The Role of Transitways in Our Region’s Economic Competitiveness

The 23rd CTS Annual Research Conference
St. Paul, MN
May 23, 2012
Twin Cities Competitive Clusters

- Competitive Clusters – interconnected industries key to regional development

Medical Manufacturing
Basic Cluster

- Bare printed circuit board manufacturing
- Adhesive manufacturing
- Electronic connector manufacturing
- Unlaminated plastics profile shape manufacturing
- Relay and industrial control manufacturing
- Computer storage device manufacturing
- Software publishers
- Paperboard container manufacturing
- Turned product and screw, nut, and bolt manufacturing
- Adhesive manufacturing
- Paint and coating manufacturing
- Plastics material and resin manufacturing
- Crown and closure manufacturing and metal stamping
- Lessors of nonfinancial intangible assets
- Management of companies and enterprises
- Ornamental & architectural metal products manufacturing
- Motor and generator manufacturing
- Unlaminated plastics profile shape manufacturing
- Unlaminated plastics profile shape manufacturing

Medical Manufacturing
How does transit relate to economic competitiveness?

- Economic competitiveness requires connections and accessibility.
  - workers to job opportunities
  - employers to the labor force

- 2030 transitways present new opportunities for linking transit, regional economic development, and equity issues.
Project Goals

• Examine the 2030 Transit system’s potential for
  • expanding labor supply of existing economic clusters
  • improving job accessibility of low- and medium-wage workers

