INDICATORS OF SUSTAINABLE COMPETITIVENESS
SAN DIEGO REGION
June 14, 2002

**To the Citizens of the San Diego Region:**

Building a region in which environmental quality, social justice, and economic vitality are balanced in a sustained fashion requires a rare combination of long-range foresight and short-term adaptability.

Continuation of the status quo, on the other hand, will likely diminish the region's quality of life, undercut its economic competitiveness and put our region at risk.

We are beginning to realize that our success is no longer guaranteed and that a new, regional comprehensive plan for the future of the region should not be just about managing growth that is inevitable, but also about finding ways to provide new opportunities that are uncertain. Two examples, directing public and private resources to support infrastructure that would create the middle income jobs needed to increase our standard of living and, local and state policies that would encourage actions to increase the supply of housing making homes more affordable to the middle income households. If we do not act boldly to create new opportunities that are available to a broad range of residents, our quality of life will surely deteriorate, for our region, our communities and our families.

This report – unprecedented in our region and, we believe, the first of its kind anywhere – is the initial step in a different way for our region to evaluate itself in three broad areas: the economy, the environment and equity. These three areas are inextricably linked and work synergistically to affect the quality of life in a region. Although improvements can and should be made in all three “Es”, for San Diego, this report shows that, for San Diego, we have our work cut out for us in the area of equity. Our region is at a competitive disadvantage in the areas that define equity, including housing affordability, income distribution, traffic congestion and early childhood education. In addition, the outlook for these equity areas is not good, suggesting we likely will not see any near term improvement if we continue with a business as usual attitude.

One of the primary goals of the Index is to act as a spark, igniting the political will and momentum necessary to move forward with initiatives to improve the region. To accomplish this task, the Index will be expanded and updated periodically.

Our committee was concerned that highlighting problems and putting the region on notice would not be enough to sustain the will and momentum necessary to implement change. What is needed – and what this Sustainable Competitiveness Index provides – is a way of measuring our progress – or lack of progress – in solving problems on a broad front. The Index can be used as a tool to keep the region’s focus balanced and moving forward. The committee also felt that, while external benchmarking against comparable regions is important, evaluating internal goals and objectives is equally as important. This document is a work in progress: as we are able to identify reliable measures of competitiveness against other regions, we will add them. As we identify new measures of performance for our own region, we will add them as well, and incorporate them into our work on the SANDAG Regional Comprehensive Plan.

We would like to thank all of the committee members and other contributors for their participation, for understanding the urgency of these issues and for their support of this endeavor. To move forward from here, a broad coalition of leaders must continue to support these efforts—financially, intellectually and personally. We urge all concerned citizens to join together and act on the critical issues discussed in this report and to participate in the creation the Regional Comprehensive Plan.

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Mayor, City of Poway,  
Co-Chair, Sustainable Competitiveness Index Advisory Committee

**Julie Meier Wright**  
President & CEO, San Diego Regional Economic Development Corporation,  
Co-Chair, Sustainable Competitiveness Index Advisory Committee
The 18 cities and county government are SANDAG serving as the forum for regional decision-making. The Association builds consensus, makes strategic plans, obtains and allocates resources, and provides information on a broad range of topics pertinent to the region’s quality of life.

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Revised May 6, 2002
ABSTRACT

TITLE: San Diego's Indicators of Sustainable Competitiveness

AUTHORS: San Diego Association of Governments in collaboration with the San Diego Regional Economic Development Corporation

SUBJECT: An Index and indicators to monitor and measure San Diego's ability to compete with other domestic metropolitan regions.

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ABSTRACT: The Indicators of Sustainable Competitiveness study is organized into three main sections:

• **Sustainable Competitiveness Index**—benchmarks our performance against 20 regional competitors and the nation in three broad areas – the economy, the environment and equity. The Index uses a focused set of indicators to determine if our competitive position is sustainable.

• **Monitoring Our Progress**—broader than the Index, this section provides an in-depth analysis of all indicators in the Index plus other indicators to provide greater insights into the San Diego region. In order to benchmark our performance against 20 regional competitors and the nation in three broad areas [the economy, the environment, and equity] three questions are asked: How are we doing? How do we compare? and, Have we improved?

• **Technological Innovation** – employs the use of data on patents to identify the sources and capacity of innovation in our economy that are responsible for helping sustain our competitiveness, improve our productivity, and provide opportunities for prosperity.
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Executive Summary

The paradigm governing national and international competitiveness has shifted in the last several decades. Competitiveness can no longer be evaluated solely on its economic elements, such as natural resources, access to labor, economies of scale and historical market position. Today, competitiveness is multi-dimensional. What determines competitiveness is the potential for a region to achieve sustained success in three broad areas: the Economy, the Environment and Equity.

After all, most residents would agree that livability or quality of life is the glue that holds this region together. Livability is a composite of the quality of the natural environment, the working environment, and the cultural, educational, recreational and other opportunities that are available to citizens to enhance their working and leisure time. These elements interact synergistically to make a region livable.

Helping local leaders evaluate our competitiveness and whether it is sustainable is what this study is all about. The San Diego Association of Governments and the Regional Economic Development Corporation, working together with the Competitiveness Index Advisory Committee, produced this study to provide a reliable and timely source of information that evaluates and monitors our regional progress in many areas that help to determine our region’s livability.

To accomplish this task, the Indicators study uses a variety of regional indicators to chart our progress, or lack of it, in three main areas: the Economy, the Environment and Equity. In charting our progress, the Indicators study provides information that San Diego residents can use to bring about positive change in their communities and our region. In this way, the Indicators study provides a powerful catalyst for forward thinking and collaborative action.

The Indicators of Sustainable Competitiveness study is organized into three main sections:

- **Sustainable Competitiveness Index**—benchmarks our performance against 20 regional competitors and the nation in three broad areas - the economy, the environment and equity. The Index uses a focused set of indicators to determine if our competitive position is sustainable.

- **Monitoring Our Progress**—broader than the Index, this section provides an in-depth analysis of all indicators in the Index plus other indicators to provide greater insights into the San Diego region. In order to benchmark our performance against 20 regional competitors and the nation in three broad areas [the economy, the environment, and equity] three questions are asked: How are we doing? How do we compare? and, Have we improved?

- **Technological Innovation**—employs the use of data on patents to identify the sources and capacity of innovation in our economy that are responsible for helping sustain our competitiveness, improve our productivity, and provide opportunities for prosperity.

**Sustainable Competitiveness Index**

Sustainable Competitiveness measures a region’s ability to maintain the human resources necessary to sustain economic prosperity balanced with improved social equity and the preservation of environmental quality.

One fundamental role of the Sustainable Competitiveness Index is to develop a consensus on the essential elements of a sustainable and competitive region. A second role of the Index is to help us move beyond the misconception that there is an internal conflict between our economic, environmental and social equity goals. All these work synergistically to improve the region. And a third role is to act as a spark, igniting the political will and momentum necessary to move forward with initiatives to improve the region.
The Index has three essential elements – one for the economy, one for the environment and one for equity. Each element has between three and five components where each component has one to three indicators. Many indicators are available for the Index; however, the 18 indicators listed in Figure 1 are selected because they provide the key information for each of the three elements. Adding more indicators would dilute the results of the Index without adding additional value.

**Figure 1**

**Sustainable Competitiveness Index Elements**

<table>
<thead>
<tr>
<th>Economic Element</th>
<th>Environment Element</th>
<th>Equity Element</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Standard of Living</strong></td>
<td><strong>1. Air Quality</strong></td>
<td><strong>1. Income Distribution</strong></td>
</tr>
<tr>
<td>• Real Per Capita Income</td>
<td>• Number of days not meeting EPA standards</td>
<td>• Ratio of average to median household income</td>
</tr>
<tr>
<td><strong>2. Business Investment</strong></td>
<td><strong>2. Water Quality</strong></td>
<td><strong>3. Capital Facilities Investment</strong></td>
</tr>
<tr>
<td>• Venture Capital Share of GMP</td>
<td>• US EPA Index of Watershed Indicators</td>
<td>• Capital Outlays on Mass Transit</td>
</tr>
<tr>
<td>• IPO funds as a share of GMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. Capital Facilities Investment</strong></td>
<td><strong>4. Transportation</strong></td>
<td><strong>5. Level of Educational Attainment for those 25 years of age and older</strong></td>
</tr>
<tr>
<td>• Capital Outlays on Air Transport</td>
<td>• Average Commute Time</td>
<td>• Percent of children aged 3-4 enrolled in preschool or nursery school</td>
</tr>
<tr>
<td>• Capital Outlays on Sea &amp; Inland Ports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Capital Outlays on Highways</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4. Innovation</strong></td>
<td></td>
<td><strong>5. Education</strong></td>
</tr>
<tr>
<td>• Patents per million population</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>5. Education</strong></td>
<td></td>
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</tr>
</tbody>
</table>

The indicators provide snapshots of essential items today [air quality, real per capita income, housing opportunity] as well as a “forward looking” perspective [patents, Venture Capital, Initial Public Offerings, Capital Facilities Investments by government]. The “forward looking” indicators will have their biggest impact in the future. For example, governmental capital outlays on air transport will impact the ability of the region to move people and material in and out of a region for decades to come. Thus, the Index incorporates dynamic aspects into its formulation as 61% of the indicators [11 of the 18] have a future impact. If the Index did not have forward looking indicators, it would provide a static evaluation which would overlook whether a region’s position is sustainable over time.

