Manufacturing provides about 18 percent of the Minnesota’s jobs, about 23 percent of the wages and an estimated 28 percent of income tax payments. Yet, little is understood how this important segment of the economy is changing and what it might be like in the future. This paper attempts to describe some recent trends and comment on their importance.

**How Industrial Location is Changing**

In general, manufacturing is becoming more geographically dispersed. The nation’s most successful steel company has plants in several predominantly rural states, but none in Pittsburgh. The latest and most modernized auto plants are no longer in Detroit, but are in places like Georgetown and Louisville, Kentucky, and Smyrna, Tennessee. Computer manufacturing, once concentrated in a few urban centers, has now spread out to some of the most rural sections of the United States such as South Dakota, as well as many locations overseas. In general, these changes are gradual; but for some communities, they are precipitous.

Industry is gradually migrating away from the urban centers of our nation to more rural settings. In 1979, the 24 largest manufacturing counties in the United States accounted for approximately 30 percent of the nation’s manufacturing payroll. By 1993, the percentage had dropped to 26 percent (Figure 1). Conversely, in 1979 the smallest 2,085 counties accounted for only 15 percent of manufacturing payroll, but this expanded to 18 percent by 1993. The condition, by group, was general; the larger community groups declined – the smaller the community groups grew in their fractions of the nation’s total manufacturing payroll.

![Figure 1](image-url)
Figure 2 provides a better way of looking at the same data. During the 14 years from 1979 to 1993, manufacturing payroll increased by 45 percent (not adjusted for inflation) in the 24 largest manufacturing counties, but grew by 112 percent in the smallest, with the other groups falling in between exactly in the inverse of their size positions. The largest communities grew less, and the smallest communities grew more. Of course, adjusted for inflation, the larger communities suffered real declines because actual inflation increases during the 1979 to 1993 period should have seen wages rise by 74.5 percent. Real manufacturing payroll declined by about 18 percent in the largest manufacturing counties and rose by about 21 percent in the group representing the smallest communities.

The huge declines in the manufacturing employment of core cities have been evident for many years. What has not been adequately covered is the magnitude of these declines and the nature of the shifts in manufacturing employment. It is a much more complicated movement than simply a shift from core city to suburb, for many of the suburbs are losing as well. In addition, there is considerable evidence that strong correlations exist between the viability of local industry and the strength of the service sector -- which has not proven to be as much of a savior as people might wish to believe. Still, a review of the actual changes will be of interest to us.

![Figure 2](image)

From 1980 to 1990, manufacturing employment decreased substantially in major core cities across the United States. Cook County, Ill. (Chicago), lost 162,000 manufacturing jobs. Wayne County, Mich. (Detroit), lost 77,000 and Cuyahoga County, Ohio (Cleveland), lost 62,000. Table 1 shows some of the rest.

Trends in the loss of manufacturing employment in major cities have continued in more recent years. From 1988 to 1995, similar losses took place in major cities during what was a generally upbeat economic period. During this economically healthy era, Cook County, Illinois (Chicago) lost 74,282 manufacturing jobs or 14.7 percent. Philadelphia lost 34 percent, Baltimore 31 percent, Brooklyn 33 percent, and Union County, New Jersey 27 percent. The data for 1988 to 1995 is more recent than the data from 1979 to 1993 but it does show a continuation of the major trends evident in the earlier data. Major cities are losing ground in manufacturing employment to the degree that the social fabric of these communities will be further impacted -- particularly if a recession should develop.
### Table 1
Changes in Manufacturing Establishments and Employment during the 1980s

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook, IL</td>
<td>11,303</td>
<td>9,450</td>
<td>-16.39%</td>
<td>612,828</td>
<td>450,897</td>
<td>-26.42%</td>
</tr>
<tr>
<td>Wayne, MI</td>
<td>3,480</td>
<td>2,843</td>
<td>-18.30%</td>
<td>277,858</td>
<td>200,359</td>
<td>-27.89%</td>
</tr>
<tr>
<td>Cuyahoga, OH</td>
<td>3,643</td>
<td>3,079</td>
<td>-15.48%</td>
<td>189,034</td>
<td>127,403</td>
<td>-32.60%</td>
</tr>
<tr>
<td>Allegheny, PA</td>
<td>1,736</td>
<td>1,627</td>
<td>-6.28%</td>
<td>131,717</td>
<td>73,852</td>
<td>-43.93%</td>
</tr>
<tr>
<td>Kings, NY</td>
<td>4,201</td>
<td>3,002</td>
<td>-28.54%</td>
<td>153,811</td>
<td>108,538</td>
<td>-29.43%</td>
</tr>
<tr>
<td>Philadelphia, PA</td>
<td>2,816</td>
<td>1,887</td>
<td>-32.99%</td>
<td>130,373</td>
<td>88,466</td>
<td>-32.14%</td>
</tr>
<tr>
<td>Milwaukee, WI</td>
<td>1,792</td>
<td>1,683</td>
<td>-6.08%</td>
<td>140,534</td>
<td>98,715</td>
<td>-29.76%</td>
</tr>
<tr>
<td>Queens, NY</td>
<td>2,710</td>
<td>2,415</td>
<td>-10.89%</td>
<td>152,046</td>
<td>111,480</td>
<td>-26.68%</td>
</tr>
<tr>
<td>Fairfield, CT</td>
<td>1,978</td>
<td>1,796</td>
<td>-9.20%</td>
<td>125,291</td>
<td>87,788</td>
<td>-29.93%</td>
</tr>
<tr>
<td>Harris, TX</td>
<td>3,707</td>
<td>4,078</td>
<td>10.01%</td>
<td>221,613</td>
<td>186,780</td>
<td>-15.72%</td>
</tr>
<tr>
<td>Erie, NY</td>
<td>1,405</td>
<td>1,310</td>
<td>-6.76%</td>
<td>108,541</td>
<td>76,375</td>
<td>-29.63%</td>
</tr>
<tr>
<td>Hartford, CT</td>
<td>1,676</td>
<td>1,733</td>
<td>3.40%</td>
<td>114,011</td>
<td>82,521</td>
<td>-27.62%</td>
</tr>
<tr>
<td>Middlesex, MA</td>
<td>2,741</td>
<td>2,793</td>
<td>1.90%</td>
<td>171,513</td>
<td>141,253</td>
<td>-17.64%</td>
</tr>
<tr>
<td>New York, NY</td>
<td>13,289</td>
<td>8,270</td>
<td>-37.77%</td>
<td>118,373</td>
<td>91,854</td>
<td>-22.40%</td>
</tr>
<tr>
<td>Hamilton, OH</td>
<td>1,709</td>
<td>1,675</td>
<td>-1.99%</td>
<td>100,702</td>
<td>74,952</td>
<td>-25.57%</td>
</tr>
<tr>
<td>New Haven, CT</td>
<td>1,629</td>
<td>1,795</td>
<td>10.19%</td>
<td>108,879</td>
<td>85,770</td>
<td>-21.22%</td>
</tr>
<tr>
<td>Los Angeles, CA</td>
<td>21,119</td>
<td>19,753</td>
<td>-6.47%</td>
<td>884,139</td>
<td>861,337</td>
<td>-2.58%</td>
</tr>
<tr>
<td>Worcester, MA</td>
<td>1,505</td>
<td>1,469</td>
<td>-2.39%</td>
<td>102,288</td>
<td>82,397</td>
<td>-19.45%</td>
</tr>
<tr>
<td>Monroe, NY</td>
<td>968</td>
<td>1,029</td>
<td>6.30%</td>
<td>117,634</td>
<td>98,050</td>
<td>-16.65%</td>
</tr>
</tbody>
</table>

**Manufacturing still provides a big payroll**

It is difficult to comprehend how major cities can sustain the losses in manufacturing employment that they have been experiencing in the past 20 years. Perhaps they can, but the loss in employment dollars is substantial, and the social impact of these losses will have to be tested through the next recession. However, we must recognize that manufacturing has been a large share of the economies of major cities for many years. Manufacturing is still significant to provide both jobs and money to core communities. Though the payrolls are shrinking, they are still big. The question that arises is what will happen when they shrink more.

Figure 3 shows the distribution of manufacturing payroll by county throughout the United States. The map requires interpretation because the western counties are far larger than most eastern counties. For instance, San Bernadino County, Calif., is approximately 20 times the size of Rhode Island. Still, we can see that the manufacturing payroll is substantial east of the Mississippi and north of the Ohio rivers. However, this industrial region is now being joined by new industrial concentrations in the South, the Southwest and the Pacific Northwest.
Payroll increases are more broadly distributed

Percent increases in manufacturing payroll are more broadly distributed than manufacturing payroll dollars. There are concentrations, but Figure 4 shows how many of the payroll increase dollars from 1979 to 1993 were dispersed into regions not commonly thought of as heavy manufacturing areas. Areas such as North Carolina, Tennessee, northern Alabama, Oregon and Arizona all enjoyed considerable dollar expansion in their manufacturing payrolls. From 1979 to 1993, manufacturing-oriented Illinois, Michigan and Ohio saw their manufacturing payrolls expand by about $10 to $11 billion dollars. During the same period, North Carolina’s manufacturing payroll increased by 11.7 billion, Texas by $14.8 billion and California by $32.1 billion. All three of these emerging states saw greater dollar increases in their manufacturing payrolls than the second largest manufacturing state in 1979, New York.

Still, manufacturing remains an important economic force in many of its historical home communities. New York saw its manufacturing payroll increase by $9.4 billion from 1979 to 1993. Such progress is significant and should be appreciated when it occurs.
Figure 4

Manufacturing Payroll Increase, dollars

by County, 1972-1993

Data source: U.S. Census of Manufactures
Map compiled by: University of St. Thomas

Percent increases in manufacturing payroll vary greatly

Percentage increases in manufacturing payroll vary considerably from state to state and from county to county. From 1979 to 1993, the United States increased its manufacturing payroll by 71 percent, slightly less than the rate of inflation, which was about 75 percent. However, the major industrial states such as New York, Illinois, Ohio and Pennsylvania were low with percentage increases of 37 percent, 45 percent, 44 percent and 31 percent respectively. In contrast, the manufacturing payrolls of Florida, Georgia, Idaho, Colorado, North Carolina, Virginia, Arkansas and Tennessee all increased by 109 percent or more.

The variation at the county level was much greater, of course. The manufacturing payroll in Allegheny County, Pennsylvania (Pittsburgh), decreased by 16 percent from 1979 to 1993 while Kings County, N.Y. (Brooklyn), and Lake County, Ind., experienced declines of 11 and 18 percent. During the same period, manufacturing pay increased 279 percent in Madison County, Ala., 175 percent in Winnebago, Wis., and 478 percent in Gwinnett County, Ga. In total, the smaller manufacturing communities experienced a 112 percent increase in manufacturing payroll while the major urban counties averaged around 55 percent. These dramatic percentage increases are not the result of small changes on a small base. Madison County, Ala. (Huntsville), now has a manufacturing payroll approximately equal to that of Baltimore -- a major manufacturing center in the East.
The decline in manufacturing establishments is severe in some areas

Perhaps more alarming than the steep drop-offs that some communities are experiencing in manufacturing employment are the declines in the number of manufacturing establishments. From 1979 to 1993, the number of manufacturing establishments declined by 26 percent in Massachusetts, 30 percent in New Jersey, 24 percent in Pennsylvania and 31 percent in Connecticut and New York. Similar but less severe declines took place in Illinois (18 percent), Ohio (12 percent) and Missouri (11 percent) and some other states. But during the same period, the number of manufacturing establishments grew by 6 percent in Indiana, 8 percent in Georgia, Wisconsin and Washington, 9 percent in Colorado, 10 percent in Florida, 20 percent in New Mexico, and 33 percent in Arizona.