• Determine transit-oriented policy and land use that benefit both businesses and residents
A Focus on Competitive Clusters

```
``... a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. "


• Export oriented (from the region)
• Linked by having common markets, buyer-supplier relationships, resources, knowledge, etc.
• Sectors in the competitive clusters drive regional economies"
Nature of Twin Cities Clusters

- Jobs as a percentage of all metro jobs

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Basic</th>
<th>Expanded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical manufacturing</td>
<td>4.4%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Management of Companies</td>
<td>9.1%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Finance &amp; Insurance</td>
<td>11.1%</td>
<td>46.9%</td>
</tr>
<tr>
<td>Book Publishers &amp; Printing Industries</td>
<td>6.2%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Lessors of Non-Financial Assets</td>
<td>2.5%</td>
<td>6.9%</td>
</tr>
</tbody>
</table>

- Their locations in relative to downtown Minneapolis

![Cumulative employment graph](image)
Location of Cluster Jobs

Medical Manufacturing  
(7% of metro jobs)

Finance and Insurance  
(47% of metro jobs)

Illustrated spatial differences in location of different cluster jobs.
Reachability of Cluster Jobs by Transit
(High frequency transit service station within a half mile)

Percentage of cluster jobs within half a mile of high-frequency transit stop

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Basic</th>
<th>Expanded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical manufacturing</td>
<td>9.6%</td>
<td>13.8%</td>
</tr>
<tr>
<td>Management of Companies</td>
<td>33.8%</td>
<td>28.1%</td>
</tr>
<tr>
<td>Finance &amp; Insurance</td>
<td>39.8%</td>
<td>29.7%</td>
</tr>
<tr>
<td>Book Publishers &amp; Printing Industries</td>
<td>31.0%</td>
<td>23.8%</td>
</tr>
<tr>
<td>Lessors of Non-Financial Assets</td>
<td>25.3%</td>
<td>30.6%</td>
</tr>
<tr>
<td>All metro jobs</td>
<td>27.4%</td>
<td></td>
</tr>
</tbody>
</table>
Access to Cluster Jobs

Medical Manufacturing
(7% of metro jobs)

Finance and Insurance
(47% of metro jobs)

Illustrated the varying degrees of access by transit to the different clusters.
Access to Labor

All workers

Low wage workers

- Each location is colored by the percentage of metropolitan workers/low-wage workers that can reach it within a 30 minute travel time.
- Not much difference in the two maps
Observations

- Contribution of cluster jobs to the overall employment differs by cluster.

- Spatial distribution of cluster jobs differs by cluster.
  - Consequently, transit accessibility/reachability to cluster jobs differs by cluster.
  - For some clusters (medical manufacturing, book publishing/printing), there are very few locations where one can live to enjoy high levels of access.

- When it comes to labor accessibility, very few locations have good access to labor force in the region.
  - Downtown locations are exceptions.

- Levels of labor accessibility in general are much lower than levels of job accessibility in this region.
  - Reflect the reality that residences are more geographically dispersed than jobs.
Equity of Access

- How well does the current service meet desired equity goals?
  - provide the basis for evaluating how future changes to the transit system could improve the overall distribution of accessibility to jobs in competitive clusters.
Transit Accessibility by Income

- On aggregate, with increasing need (lower income) access levels increase.
- Significant variation in level of access within each income bracket.
Accessibility by Income and Distance

- Much of the higher access is due to proximity to Minneapolis, though there still remains higher access for poorer populations.
Metropolitan Area Income Distribution

0-5 mi of downtown: 17% of population
5-10 mi: 27% of population
10-15 mi: 28% of population
15-20 mi: 28% of population

48% of the block groups in the first 5 miles of downtown are block groups with median income in the lowest 20% of the metropolitan income distribution.
Observations

- Much of the lowest income population lives within the first 10 miles of downtown Minneapolis.
- They therefore enjoy relatively higher levels of accessibility.
- Access levels for the suburban poor is not much different from that for suburban wealthier neighborhoods.
- Access levels for urban wealthy neighborhoods is not much different from that for the urban poor.
Observations

- Income distribution and spatial distribution of people are strongly related.

- As a result, as the new systems are deployed, which places they serve will impact the accessibility improvement distribution
  - Suburban gains likely to go to the wealthier populations
  - Urban gains likely to go to poorer populations

- The equity component of accessibility is something we will come back to as we investigate future scenarios of land use development.
Future Scenarios: Goals

• Measure how the 2030 transit system alters the accessibility of the metropolitan region
  • Using regional expected housing & employment in 2030.
  • Accessibility to the competitive clusters

• Test different, *potentially achievable* scenarios of population and employment distributions in the metropolitan area
  • shift job and population concentration from what is forecasted by the Metropolitan Council.
  • examine alternative growth patterns that enhance accessibility and can work together with the 2030 transitways.
Expected change from 2010 to 2030

• Given the new system in 2030 and the anticipated changes in residential and employment land use, we first compare the anticipated changes:
  • Calculate the average population-weighted accessibility
    • 2010 estimate: 117,611 jobs
    • 2030 estimate: 126,219 jobs
    • A net positive increase of 8,808 (6.8%)
Scenario Analysis

<table>
<thead>
<tr>
<th>Population Scenarios</th>
<th>Employment Scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centralizes at transitways</td>
<td>X</td>
</tr>
<tr>
<td>MC 2030 forecasts</td>
<td>X</td>
</tr>
<tr>
<td>Growth at fringe</td>
<td>X</td>
</tr>
</tbody>
</table>

Within each combination, we test small, moderate, and aggressive job and population growth rates.
### Centralization: Growth rates

<table>
<thead>
<tr>
<th>Transitway type crossing TAZ</th>
<th>Growth Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>None</td>
<td>0%</td>
</tr>
<tr>
<td>Light rail</td>
<td>3%</td>
</tr>
<tr>
<td>Arterial BRT</td>
<td>2%</td>
</tr>
<tr>
<td>Limited stop BRT</td>
<td>1%</td>
</tr>
<tr>
<td>Commuter Rail</td>
<td>0%</td>
</tr>
<tr>
<td>Express Bus</td>