The method of compiling the index is based on rank ordering the data. For example, real per capita income for the 21 regions and the US are rank ordered from the highest income to the lowest income. The region with the highest per capita income is ranked 1st [best] and the region with the lowest income is ranked 22nd [worst]. This ranking is done for each component of an element. Since scores are based on rank, where lower rank numbers indicate better performance, the lowest overall score is best. In the Economic Element, the best possible score would be 5 [rank 1st for all five components] and the worst score would be 110 [ranked 22nd for all five components].

1 The element scores are the sum of the rank ordering of the element’s components. For the Economic Element there are five components, for the Environment Element there are three components and for the Equity Element there are five components. Because each element has a different number of components, the element scores are multiplied by a factor to insure each element has the same weight.
This process is duplicated for each element. It is possible that a region could perform quite well in two elements but poorly in the third element. This unbalanced condition would likely not be sustainable and we add the Balance Element\(^2\) to account for the interdependence of all three elements. However, further research needs to be undertaken to verify our hypothesis of balance and sustainability.

To compute a region’s Sustainable Index score, the rank order for each of the four elements is added. All 21 of the region’s summed Index scores and the US scores are then rank ordered from the lowest total [best] to the highest total [worst] to obtain the overall leader for the Sustainable Competitiveness Index. All of these computations are found in the appendix.

Ranked \(1^{st}\) in the Sustainable Competitiveness Index is Austin followed by Raleigh and Minneapolis. San Diego is ranked \(9^{th}\) tied with San Jose. Four regions are ranked below the US and they are Sacramento, Tampa, Phoenix and Miami with Miami ranked last [see Figure 2]. The figure presents the data in terms that are above or below the U.S. data in order to get a sense of how each region performs relative to the nation.

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\(^2\) To specifically address this issue, the variance for each region is calculated and titled the Balance Element. The variance is a statistical term and represents the degree of spread of a data set.
San Diego’s weak element is equity and the indicators in equity that are ranked lowest are housing affordability [20th] and the percent of children aged 3-4 enrolled in early education programs [19th]. The reason San Diego’s is ranked 12th for the Balance Element is because its ranking in Equity is not in line with its rankings in Economy and Environment. In short, equity issues are San Diego’s problem areas and may reduce future competitiveness. With a ranking as low as San Diego’s equity ranking, the Index is suggesting that San Diego’s policy makers need to address the equity issues.

People are the cornerstone of the San Diego region. They are the ones that do research, innovate, form businesses and maintain our environment. If the region’s equity issues cannot be addressed, some residents may choose to leave, in which case, San Diego will lose its most valuable asset.

**Monitoring Our Progress**

Livability and quality of life are the bottom line; they are the glue that holds our region together. In order to maintain and expand the San Diego region’s economic vitality, we need to continue to retain the best and brightest people to live and work here.

Livability is a composite of the three main areas of focus—the economy, the environment and equity. These three elements interact synergistically to make our region livable. Analysis in the monitoring section reviews these three areas in depth, detailing more than twice as many variables as are contained in the Sustainable Competitiveness Index. Not only are more indicators reviewed, additional in-depth analysis is undertaken to provide insights on key topics.

How are we doing? The regional indicators from our three broad areas point to a mixed performance picture for the San Diego region. Major strengths of the region include its ability to launch new companies via initial public offerings, attract venture capital, innovate, and retain businesses that are leaders in technological innovation. The region also shows strengths in water quality, and capital outlays for certain environmental facilities. Weaknesses include housing affordability, growth in our standard of living, income distribution, traffic congestion and capital expenditures on public transit.

How do we compare? When compared to 20 other regions the response to this question is based on pre-determined terminology. If San Diego is ranked 1st through 4th, the answer is “Excellent”, if ranked 5th through 8th, the response is “Above Average”, if ranked 9th through 13th the response is “Average”, if ranked 14th through 17th, the response is “Below Average” and if ranked 18th through 21st the response is “Poor”. Figure 3 is a summary table of the comparisons of all the indicators in each category.

Our environmental indicators show that we are well ahead of most of our competitors as we rank above average or excellent in most categories. Both our ranking in air quality and unemployment, although below average, have shown significant improvement. Our economic indicators are slightly less positive, but still rank above a majority of our competitors. One disconcerting trend is that our standard of living, as measured by real per capita income, is below average, when compared to our competitors. Our worst comparison is in the equity area where housing, health care and transportation measures of equity, in most cases, show us below our competitors.

Of the 31 rankings that are analyzed, 13 or 42% are ranked excellent or above average while 12 or 39% are ranked below average or poor. Of the 13 indicators that receive a ranking of excellent or above average, 7 or 54% are economic indicators, 4 or 31% are environmental indicators, and 2 or 15% are equity indicators. Of the 12 indicators that receive a ranking of below average or poor, 7 or 58% are equity indicators, 3 or 25% are economic indicators and 2 or 17% are environmental indicators.
## Figure 3

### How Does San Diego Compare?

To 20 Other Metropolitan Regions

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Excellent</th>
<th>Above Average</th>
<th>Average</th>
<th>Below Average</th>
<th>Poor</th>
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<tr>
<td><strong>ECONOMY</strong></td>
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<tr>
<td>Per Capita Income</td>
<td></td>
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<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
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<tr>
<td>Inflation</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
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<tr>
<td>Venture Capital [2 indicators]</td>
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<td>Initial Public Offerings [2 indicators]</td>
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<td></td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Capital Outlays on Highways</td>
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<tr>
<td>Air Quality</td>
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<td></td>
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</tr>
<tr>
<td>Water Quality</td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Crime</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Capital Outlays on Sewerage</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Capital Outlays on Solid Waste</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Capital Outlays on Water Utilities</td>
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<td></td>
</tr>
<tr>
<td>Income Distribution</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Housing [3 indicators]</td>
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<td></td>
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</tr>
<tr>
<td>Health Care</td>
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</tr>
<tr>
<td>Transportation [3 indicators]</td>
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</tr>
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<td>Capital Outlays on Mass Transit</td>
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<td>6</td>
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<td>22.6%</td>
<td>19.4%</td>
<td>29.0%</td>
<td>9.7%</td>
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</table>
Have we improved? Yes - especially in the economic and environmental areas [see Figure 4]. The area where there is the least improvement is equity.

In the economic area, real per capita income began increasing in 1994 after declining for five consecutive years. Also, San Diego’s unemployment rate fell from a high of more than 7% to less than 3% during the decade. However, on a cautionary note, San Diego is still creating far too many low paying jobs. We have not yet replaced all the high paying jobs we lost during the 1990 to 1994 recession.

In the environmental area, San Diego had substantial improvements in the last decade in air quality as the number of days not meeting U.S. Environmental Protection Agency standards declined from 96 days in 1990 to 14 days in 2000. Another area in which San Diego had substantial improvement was crime – between 1990 and 1999 the violent crime rate per thousand population declined 39% while the property crime rate declined 53%.

In the equity area there are mixed results for most indicators. Housing is one area where San Diego did not improve as the price of the median home continues to spiral upward, rising 36% from $220,000 in January 2000 to $300,000 in February 2002. These high prices are not offset by a proportionate increase in wages; therefore, housing is becoming less affordable. While income distribution deteriorated slightly during the previous decade, a positive note can be found from the fact that the number of individuals reporting an adjusted gross income of less than $10,000 per year declined by about 39% between 1990 and 1999.

On balance, San Diego appears poised to improve its well being in the new millennium. However, a note of caution is in order with respect to equity issues. People are San Diego’s most vital asset and the housing and income distribution issues can affect our region’s ability to maintain our vital asset.
### Figure 4

**Has San Diego Improved?**

Compared to historical San Diego data

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>No</th>
<th>Mixed Results</th>
</tr>
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<tr>
<td><strong>ECONOMY</strong></td>
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<tr>
<td>Per Capita Income</td>
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<td></td>
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<td>Unemployment Rate</td>
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</tr>
<tr>
<td>Inflation</td>
<td></td>
<td>↓</td>
<td></td>
</tr>
<tr>
<td>Venture Capital</td>
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</tr>
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<td>Initial Public Offerings</td>
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<tr>
<td>Exports</td>
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<td>Capital Outlays on Air Transport</td>
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<td>Capital Outlays on Sea and Inland Ports</td>
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<tr>
<td>Capital Outlays on Highways</td>
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<tr>
<td>Patenting</td>
<td>↑</td>
<td></td>
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<tr>
<td>Education</td>
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<td>Air Quality</td>
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<td>Water Quality</td>
<td>↑</td>
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<tr>
<td>Crime</td>
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<td>Capital Outlays on Sewerage</td>
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<td>Capital Outlays on Solid Waste</td>
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<td>Capital Outlays on Water Utilities</td>
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</tr>
<tr>
<td>Income Distribution</td>
<td></td>
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<tr>
<td>Housing</td>
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<tr>
<td>Health Care</td>
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<td>Education</td>
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<td></td>
</tr>
<tr>
<td>Transportation</td>
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<td></td>
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<tr>
<td>Capital Outlays on Mass Transit</td>
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<td><strong>7</strong></td>
</tr>
<tr>
<td>Distribution</td>
<td>56.5%</td>
<td>13.0%</td>
<td>30.4%</td>
</tr>
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</table>

06/17/02 Final Report
Measuring Technological Innovation

The most successful businesses in today’s marketplace are repeatedly creating and improving products and services, inventing more efficient production systems and technologies, and collaborating both nationally and internationally for mutual benefit. Increasingly, efficient management of well-developed local resources has become the determinant of a region’s economic, social and environmental well being. Thus a region’s competitive advantage today is driven by the ability of firms to continuously innovate and upgrade. Furthermore, innovation is the driving force behind improvements in productivity, a key component of regional prosperity.