Much more dramatic changes have taken place at the county level. The number of manufacturing establishments declined by 35 percent in 20 major manufacturing counties, while increases of 20 percent or more were achieved in many (but by no means all) smaller communities. In general, manufacturing establishments are migrating away from the Middle Atlantic and New England states and California to the more rural areas of the country. Some parts of the Midwest have experienced declines, but not all. Illinois' statewide decline of 18 percent slips to 5.6 percent without Cook County (Chicago). By excluding the declines in a few specifically declining industrial centers, Illinois' manufacturing establishment growth would be positive.
Average pay is still high in the traditional manufacturing regions

Although manufacturing is losing ground in some of the traditional manufacturing regions of the country, manufacturing pay is still positive. New Jersey is an example. New Jersey lost 17 percent of its manufacturing employment from 1987 to 1992, but maintained an average annual pay per employee in manufacturing of $35,918 (in 1992) -- higher than any states but Delaware and Michigan. This decline in manufacturing employment while manufacturing pay increases is not an unusual phenomenon when retrenchments are taking place. Often, the more senior personnel are retained as the company downsizes to meet competition or to prepare for ultimate relocation to another region. Thus, both manufacturing pay and manufacturing employment have to be examined together to gain a proper assessment of what might happen to the industrial economy of the future.

To some extent, this combination of retention of more senior personnel with higher salaries together with attractive opportunities in other communities may make the relocation alternative appear better than it really is. As a practical matter, pay in many professions is related to seniority and experience. If the comparisons are being made between a higher paid older work force in an established community and newer recruits in an emerging community, the cost differences being compared may be reduced over time as the work force in the new location gets older and accrues more experience.

Foreign Investment is Important

Whether we prefer the situation or not, the fact of the matter is that foreign investment has played a hugely important role in the resurgence of U.S. manufacturing in the late 1980s and early 90s. Of course, we have to situate this period of prosperity within the appropriate industry. The expansion of the last 12 years has been highly influenced by the relative prosperity and expansion of two major industries, automotive and aircraft. The United States has actually lost ground in important industries such as ship building, electrical generation equipment, machine tools, and perhaps even software. But during the past 12 years, this country has sold a lot of automobiles and aircraft and the states and industries that serve these two important end markets have prospered greatly. Indiana, for instance, has enjoyed great prosperity during this period, and that prosperity will no doubt continue as cars sell. Indiana has many manufacturing strengths and so the state will no doubt continue as an important manufacturing region. It is, for instance, one of the leading suppliers of medical devices. But, if there should be a decline in auto sales, Indiana will no doubt be affected because so much of its industry still serves that important market. Minnesota, in a manner perhaps unknown to the average citizen, is also tied to both automotive and aircraft. We do not have any major airframe manufacturers in the state of Minnesota but we have a huge number of suppliers in the form of Remmele, Honeywell, Kurt Manufacturing, Rosemount, Hitchcock, and others. Any serious spacing out of aircraft orders due to the slowdown in Asia or to other problems, will no doubt impact Minnesota. We should recognize also that Toyota is building a huge truck plant in Indiana which is quite likely to ultimately compete with the 73 year old Ford plant we have in St. Paul.

Some of Indiana’s strength of the past decade has been its ability to attract foreign investment. Indiana boasts that it is home to 50 investments from the United Kingdom, 47 from Germany, 29 from France, 24 from the Netherlands, 9 from Sweden, 8 from Italy, 7 from Ireland, 5 from Belgium, 34 from Canada, and 190 from Japan. Investments have also been made from Australia, Austria, Brazil, China, Denmark, Finland, Greece, Israel, South Korea, Taiwan and Yugoslavia (Cinergy, 1998). Minnesota has no doubt had foreign investments as well but at this point, we are unsure of the actual count.

Summary - Manufacturing’s Gradual Migration

In summary with respect to manufacturing growth, the nation is gradually changing to the degree that social consequences are quite likely for some communities in the future. Older historically important centers of manufacturing are losing their industrial employment at an alarming rate -- even during a period of robust prosperity. The two coasts are faring far worse than the Midwest, selected Western states and the top of the South. Manufacturing is migrating in two ways; from major city to hinterland and from higher value-added to lower value-added industries. The consequences could be substantial. We can gain a better insight by examining Minnesota as a sample case.

Minnesota does compare favorably to most of the traditional manufacturing states, but there are exceptions here, as well. The nearly 7 percent increase in manufacturing employment from 1988 to 1995 is certainly better than the 2 percent losses in Illinois and Ohio and the precipitous declines in California and the East Coast. In general, the Midwest has held up better than the East Coast and California -- in part because so much of the nation’s current prosperity is related to robust sales of two major products -- automobiles and aircraft. Minnesota was also about in the middle in manufacturing payroll growth. Minnesota’s manufacturing payroll increased 31 percent from 1988 to 1995 which ranked 25th among the 50 states -- well above the increases recorded in Ohio, Pennsylvania, California and most Eastern states, but behind the 35 percent increase recorded in Indiana, the 38 percent in-
crease in Wisconsin and the forty plus rates of payroll increase experienced by many states.

Minnesota’s manufacturing employment increased 6.82 percent from 1988 to 1995 — certainly a respectable performance. However, during the same period, Wisconsin’s manufacturing employment increased by 12.54 percent while Indiana’s increased by 8.47 percent. In Indiana’s case, one possible reason might be the large influx of foreign companies that have flocked to the state because of its relatively low cost and its proximity to large markets. Another might be the general interest in manufacturing that has permeated Indiana’s public policies. In Wisconsin’s case, a possible reason might be the state’s historical reliance on basic manufacturing, as opposed to more faddish “high-tech” manufacturing, along with a friendly attitude toward manufacturing on the part of state officials. A third reason might be the most convincing. Both Indiana and Wisconsin are good manufacturing states which are generally lower cost than other nearby states.

**Table 2**

<table>
<thead>
<tr>
<th>State</th>
<th>1988 Mfg Employment</th>
<th>1995 Mfg Employment</th>
<th>Change</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wisconsin</td>
<td>530,138</td>
<td>596,622</td>
<td>+66,494</td>
<td>+12.54%</td>
</tr>
<tr>
<td>Indiana</td>
<td>620,193</td>
<td>672,734</td>
<td>+52,541</td>
<td>+8.47%</td>
</tr>
<tr>
<td>Minnesota</td>
<td>387,642</td>
<td>414,087</td>
<td>+26,445</td>
<td>+6.82%</td>
</tr>
<tr>
<td>Michigan</td>
<td>948,943</td>
<td>960,243</td>
<td>+11,300</td>
<td>+1.19%</td>
</tr>
<tr>
<td>Illinois</td>
<td>1,033,272</td>
<td>1,011,741</td>
<td>-21,531</td>
<td>-2.08%</td>
</tr>
<tr>
<td>Ohio</td>
<td>1,119,170</td>
<td>1,093,560</td>
<td>-25,610</td>
<td>-2.29%</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>1,051,180</td>
<td>935,945</td>
<td>-115,235</td>
<td>-10.96%</td>
</tr>
<tr>
<td>California</td>
<td>2,140,959</td>
<td>1,842,438</td>
<td>-298,521</td>
<td>-13.94%</td>
</tr>
<tr>
<td>Maryland</td>
<td>231,375</td>
<td>187,771</td>
<td>-43,604</td>
<td>-18.85%</td>
</tr>
<tr>
<td>New Jersey</td>
<td>684,408</td>
<td>546,357</td>
<td>-138,051</td>
<td>-20.17%</td>
</tr>
<tr>
<td>New York</td>
<td>1,249,626</td>
<td>963,231</td>
<td>-286,395</td>
<td>-22.92%</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>600,730</td>
<td>457,310</td>
<td>-143,420</td>
<td>-23.87%</td>
</tr>
<tr>
<td>Connecticut</td>
<td>383,455</td>
<td>288,198</td>
<td>-95,257</td>
<td>-24.84%</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>114,087</td>
<td>84,782</td>
<td>-29,305</td>
<td>-25.69%</td>
</tr>
</tbody>
</table>

The changes in manufacturing employment from 1988 to 1995 offer an interesting contrast between the traditional manufacturing states displayed in Table 2 and the emerging manufacturing states shown in Table 3. What is of interest in this chart is the geographic dispersion of manufacturing from east of the Mississippi River and north of the Ohio River to many regions across the United States. From 1988 to 1995, during one of the healthiest periods in US history and during a period particularly favorable to auto sales, Michigan added 11,300 jobs -- not many more than Nevada or New Mexico. Kentucky created four times as many manufacturing jobs on a base that was 30 percent that of Michigan. Texas created 74,000 jobs, Alabama and Tennessee 40,000 each, Utah 27,000 and Mississippi 24,000. From 1988 to 1995, Nebraska saw its manufacturing payroll increase by more dollars than did New York. Industrially smaller South Carolina had manufacturing payroll increases about equal to all of New England. Clearly, the set of manufacturing competitors is enlarging.

This widespread dispersion of capable manufacturing has ramifications to Minnesota and some implications for policy initiatives. We are doing well but we are most assuredly not alone. Others, sometimes others whom we may not have suspected, are doing well also. Some of these newly emerging manufacturing communities are developing strengths that, in former years, were distinctive to Minnesota. With its major research university, its excellent network of private colleges and its established technical colleges, Minnesota is certainly capable of continuing its robust manufacturing performance. But, we should recognize that other regions will be developing their capabilities as well.
Table 3
Employment Changes in Emerging Manufacturing States

