and I-435. The right-hand panel depicts the same roadway, east of I-435 as it nears Birmingham. The western portion of the MO-210 is multi-laned with limited access, it parallels BNSF's Transcon route and, in fact, offers nearly immediate access to BNSF yard facilities in North Kansas City.

The eastern segment of the roadway, while still near the BNSF route and a rail line served by the Iowa Chicago & Eastern (ICE) is a two-lane roadway through largely agricultural property. It is the study team's understanding that the subject scenario involves evaluating the economic impacts of upgrading the eastern cross-section of MO-210 so that it more closely resembles the cross-section west of I-435.

Direct Economic Impacts An examination of Figure 9 makes it clear that there is substantially more industrial and commercial development along the western route segment. Moreover, there is very little doubt that highway improvements to the east of I-435 would help to support similar developments along that segment of MO-210. What is less clear is how these developments would add to any net economic gain within the greater Kansas City region. More specifically, it is unclear how the proposed roadway improvements would offer cost advantages to potential tenants that are not already available elsewhere within the metro area.

If there are distinct benefits that would accrue only to firms locating along the upgraded portion of MO-210, then these should be made clear, so that they can be transformed into inputs within a regional economic simulation. If area-specific cost advantages do not exist, it would still be possible to estimate the economic consequences for the immediate area. However, from a regional standpoint the economic impacts in terms of employment and incomes, should probably be viewed as neutral on the regional level.

Figure 9.



Further Discussion Most of the alternative scenarios involve the development of infrastructure that offers unique opportunities to capture economic efficiencies and, thereby, generate regional benefits. This is not particularly true of the MO-210 proposal. However, this finding does not imply that the proposed improvements are not desirable based on other criteria. There are, in fact, numerous other motivations used to evaluate proposed infrastructure improvements. These include, but are not limited to local equity, land use implications, and the ability to mitigate negative externalities elsewhere. Proponents of this particular scenario may find these alternative motivations well worth exploring.

4.4 Evaluating Maintenance v. Construction Expenditures

Scenario Description The final scenario is, by far, the most ambitious in terms of the data required to develop necessary inputs and also in terms of the overarching policy implications. Like all state DOTs, Kansas and Missouri's Departments engage in short-range and long-range planning that, in turn, leads to specific construction and maintenance programs over various planning horizons. In this way, projected budgets are divided among these two activities. The scenario at hand involves evaluating the Kansas City area economic impacts of the currently planned division of funds between construction and maintenance activities.

The complexity arises from the interdependence of construction and maintenance activities. This interdependence has several implications that include, but are not limited to the following:

- Construction of new roadways contributes additional lane-miles to the pool of infrastructure that must be routinely maintained;
- Newly constructed roadways or the reconstruction of existing facilities may, at first, require less routine maintenance than older route segments;
- The construction of additional lane-miles may or may not reduce traffic-related wear to existing structures; and
- Demand growth for new highway capacity is generally continuous, while construction and maintenance activities are often "lumpy," so that altering relative construction and maintenance schedules may lead to either premature or overdue roadway maintenance.

Modeling Concerns From a modeling standpoint, the highly dynamic and interdependent nature of construction and maintenance programs presents a number of challenges. First, anticipating direct transportation impacts would require very specific data detailing planned expenditures and anticipated roadway outcomes over, perhaps, a twenty-five year time span in order to establish a baseline set of economic impacts. Next, it would be necessary to vary the combination of construction activities based on the desired scenario and re-estimate the direct roadway capacity impacts. To the extent that either construction or maintenance activities are targeted to specific roadway segments, the analysis would also be forced to consider network effects and the potential redirection of highway traffic flows. Finally, given the interdependence of construction activities and necessary maintenance, anticipated maintenance schedules would need adjustment each time a new construction activity is included or excluded from the analysis.

Scenario Discussion The policy implications inherent in this scenario are significant. Understanding the direct impacts of varying construction and maintenance combinations would, in itself, be hugely valuable to planners and policy-makers and the extension of these direct effects to region-wide economic impacts would only enhance this value. Unfortunately, the data requirements and modeling complexity make the execution of such a study nearly impossible.

5 Concluding Remarks

Transportation infrastructure proposals generally draw vocal praise or criticism from those individuals and entities that will directly benefit from the project or from those who will directly incur costs. Broader community participation in the decision-making process is too often hampered by a lack of information regarding the probable project impact on residents and businesses that are only indirectly affected. This is unfortunate because infrastructure decisions greatly impact both the character of a region and the level of prosperity that can be attained on a community-wide basis.

In the current setting, SmartPort and MARC are working to alleviate this information shortfall by supplying information describing predicted direct effects *and* estimates of long-range regional economic impacts. In doing so, they have vastly increased the potential for valuable public input in the decision-making process and enhanced the efficacy of governance.

The results presented here are, by no means, conclusive. To the contrary, they merely hint at the likely economic impacts of freight transportation improvements within the region. However, as noted in the opening pages of this document, there is one singularly clear conclusion – some combination of the nine scenarios considered here or even the substitution of equally viable alternatives will inevitably lead to increased commerce within the region and a degree of attendant prosperity.