One measure of technological innovation that drives competitiveness is the level of patenting in a region. Patents are a way of registering an entirely new product, a new way of producing, or an innovative improvement on an established process. A patent protects the economic rights or value of the innovative idea.

Figure 5

Utility Patents
awarded per 10,000 population

Innovation is linked to the patenting process and patents serve as the primary method for identifying business and industry that are innovative and collectively act as the primary drivers of economic activity in the region. Our research shows that these firms are typically located in San Diego’s technology clusters. The technologically innovative clusters in San Diego are identified as Biomedical Products, Biotechnology and Pharmaceuticals, Communications, Computer and Electronics Manufacturing, Defense and Transportation Manufacturing, Environmental Technology, Horticulture, Recreational Goods Manufacturing, and Software and Computer Services.

The impact on the San Diego region from the firms in these innovative clusters has been substantial as new firms were established in them at about six times the rate of new firms established outside the innovative clusters. Further, wages increase two and one-half times faster in the innovative clusters when compared to wage increases outside of them.

The innovative clusters in San Diego are vibrant and will likely lead the regional economy toward improved prosperity. The recession in the early 1990's saw the Defense and Transportation cluster shrink dramatically, leaving the innovative clusters poised to grow in a more balanced fashion than in the early 1990's when the defense cluster accounted for about 34% of all technology sector employment. Today there are five innovative clusters each having between 14% and 18% of the innovative cluster employment. Well-established research capabilities, a fully developed network to incubate new businesses, and an ability to attract Small Business Innovation Research funds and venture capital from investors all point to an opportunity for future prosperity.

If there is a challenge, it is that future growth in employee compensation in the innovative clusters may not be as fast as that experienced in the previous decade. A significant portion of employee compensation in the 1990s in the innovative clusters [especially in the Communications cluster] was derived from stock options and not through the commercialization of products that result in new middle income jobs that support product production. Although, wage growth in the innovative clusters are likely to out pace the average for the regional economy, our challenge will be to retain our emerging growth companies and encourage them to open product production facilities in our region, as well as maintaining and expanding their research and development activities.

Future Actions

This report responds to a shift in the way regions evaluate their competitiveness. Competitiveness is multi-dimensional, and is determined by the ability of a region to achieve sustained success in three broad areas of the Economy, the Environment and Equity.

Although improvements can and should be made in all three “E” areas, for San Diego this report shows that we have our work cut out for us in the area of equity. Our research shows that our region is at a competitive disadvantage in the areas that define equity, including housing affordability, income distribution, traffic congestion and early childhood education. In addition, the outlook for these equity areas is not good, suggesting we likely will not see any near term improvement if we continue with a business as usual attitude.

Our research shows that these three broad areas are inextricably linked and work synergistically to improve or worsen the quality of life in a region. How long before our competitive disadvantages in equity spill over and effect our economic and environmental competitiveness? For example, most residents support retaining businesses that create good paying middle-income jobs, but where will these workers live? Isn’t some of the growth in southern Riverside County a reflection of our competitive disadvantage in housing? Isn’t one of this region’s most poignant examples of a competitive disadvantage the young worker with a family who must drive an hour or two each day to find affordable housing? Isn’t the work commute from southern Riverside into San Diego partially responsible for our poor performance in traffic congestion?

As stated earlier, one of the three primary goals of the Index is to act as a spark, igniting the political will and momentum necessary to move forward with initiatives to improve the region. To accomplish this task, the Index needs to be expanded and updated annually.

We propose to expand the number of indicators in each of the three areas to include ones that represent goals and objectives that we set just for our region. External benchmarking is important, but evaluating internal goals and objectives is equally as important. We propose to add additional indicators as part of our work on the SANDAG Regional Comprehensive Plan.
We have learned that highlighting problems and putting the region on notice is not enough to sustain the will and momentum necessary to implement change. What is needed – and what the Sustainable Competitiveness Index provides – is a way of measuring our progress, or lack of progress being made to solve problems on a broad front. The Index can be used as a tool to keep the region’s focus balanced and moving forward on a broad range of issues effecting our economy, environment and equity.
Introduction and Overview

This report is divided into three major sections with supporting appendices. The first section is titled “An Index to Measure Sustainable Competitiveness”. The Sustainable Competitiveness Index is unique tool created by the Competitiveness Index Advisory Committee of the San Diego Association of Governments [SANDAG] to assist policy makers by pinpointing areas of relative strength and relative weakness in the San Diego region. The Index does this by benchmarking San Diego data against data for 20 other metropolitan areas and the nation. The Index is intended to quantify the ability of the San Diego region to be competitive with other geographical regions over the long run. Because the Index focuses on the long run, it utilizes indicators that are forward looking – such as governmental capital outlays, business investment, and education. In fact, these forward looking indicators account for 61% of the indicators in the Index. The remaining indicators provide snapshots of indicators important to the regions present condition such as real per capita income and housing affordability. Additionally, the index seeks to capture a balance between economic, environmental and equity issues, it uses indicators from each of these three areas and incorporates a balance element to assure the importance of all three areas.

“Monitoring Our Progress” is the second section and is also intended to assist policy makers by providing substantial additional comparative information on San Diego. This section evaluates 31 indicators by asking three basic questions: How are we doing? How do we compare? and, Have we improved? The question “How do we compare?” uses the rank order method to determine where San Diego ranks on each of 31 indicators compared to 20 other metropolitan regions. The question “Have we improved” utilizes time series analysis of San Diego data to determine if there has been improvement in the San Diego indicator. The monitoring section uses snapshots of the present plus historical time series analysis. In addition to the 31 indicators obtained for all 21 metropolitan regions, additional indicators for San Diego are compiled to provide greater in-depth analysis of selected topics.

“Measuring Technological Innovation” is the third section and its purpose is to detail the linkage between innovation and economic prosperity. Using patents, copyrights and clusters, this section presents in-depth analysis that describes the importance of technological innovation to the performance of the San Diego economy. Our research connects the level of patent activity to its source, identifying our most competitive clusters. The technological innovations patented by these clusters are the driving force behind improvements in productivity, a key component of competitiveness in nearly all firms in the region.

This study can be found on the web at http://www.sandag.org/indicators.

How To Use This Report

Key to using the study is understanding the nine appendices. These appendices contain all the data used in the study and are organized around the three major sections. For example, Appendix A contains the data for the Sustainable Competitiveness Index – which is first section of the report. Appendix B contains the data for the Monitoring Our Progress section – the second section of the report. Within Appendix B, the data are organized into three broad categories – economic indicators, environment indicators and equity indicators - the same division found in the Monitoring Our Progress section. Appendix C contains the data for the technology section - which is the third section of the report.

Appendix D contains sources used to obtain the data and will be valuable when the data are updated. The sources include organization names, address and telephone numbers, as well as web links to the data.
Appendix E outlines the process and results used to select the 20 metropolitan regions with which San Diego is compared. The 20 metropolitan regions, with which San Diego is compared, were selected for this study by narrowing the list of regions using population, then evaluating the potential regions based on economic, environmental and economic criteria. Some regions were dropped so a state was not over-represented and others were added to capture regions that were considered “leaders” in a particular area. The final list of metropolitan statistical areas [MSA – defined by the Office of Management and Budget] as well as the 3-letter identifiers used in the figures are the following:

<table>
<thead>
<tr>
<th>MSA</th>
<th>3-Letter ID</th>
</tr>
</thead>
<tbody>
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<td>Atlanta, GA</td>
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<tr>
<td>Austin-San Marcos, TX</td>
<td>AUS</td>
</tr>
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<td>Baltimore, MD</td>
<td>BAL</td>
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<td>Boston, MA</td>
<td>BOS</td>
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</tr>
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</tr>
<tr>
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<td>NOR</td>
</tr>
<tr>
<td>Orange, CA</td>
<td>ORA</td>
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<td>Phoenix-Mesa, AZ</td>
<td>PHO</td>
</tr>
<tr>
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<td>PIT</td>
</tr>
<tr>
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<td>San Francisco, CA</td>
<td>SFO</td>
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<td>San Jose, CA</td>
<td>SJE</td>
</tr>
<tr>
<td>Seattle-Tacoma, WA</td>
<td>STA</td>
</tr>
<tr>
<td>Tampa-St. Petersburg, FL</td>
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<tr>
<td>Washington, DC</td>
<td>WAS</td>
</tr>
</tbody>
</table>

Appendix F contains the terminology used to describe a region’s standing based on its rank ordering. The rank ordering analysis occurs in the Monitoring Our Progress section. Appendix G contains a list of 67 jurisdictions in the San Diego region [1 county, 18 cities and 48 special districts] for whom we compiled Capital Outlay data from the Bureau of the Census. Appendix H contains the United States Office of Management and Budget [OMB] definitions of each of the 21 metropolitan areas in this study. Appendix I is the Glossary of Terms containing definitions of all key terminology and acronyms used in the study.