<table>
<thead>
<tr>
<th>State</th>
<th>1988 Mfg Employment</th>
<th>1995 Mfg Employment</th>
<th>Change</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Dakota</td>
<td>29,408</td>
<td>45,222</td>
<td>+15,814</td>
<td>+53.77%</td>
</tr>
<tr>
<td>Nevada</td>
<td>26,243</td>
<td>35,526</td>
<td>+9,283</td>
<td>+35.37%</td>
</tr>
<tr>
<td>North Dakota</td>
<td>16,269</td>
<td>22,188</td>
<td>+5,919</td>
<td>+36.38%</td>
</tr>
<tr>
<td>Idaho</td>
<td>54,316</td>
<td>72,066</td>
<td>+17,750</td>
<td>+32.68%</td>
</tr>
<tr>
<td>Utah</td>
<td>94,934</td>
<td>121,960</td>
<td>+27,026</td>
<td>+28.47%</td>
</tr>
<tr>
<td>New Mexico</td>
<td>35,841</td>
<td>43,895</td>
<td>+8,054</td>
<td>+22.47%</td>
</tr>
<tr>
<td>Nebraska</td>
<td>94,558</td>
<td>112,951</td>
<td>+18,393</td>
<td>+19.45%</td>
</tr>
<tr>
<td>Arkansas</td>
<td>212,363</td>
<td>250,755</td>
<td>+38,392</td>
<td>+18.08%</td>
</tr>
<tr>
<td>Kentucky</td>
<td>262,052</td>
<td>305,321</td>
<td>+43,269</td>
<td>+16.51%</td>
</tr>
<tr>
<td>Iowa</td>
<td>219,610</td>
<td>248,812</td>
<td>+29,202</td>
<td>+13.30%</td>
</tr>
<tr>
<td>Alabama</td>
<td>353,712</td>
<td>393,859</td>
<td>+40,147</td>
<td>+11.35%</td>
</tr>
<tr>
<td>Mississippi</td>
<td>224,900</td>
<td>249,760</td>
<td>+24,860</td>
<td>+11.05%</td>
</tr>
<tr>
<td>Louisiana</td>
<td>163,435</td>
<td>178,627</td>
<td>+15,192</td>
<td>+9.30%</td>
</tr>
<tr>
<td>Oregon</td>
<td>208,623</td>
<td>227,601</td>
<td>+18,978</td>
<td>+9.10%</td>
</tr>
<tr>
<td>Arizona</td>
<td>183,427</td>
<td>199,783</td>
<td>+16,356</td>
<td>+8.92%</td>
</tr>
<tr>
<td>Tennessee</td>
<td>496,633</td>
<td>537,213</td>
<td>+40,580</td>
<td>+8.17%</td>
</tr>
<tr>
<td>Texas</td>
<td>938,491</td>
<td>1,012,788</td>
<td>+74,297</td>
<td>+7.92%</td>
</tr>
<tr>
<td>Georgia</td>
<td>580,809</td>
<td>598,223</td>
<td>+10,834</td>
<td>+3.00%</td>
</tr>
<tr>
<td>North Carolina</td>
<td>862,766</td>
<td>870,344</td>
<td>+7,578</td>
<td>+1.00%</td>
</tr>
</tbody>
</table>

Causes of Industrial Change

Relocation: A Combination of Attracting and Repelling Forces

Whether industry is being attracted by new and ideal circumstances in other communities or repelled by conditions in their home communities is an interesting and difficult question. In reality, there are both repelling and attracting forces. In this study, a combination of economic data, company data, industry data and field analysis has been employed to examine these attracting and repelling forces. No one of these forces is influential enough to serve as a primary cause of industry relocating from one community to another. However, many forces are worth discussing.

Repelling Forces

Repelling forces do exist, particularly in major core cities. Among the repelling forces most influential to businesses are the following:
1. Shortage of land
Expanding and thriving businesses almost inevitably need additional space. Although any company can almost always better use available space, if it is growing, additional land is often required. Most cities are densely occupied, and significant amounts of land are only rarely available to companies who need it.

2. Land is expensive
If land is available, it is likely to be six or eight times more expensive than similar land in a greenfield environment. Importantly, additional heavy cleanup costs are often associated with readying older industrial land for a new industrial use. Though our environmental laws have favorable aspects, they can impede the reuse of previously polluted industrial land even if neither the buyer nor the seller had anything to do with the polluting. Some states and communities have passed legislation to reduce this problem, but the cost of procuring and preparing industrial land may still represent a repelling force.

3. Local residents might object to industrial expansion.
Sometimes even the noblest companies fall prey to citizen resistance to industrial expansion. In some cases resistance is overcome quickly. In many cases, the citizen objection results in prolonged reviews and hearings that drive up costs and drive away companies who might otherwise be perfectly suitable industrial residents.

4. Labor markets may not be attractive to employers.
Major cities have excellent workers, but many of these excellent workers may already be employed. Those that are not employed may lack the technical and employee skills needed for manufacturing. A part of the problem may also be that employers may perceive employment relationships as contentious and legalistic -- particularly if high-risk populations are being hired. Employers may be willing to hire members of high-risk applicant groups, especially when labor markets are tight, but they may wish to avoid becoming liable for the personal behavior of high risk employees.

5. Building codes may prohibit modernization.
Building codes serve useful purposes, but applying overly stringent codes to older buildings in core cities may mean that expansion and modernization are impossible financially.

6. Labor groups may be unresponsive to work rule changes necessary to keep the industry competitive.
In many cases, organized labor has put forth a highly enlightened and capable cadre of leaders who work well with industry. In a few cases, local union leaders (or the rank and file) may refuse to consider changes necessary for the firm to compete internationally.

7. Company management may be incapable.
Just as there can be intransigent labor leaders, there can be intransigent managers in companies. It would be hard to argue persuasively that one is more of a problem than the other. Good companies and good unions seem to work well together, but some companies seem to have more problems than they should have.

8. Crime and local operating costs may be high
Taxes and crime are high, and regulatory agencies often exhibit a marked tendency to footdrag on important regulatory approvals.

9. The company is acquired and the plant is shut down.
It is likely that much of the industrial movement within the United States is traceable to the large number of mergers, acquisitions and amalgamations that have taken place during the past 20 years. If the amalgamation is a successful one, the amalgamated plant may survive and prosper. However, amalgamations that are highly leveraged transactions often result in starving the operating units of capital to such a degree that competitiveness becomes increasingly difficult.

10. Transportation arteries may no longer be adequate.
Much of the nation’s industrial structure has been in its present location for several decades, during which time traffic patterns, transportation systems, areas of congestion and ease of access may all have changed. What might have been an excellent location with efficient access to primary suppliers and customers in 1950 may today be a highly congested area surrounded by slow-moving heavy traffic. The local railroad may no longer be reliable as a mode of transportation if it even exists.
11. The company may have completed its useful life.
There is nothing written in the economic code to suggest that companies have to last forever. Indeed, it is quite possible
that even well-run companies overtly decide to cease operation at a point in time. The reasons may be many. Perhaps the
founder wishes to retire and no replacement is forthcoming. Perhaps the founder sees harsher economic times either in the
future to the degree that the resolve to continue is lacking. Perhaps there are health problems on the part of key principals.
Perhaps the property is more valuable than the business itself.

While none of these repelling forces may be individually sufficient to cause relocation, they may become meaningful factors
in long term trends. The average life of a manufacturing plant is long -- perhaps seventy years. When a plant reaches ad-
vanced age, almost everything surrounding it has also changed markedly from the conditions that existed at the time the
plant was sited. This combination of age, changing conditions, and preferences on the part of contemporary managers can
all influence the decision to continue in a present location, liquidate the business or move to a new location. Within this
framework of ages, changes and preferences, the above repelling factors may be influential -- not necessarily constantly.
Perhaps they only surface when other attracting forces become evident.

Attracting Forces
Legitimate attracting forces influence industries considering relocation. Some companies have good geographic locations
— perhaps on an interstate network near the center of a large market. Some communities are generally lower in cost -- not
only labor rates but other cost items as well. Some may be in better climates. A few attracting forces are enumerated below:

1. Major customers or suppliers may be near the new location.
One of the most significant attracting forces is proximity to major customers or suppliers. Since both customer and sup-
plier lists are dynamic outgrowths of emerging industries and businesses, we can expect some industrial relocation merely
because of the shifting geographical patterns of emerging industries. Beyond these more general trends, we have the major
phenomenon of end-product companies trying to reduce their suppliers to a smaller and more trusted number. Especially
attentive service is often required to achieve the status of a preferred supplier, and this may involve the relocation of indus-
trial facilities to better accomplish this special level of service.

2. Perceived favorable work ethic on the part of employees.
The perception of a favorable work ethic can be related to the existence of a well-developed educational system, which may
be unrelated to educational costs, or because there is little competition from high-paying, capable employers. Informal con-
versations with many employers have led the author to believe that the perceived work ethic is a more powerful attracting
force than lower wages. In any case, it is certainly a meaningful attracting force.

3. Satisfactory or exemplary records of quality experienced by other employers
Contrary to some suggestions, there is strong evidence that low-cost operators can, and often do, achieve exemplary levels
of product quality. Interestingly, high quality and lower cost often move hand-in-hand. The achievement of high quality can
be an important attracting force.

4. Legislative and court systems perceived to be evenhanded.
Some communities have labor legislation or court systems of interest to employers. Employers generally do not prefer con-
frontational events and certainly do not prefer court systems and legislatures that are commonly perceived as against em-
ployers. Occasionally, newer greenfield communities may legal or regulatory characteristics that may seem more even-
handed than those of the home community.

5. Industrial swarming develops systems of attracting forces.
Often, highly capable suppliers, with special technical skills, are invited to new locations by their customers. Some of these
invitations have been extended to suppliers to the computer and electronics industries as these industries have increasingly
moved offshore. Minnesota, as an example, has capable suppliers to the aircraft industry. These high technology foundries,
machine shops, heat treaters, plating shops and metal stampers work together to provide an efficient and capable infra-
structure that supports present industries and nurtures others.

6. Attractive economic incentives
Attractive economic incentives may be available in new locations perhaps in part because industry is healthy and taxes are
therefor quite low. However, there is so much competition for industrial employment that reasonably attractive incentive
packages are available in many locations.

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7. **The company is acquired and the plant is expanded.**
Many companies are changing owners. While some business combinations may be highly leveraged, poorly-thought-out ventures with little added-value, others may be quite well-developed strategic initiatives. Some of these combinations, such as those consummated by Minnesota based Pentair, do result in significant investment at the acquired site.

8. **Attractive wage rates**
Low wage rates are of interest to employers, but probably not at the expense of other important attracting forces.

These attracting forces can offer a rosy alternative to the manufacturer wishing to expand. But many locations have these attributes. Some communities succeed and their industrial base grows, but most do not. So the combination of these repelling and attracting forces, together with the individual situations, needs further study and exploration.

**Emotionalism as a Locating Force**

Although economics, basic consideration of revenue and cost, plays a role in decisions about industry location and relocation, these important decisions are not always based entirely on rational appraisals. Emotionalism creeps into decisions about where companies should be, or should not be. In some cases, companies may seek new surroundings largely because management is incapable of running the business properly in its current location. Top officers of poorly performing companies often rationalize their mistakes. Occasionally, managers become introspective and recognize that modifications in their own behavior may be important remedial steps in restoring the health of the firm. More often, however, executives in charge of troubled enterprises blame everything else, including their location or its business climate. This mentality leads to company relocations that may not be entirely necessary.

Personal factors, including personality clashes between management and unions and between management and city officials, affect company relocation decisions. It is by no means certain that rational managers, prudent labor leaders and statesmanlike public officials will coexist in the same town simultaneously. Industrial relocation is often influenced by noneconomic factors. Emotionalism, perceptions, views of the future and a variety of other not-very-quantifiable factors influence industrial location -- particularly the magnitude of the repelling forces. The forces affecting industrial location cannot be reduced to strict economic terms. Emotion and attitudes do play a role in where companies choose to expand.

We should recognize, however, that the general reputation of a state regarding its business climate is considered -- whether this reputation is deserved or undeserved. Most companies contemplating expansion, contraction or relocation are well supplied with comparative statistics on the regions being considered and they feel quite free to contact company executives with personal experience. Mathematical models, which incorporate tax, operating costs and other factors, are quite numerous and most companies reviewing locational options are very well informed. Certain states do have reputations and, in some cases, it is in their best interest to preserve or improve them.

**The Labor Shortage Revisited**

Lately, there has been considerable media coverage concerning the general shortage of skilled workers in many parts of the US. It is true that many manufacturers are frustrated with the shortage of skilled workers and many do see the unavailability of qualified workers as a constraint on their businesses. It is also factual that the number of new labor force entrants is unlikely to be as substantial during the next few decades as it has been in the past. Further, new labor force entrants are not likely to have the same off-the-farm work readiness skills as the people responsible for building Minnesota’s industry during the past eighty years. The documentation of the labor shortage has been extensive in some regions of the country. In this report, we would like to offer an additional, somewhat disparate, perspective.