<td>0%</td>
</tr>
</tbody>
</table>

- **Transitway type is assumed to affect the potential additional population and employment gains.**
- Same percentages are used for both population and jobs
  - Example, in the aggressive light rail case for example, a place expected to see a 20% gain from 2010 under the base scenarios will be given a 30% increase instead.
Scenario 1: Centralization

- Job and Population Centralization along Transitways
  - Increase jobs/population by an additional $x\%$ than forecasted along transitways based on transitway type
  - Assume this growth occurs at the expense of all metro locations that had job growth forecasted
    - Reduce jobs in equal proportion from all growing regions (but never going below 2010 levels)
  - Places expected to lose jobs from 2010 to 2030 are not affected

- Use a region wide measure of accessibility for comparison: Essentially, the expected number of jobs that are 30-minute transit accessible for a randomly chosen metro resident.
Centralization

<table>
<thead>
<tr>
<th>Population Centralization</th>
<th>Employment Centralization</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>126,419</td>
</tr>
<tr>
<td>Low</td>
<td>+0.6%</td>
</tr>
<tr>
<td>Moderate</td>
<td>+1.2%</td>
</tr>
<tr>
<td>High</td>
<td>+2.2%</td>
</tr>
</tbody>
</table>

- The None-None scenario corresponds to the base 2030 case.
- Centralization occurs along transitways only
- Gains in accessibility for the average individual is high as a result of employment centralization than from population centralization.
Scenario 2: Decentralization

- Scenario envisions that accelerated growth in jobs and population occurs outside of the metropolitan area.

- Three cases of growth are tested for each TAZ outside of the I-494/I-694 loop.
  - Low = 1% additional
  - Medium = 3% additional
  - High = 6% additional

- These come at the expense of TAZs within the I-494/694 ring which lose population/jobs up to a minimum of 2010 levels.

- Zones with anticipated jobs/population loss inside the loop by 2030 are not affected.
## Decentralization

<table>
<thead>
<tr>
<th>Population Decentralization</th>
<th>Employment Decentralization</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>None</td>
<td>126,419</td>
</tr>
<tr>
<td>Low</td>
<td>-0.03%</td>
</tr>
<tr>
<td>Moderate</td>
<td>-0.09%</td>
</tr>
<tr>
<td>High</td>
<td>-0.18%</td>
</tr>
</tbody>
</table>

- The None-None scenario corresponds to the base 2030 case.
- Decentralization occurs everywhere outside the I-494/694 beltway.
- Losses for the average individual are not very large under any scenario, but larger losses arise from employment decentralization than from residential decentralization.
### Scenario 3: Job Decentralization and Population Centralization

#### Employment Decentralization

<table>
<thead>
<tr>
<th>Population Centralization</th>
<th>None</th>
<th>Low</th>
<th>Mod.</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>126,419</td>
<td>-0.21%</td>
<td>-0.63%</td>
<td>-1.29%</td>
</tr>
<tr>
<td>Low</td>
<td>+0.6%</td>
<td>+0.43%</td>
<td>+0.01%</td>
<td>-0.66%</td>
</tr>
<tr>
<td>Moderate</td>
<td>+1.2%</td>
<td>+0.98%</td>
<td>+0.56%</td>
<td>-0.11%</td>
</tr>
<tr>
<td>High</td>
<td>+2.2%</td>
<td>+2.0%</td>
<td>+1.57%</td>
<td>+0.89%</td>
</tr>
</tbody>
</table>

- The None-None scenario corresponds to the base 2030 case.
- Decentralization occurs everywhere outside the I-494/694 beltway, Centralization occurs everywhere inside the I-494/694 beltway.
- Both gains and losses are possible, but are of moderate magnitude.
Scenario 4: Job Centralization and Population Decentralization

<table>
<thead>
<tr>
<th>Population Decentralization</th>
<th>Employment Centralization</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>None</td>
<td>126,419</td>
</tr>
<tr>
<td>Low</td>
<td>-0.03%</td>
</tr>
<tr>
<td>Moderate</td>
<td>-0.09%</td>
</tr>
<tr>
<td>High</td>
<td>-0.18%</td>
</tr>
</tbody>
</table>

- The None-None scenario corresponds to the base 2030 case.
- Decentralization occurs everywhere outside the I-494/694 beltway, Centralization occurs everywhere inside the I-494/694 beltway
- Significant gains from jobs centralization, moderate to high population decentralization has small negative impacts.
Scenario 5: Job & Population Centralization (not transitway focused)

<table>
<thead>
<tr>
<th>Population Centralization</th>
<th>Employment Centralization</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Low</td>
<td>+0.05%</td>
</tr>
<tr>
<td>Moderate</td>
<td>+0.26%</td>
</tr>
<tr>
<td>High</td>
<td>+1.48%</td>
</tr>
</tbody>
</table>

- Increased concentration within all inner-beltway TAZs
- Modest gains when compared to a transitway focused centralization
Accessibility Changes 2010 to 2030

Legend
Number of jobs accessible with 30 mins of transit travel
- 0 - 50000
- 50001 - 150000
- 250001 - 350000
- 350001 - 550000
- 150001 - 250000

- > 550001
Where are the gains?
Where are the gains relative to income?

- Looking at TAZ income profile against anticipated gains:
  - Largest average gain is among the low income TAZs
  - Moderate job decentralization doesn’t have a very large negative impact
  - Moderate centralization significantly increases average accessibility for the lowest income TAZs
Lessons

- Accessibility is improved both through a concentration of jobs and housing within the I-494/694 beltway
  - Yet, higher payoffs from in job concentration if concentration occurs along transitways.
  - The amount of losses from potential decentralization is smaller compared to the amount of increases from potential centralization.
  - Improvements are more pronounced in low-income area.

- Implications:
  - Focus on increasing job and residential density in the center.
  - Focus on the transitways as guides to where more development should occur (i.e., the Corridors of Opportunities approach) leads to higher payoffs.
  - Locating new jobs near transitways is especially important for maximizing the positive impact of current and future Twin Cities transitways.
Future Directions

- How to ensure improved job accessibility translates to improved employment outcomes for the socio-economically disadvantaged?
  - Especially when it comes to the competitive cluster jobs.

- How to achieve job centralization?
  - Feasibility by sector and cluster
  - Spatially targeted economic development programs? Innovations?

- How to ensure proper commercial/industrial spaces available for businesses willing to locate near transit?
Thank you!

This research is graciously sponsored by the McKnight Foundation, the Surdna Foundation, and the Jay and Rose Phillips Family Foundation of Minnesota.