**Data Issues**

Compiling the data for this study was a major undertaking. A common problem encountered was that data were not compiled by metropolitan region for a specific indicator. Thus, many “ideal” indicators were not available.

It is hoped this study will provide a “Call to Action” for the federal government and other state agencies to begin compiling a wider variety of data on a metropolitan regional basis for all the MSA’s in the United States. It is highly likely that other regions are interested in regional data.

One federal publication that compiles data on the regional level is the “State and Metropolitan Area Data Book” and the federal government publications this study every five or so years. The publication is valuable and contains data on 21 indicators. However, the frequency of publication and the limited scope of the indicators make this report less useful for local government policy makers. It is hoped this type of study would become more regular and incorporate a wider array of indicators so local policy would have access to more regional data.

This is the important point: data for local government policy makers is difficult to find for metropolitan regions outside their own.

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4 The most recent study is the Fifth edition titled “State and Metropolitan Area Data Book 1997-98” and published by the U.S. Department of Commerce.
An Index to Measure Sustainable Competitiveness

**Sustainable Competitiveness** means that a region is successful in its ability to retain human resources that are used to sustain economic prosperity balanced with improving social equity while preserving environmental quality. Further, sustainable competitiveness provides the focus necessary to maintain and or improve its competitive edge over time. Thus, a region’s sustainable competitiveness requires the integration and balance of economy, environment and equity.

Everyone seems aware of globalization, but few realize that regions alone have the necessary scale and diversity to compete in the global marketplace. Also, our region must recognize that we compete with the world, whether we do it well or not, thus the ability to remain competitive with other regions is critical to the long run well being of San Diego.

Winners in this new competitive environment will be the regions that that can continually innovate. To innovate successfully, a region needs skilled individuals and if San Diego is to maintain its skilled work force and attract other skilled individuals, the region’s leaders must learn to work together to build affordable housing, relieve traffic congestion, preserve open space and promote economic development. If government is going to be effective in this new age, we are going to have to start thinking regionally and benchmarking our performance in three broad areas that together determine whether a region’s competitiveness is sustainable:

- **Economy** - standard of living, innovation, educational attainment, private investment as a share of regional product and government capital facilities investment on infrastructure necessary for economic development.
- **Environment** - air and water quality, and governmental capital investments on infrastructure that impact environmental quality.
- **Equity** - the distribution of income, housing affordability, basic education, transportation, and governmental capital facilities investments on public transportation.

To help San Diegans understand their region’s competitive position, SANDAG’s Competitiveness Index Advisory Committee has created the **Sustainable Competitiveness Index**. The purpose of this unique index is to quantify the elements of sustainable competitiveness and benchmark one region against another. The components of the index are both forward looking and balanced.

Many indicators are available for the index; however, the indicators listed in Figure 6 are selected because they provide the key information for each of the three elements. Adding more indicators would dilute the results of the index without adding additional value.

The indicators provide snapshots of essential items today [air quality, real per capita income, housing opportunity] as well as a “forward looking” perspective [patents, Venture Capital, Initial Public Offerings, Capital Facilities Investments by government]. The “forward looking” indicators will have their biggest impact in the future. For example, governmental capital outlays on air transport will impact the ability of the region to move people and material in and out of San Diego for decades to come. Thus, the Index incorporates dynamic aspects into its formulation as 61% of the indicators [11 of the 18] have a future impact. If the Index did not have forward looking indicators, it would provide a static evaluation which omits the ability of systems to change.

One fundamental role of this index is to develop a consensus on the essential elements of a sustainable and competitive region. A second role of the index is to help us move beyond the misconception that there is an internal conflict between our economic, our environmental and our social equity goals. And a third role is to act as a spark, igniting the political will and momentum necessary to move forward with initiatives to improve the region. An important task is to work to translate this emerging consensus into action.
This unique index can help policy makers by pinpointing areas of relative weakness and areas of relative strength. The index can assist local government officials with limited financial resources to make policy decisions that are focused on correcting deficiencies to help San Diego be competitive.

**Indexing Concept**

The Sustainable Competitiveness Index allows us to benchmark ourselves against other similar regions as well as the nation. The Index has three original essential elements – one for the economy, one for the environment and one for equity. Each element is composed of three or more components. The components may be a single indicator – such as real per capita income. Or the component may be two or more indicators – such as capital facilities investment which is composed of capital outlays per capita for sewerage, capital outlays per capita for solid waste management and capital outlays per capita for water utilities. Figure 6 details these three of the Index’s elements.

**Figure 6**

<table>
<thead>
<tr>
<th>Economic Element</th>
<th>Environment Element</th>
<th>Equity Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Standard of Living</td>
<td>1. Air Quality</td>
<td>1. Income Distribution</td>
</tr>
<tr>
<td>• Real Per Capita Income</td>
<td>• Number of days not meeting EPA standards</td>
<td>• Ratio of average to median household income</td>
</tr>
<tr>
<td>• Venture Capital Share of GMP</td>
<td>• US EPA Index of Watershed Indicators</td>
<td>• Housing Opportunity Index</td>
</tr>
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<td>• IPO funds as a share of GMP</td>
<td></td>
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<td>• Capital Outlays on Air Transport</td>
<td>• Capital Outlays on Sewerage</td>
<td>• Capital Outlays on Mass Transit</td>
</tr>
<tr>
<td>• Capital Outlays on Sea &amp; Inland Ports</td>
<td>• Capital Outlays on Solid Waste</td>
<td></td>
</tr>
<tr>
<td>• Capital Outlays on Highways</td>
<td>• Capital Outlays on Water Utilities</td>
<td></td>
</tr>
<tr>
<td>4. Innovation</td>
<td>4. Transportation</td>
<td>5. Education</td>
</tr>
<tr>
<td>• Patents per million population</td>
<td>• Average Commute Time</td>
<td>• Percent of preschoolers in early childhood education programs</td>
</tr>
<tr>
<td>5. Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Level of Educational Attainment for those 25 years of age and older</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The method of compiling the index is based on the rank ordering of data. For example, real per capita income for the 21 regions and the US are rank ordered from the highest income to the lowest income. The region with the highest per capita income is ranked 1st [best] and the region with the lowest income is ranked 22nd [worst]. This ranking is done for each component of an element. Since scores are based on rank, where lower numerical rank numbers indicate better performance, the lowest overall score is best. In the economic element, the best possible score would be a 5 [a rank of one in each of five components]. This process is duplicated for each element.

It is possible a region could perform quite well in two elements but poorly in the third element. This “unbalanced” performance is considered a threat to a region’s sustainable position and to specifically address this issue, we add a Balance Element.
To compute the Balance Element, the formula for statistical variance is used and applied to each region’s Economic, Environmental and Equity scores\(^5\).

While it is hypothesized that an unbalance position is unsustainable, no research has been undertaken to substantiate this claim. Thus, one area that should be analyzed is the correlation between balance and sustainable competitiveness.

To compute a region’s Sustainable Index score, the rank order for each of the four elements [Economy, Environment, Equity, and Balance] is added. All of the region’s summed index scores are then rank ordered from the lowest total [best] to the highest total [worst] to obtain the overall leader for the Sustainable Competitiveness Index. All of these data are found in Appendix A.

**The Economic Element**

Indicators selected for this element represent the current standard of living and the ability of a region to sustain economic development. The Economic Element has five components with each component weighed equally. The five components are the following:

1. Standard of living as measured by real per capita income in constant 2000 dollars
2. Business Investment as measured by two indicators:
   • Venture Capital funding as a share of Gross Metropolitan Product
   • Initial Public Offerings funds raised as a share of Gross Metropolitan Product
3. Capital Facilities Investment as measured by three indicators:
   • Capital Outlays on air transport facilities in constant 2000 dollars per capita
   • Capital Outlays on sea and inland port facilities in constant 2000 dollars per capita
   • Capital Outlays on highways in constant 2000 dollars per capita
4. Innovation as measured by the number of patents per million population
5. Education as measured by the level of attainment of the population aged 25 or older


The Economic Element accounts for 25% of the Sustainable Competitiveness Index.

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\(^5\) The variance is a statistical term and represents the degree of spread of a data set.

\(^6\) These data are from the Bureau of the Census and are collected in five-year intervals. The four years for which we have data are 1982, 1987, 1992 and 1997. Since these expenditures tend to be “lumpy” in nature, we add the capital outlays in constant 2000 dollars together from the various categories and divide by 15 to obtain a 15-year average. The 15-year average is then divided by a region’s 2000 population to obtain Capital Outlays per capita in constant 2000 dollars. See the Appendix for details.
Ranked 1st is San Francisco while San Jose is ranked 2nd and Seattle-Tacoma is ranked 3rd. San Diego is ranked 10th while Norfolk-Va. Beach is ranked last [see figure 7]. The graph presents the data in terms that are above or below the U.S. score to get a sense of how each region performs relative to the nation. Only Sacramento, Tampa, Miami and Norfolk fall below the US average for the Economic Element.

![Figure 7: Economic Element - 2000](image)

To help understand the rankings, a Figure 8 is presented on the following page that presents the components of the Economic Element for each region’s individual scores. The optimal score a region can obtain for the Economic Element is 5, and San Francisco’s score is 11 while San Jose’s score is 18. San Diego’s score is 57 [ranked 10th] while Norfolk’s score is 97 [ranked last]. The US score is 81.