**The economy has been unusually robust.**

From 1994 to 1998, the US economy has been operating in as robust a manner as it has at any time in its history. Perhaps these unusually good times will continue well into the future. If they do, we should all be thankful. If they do not, we should not be surprised. If the economy does slow, the employment picture could change substantially. Many of us can remember the early 1980s when more than twelve million people were unemployed.

Prolonged robust economies depend upon maintaining strong competitive positions. The US economy is competitive in many ways but competitive positions are also influenced by practical factors like exchange rates. In spite of our immense talents and resources, part of our prosperity is impacted by world events. Some of the most potentially influential world events are volatile and unpredictable.

Beyond concerns for the cyclical nature of the US economy, some additional concerns might be raised about its structure. The mid-nineties boom was extensively fueled by two important industries, automobiles and computers, and greatly helped by chemicals, aircraft and medical devices. Even with strong performance on the part of these several industries, manufacturing employment actually declined by 525,000 from 1988 to 1998. In order for the economy to remain robust, these industries will have to remain strong. Yet, there are discernible signs of slowing in each of these industries.
The US economy is generally healthy in many respects. However, there is little evidence that our expertise has reached the point that we can forget about cyclical downturns and the gradual erosion of our competitive position -- in part due to currency changes brought on by world events.

**The US trade deficit is growing markedly.**

The U.S. Trade deficit recently reached an all-time high -- nearly $16 billion in a single month. Ironically, this huge trade deficit was accumulated during a time when the price of oil had been dropping. The non-oil trade deficit is by far the worst we have ever experienced. Some people estimate that the US trade deficit may reach $300 billion in 1999. It is hard to understand how it is that our economy can remain robust, and employment remain full, coincident with burgeoning trade deficits of this nature.

The problems of Southeast Asia will impact US companies. Southeast Asia is like Italy. The governments and the banks may be broke but the modern production equipment and trained workers are still in place. Many of the Asian industrial companies remain vigorous competitors. The recent changes in exchange rates will allow them to more aggressively compete on price and some U.S. companies are not positioned for this onslaught.

The US burgeoning trade deficit could fuel another potential, yet rarely discussed, problem. The deficit could reduce the attractiveness of US bonds. The US remains the worlds largest debtor -- still with a ravenous appetite for borrowed funds. The trade deficit, a huge debt and continued borrowing could combine to diminish the luster of US investments in general. While it is quite probable that we will be able to avoid these problems, there is not much evidence that our wise policies have been as influential as our good fortune. Demographics suggest that labor scarcity will continue but tougher times on currency and financial markets could loosen the tight labor market in the future.

**Pockets of disguised, endemic and part-time employment continue to exist.**

Although labor is scarce in many less urban areas, there still exist many core cities that have not solved the problem of the lack of opportunity for many citizens. So much has been written about the limited opportunities available to people in the inner cities that there is no need to belabor the point here. Even during the boom period of the mid 1990s, layoffs and downsizing plagued many families and communities and unemployment rates among minorities remain high. Because qualified people are less readily available in some communities, it does not mean we have provided opportunity for all. The current concern over the lack of availability of health insurance provides evidence that the quantity of good jobs with good benefits is not equally matched to the aspirations of citizens. There may not be a shortage of workers. There may be an enormous mismatch between what is required and what people are available to do.

An interesting question emerges from the recent expansion patterns of two of the country’s most lucrative industries, medical devices and pharmaceuticals. These high paying industries could easily attract employees here in the United States where many companies began their operations. As a practical matter, however, much of the expansion has been in Puerto Rico where quality is perceived to be better and employee loyalty is considered to be very high. Minnesota products like pacemakers are no exception. There are probably fewer than 5,000 pacemakers manufactured each year in Minnesota versus probably well over 100,000 in Puerto Rico. If, as this author believes, much of the expansion to offshore sites is triggered not by cost advantages but by quality advantages, then our principal concern should not the quantitative availability of workers but their preparation for useful employment. This interpretation might put more pressure on those of us involved in education to improve the quality of our services so that our students can better attain the opportunities before them.

**Our use of our labor force is far from optimal.**

From the standpoint of numerical requirements to support manufacturing, the labor shortage is a great myth. In all of the United States in manufacturing, construction, mining and agriculture, we employ only about 16 million people in direct labor out of a total population of 263 billion. Furthermore, the number of people actually employed in manufacturing has declined by 524,000 in the past ten years (1988 to 1998). Meanwhile, employment in government has increased by 2.6 million, transportation and public utilities grew by one million, wholesale trade by 850 thousand, retail trade by 3.6 million and services by 11.5 million. It is interesting to note that employment in these industries has mushroomed even though the wages and benefits in most manufacturing industries are often higher. This anomaly of mushrooming employment in lower paid industries should be considered when evaluating the worker shortage as it applies to manufacturing. Most employers will say that there is a shortage of job applicants with skills relevant to manufacturing. But, it is not clear to this author that the crux of the problem rests with numerical supply. The problem seems more related to the development of qualifications and to our misapplication of the human resource to activities that may not need to be done.

Manufacturing now accounts for 15 percent of US jobs, as opposed to more than one-third of the jobs in 1950. Meanwhile, we have almost recklessly expanded employment in government, retail trade and services. Some of these jobs are valuable and needed, of course. However, we seldom give our employment patterns the scrutiny they deserve. Behind waning dis-
posable real income, an increasing share of U.S. earnings are being devoted to the delivery of services, not all of which are voluntarily sought but instead are forced requirements for existing and working in the United States. Higher aggregate expenses for legal services, child care, financial services and insurance have all increased the living costs of those people whose incomes may be declining in real terms. The cost of services has grown from 42 percent of disposable personal income in the late 1950s to 51 percent in the 1990s, more than $4,000 more per capita in constant 1987 dollars. As our economy displayed statistical advancement, much of what was being purchased was either involuntary or of minimal long-term benefit.

The result of these shifts in national income generation patterns has been that our economy is more dependent upon a different set of major employers, the vast majority of whom are not industrial employers. In state after state, the largest employers ceased to be industrial companies and became, instead, units of government, financial companies, hospitals, school districts, retailers (with part-time workers) and public utilities. By 1992, only five industrial companies were numbered among Minnesota’s largest 25 employers and none of them were expanding in Minnesota. The year 1991 was a watershed for the United States. For the first time in the history of the nation, civilian government employment exceeded manufacturing employment (Figure 6).

**Figure 6**

![Manufacturing & Government Employment 1946 to 2001 in Millions of Employees](image)

This constant shift of employment out of production and into services and retail has impacted the prosperity of families. The same trend has been repeated over and over. The wages of the family’s principal earner were declining so the nominal gap was made up by members of the family taking on additional work. Sometimes another member of the family became an additional wage earner. Sometimes the principal wage earner took on a part time job or more overtime. Sometimes school-aged youth became wage earners. Since new transactions were involved, this additional work activity reflected favorably in the national economic statistics, but these nominal advancements disguised the fact that people were struggling harder to keep pace with their many obligations. It was a trend not without some cost to the social fabric of our nation.

In spite of hard work and productivity gains on the part of America’s workers and business people, many of them have not gained much ground economically. This is true of both workers and corporations — perhaps because the fruits of these activities are not accruing the same way they once were. Lawsuits, mandated costs, irresponsible corporate management, hostile takeovers, and other activities, some of them laudable, have all siphoned money out of the industrial sector of the country at a time when international competition is escalating the need for funds. Governments and other overhead activities have greatly increased their expenditures and hence drawn greater proceeds from the system. Since the 1950s, state, county, local and federal governments have been increasing their expenditures at about twice the rate of the industrial sector but government expansion has not been alone. In more recent years, a variety of overhead activities and retail trade have been expanding even during times when industries have been shrinking.

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Many people of course suggest that the transition to a higher service content is a predictable characteristic of an economy in the mature stage of development and we have no argument with that premise. The question is one of degree. How much of a transition to the service economy is usual? What are the boundary conditions? Importantly, is there any possibility of diminishing returns regarding the service sector of the economy. In this regard, we are not dealing with categorical problems which can be easily solved with sound-bite remedies. The problems are deeper and less aligned with political doctrine. In the main, they are arithmetic problems. How much overhead can we have, what is it doing and who will pay for it? And, what are the variances in quality in both the service sector and in manufacturing?

It is within this framework that we examine the question of the scarcity of labor. If everything we are doing is an essential contribution to community well-being, then perhaps there is a labor shortage. If, on the other hand, we are engaging in at least some activities that do not contribute to community well-being then perhaps much of the labor shortage could be solved by the reallocation of resources. Through lower postal rates, we subsidize the distribution of junk mail, which few people want, so we can overburden our landfills and reduce the quality of our environment. Through tax increment financing, we subsidize the expansion of shopping centers where the wage rates are among the lowest of any industry. Through a variety of public initiatives, we expand both lotteries and casinos, neither of which produce real wealth, while they add to a growing list of community social problems. There are other examples of how we could reduce our labor shortages if we assessed our valuable human resource to be as precious as it is.

The world’s population exceeds five billion, many of whom would like to move here.

One of the most heartening experiences is to visit with the talented, hardworking and eager young people of this world who would like to spend their lives in the United States. Countries like Peru, Iran, Columbia, Kenya, Venezuela, India, Indonesia and others have millions of highly talented young people, many of whom are products of an education system superior to ours and then educated further in foreign or US universities. The nation’s experience with immigrants has been very favor-
able in the past and an even greater potential is in store for us in the future if we choose to accept it. A policy to increase immigration would, of course, have to be selective and well thought out. It would no doubt be controversial. But it would also stimulate demand and the nearly limitless availability of talent.

Immigrants have figured decisively into Minnesota’s industrial history in ways not fully understood by policy makers and others. Three of Minnesota’s most technically advanced companies, Remmele, Kurt and Bermo were all started by immigrants from Germany, some of them Christian, some of them Jewish. Immigrants from Scandinavia, Czechoslovakia, Hungary, Poland, China, and many other countries have started companies, sold products, provided expertise and served as dependable employees to help provide this section of the United States with the standard of living it now has.

The Myth and Truth to the Labor Shortage

Manufacturing does need more and better employees during this robust economic period. That is a truth. But, since manufacturing employment continues to shrink nationally, there is labor out there some place. With fifteen percent of the nation’s employment now in manufacturing, and with much of that labor higher paid than in some other industries, and with highly talented people clamoring to come here, and with our use of labor far from optimal, and with the financial problems of Asia threatening our current boom, it is hard to accept the perceived labor shortage as our major constraint. However, as we look toward the future, the replenishment of our current labor force, with respect to both talent and quantity, may become more difficult.

Prosperity and Individual Industries

All industries contribute to community prosperity, but some industries are regarded as more valuable by the buying public. People are willing to pay more for a jetliner or a precision instrument than for informal apparel or advertising inserts. More market value is generated in some industries than in others, and in most cases, this means higher wages per employee.

There is a correlation between value-added activities and wages paid. Figure 8 shows this relationship for a set of three-digit manufacturing industries, derived by combining data made available for 1990. Note that hourly wages (in 1990 $) were much higher in those industries where the value-added per employee exceeded $80,000 per year.
The relationship between value-added and pay was duplicated again with different data with the same result (Figure 9). Those industries generating higher value-added per employee pay more. Thus, in terms of employee and community prosperity, it matters a great deal which industries are expanding and contracting. A similar scattergram can be constructed at the county level. Those counties with higher value-added per employee in manufacturing also show higher average manufacturing pay.

Figure 9

Value-added & Annual Pay by Industry for 1992

The fact that some industries create more value than others has ramifications for the way we consider our industrial economy. If we are gradually shifting employment from higher value-added industries to lower value-added industries, which we appear to be doing, we are altering both the social fabric and the financial underpinnings of our entire nation. Given our progressive tax system, real tax revenue will drop off exponentially if we shift more of our working population to lower value-added industries, and the general community prosperity is likely to suffer as well.

Much of the shift to lower value-added industries has already begun. Our international competitors are not naive. They understand that there is more money in manufacturing automobiles, instruments or highly sophisticated industrial machinery than in lower value-added activities. They understand both the importance of high value-added industries and the relative strengths of U.S. firms participating in these essential industries. We have much more international competition in industries where U.S. companies are weak or poorly managed than in other industries, such as appliances or paper, where U.S. companies are strong. Often, the manufacturing processes are similar. What is different is the caliber of our industrial presence.

The differences in wages and benefits between industries is dramatic. Both the paper industry and the textile mill industry have about 630,000 employees in the United States, but the similarities end there. The paper industry generates about $95,000 per year in value-added for each employee (1990 figures) and pays an average of $13.42 per hour (1993). Seven of the world’s ten largest paper mill companies are headquartered in the United States and six of these are consistently profitable. The industry has around $33 billion of bankable equity or about 9 percent of the U.S. total for industrial companies. Research and development expenses are high, patents are high and the entire industry is one where the U.S. competitive position is strongest.
In contrast, the textile mill industry generates about $42,000 of value-added per employee per year and pays an average of $8.89 per hour or 34 percent less than the paper industry. Of the 204 companies listed with textile mill SIC codes listed in the Moody’s Industrial Database, 47 are U.S. companies controlling 45 percent of the listed assets — primarily because of extraordinary U.S. strength in two segments, knitting and carpets. But bankable equity is only $3 billion or 9 percent as much as the paper industry, which has the same number of employees. Profit rates average around two to three percent in the textile mill industry except, again, in knitting and carpets. Overall, this industry is in a weak competitive position.

The degree to which our industries differ in technological prowess, financial strength, wages paid, taxes paid and managerial responsiveness is enormous — enough so that averages or aggregate figures cease to have clear meaning without in-depth understanding of the subsets.

Neither revenue, profits nor employment are sufficient indicators of actual manufacturing activity. A company, or a nation, can have high revenues, and in some cases temporary profits, by importing component parts, whole assemblies or even whole products and then shipping products to customers. Manufacturing operations of this nature were described several years ago by “Business Week” as the “hollow corporation.” They show revenue when components are merely shipped even though not much value is created. An alternative explanation exists when the products are simply not of very much value on world markets. Long-term prosperity is highly dependent upon value-added for its relationship to hourly pay and fringe benefits. Voluntary fringe benefits (those not required by law) vary from about $1,500 per worker per year to about $10,000 even within manufacturing (Figure 10). This huge range in voluntary benefits again reflects the favorable influence of high value-added production and influences major social questions such as health care.

Lower Levels of Reinvestment

During the mid 1960s and late 1970s, U.S. corporations typically operated at about the 8 percent after-tax profit rate and then paid out about 40 percent of these profits in dividends. In the 1990s, corporate profit rates have been closer to 5 percent while dividend payout ratios have risen to 70 percent. This combination of lower profit rates and higher dividend payouts has resulted in a decline in reinvested profits from about 5 percent of revenue in the 1960s to about 1.5 percent today. This reduction in the money available for reinvestment is likely to affect our competitive position in the years ahead. The absolute level of reinvested profit dollars declined from about $120 per employee per year in the late 1970s to around $40 today. This change could affect U.S. competitiveness in the future because less money is being made available for investment in plants, equipment and new product development.

The variation among companies is, of course, much greater than it is among industries. Companies such as 3M, Medtronic and Merck are well managed companies with strong technologies and solid financial positions. Other companies are not as strong. The principal question, however, is how much less strong are they?

In Minnesota, industrial companies have a combined total of $12.7 billion of bankable equity, of which 3M has $5.4 billion or 42 percent. 3M usually ranks high in number of patents issued, and a very high fraction (maybe three quarters) of Minnesota’s foundation giving stems from 3M-related foundations. The company is an active participant in international business where it routinely gets half of it sales and generates more than 40 percent of Minnesota’s industrial profits — 17 times as much as Ceridian Corporation, which (as Control Data) was at one time one of Minnesota’s largest employers. 3M’s bankable equity is nine times that of Medtronic (another excellent company), five times that of Honeywell (also fine) and 155 times that of Ceridian. Clearly there is an enormous range in these companies with respect to their ability to participate meaningfully in international competition. Minnesota is fortunate to have companies such as 3M, Medtronic, Honeywell, ADC, HB Fuller, Pentair, Tennant, Polaris, Arctco and MTS. By comparison, the bankable equity for all industrial corporations headquartered in Wisconsin is about equal to that of 3M. Iowa has industrial bankable equity a little more than that of Honeywell.

Yet, as a nation, we also have many problems. Companies such as Bell & Howell (Illinois), Black & Decker (Maryland), Rexnord (Wisconsin), Navistar (Illinois), Northrop Grumman (California and New York), Owens Corning Fiberglass (Ohio), Anchor Glass (Florida) and Uniroyal Chemical (Connecticut), collectively with more than a half a billion in sales, have contributed heavily to U.S. industrial expansion in the past. Currently, they have weak balance sheets and low profit margins — often the result of reckless diversification. Since 1994, 95 and 96 were excellent years, most companies did fairly well. However, if the economy were to weaken, especially for a period of three or four years, several major U.S. employers would be in great jeopardy.

Weakness in Education

The United States spends vast sums on education, but much of it fails to benefit students. The money goes primarily for higher salaries, more time off and earlier retirements for members of the staff. It does not go for more rigorous programs, school years comparable to those of our competitors or for a more appropriate blending of theoretical and applied knowledge. By international standards, our education system at the elementary and secondary level is weak. Albert Shanker, president of the American Federation of Teachers, said it best: “Eighty-five percent of the people accepted into college in the United States would not get accepted anywhere else in the world.”
Even at the college level, our educational initiatives rarely have an industrial tone. Science degrees have not increased much in 30 years, but we have far more people graduating with degrees in the theater arts and political science. We have more graduates in business administration, but our share of world business is lower in many industries. We need technology to remain competitive in world markets, but our engineering programs have survived mainly on the strength of a foreign student population.

**Figure 10**

Voluntary Fringe Benefits per Worker
Manufacturing Industries in 1994

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<td>Textile Mill Products</td>
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<td>Lumber &amp; Wood Products</td>
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<td>Leather &amp; Leather Products</td>
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<tr>
<td>Apparel &amp; Other Textile Products</td>
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Source: US Department of Labor, 1996

Technology is in everything, of course, so we should not suggest that industries such as snack food, public building furniture, burial vaults and greeting cards have no technology. The question is: are these industries' technological positions as defensible as aircraft and flight control systems. In some cases, our expanding industries rely heavily on technology, as is the case with drugs, medical devices and agricultural chemicals. Whether this incremental need for technology will keep pace with the employment losses we seem to be experiencing in aircraft, navigation equipment, computers, electronic components, steel making, shipbuilding and measuring and controlling devices remains to be seen. Collectively, we have lost 607,000 jobs in these industries since 1988 even though the vast downturns in steel making and shipbuilding occurred earlier. Meanwhile, we added 55,000 jobs in medical devices and drugs.

Low-tech industries have theoretical advantages stemming from transportation costs and other factors, and are important. But more important are the relationships among technology, value-added and pay. From 1988 to 1993, we added 50,000 jobs in the meat products industry at $8.49 per hour (average for the industry in 1993). We added 6,000 in the toy industry at $8.80 and 17,000 jobs in miscellaneous food at $9.51. Dairy products were better. We added 43,000 jobs at $11.66 per hour — still a long way from compensating for the 142,000 jobs we lost in aircraft at $17.24 per hour.

Conventional arguments often suggest that these changes are natural. Industries rise and fall. Industries emerge to replace those that are declining. Perhaps. However, there seems to be evidence that the replacement is taking place in other economic regions. Brazil is now a credible producer of aircraft. Malaysia is a key producer of computer components, and 70 percent of the world's disk drives are built in the tiny country of Singapore. Taiwan is now manufacturing outstanding ma...
increased machine tools, and Korea has developed as one of the world’s most technologically advanced producers of flat panel displays. With the rapid growth of scientists and engineers in other countries, we might wonder if the technological basis of U.S. prosperity will continue as it has in the past.

Increased Foreign Competition

Although total exports and imports are important at the aggregate level, there is much to be gained by examining trade balance by industry. In reality, the U.S. trade balance would look even less favorable except that the price of oil has declined and we have reduced our use of oil through our conservation efforts. In many high-value-added industries, we have suffered a substantial worsening in our trade balance. Of concern is the rapidly worsening situation in areas where we formerly did well, such as computers, telecommunications and miscellaneous manufacturing.

Our trade balance is serious enough, but it is more frightening if we examine it by category. The U.S. trade deficit on oil declined from about $70 billion in 1980 to around $50 billion in 1994. Meanwhile, during the same period, the non-oil trade balance worsened from a $50 billion surplus to a $100 billion deficit. The trade deficit on basic manufactures (paper, steel, tires, tools, etc.) mushroomed to more than $30 billion last year. For miscellaneous manufactures, such as precision instruments, apparel, watches, photographic equipment and toys, the trade deficit is $60 billion. The most alarming of these trends is the escalating trade deficit in the high value-added industries where U.S. workers have enjoyed the highest standard of living.

In some industries, such as guided missiles and farm machinery, U.S. producers enjoy worldwide prominence. In others, such as electrical industrial apparatus, shipbuilding (which is an industry that triggers other industrial activity) and metal forgings, U.S. producers are not significant. From the perspective of those interested in wages and benefits, the wrong industries are expanding. Out of a sample of 116 industries followed from 1988 to 1992, declining industries generated about 7 percent more value-added than expanding industries and paid hourly wages about 9 percent more.

The United States has lost 19.5 percent of its work force in five years in the electrical generation equipment industry — an industry where we still hold a modest, but shrinking, trade surplus. Two of our larger producers, Allis-Chalmers and Westinghouse, went bankrupt or withdrew. Though other U.S. manufacturers operate in the same industry, it is difficult to imagine how we might improve our performance on world trade if there is an insufficient supply of well-run companies capable of effectively competing internationally.

The interconnections between individual companies operating in key strategic industries are not lost on our international competitors who readily recognize the preparedness of competing companies as partial determinants of whether they elect to enter certain markets.

There is a relationship between the capabilities of individual companies and the growth or shrinkage of manufacturing employment in particular communities. Demographic, tax, utility, and supplier characteristics are all important determinants of industrial location. The quality and capabilities of individual firms participating in key strategic industries is perhaps the most important variable of all.