San Francisco and San Jose dominate the Economic Element. Between them, they hold 7 of the top ten positions – ranked 1 & 2 in Standard of Living, 1 & 2 in Business Investment and 1 & 2 in Educational Attainment. San Jose also holds the #1 ranking in Innovation.

San Francisco’s rank as #1 in the Economic Element is extremely strong, as it is ranked 1st in two components – the Standard of Living and Educational Attainment. In addition, San Francisco is ranked 2nd in Business Investment, 3rd in Innovation and 4th in Capital Facilities Investment.
For San Francisco, its #1 rank in Standard of Living comes about because its real per capita income in 2000 is $52,348, which makes it about 77% higher than the US average of $29,501. San Diego is ranked 10th for this component with per capita income equal to $31,357. Ranked last for this component is Norfolk with $26,089.

San Francisco’s #1 rank in Educational Attainment follows from having about 17% of its adults holding graduate or professional degrees compared to about 9% for the US average, and about 28% of its population holding a bachelor’s degree, compared to about 16% for the US[7]. For San Diego [ranked 14th], about 11% of its adults have graduate or professional degrees while about 19% hold bachelors degree. For Miami [ranked last] about 9% of its adults have hold graduate or professional degrees and about 16% of its adults hold bachelors degrees.

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[7] There is scoring system used to compute the overall level of educational attainment for each region and this is detailed in the appendix. There are five categories – less than high school, high school graduate, associate’s degree or some college, bachelors’ degree, and graduate or professional degree.
San Jose is ranked 2nd in the Economic Element in large part because of its #1 ranking in Business Investment, #1 ranking in Innovation, its #2 ranking in Standard of Living and #2 ranking in Educational Level of Attainment. For Business Investment, the San Jose region has revenues from Initial Public Offerings and Venture Capital representing about 16% of Gross Metropolitan Product – more than 10 times higher than the US average of 1.6%. San Diego is ranked 6th for this component with Business Investment representing about 3% of GMP. Ranked last is Norfolk with Business Investment represent about 0.01% of its GMP.

For the component of Innovation, San Jose’s ratio of patents per million population is about 3,400 – more than 11 times the US average of 308. San Diego is ranked 7th for this component with a ratio of 620 while Norfolk is ranked last with a ratio of 84 patents per million population.

Minneapolis is the only other region to get a #1 ranking for a component of the Economic Element as it is ranked 1st in Capital Facilities investments for air transport, sea and inland ports and highways. On a per capita basis in constant 2000 dollars, Minneapolis spent about $34 – more than 2½ times the US average of about $13. San Diego is ranked 14th for this component with per capita capital outlays of about $15 while Boston is ranked last with per capita capital outlays of about $5.

Norfolk, which is ranked last for the Economic Element is ranked last in three components – the Standard of Living, Business Investment and Innovation and it is ranked 21st in Capital Facilities Investment. Its area of relative strength is Educational Attainment where it is ranked 10th.

San Diego’s areas of relative strength are Business Investment where it is ranked 6th and Innovation where it is ranked 7th. San Diego is ranked 14th in Capital Facilities Investment, 14th in Educational Level of Attainment and 16th in Standard of Living.

The Environment Element

Indicators selected for this element represent direct measures of environmental quality or government investments in infrastructure that impact environmental quality. The Environment Element has three components with each component weighed equally. The three components are the following:

1. Air Quality as measured by the number of days in a year a region does not meet United States Environmental Protection Agency ambient air quality standards
2. Water Quality as measured by the United States Environmental Protection Agency’s Watershed Index that evaluates watershed health
3. Capital Facilities Investment as measured by three indicators:
   • Capital Outlays on sewerage treatment facilities in constant 2000 dollars per capita
   • Capital Outlays on solid waste management in constant 2000 dollars per capita
   • Capital Outlays on water utilities in constant 2000 dollars per capita


The Environment Element accounts for 25% of the Sustainable Competitiveness Index.

These data are from the Bureau of the Census and are collected in five-year intervals. The four years for which we have data are 1982, 1987, 1992 and 1997. Since these expenditures tend to be “lumpy” in nature, we add the capital outlays in constant 2000 dollars together from the various categories and divide by 15 to obtain a 15-year average. The 15-year average is then divided by a region’s 2000 population to obtain Capital Outlays per capita in constant 2000 dollars. See the Appendix for details.
Ranked 1st is Austin with Denver ranked 2nd and San Francisco and San Diego tied for 3rd [see Figure 9]. The graph presents the data in terms that are above or below the US score to get a sense of how each region performs relative to the nation. Only four regions fall below the US average and they are Houston, Baltimore, Washington, DC and Boston – with Boston ranked last.

![Figure 9](image)

To help understand the rankings, Figure 10 is presented on the following page that presents the components of the Environment Element for each region’s individual scores. The optimal score a region can obtain for the Environment Element is 3 and Austin’s score is 17. Denver is ranked 2nd with a score is 20 while San Diego and San Francisco are tied for 3rd with a score of 21. Thus, the top three regions all have very close scores. Boston is ranked last with a score of 47 and the US score is 39.

Austin’s rank as #1 in the Environment Element is based on a #2 ranking in water quality, a #3 ranking in capital facilities investment and a #12 ranking in air quality. Austin has no #1 ranking for an individual component in the Environment Element, but high overall performance places it at the top of the list.

For the Air Quality component, there are five regions tied for the #1 ranking and they are Miami, Minneapolis, Portland, San Francisco and San Jose. All of these regions met the United States Environmental Protection Agency’s air quality standards every day of 2000. San Diego is ranked 18th for this component as it did not meet the Environmental Protection Agency standards on 14 days. Houston is ranked last and did not meet the air quality standards on 42 days. The US score represents the average for the 21 metropolitan regions in this study as the US Environmental Protection Agency does not estimate a national average.
For the Water Quality component, Denver is ranked 1st with a score of 1.0 on the Index of Watershed Indicators [IWI]. This Watershed Index is compiled by the US Environmental Protection Agency and ranges from 1 [good watershed quality] to 6 [poor watershed quality]. Five regions are tied for 2nd and are Austin, Phoenix, Raleigh, San Diego and San Francisco. Two regions are tied for last and they are Boston and Minneapolis. The US is ranked 10th and its score of 3.3 is based on the average water quality for more than 2,000 watersheds in the United States.  

### Figure 10
Environment Element Summary

<table>
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<tr>
<th>Metropolitan Regions</th>
<th>Score</th>
<th>Rank</th>
<th>Rank</th>
<th>Rank</th>
<th>Rank</th>
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<td>47</td>
<td>22</td>
<td>6</td>
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</tbody>
</table>

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9 The Index of Watershed Indicators is a compilation of information on the “health” of aquatic resources in the United States. It combines a variety of indicators that point to whether rivers, lakes, streams, wetlands and coastal areas are “well” or “ailing” and whether activities on the surrounding lands that affect the waters are placing them at risk. Examples of indicators include the occurrence of contaminants in surface or groundwater and the percent of rivers and lakes supporting drinking water use. The IWI is composed of three components and each watershed is ranked on a scale of 1 to 6 where 1 is best and 6 is worst.

10 See the Water Quality portion of Monitoring Our Progress for greater detail on the indicator.
San Diego is ranked 1st in Capital Facilities Investment in Sewerage, Solid Waste Management and Water Utilities. The governmental capital outlay data are on a per capita basis in constant 2000 dollars. San Diego governments had capital outlays that averaged about $37 per capita – more than twice the US average of about $17 per capita. Ranked 22nd is Pittsburgh with per capital capital outlays of about $13.

Boston, which is ranked last in the Environment Element, is ranked 21st in Water Quality and 20th in Capital Facilities Investment. Boston’s area of relative strength is Air Quality where it is ranked 6th.

San Diego is tied for 3rd in the Environment Element based on its strong areas of Capital Facilities Investment [where it is ranked 1st] and Water quality [where it is ranked 2nd]. San Diego’s area of relative weakness is Air Quality where it is ranked 18th.

**The Equity Element**

Equity is concerned with distribution and opportunity throughout the population. To evaluate distribution and opportunity we select indicators that measure distribution directly or indirectly, and we examine capital expenditures that impact all citizens' lives. The Equity Element has five components with each component weighed equally. The five components are the following:

1. Income Distribution as measured by the ratio of average household income to median household income
2. Housing affordability as measured by the Housing Opportunity Index which relates the median sales prices of homes to median incomes
3. Transportation as measured by average commute time
4. Capital Facilities Investments measured by:
   - Capital Outlays on mass transit in constant 2000 Dollars per capita
5. Education as measured by the percent of preschoolers in early childhood education programs.


The Equity Element accounts for 25% of the Sustainable Competitiveness Index.

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11 These data are from the Bureau of the Census and are collected in five-year intervals. The four years for which we have data are 1982, 1987, 1992 and 1997. Since these expenditures tend to be “lumpy” in nature, we add the capital outlays in constant 2000 dollars together from the various categories and divide by 15 to obtain a 15-year average. The 15-year average is then divided by a region’s 2000 population to obtain Capital Outlays per capita in constant 2000 dollars. See the Appendix for details.
Ranked 1st is Pittsburgh with Norfolk ranked 2nd and Atlanta ranked 3rd [see Figure 11]. The graph presents the data in terms that are above or below the US data to get a sense of how each region performs relative to the nation. Ten regions fall below the US average and they are Seattle, Baltimore, Denver, Orange, Sacramento, Houston, San Diego, Phoenix, Portland and San Francisco – with San Francisco ranked last.