Prosperity is linked to presence of good companies

A close review of industrial relocation patterns suggests this conclusion: prosperity is linked to presence of good companies. The high achieving counties referenced in this report (Hinterland Highspots, Metro Movers, Beaten-path Boomtowns and Gradual Growers) greatly benefited from the presence of futuristic, investment prone, people oriented employers. It is not always true that these noble companies are engaged in high-technology industries. Their activities themselves may be quite ordinary but they perform these tasks with dignity and interest. They embody the battle cry once uttered by Ford executive Lew Veraldi when he headed new car programs for Ford during the development of the highly successful Taurus/Sable and Continental projects; “we must do common things uncommonly well.”

Sterling Livingston’s landmark Harvard Business Review article “Pygmalion in Management” captured the essential quality so prevalent in the successful companies we have today: Nucor, Merck, Medtronic, Rubbermaid, 3M and so many others. They treat their activities, and the people doing them, with dignity and that tactic sees

Labor Cost as an Industrial Location Determinant

As manufacturers struggle to remain competitive in the face of ever-increasing international competition, many are forced to consider the cost of labor as a factor in their location decision. Much has been written about this subject, often with emotion. Some people suggest that it is necessary to locate new facilities where labor cost is low. Others suggest that the wages of labor are stagnant and even decreasing and, if this trend continues, the United States will ultimately compromise its buying power, its standard of living and the viability of supporting service businesses. From the manufacturer’s perspective, the principal question is where can dependable labor be found at a reasonable cost. Labor cost indeed has domestic policy overtones and affects industrial competitiveness. A better understanding of labor cost and how it operates is pertinent to all
of these perspectives.

**Labor cost is a small percentage of total cost.**

Generally, labor cost for all U.S. manufacturing was 18.6 percent of shipments in 1992. This is the total labor cost for all people employed in manufacturing including factory labor, sales people, accountants, managers and everybody else. Factory wages consume only about 9.4 percent of total shipments - a percentage much smaller than that of materials, which was 52.3 percent. Looking at the problem another way, the average manufacturer spends about five and a half times as much money on materials as on wages to process those materials into finished products. The average U.S. manufacturer also spends as much money on other salaries as is spent on factory labor. Although factory labor is an important cost, it is not a large enough cost to account in any meaningful way for the trade deficits now being experienced by the United States. These deficits, in a large part, are often caused by other transactions -- some of which are not voluntary. External costs for such things as taxes, litigation, permitting and mandated requirements are all significant enough to be considered factors affecting the competitive position of individual firms, national trade deficits and the long-term employment prospects for individuals.

The impact of external factors on competitive position was recently examined by the renowned European management school IMD in Lausanne, Switzerland, in the recently completed World Competitiveness Report 1994, which ranked 41 nations for their effectiveness in competing internationally. The researchers examined each country on 381 variables. In part because of external factors such agriculture, basic research, the ability to attract talent from overseas, entrepreneurship, foreign investment overseas, scientists and engineers, total value-added and the availability of finance, the United States finished first overall followed by Singapore, Japan, Hong Kong, Germany and Switzerland. The final tally did not square precisely with the Executive Opinion Survey that was a part of the report that placed the United States in tenth position. Nonetheless, the report described many observable U.S. strengths. The United States also ranked close to the top of the list in other advantages, such as the use of information technology, willingness to delegate, worker motivation and living standards. Clearly, the United States is a nation with many advantages and strengths. We have much to be thankful for.

**Labor quality as a factor in trade deficits.**

The World Competitiveness Report by IMD also considered other factors where the United States did not fare so well. The United States ranked below the 25th percentile among the 41 countries on several items.

### U.S. Rankings in the IMD Competitiveness Report

<table>
<thead>
<tr>
<th>Item</th>
<th>Absolute Rank</th>
<th>Percentile Rank</th>
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</thead>
<tbody>
<tr>
<td>Lobbying by Special Interest Groups</td>
<td>32</td>
<td>24%</td>
</tr>
<tr>
<td>National Debt</td>
<td>32</td>
<td>24%</td>
</tr>
<tr>
<td>International Experience</td>
<td>34</td>
<td>20%</td>
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<tr>
<td>Attitude of the Young People</td>
<td>35</td>
<td>17%</td>
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<tr>
<td>Management Long-term Orientation</td>
<td>36</td>
<td>15%</td>
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<tr>
<td>Aids</td>
<td>39</td>
<td>7%</td>
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<tr>
<td>Managerial Constraints</td>
<td>40</td>
<td>5%</td>
</tr>
<tr>
<td>Product Liability</td>
<td>40</td>
<td>5%</td>
</tr>
<tr>
<td>Self Sufficiency in Natural Resources</td>
<td>40</td>
<td>5%</td>
</tr>
<tr>
<td>Alcohol and Drug Abuse</td>
<td>41</td>
<td>2%</td>
</tr>
<tr>
<td>Environmental Infrastructure</td>
<td>41</td>
<td>2%</td>
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<tr>
<td>Justice and Security</td>
<td>41</td>
<td>2%</td>
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</tbody>
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Neither the United States nor any other developed country has monopoly on high-quality labor. A well-respected multinational firm can recruit capable employees in many locations. Labor, like any other factors of production, must compete; and it is the responsibility of all of us to ensure that members of our society are prepared for the intense international competition that is now upon us. This means that we should strengthen our weak (but expensive) education system, take a tougher stand on alcohol and drug abuse, and do a better job of instilling the character traits necessary for responsible citizenship -- including responsible employment. The above measures might also be considered for their ability to influence industrial location.

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But it is hard to argue that labor costs are the major reason for U.S. trade deficits. Until the abrupt exchange rate changes brought on by the Asian financial crisis, direct labor has not been more costly in the United States than in other industrialized countries. For the most part, it has been much cheaper than it has been in Germany, about the same as in Japan, lower than in the Scandinavian countries, a little higher than in Korea and Singapore, and quite a bit higher than in Mexico. But with respect to most of our competitors, we have been on par in terms of labor cost or in a preferred position. Per hour labor cost is not in and of itself a major reason for the shift to offshore manufacturing. Although labor cost is important, it is not the overriding factor in our nation's inability to compete. In a nation of more than 260 million people, about 16 million are employed in direct labor in manufacturing, construction and mining with a combined payroll of around $500 billion per year out of a gross domestic product of seven trillion. This is hardly the group to blame for the worsening trade deficits of the United States. As recently as 1993, about 85 percent of our non-oil trade deficit was accumulated with countries having higher production wages than we have in the United States.

The quality of labor is an important variable in industrial location but it is available in many places. Major companies can get high-quality labor in such places as Taiwan, Singapore, Mexico, Malaysia, Puerto Rico or Spain -- in part because respected international companies are often perceived to be attractive employers and therefore have little difficulty attracting the talent they seek. Highly competent people live in many places throughout the world. When plants are transferred to offshore locations, the quality of labor may actually improve.

Variations among industries are substantial.

The cost of labor is much more significant in some industries than others, however. Factory labor does not constitute a major cost in our capital-intensive industries such as petroleum and chemicals where it is usually less than 5 percent of the value of shipments. It is more significant in textiles, apparel, furniture, plastics, glass and fabricated metals where factory wages range from 13.2 to 15.5 percent of shipments. Even here, other cost items are more expensive. Materials average about 49 percent of shipments in these industries -- about three and one half times factory wages. Interestingly, with the exception of plastics, these industries have been experiencing intense pressure from imports and collectively the U.S. lost 480,000 jobs in these industries between 1987 and 1992.

Does this mean that we cannot compete as a nation if factory labor rises above 13 percent? It will be helpful to answer this question if we look more at individual industries and the variation we have among the companies competing in these industries.

The plastics industry is an industry with many capable firms -- often small, but professional ones. Both the plastics industry and the textile industry spend the same percentage of shipment value on factory wages, 13.21 percent. But, the plastics industry spends $1,676 more on capital equipment per year for each employee ($5,285 vs. $3,609 in 1992). The apparel industry spends about 15 percent of the value of shipments on factory labor, but only $969 on capital expenditures per employee -- about 18 percent of what is spent in the plastics industry. We see this same problem repeatedly: when poorly performing firms do not invest, the country suffers an erosion of its competitive position. In industries where capital expenditures per employee are low, in textiles, apparel, miscellaneous manufacturing, electrical equipment, fabricated metals and leather, we have been losing ground. In contrast, capital expenditures have been high in chemical and paper, and we have suffered no significant inroads from foreign competition.

Trade deficits and industrial migration are company related.

One of the sad conclusions one must inevitably make is that much of our unfavorable trade balance is company related. Our trade deficit often accumulates because we have poorly performing and poorly managed companies competing internationally in key strategic industries. Their dominant position in this country usually reflects history -- these companies were better run at other times. But, during the past 20 years or so, substandard companies have been the largest U.S. participants in most of the industries where the United States has lost ground. It isn't that we cannot make shoes in the United States; it is that we did not have leading shoe companies that understood manufacturing, though Minnesota based Red Wing Shoe and Wisconsin based Mason Shoe may be rare exceptions. It can also be said that Westinghouse played a role in the slipping U.S. position in electrical equipment and that Bethlehem's and LTV both contributed to the shrinkage of the US steel industry. There are other examples.

Shouldn't we wonder what might be possible? Why can't we make more shoes here? Unemployment is still high in some areas. It isn't that we do not know how to make shoes. The shoe industry has been operated with a losing mentality -- practically no capital investment, older plants and outmoded methods. Yet factory labor costs are around $2.70 per pair of shoes. Maybe costs could be cut by $2 per pair by moving production overseas -- maybe. However, if the plastics, chemical or paper industries operated the same way, we would have trade deficits in those industries as well. We do not have deficits in these industries because chemicals, paper and plastics all use methods that are vastly superior to those in use by U.S. shoe manufacturers. We've been losing about 4,000 jobs per year in the U.S. shoe industry because the companies involved have elected not to compete -- in much the same way that Bethlehem and LTV elected not to compete in steel and Westinghouse elected not to compete in electrical equipment.
On the other hand, Nucor Steel, also a U.S. company, is one of the most technologically advanced steel producers in the world. Nucor has modern methods, good teamwork, excellent management and heavy investment. Although the company is only about half the size of Bethlehem and LTV, it typically earns a great deal more money. What Nucor has done for steel might serve as a role model for other industries. If we had more companies like Nucor, we could build shoes, electrical equipment, television sets, VCRs and a variety of other products in the United States without great fear of imports. But we will have to fear imports if mediocre companies continue to use archaic methods.

Within any community, there are companies that are well equipped and modern. They invest heavily in their people and in their physical plants. But there are not enough of these companies to sustain the U.S. standard of living as we know it. We have too many companies that still operate in ways that will not ensure survival in the future. Warner-Swasey cam-operated chuckers were good machines for the 1960s, but they won't make much money for people currently or in the years ahead.

This essential relationship between the company and the destiny of the community and the country is of unmistakable importance. Too often, we attempt to achieve progress through broad policies. Often, however, individual companies are not equipped to face international competition nor are they emotionally prepared to make the improvements necessary to compete effectively. Yet, in local instance after local instance, there is evidence suggesting that when the companies are healthy, the community and the nation are healthy. When they are not healthy, the entire community suffers.

Attempts to make the company an instrument of social justice have not been successful in the United States or other countries. However, at the same time, this linkage between healthy well-run companies and community prosperity seems underexplored.

### Recessions as Competitiveness Clarifiers

Recessions seriously affect the financial condition of marginal firms in four ways. First, the actual decline in orders received reduces revenue proportionately (less business). Second, competing firms may reduce prices to attain sufficient business resulting in lower prices for the sales that are made (lower-priced business). Third, the reduced quantities of units produced may result in higher overhead absorption per unit sold (higher-cost business). Fourth, generally pinched financial conditions may impede the willingness or ability to make capital expenditures that will improve quality and lower cost (reduced capability to get business).

This fourfold combination of less business, lower-priced business, higher-cost business and reduced capability to get business always proves lethal if not corrected. The declines may not be apparent, but every moment that goes by, the declining firm becomes marginally weaker. In accordance with Zimmerman's study of troubled companies (1988 and 1991), the shipping firm usually sustains only modest losses -- perhaps 1 percent per year. But unless the trends are interrupted, recessions bring great distress to the financial statements of less-competitive firms. Allis-Chalmers and International Harvester provide good examples. Both International Harvester and Allis-Chalmers provide sobering examples of how seemingly large vibrant firms can fall prey to competitive pressures in only a few short years. Recessions do not cause industrial failure; they only exacerbate weaknesses that were there all along. Unfortunately, for the communities involved, many individual companies and plant operations are unsuitably prepared for the competitive positions we have before us.

### Economies-of-scale Revisited

Much of what is happening to U.S. and foreign manufacturing is a result of changes in the ways we accomplish economies-of-scale, which we are accomplishing differently than we did 50 years ago. Alfred Chandler's great works on this subject, including *Strategy and Structure*, *The Visible Hand*, and *Scale and Scope*, add much to our understanding of how important cost is as a determinant of both business strategy and the evolution of industry. There was a time when the consolidation of operations within an existing firm could reduce or eliminate the implicit supplier profit that was ultimately passed on to the customers in the form of price. But during the last 20 years or so, profit rates in the United States have declined substantially to about five-eighths (5/8) of what they were in the 1970s so there are fewer profits to be concerned about. At the same time, large corporations have found that it is difficult for them to respond quickly to changes in market preferences and the need for process investment. The three major U.S. auto companies provide interesting testimonials to the existence of diseconomies-of-scale. General Motors is by far the most vertically integrated; Ford is second; and Chrysler is third, yet has operated with the highest margins in most recent years. It is GM that has had the most severe profit problems in the past 15 years, although the company has been improving, and the most severe labor problems. One of the ways GM is attempting to improve is to become less vertically integrated -- a matter of concern to the United Auto Workers.

During the past quarter century, there have been many approaches aimed at reducing the cost of manufacturing labor. One approach is to aim directly at organized labor and seek concessions so employers may procure the same activities at lower costs. In the main these efforts have not been successful, although International Harvester and other manufacturers have tried. The reason they have not been successful is in part due to the caliber of management asking for the concessions. It is also due to the inherent difficulty in reducing product cost through the reduction of labor alone. In U.S. manufacturing generally, labor accounts for about 18.4 percent of the revenue. Direct labor on the production line accounts for about 9 percent. Thus, if all of the direct labor worked for free the maximum savings would be something in the order of 9 percent of revenue. The feasible cost savings achievable with the cost of labor approach are probably limited to a few percentage
points of revenue. That is usually not adequate to turn a noncompetitive activity into a competitive one if other steps are not taken.

A much more financially rewarding way of achieving savings has been to gradually outsource an increasing portion of the production of modular components to suppliers who can more effectively manage the process and make the appropriate investments so that the process can be accomplished at the lowest total cost. This doesn’t always work; but the fact that it often does work is altering the manufacturing landscape across the country and creating concern among employees and labor groups.

Deere and Company provides an example of how this can be accomplished. Deere has long been one of the most efficient and lower-cost producers in the United States and is perhaps the most efficient in its industry in the world. It could not be argued convincingly that the company has a “cost problem.” However, the farm equipment industry is likely to have competition from many sources: from emerging producers in Asia who are likely to be capable in offering products at low cost, from resurrected companies in Eastern Europe, and from reconstituted producers in this country, such as AGCO. What is not a cost problem to Deere today might very well become a serious cost problem 15 or 20 years hence. Yet, Deere has long had a wholesome relationship with its union, the United Auto Workers — an organization certainly informed about the same economic and industrial trends that Deere observes. The unions may need to resist certain trends, but it cannot be assumed that they do not understand them.

In general, it is difficult for the union to accept major and abrupt changes such as the closing of plants and the outsourcing of production on a major scale. But it is not quite so difficult to incrementally agree to a slightly changed formula where the outsourcing of specific components or subassemblies is permitted in return for long-term job stability for the workers who are presently employed. Measured in quarters or years, this trend is almost imperceptible; but measured in decades it is quite pronounced.

In summary, labor cost is important but not causal. Management, methods, investment, teamwork, labor quality, governmental efficiency and cooperation are all super-important, and it is in these areas where we all have to examine our performance. Many of our companies are out-of-date technically and are reluctant to invest. Our government is too big, in many ways ineffective and, in some cases, a barrier to progress. Our school system has become an international embarrassment. Our young people need to cultivate stronger character traits. Cooperation among management, labor and government can be improved. We should recognize the interconnections between what happens at home, in families, in schools and on the social front, and labor quality. These forces do add to or detract from our reputation as a favorable location for manufacturing.

The Delusion of Prosperity

The problem with a shrinking competitive position is that it tends not to be apparent when the economy is robust. Wages are higher, sales are modestly higher and productivity gains have been achieved through subtraction -- by cutting employees in relation to revenue and work levels. Declining levels of capital expenditures are not immediately apparent and, on the surface, things appear to be going on much as they were. At some point, however, the firms and their communities must grapple with their declining competitive positions. This may not happen until the arrival of a recession or it may not happen at all.

Perhaps we can continue to enjoy prosperity with the dramatic shrinkages in industrial output experienced by our historically industrial regions but it is difficult to see how. Poverty rates, divorce rates, the number of children born to women under twenty years of age, per-capita income, city taxes -- all these seem to worsen as manufacturing declines. It is unclear, of course, what is driving these changes. Does the loss of manufacturing spawn social problems or do social problems repel manufacturers? We do not know, but there is considerable evidence that the two trends are coincident.

Though Minnesota has not yet experienced the full impact of declining manufacturing, we should not conclude that these trends are not on the way. Even within Minnesota, we are witnessing the sharp decline of manufacturing in urban areas -- even suburban areas. Hennepin County, vast as it is, is losing manufacturing employment. As is the case with any other skill, manufacturing must constantly renew itself. New equipment, new training and other forms of revitalization are constantly needed for any manufacturing center to retain its edge in this highly competitive world.

But, this renewal is not singularly the responsibility of the industrial sector. We all have a stake in it. In order to compete industrially, those of us in education will have to teach better and more cost effectively. Those of us in law will need to incorporate more justice in what we do and less opportunism. Those of us in government will need to become more innovative and find ways to deliver services more efficiently. Those of us in utilities and transpiration must do the same. Manufacturers, of course, must begin it all by operating efficiently and appropriately. We can begin by paying our executives more realistically and less ostentatiously. We are all in this together and we must find ways of working together to improve our competitive position or we will inevitably suffer the same spiraling downturn that is currently plaguing some of the Eastern states.

From a political perspective, there is a great incentive. Good manufacturing helps lower taxes. Perhaps there are higher goals but the arithmetic relationship is quite clear. Taxes become very high when the industrial base disappears, as Figure 11 illustrates with each marker indicating the tax and manufacturing employment situation of a major US city.
Industrial Health and Community Prosperity

It remains to be seen if the initiatives emerging from the recent welfare debate will be meaningful over the long term. Half of all U.S. AFDC recipients reside in 72 of the nation’s 3,144 counties. About 10 percent are in two counties – Los Angeles, Calif., and Kings County (Brooklyn), N.Y. These 72 counties lost 480,000 manufacturing jobs in 15 years (from 1972 to 1987) and have suffered more declines in recent years. Brooklyn lost 88,000 manufacturing jobs – about one third of the total. Cook County (Chicago) lost a quarter of a million jobs. Cuyahoga County (Cleveland) lost 70,800, Wayne County (Detroit) 123,000, and Philadelphia 107,000.

We know from studies conducted by the Economic Policy Institute, the Department of Commerce and other organizations that the multiplier effect of manufacturing jobs is several times higher than it is for jobs in either services or in retail trade. If we gain 50,000 new manufacturing jobs, another 150,000 other jobs are created -- versus 40,000 to 60,000 additional jobs if we add employees in the services or trade. But the multiplier is bi-directional. If we lose 50,000 manufacturing jobs, the decline of support and service industries soon follows.

Some people suggest that we now have an economy so robust that companies cannot find enough workers. In a way, this is true, particularly in more dispersed manufacturing centers like Hutchinson, Minn., Sioux Falls, S.D., or Forest City, Iowa, where sheer population numbers limit hiring during high points of the business cycle. But it isn’t as true in inner cities where unemployment is still a problem. Unemployment in many urban counties has approached 10 percent during one of the best economic periods in the history of the nation. Unofficial unemployment is, of course, much higher.

Within this framework of a robust economic period where the United States has, to some degree, benefited from its relative stability compared to some other emerging nations, the US has become the world’s largest debtor. Perhaps we can go on for a very long time letting our industry erode while borrowing more money to import what we seem unwilling to produce, but it is hard to see how this situation can be offered as a workable scenario for the long term. Sociologists and others will be better equipped to weigh the advantages and liabilities of a waning industrial base. My purpose here is not to suggest that US manufacturing has disappeared or that it will disappear in the near future. My purpose is to suggest that it is weaker than it might appear, that our industrial presence has lessened in some very important industries, and that these declines are affecting some communities with a vengeance.
Nonetheless, some communities cope and adapt better than others. The primary reason why some of them not only cope but excel is because good companies are located in these communities. The quality, energy and willingness to invest on the part of enlightened companies are the principal strategic attributes of successful communities. Policy initiatives that support the attainment of these important strategic attributes are clearly to the communities’ advantage but there may be other policy initiatives worth exploring.

Figure 12

Capital Expenditures and Annual Pay

<table>
<thead>
<tr>
<th>Cap Exp in $000 per Employee per Year</th>
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</thead>
<tbody>
<tr>
<td>$60,000</td>
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<tr>
<td>$50,000</td>
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<tr>
<td>$40,000</td>
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<td>$20,000</td>
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<td>$10,000</td>
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Ref: US Census of Manufacturers, 1992

Does Public Policy Matter?

One of the most pressing questions about the relocation of industry is whether or not it can or should be influenced by public policy. This is not an easy question, in part because the question itself involves value judgments. The question is difficult also because the statistical evidence is not universally conclusive. However, there are interesting observations on the role and effectiveness of public policy that can be made based on the information provided in this study. Importantly, however, public policy has to be evaluated for its effectiveness at different levels within our society. A policy that may benefit a specific community may not be at all effective in the aggregate. These observations have been made cogently by Art Rolnick and others who deplore the “war between the states” on industrial relocation incentives.

When discussing the impact of public policy on industrial relocation, we have to recognize that not all industrial movement can be assigned a probable cause — at least not a probable cause that can be identified scientifically. Industrial location is often influenced by spurious random events that have little to do with economics. The major plant of AgChem, for instance, is located in Jackson, Minn., mostly because a friend of the founder had unused factory capacity there. Over the years, AgChem has grown and prospered in that same location. Jackson is remote from major suppliers, not particularly proximate to major customers, has no major air service, and is not close to a major university which would be of major benefit to such a technologically driven company. Yet, AgChem has survived and prospered in Jackson, and Jackson has survived and prospered because of AgChem. There are countless other examples in communities across the United States.