To help understand the rankings, Figure 12 is presented on the following page that presents the components of the Equity Element for each region’s individual scores. The optimal score a region can obtain for the Equity Element is 5 and Pittsburgh’s score is 32. Norfolk is ranked 2nd with a score of 37 while Atlanta is ranked 3rd with a score of 38. Thus, the top three regions all have very close scores. San Francisco is ranked last with a score of 77, the US score is 62 and San Diego’s score is 69.

There are no regions that dominate the Equity Element the way San Francisco and San Jose dominate the Economic Element. Not only are the Equity Element scores much higher than the optimal [5], a comparison with the Economic Element [which also has five components] demonstrates how different the scores are. For the Economic Element, the #1 ranked region has a score of 11 with the 2nd ranked region having a score of 18. For the Equity Element, the #1 ranked region has a score of 32 while the #2 ranked region has a score of 37. There are two regions in the Equity Element that have two #1 component rankings, and both of these regions have at least one other component in which they are ranked 21st or 22nd.

Pittsburgh’s rank as #1 in the Equity Element is based on a #5 ranking in average commute, a #5 ranking in capital facilities investment, a #7 ranking in income distribution, a #7 ranking in the percent of preschoolers in early educational programs, and a #8 ranking in affordable housing.
Pittsburgh has no #1 ranking for a component in the Equity Element. By contrast, Norfolk is ranked 1st in two components – Income Distribution and Average Commute time and Washington DC is ranked 1st in two components – Capital Facilities Investment and Education.

For the Income Distribution component, Norfolk is ranked 1st and has a ratio of average household income to median household income of 1.23612. This ratio is selected as it is one measure of determining the manner in which income is distributed among the population. If the households at the upper end of the distribution have disproportionately more income than households at the lower end, the values at the top will outweigh those at the bottom, and the mean will be larger than the median. Thus, ratios closer to 1.0 imply more equal distribution. For contrast, the US ratio is 1.381 which is about 12% more unequally distributed than found in Pittsburgh. Washington DC is ranked last for this component with a ratio of 1.584 while San Diego is ranked 15th with a ratio of 1.395.

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<table>
<thead>
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<th>Income Distribution</th>
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<th>Average Commute</th>
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</tbody>
</table>

Both of these statistics measure central tendency. If the average and median values are the same, the ratio equals 1.0 and there is a “normal distribution” of incomes. The higher the ratio above 1.0, the more unequal the distribution.
The next component is Housing Affordability as measured by the Housing Opportunity Index, which relates median home prices to median household incomes. Minneapolis is ranked 1st with a score of 78.4 implying 78.4% of the households earning the median income can afford to purchase a home. By comparison, the US score is 62.8. Ranked last is San Francisco with a score of 10.3 while San Diego is ranked 20th with a score of 30.1.

The next component is the Average Commute time and the data used are total commute times—the sum of the morning and afternoon commute. The afternoon commute tends to be about 20% longer than the morning commute. Ranked 1st with the shortest average commute time is Norfolk with about 46 minutes. The average commute time for the US is about 56 minutes or about 23% longer than Norfolk’s. Ranked last is Atlanta with an average commute time of over 72 minutes or 57% higher than Norfolk’s average commute time. San Diego is ranked 4th with an average commute time of about 49 minutes.

Washington DC is one of three different regions with a #1 component ranking in the Equity Element and it is ranked 1st in Capital Facilities Investment in Mass Transit. The governmental capital outlay data are on a per capita basis in constant 2000 dollars. Washington DC metropolitan area governments have capital outlays that average about $63 per capita—more than six times the US average of about $10 per capita. Ranked 22nd is Baltimore with per capital capital outlays of about $0.01. San Diego is ranked 11th with governmental capital outlays of about $9 per capita.

Washington DC is also ranked 1st in the Education component where we measure the percent of children aged 3-4 enrolled in early childhood educational programs. Longitudinal studies have shown that enrollment in these pre-school programs leads to greater success in life. For this component, Washington DC has about 69% of its 3-4 year old children enrolled in early educational programs. The US average is about 56% [about 20% lower than the Washington DC score]. Ranked last is Sacramento with a 35% enrollment share while San Diego is ranked 19th with 45%.

San Francisco, which is ranked last in the Equity Element, is ranked 22nd in Housing Affordability, 21st in Income Distribution, 14th in Average Commute, and 11th in Education. San Francisco’s area of relative strength in the Equity Element is in Capital Facilities Investment where it is ranked 9th.

If San Diego has an “Achilles’ heel”, it is with regard to equity as it is ranked 19th. San Diego derives its Equity Element ranking based on a 20th place ranking in Housing Affordability, a 19th place ranking in Education, a 15th place ranking in Income Distribution and an 11th place ranking in Capital Facilities Investment. San Diego’s area of relative strength in the Equity Element is Average Commute time where it is ranked 4th.

### The Balance Element

Since Sustainable Competitiveness is concerned with a balance between the economy, the environment and equity, the variance is estimated and used as the measure of balance. The larger a region’s variance, the less balance it has. Therefore, the regions are rank ordered on their variance with the lowest variance being ranked highest. Recall, the element scores are the sum of the rank ordering of the element’s components. For the Economic Element there are five components, for the Environment Element there are three components and for the Equity Element...
there are five components. Because each element has a different number of components this creates a bias toward the elements with more components. Thus, the element scores are multiplied by a factor to insure each element has the same weight. These adjusted scores are termed “normalized” scores. The best possible normalized score is 45 based on the following computations:

- Economic element - a score of 15 based on five [ranked 1st for five components] multiplied by the equalizing factor which is three [3].
- Environment element – a score of 15 based on three [ranked 1st for three components] multiplied by the equalizing factor which is five [5].
- Equity element - a score of 15 based on five [ranked 1st for five components] multiplied by the equalizing factor which is three [3].

The optimal normalized score is 45 [ranked 1st in all components] while the lowest normalized score is 990 [ranked 22nd for all components]. After the computations we discover that Raleigh is ranked 1st, Houston is ranked 2nd and Baltimore is ranked 3rd [see Figure 13]. The graph presents the data in terms that are above or below the US data to get a sense of how each region performs relative to the nation. Seventeen of the 21 regions fall below the US data with San Francisco ranked last and San Diego ranked 12th.

Figure 13

The Balance Element accounts for 25% of the Sustainable Competitiveness Index.

15 With five components for the economic and equity elements and three components for the environmental element, the common denominator is 15. To have a balanced composite score where each element has the same weight, the environmental score is multiplied by five [5] and the economic and equity element scores are each multiplied by three [3].
To help understand the rankings, Figure 14 is presented below that presents the components of the Balance Element with each region’s variance and rank. Raleigh’s score is 29.6 while Houston’s score is 40.2. The score for the United States is 626 while that of San Francisco [ranked last] is 6,696. San Diego is ranked 12th with a score of 1,784.

**Figure 14**

**Balance Element Summary**

<table>
<thead>
<tr>
<th>Metropolitan Regions</th>
<th>Variance</th>
<th>Rank</th>
<th>Score</th>
<th>Rank</th>
<th>Score</th>
<th>Rank</th>
<th>Score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
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<td>29.6</td>
<td>1</td>
<td>147</td>
<td>9</td>
<td>160</td>
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<td>Houston, TX (HOU)</td>
<td>40.2</td>
<td>2</td>
<td>189</td>
<td>12</td>
<td>200</td>
<td>19</td>
<td>204</td>
<td>18</td>
</tr>
<tr>
<td>Baltimore, MD (BAL)</td>
<td>113.6</td>
<td>3</td>
<td>195</td>
<td>14</td>
<td>220</td>
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<td>14</td>
</tr>
<tr>
<td>Orange, CA (ORA)</td>
<td>169.6</td>
<td>4</td>
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<td>13</td>
<td>170</td>
<td>11</td>
<td>201</td>
<td>14</td>
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<tr>
<td>United States (USA)</td>
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<td>243</td>
<td>18</td>
<td>195</td>
<td>18</td>
<td>186</td>
<td>12</td>
</tr>
<tr>
<td>Austin-San Marcos, TX (AUS)</td>
<td>644.2</td>
<td>6</td>
<td>120</td>
<td>6</td>
<td>85</td>
<td>1</td>
<td>147</td>
<td>5</td>
</tr>
<tr>
<td>Minneapolis-St.Paul, MN (MIN)</td>
<td>910.9</td>
<td>7</td>
<td>105</td>
<td>4</td>
<td>170</td>
<td>11</td>
<td>168</td>
<td>11</td>
</tr>
<tr>
<td>Sacramento, CA (SAC)</td>
<td>1,110.2</td>
<td>8</td>
<td>255</td>
<td>19</td>
<td>175</td>
<td>14</td>
<td>201</td>
<td>14</td>
</tr>
<tr>
<td>Portland-Salem, OR-WA (POR)</td>
<td>1,317.6</td>
<td>9</td>
<td>180</td>
<td>11</td>
<td>125</td>
<td>5</td>
<td>213</td>
<td>20</td>
</tr>
<tr>
<td>Atlanta, GA (ATL)</td>
<td>1,429.6</td>
<td>10</td>
<td>201</td>
<td>15</td>
<td>185</td>
<td>15</td>
<td>114</td>
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<tr>
<td>Washington, DC (WAS)</td>
<td>1,754.0</td>
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<td>132</td>
<td>7</td>
<td>225</td>
<td>21</td>
<td>141</td>
<td>4</td>
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<tr>
<td>San Diego, CA (SAN)</td>
<td>1,784.0</td>
<td>12</td>
<td>171</td>
<td>10</td>
<td>105</td>
<td>3</td>
<td>207</td>
<td>19</td>
</tr>
<tr>
<td>Phoenix-Mesa, AZ (PHO)</td>
<td>1,784.2</td>
<td>13</td>
<td>225</td>
<td>17</td>
<td>130</td>
<td>6</td>
<td>213</td>
<td>20</td>
</tr>
<tr>
<td>Boston, MA-NH NECMA (BOS)</td>
<td>1,793.6</td>
<td>14</td>
<td>141</td>
<td>8</td>
<td>235</td>
<td>22</td>
<td>150</td>
<td>6</td>
</tr>
<tr>
<td>Denver-Boulder, CO (DEN)</td>
<td>2,046.9</td>
<td>15</td>
<td>111</td>
<td>5</td>
<td>100</td>
<td>2</td>
<td>201</td>
<td>14</td>
</tr>
<tr>
<td>Portland-St. Pete., FL (TAM)</td>
<td>2,117.6</td>
<td>16</td>
<td>258</td>
<td>20</td>
<td>170</td>
<td>11</td>
<td>153</td>
<td>8</td>
</tr>
<tr>
<td>Seattle-Tacoma, WA (STA)</td>
<td>2,166.0</td>
<td>17</td>
<td>78</td>
<td>3</td>
<td>135</td>
<td>8</td>
<td>192</td>
<td>13</td>
</tr>
<tr>
<td>Pittsburgh, PA (PIT)</td>
<td>2,220.2</td>
<td>18</td>
<td>201</td>
<td>15</td>
<td>190</td>
<td>16</td>
<td>96</td>
<td>1</td>
</tr>
<tr>
<td>Miami-Ft Lauderdale, FL (MIA)</td>
<td>2,546.9</td>
<td>19</td>
<td>264</td>
<td>21</td>
<td>155</td>
<td>9</td>
<td>159</td>
<td>10</td>
</tr>
<tr>
<td>San Jose, CA (SJE)</td>
<td>3,256.9</td>
<td>20</td>
<td>54</td>
<td>2</td>
<td>190</td>
<td>16</td>
<td>150</td>
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</tr>
<tr>
<td>Norfolk-Va Beach VA (NOR)</td>
<td>6,520.2</td>
<td>21</td>
<td>291</td>
<td>22</td>
<td>130</td>
<td>6</td>
<td>111</td>
<td>2</td>
</tr>
<tr>
<td>San Francisco, CA (SFO)</td>
<td>6,696.0</td>
<td>22</td>
<td>33</td>
<td>1</td>
<td>105</td>
<td>3</td>
<td>231</td>
<td>22</td>
</tr>
</tbody>
</table>

The reason Raleigh’s variance is so low is because of similarity in rankings for the three elements. Raleigh is ranked 9th for the Economic Element, 9th for the Equity Element, and 10th for the Environment Element. For contrast we examine San Francisco which is ranked last for the Balance Element. San Francisco is ranked 1st in the Economic Element, 3rd in the Environment Element and 22nd in the Equity Element. Thus, across these three areas, San Francisco is very un-balanced and this is reflected in its large variance and low ranking.

The United States is fairly balanced with a 12th place ranking for the Equity Element, and two 18th place rankings – one for the Economic Element and one for the Environment Element. Houston is ranked #2 on the Balance Element because of its consistent, though relatively low, rankings – #19 for the Environment, #18 for Equity and #12 for the Economy. Recall, though, that the Balance Element accounts for only 25% of the overall Index. Therefore, the consistently low rankings in the other elements will mostly outweigh the compensatory effects of a high ranking in the Balance Element.
For San Diego, its 12th place ranking for the Balance Element comes about with a 19th place ranking for the Equity Element, a 3rd place ranking for the Environment Element, a 10th place ranking for the Economic Element.

The Competitiveness Index

A region’s Sustainable Competitiveness Index score is based on each of the four elements: Economy, Environment, Equity, and Balance. Each region’s four element rank order scores are summed and the resulting total is rank ordered from the lowest total [best] to the highest total [worst] to obtain the overall leader for the Sustainable Competitiveness Index.

 Ranked 1st in the Sustainable Competitiveness Index is Austin followed by Raleigh and Minneapolis. San Diego is ranked 9th tied with San Jose. Four regions are ranked below the US and they are Sacramento, Tampa, Phoenix and Miami, with Miami ranked last [see Figure 15]. The figure presents the data in terms that are above or below the US data to get a sense of how each region performs relative to the national average.
To help understand the rankings, Figure 16 is presented below that presents the components of the Competitiveness Index with each region’s Index score and rank ordering, and the rank ordering for each of the elements [economy, environment, equity and balance]. Each of the elements is weighed equally for the index.

**Figure 16**

**Sustainable Competitiveness Index Summary**

<table>
<thead>
<tr>
<th>Metropolitan Regions</th>
<th>Rank Order</th>
<th>Sustainable Competitiveness Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Economic</td>
<td>Envt</td>
</tr>
<tr>
<td>Austin-San Marcos, TX (AUS)</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Raleigh-Durham, NC (RAL)</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Minneapolis-St. Paul, MN (MIN)</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Denver-Boulder, CO (DEN)</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Seattle-Tacoma, WA (STA)</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Orange, CA (ORA)</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>Atlanta, GA (ATL)</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Washington, DC (WAS)</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>San Diego, CA (SAN)</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>San Jose, CA (SJE)</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>Portland-Salem, OR-WA (POR)</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>San Francisco, CA (SFO)</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Boston, MA-NH NECMA (BOS)</td>
<td>8</td>
<td>22</td>
</tr>
<tr>
<td>Pittsburgh, PA (PIT)</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>Baltimore, MD (BAL)</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>Houston, TX (HOU)</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>Norfolk-Va Beach VA (NOR)</td>
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<td>6</td>
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<tr>
<td>United States (USA)</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Sacramento, CA (SAC)</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>Tampa-St. Pete., FL (TAM)</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>Phoenix-Mesa, AZ (PHO)</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>Miami-Fl Lauderdale, FL (MIA)</td>
<td>21</td>
<td>9</td>
</tr>
</tbody>
</table>

The optimal score a region could receive is 4 and Austin’s score is 18. Austin’s #1 ranking comes about with a #1 ranking in the Environment Element, a 5th place ranking for the Equity Element and two 6th place rankings – one for the Economic Element and one for the Balance Element. The next highest score belongs to Raleigh and is 29 – a good deal behind Austin. Raleigh-Durham obtains its 2nd place Index ranking with a 1st place ranking on the Balance Element, two 9th place rankings – one for the Economic Element and the other for the Equity Element, and a 10th place ranking for the Environment Element.

Miami’s 22nd place ranking on the Index is composed of a 21st place ranking for the Economic Element, a 19th place ranking for the Balance Element, a 10th place ranking for the Equity Element, and a 9th place ranking for the Environment Element.

San Diego’s 9th place ranking on the Index comes about from a 3rd place ranking for the Environment Element, a 10th place ranking for the Economic Element, a 12th place ranking on the Balance Element, and a 19th place ranking for the Equity Element.
The Next Steps

It appears Austin is doing well – and doing well in all areas as it is ranked 1st in the Environment Element, 5th in the Equity Element and 6th in the Economic Element. By contrast, San Diego is ranked 3rd in the Environment Element, 10th in the Economic Element and 19th in the Equity Element.

Looking beyond just the numbers, San Diego needs to improve if it is going to be competitive with a region like Austin. The element San Diego needs to improve is Equity where San Diego is ranked 20th in Housing Affordability, 19th in Education, 15th in Income Distribution, 11th in Capital Facilities Investments and 4th in the Average Commute time. The two topics that stand out are the 20th place ranking in Housing Affordability and the 19th place ranking in Early Childhood Education.

To improve our ranking for these two indicators requires changes in policies for the relevant indicators. The following questions are designed to focus efforts on changing policies that impact the indicators that are causing San Diego’s low ranking in housing affordability and early childhood education:

- What are the issues causing the low ranking for housing and education?
- Are there public policies or investments that could be made to alleviate the problem?
- Which parties are responsible for policies that impact the indicators?
- What is the process by which the relevant polices are changed?
- Is it possible to include some of these topics in SANDAG’s Regional Comprehensive Plan?

The greatest asset San Diego has is its human resources. It is the region’s people that have the ideas to innovate, build a sound economy and maintain the environment. If housing gets so unaffordable that people decide to leave, it could well hurt San Diego’s ability to compete with other regions for human resources.
Monitoring Our Progress

This monitoring section of the study follows directly from a recommendation found in the Final Report of the Prosperity Strategy completed in 1998. Recommendation 11 in the final report states:

Direct SANDAG Staff to support an on-going monitoring process that would result in periodic evaluation of the region’s economy, as well as a status report on the ability of the collaborative effort to carry out the main thrust of the Prosperity Strategy.