There are a few examples of how manufacturing has come to be located in communities because of personal preferences on the part of people involved with the company. Some companies have plants in Colorado because people like to ski or plants in Florida because people like warmer weather during the winter. These are exceptions, however, and in the final
analysis, the location of manufacturing is scientific and economically driven -- cost, quality, efficiency and the supplier base all matter. Along the way to optimality, however, decades may pass where the location of industry is influenced by a variety of other, sometimes quite unrelated, factors.

Yet, there are credible instances where public policy has affected industrial relocation decisions, and where the relocating industries have stimulated ancillary economic growth for their communities. An example might be the relocation of automotive assembly to communities in Tennessee. Some people may argue that the costs of the incentives provided to the companies were too high. Others may argue that the manufacturing employment merely shifted from another community that may have needed the employment even more. Both of these arguments need to be considered and each has validity. Nonetheless, the economy of Tennessee is prospering and the manufacturing employment gains experienced in the communities surrounding some of the plants are very substantial.

To deal with the question, does public policy matter, we must first explore to what degree can industry be attracted.

**Can Industry be Attracted?**

Nobody likes to see local industry decline, and so public officials frequently respond to declining industrial employment in ways that may not be helpful in the long term. Industrial development commissions at the state, community, county, region and metropolitan levels are frequently set up to attract new industry from other areas. Often they are armed with expensive publicly supported programs to train workers, build buildings and provide financing for capital equipment for manufacturers interested in locating in the communities involved. Are these programs effective? Do they make a difference? These considerations get back to the fundamental question of whether or not industry can be attracted.

In some cases, sometimes fairly significant cases, industry **will** be attracted. Examples include the attraction of the Nissan and Saturn plants to Tennessee, the Toyota plant to Kentucky or the Mercedes-Benz plant to northern Alabama. Investments in North America, particularly on the part of offshore industrial companies, have been growing and indeed it might be argued that US industrial expansion might not amount to very much were it not for the massive foreign investments into states like Kentucky, Tennessee and Indiana. Given that these newcomers are going to locate someplace, industry may be attracted. Whether the industry attracted is worth the cost of the attracting is still a question worthy of analysis and discussion. But there are instances where new industries, moving in from an entirely different geographic area, have added to both local manufacturing employment and local economic vitality. Toyota employs 6600 people in its Georgetown Kentucky plant just as Honda employs over 12,000 people in Ohio and Nissan employs 6600 people in Tennessee. Toyota will soon move into a highly automated truck plant in Evansville, Indiana which may soon compete with the 73 year old Ford plant Minnesota has in St. Paul. Mercedes-Benz is now producing vehicles in northern Alabama. Foreign investment in key strategic industries has been very substantial -- especially when compared to offerings by some US producers.

Yet, there are other instances where expansion has taken place without the influence of public policy. Industry grew naturally, sometimes almost as happenstance -- because of where the company started out or because of unrelated connections between the company and a new community. 3M's expansion in Minnesota grew quite independent of public policy. In some cases, given the tax and cost situations in particular communities, expansion in a home community was less advantageous to the firm than selected expansion of selected manufacturing operations in new communities. Still, the expansion took place.

A host of economic factors influence the industrial location decision. Most of these are not influenced by public policy -- at least they are not influenced very much. Examples of compelling, overriding economic factors in the location decision might be a concentration of petroleum processing in Louisiana or the location of auto parts manufacturing east of the Mississippi River and north of the Ohio River. Nucor put a steel plant in Crawfordsville, Indiana largely because 47 percent of the cold-rolled sheet steel is consumed in Indiana and four nearby states. Though taxes and incentives are of interest to companies, this interest does not override other factors more central to the existence of the businesses.

Included in these compelling economic factors influencing location is the phenomenon of complementary process swarming. Complimentary process swarming occurs when industries or companies perform manufacturing processes that are integral and essential to other industries. An example might be Minnesota's relatively strong position as a supplier to the aerospace and aircraft industries. Kurt Manufacturing machines the parts from castings produced by Hitchcock Industries or Progress Castings, which will be installed on planes where the tooling for the composite lay-up is provided by another Minnesota company, Remmele. We may never understand exactly how this started and we should not assume that more effective complementary process swarming will not surface at other locations at a different time. In the meantime, the competitive edge provided by the geographic proximity of complementary industrial companies certainly helps communities where it exists. Over the long term, these trends tend to favor individual companies who invest heavily, work groups that are cost effective and of high quality, and personal associations over formal development programs.

**Frugality as a Policy Objective**

Policy is of interest, however, and one fairly basic question that is often discussed is how much should the public sector spend to perform its functions. This study will not explore this question but we do wish to examine the differences that
presently exist between states in this regard. One measure that is of some interest is public payroll per capita within each state. Minnesota spent $1,881 of public payroll dollars per man, woman and child in the state in 1996. These are only state and local salaries, not federal salaries occurring in the same state. Minnesota is fairly high in this regard, sixth highest of all states excluding DC and Alaska which have are special cases. Iowa spent $1,731, Wisconsin $1,744, Indiana $1,487 and Tennessee $1,353 (Figure 13). Iowa and Wisconsin spent 8 percent less than Minnesota, Indiana 21 percent less and Tennessee and South Dakota 28 percent less. In its spending on public payroll, Minnesota ranks with heavily spending eastern states such as New York, New Jersey and Connecticut -- all of which are losing their manufacturing bases at frightening rates.

Figure 13

Public Employment Payroll per Capita
1996 State & Local Government by State

Who knows if Minnesota’s spending for public payroll is worthwhile. The only thing that this study will suggest is that Minnesota is spending more than states where manufacturing is expanding and about the same as where it is not. The problem with this situation is that everybody knows it. A telling remark was relayed to us by an executive with a highly successful company which considered, but then rejected, the possibility of a Minnesota manufacturing plant.

“We pay very little attention to taxes because taxes can change. But, we pay a great deal of attention to spending. We have all of this modeled on our computer.”

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Nagging Questions about Industrial Relocation

This report on the relocation of industry is intended to be descriptive rather than prescriptive. However, there are some nagging questions which deserve serious further inquiry. Perhaps some of the material presented here will be useful in addressing these questions, but there is much other usable research which might also be helpful. Our intention here is to offer a starting point for further discussion.

Is the economy we are building for the future viable in the long term?

Is the post industrial economy socially doable over long periods? Given the escalating trade deficits and our current position as the world’s largest debtor, it is hard to see how. Surely the economy we are building is not helpful to core cities. If there is a way where the post industrial economy can work, those who advocate it have a responsibility to report to the rest of the society exactly how this is all supposed to work and how it will treat certain winning and losing groups. Perhaps we could say that markets are at work and that not much can be done to save a Philadelphia or a Brooklyn or, ultimately, a Minneapolis. It may be true that many of these cities, with their high government payrolls, high crime and ineffective systems, have priced themselves out of the modern industrial economy and there is not much that can be done to alter these powerful economic trends. If that is true, then it would seem to make more sense to reduce the available subsidies to hasten the transition to more promising regions, many of which are short of people. We won’t answer this question here but we hope this study of industrial relocation will provide material that will be meaningful to the discussion.

Figure 14

Manufacturing Employment as a % of Non-ag Civilian Employment

![Graph showing manufacturing employment as a percentage of non-agricultural civilian employment.](image)

Ref: Economic Report of the President - 1997

Should we welcome more qualified immigrants?

There is a shortage of qualified manufacturing talent available in Minnesota and, as we look ahead, the availability of qualified workers looks even slimmer. Yet, there are millions of highly qualified and willing people who would like to leave the turmoil in their present countries and move to the United States. The fine people attending graduate and undergraduate schools in the US provide an indication of what talent is available from overseas. Perhaps it would be in our very best interests to encourage immigration more than we do.

Can anything be done to make core cities more attractive to industry?

This question is beyond the scope of this report but it seems to this author to be an imperative question. If for no reason other than fiscal viability, it seems unlikely that the major cities of the United States will be able to survive with the long gradual exodus of manufacturing that so many of them are now experiencing — even during good times. In order for manufacturers to be attracted core cities so many things would have to change. The attracting forces outlined in Section IV will have to become more compelling than the repelling forces. Whether these major changes can be politically accom-
Will the smaller communities be able to progress further?
It depends upon the companies and, to some extent, on labor availability. Perhaps, in our formation of policy initiatives, we have ignored the role and importance of the corporation. Perhaps we should appreciate the corporations more and then expect more exemplary citizenry -- as Europe has done. There are many excellent companies and some that are not very well run at all. We should not group them together. We may find it fitting to cooperate effectively with the better companies.

Can the US compete?
You bet. Our study focuses on 129 counties that are competing just fine and then draws contrasts with the 81 that are not. Ironically, many of these successful counties operate with the same state laws, the same taxes and the same regulations as some of the unsuccessful counties in the same state. It seems significant that fully nineteen states had counties that ended up in both the successful and unsuccessful groups. Competing internationally is not impossible but it requires the cooperation of enlighten companies working within the framework of sound public policy. Many of the losing counties have neither of these attributes but instead have mediocre or poorly run companies trying to coexist with destructive policies.

Do we focus enough attention on local expansion?
A critical review of Minnesota’s industrial history suggests that Minnesota is fairly good at fostering new companies but not so good in capturing their expansion as they develop and grow. We do not have a disaster but Minnesota does not have robust growth. Over long periods of time, Minnesota has medium growth and some of it is lower value-added industries. Should we reduce the number of state sponsored industrial development and technology assistance programs and make them more available to companies presently in Minnesota?

Do we concentrate enough on the supplier base?
Perhaps we should aim the few development programs that remain at strengthening the supplier base for existing companies. As an in industrial society, we have given too little attention to the linkages between manufacturing operations. It should be recognized that if our foundries close, the machine shops that finish the castings also are jeopardized, and that a base of strong suppliers is essential in order for our end-product producers to expand. Chrysler Corporation and the Ford Motor Company have emerged as powerful automobile producers in recent years in part because of the competence of their suppliers, but our public programs and economic policies do not consider what supplier networks are necessary to major producers in order to compete in world markets.

Is there any guarantee that successful counties will continue to do well?
No, there isn’t. Constant adaptation is necessary for any company and any community to remain competitive over long periods. Some of the Hinterland Highspots, in particular, have their destinies in the hands of a few major employers -- often in the same industry. Structural changes could impact these industries and hence the companies and the communities. Changes in the disk drive industry, for instance, could severely impact a Minnesota Hinterland Highspot, McLeod County. But, many of these companies and communities have been able to adapt in the past, however, and perhaps they will again in the future.

Looking Forward
Industry is relocating. The pace is slow and sporadic but the leading indicators are always clear -- slackening capital investment, reduced training, shrinkage in the number or fraction of production workers, land acquisition problems, labor troubles initiated by either side, technological obsolescence, unenlightened management, the misapplication of individual effort, governmental ineptitude and financial humbuggery. We can avoid the problem of a shrinking industrial base if we wish but we will have to work together. Improvement is possible, as the successful counties have demonstrated. But success is not guaranteed as the unsuccessful counties have been able to prove.
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