To monitor the region, data are gathered for more than 30 indicators that are grouped into the categories of economy, environment and equity. More indicators are gathered and presented in this section than utilized in the Sustainable Competitiveness Index section. The Index section uses indicators germane to the construction of the index while this section provides a broader picture of the region and requires more indicators. For some topics, additional San Diego data are presented to provide a more comprehensive view for policy makers. As the Comprehensive Regional Plan is developed, it is likely more indicators will be added to help government officials monitor the region with regard to the goals and objectives enumerated in the regional plan. The groupings and indicators used in this study are presented below:

- **Economic Indicators**
  1. The standard of living as measured by real per capita income with supporting employment and wage rate information
  2. Unemployment rate
  3. Inflation as measured by the Consumer Price Index (CPI)
  4. Business investment as measured by venture capital – both dollars raised and the number of companies receiving funding
  5. Business investment as measured by initial public offerings – both dollars raised and the number of companies going public
  6. Exports
  7. Capital facilities investments on air transport as measured by governmental capital outlays on air transport
  8. Capital facilities investments on sea and inland ports as measured by governmental capital outlays on sea and inland ports
  9. Capital facilities investments on highways as measured by governmental capital outlays on highways
  10. Innovation as measured by patents per million population
  11. Education as measured by the level of attainment of the population aged 25 years or older

- **Environmental Indicators**
  12. Air quality as measured by the number of days not meeting the US Environmental Protection Agency air quality standards with supporting data on ozone concentration
  13. Water quality as measured by the Index of Watershed Indicators compiled by the US Environmental Protection Agency with additional information on local tap water quality
  14. Crime as measured by the total crime rate per thousand population
  15. Capital facilities investments on sewerage as measured by governmental capital outlays on sewerage
  16. Capital facilities investments on solid waste management as measured by governmental capital outlays on solid waste management with additional information on recycling

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17. Capital facilities investments on water utilities as measured by governmental capital outlays on water utilities

- **Equity Indicators**
  18. Income Distribution as measured by the ratio of mean household income to median household income with supporting data on the percent of individuals above, below, and in the middle income category
  19. Housing as measured by the housing opportunity index, median home prices and home ownership
  20. Health care as measured by the number of hospital beds per thousand population with additional data on the percent of population without health insurance
  21. Education as measured by the number of institutions of higher education, the number of students enrolled in higher education, and the percent of pre-school children in kindergarten and nursery school.
  22. Transportation as measured by the average commute time, roadway congestion and unlinked passenger trips per thousand population which is an indicator of mass transit utilization
  23. Capital facilities investments on mass transit as measured by governmental capital outlays on mass transit

There are two types of **quantitative analysis** performed for each indicator:
- **Snapshots** - comparing San Diego's data to the data of 20 other metropolitan regions for several years (typically 1990, 1995 and 2000) and rank ordering the results.
- **Time Series Analysis** - tracking the indicators over time. In the time series analysis, San Diego data are compared to similar data for the state of California and the United States for each year for the period 1990 through 2000.

The strengths and weaknesses of each category are ascertained by asking the following three questions of each indicator:
- How are we doing?
- How do we compare?
- Have We Improved?

When answering the question “How do we compare?” the response is based on pre-determined terminology. If San Diego is ranked 1st through 4th, the answer is “Excellent”, if ranked 5th through 8th, the response is “Above Average” and so forth. The details of the grading scheme are outlined in Figure 17.

### Figure 17
Evaluation Terminology for Key Questions - Grading Scheme

<table>
<thead>
<tr>
<th>Rank</th>
<th>Excellent</th>
<th>Above Average</th>
<th>Average</th>
<th>Below Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>5</td>
<td>9</td>
<td>14</td>
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<tr>
<td>2</td>
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<td>4</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>17</td>
<td>21</td>
</tr>
</tbody>
</table>

When answering the question “Have we improved?” the response is based on examining historical San Diego data and the answer is either yes, no, or mixed results if it is not clear.

An indicator that appears in all three elements of the monitoring section is Capital Facilities Investment, also referred to as Capital Outlays. Highlighted in the following paragraphs are a
discussion about pertinent data issues and a detailed description of the indicator. Much care was taken in the collection of these data in an attempt to accurately capture the implications of Capital Outlays on the future of a region.

**Capital Facilities Investment**

Capital Facilities Investment refers to capital outlays made by a governmental body. In the San Diego region there is the County government, 18 City governments, and hundreds of Special Districts. All of these organizations have the potential to make capital outlays. Capital outlay indicators are found in each of the sections and this overview provides some insights into the data.

Capital outlays are expenditures to purchase assets or create value that add to the government’s net worth and can include real estate, construction, and other assets that have a useful life longer than one year [automobiles, computers, etc.]. For greater detail on the definitions of capital outlays used in this study, see the glossary.

Local governmental capital outlays are examined for two reasons. First, they are under the control of local government jurisdictions and reflect local government policy. Second, capital outlays have an impact on a region today and in the future. For example, capital outlays spent to expand an airport will increase the number of passengers and the amount of cargo that can be transported in and out of a region. Capital outlays, therefore, have long term implications for the development of the economy, the environment, and issues dealing with social equity.

Compiling data on capital outlays for the metropolitan regions is a formidable task. Within a region different jurisdictions have responsibility for different categories of expenditures and this pattern varies between metropolitan regions. In addition, different jurisdictions use different fiscal years, use different schemes to classify their expenditures, and use different accounting systems. Thus, comparing data between metropolitan regions is a major undertaking. To facilitate the process we utilize data from the Bureau of the Census, Governments Division. These data hold merit because of their uniformity and consistency across both geographical and topical areas. The Census Bureau obtains these data from each state’s controller’s office, after which they classify and compile the database. This “census” of government finance is conducted every five years and this study contains data from the 1982, 1987, 1992 and 1997 census.

Using the Census database to obtain local government capital outlays is not without problems. The Census data does not capture Federal government and State government capital outlays made directly in a region. In San Diego, for example, the California Department of Transportation [CALTRANS] has direct invests in infrastructure and these expenditures are classified as capital outlays by the State government. However, the Census data are not able to capture these capital outlays as local government capital outlays because they are not “funneled” through a local government agency. Therefore, the Census data undercounts capital outlays made in a region by an outside organization when the funds are not channeled through a local government.

A category for which we have complete data on capital outlays is Mass Transit. In San Diego in 1997, the Bureau of the Census records about $4.5 million in capital outlays. For the same year and category, the Federal Transit Administration [FTA], records about $81.4 million - a difference of about $76.9 million. On a nationwide basis for mass transit, the Bureau of the Census records local governments had capital outlays of about $5.3 billion in 1997. According to the FTA, the total is about $7.6 billion. The difference is $2.3 billion or about 43% of the amount reported by the Bureau of the Census.

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17 The Census Department undertakes a sample of jurisdictions every year to compile revenue and expenditure data, however, these sample data are not utilized because they omit jurisdictions that are responsible for certain categories of expenditures. Thus, the sample data are misleading for certain categories of expenditures.
The District of Columbia [part of the Washington DC metropolitan region] has its own unique issues because it is a combination of local and state government. Part of the government’s revenues comes from the Federal Government, and in many states these categories of transfers might go to a State government. Thus, DC’s capital outlays may include items usually done at the state level in other states. From this perspective, the District of Columbia may have capital outlays that are higher than might normally be expected. In addition, the Federal government often makes direct investments in the District of Columbia. This problem may also occur in cities that are State government capitals – such as Sacramento, Boston, etc.

For this report we note the differences between FTA and Census data and hope to be able to uncover the cause of the divergence the next time the Index is compiled. For now, we use the Bureau of the Census data because it offers consistency across all jurisdictions and all categories of expenditures and revenues.

For local governments, the share of total expenditures spent on capital outlays varies between jurisdictions. For San Diego, about 15% of all expenditures are capital outlays. For all local jurisdictions in the United States, the average spent on capital outlays is about 13% [see Figure 18].

**Figure 18**

**Local Government Expenditures in 1997**

in nominal dollars

<table>
<thead>
<tr>
<th>San Diego Total Expenditures</th>
<th>United States Total Expenditures = $852.0 billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>$9.7 billion</td>
<td></td>
</tr>
<tr>
<td>Expenditures (not including capital outlays) $8.2 billion 85%</td>
<td>Capital Outlays $113.6 billion 13%</td>
</tr>
<tr>
<td>Capital Outlays $1.5 billion 15%</td>
<td>Expenditures (not including capital outlays) $738.5 billion 87%</td>
</tr>
</tbody>
</table>

Note: US total is the sum of all local government expenditures
This study focuses on capital outlays in seven Core areas – Air Transport, Highways, Mass Transit, Sewerage, Solid Waste, Sea & Inland Ports, and Water Utilities. The share of Capital Outlays spent on these Core areas varies dramatically by region. For the jurisdictions in San Diego, about 56% of all capital outlays are spent on these seven areas in 1997 [see Figure 19].

Nationwide, local jurisdictions spent about 33% of their capital outlays on these seven categories [see Figure 20].
To determine if there have been any “real” changes in capital outlays, the nominal dollars data presented above are converted to dollars that are adjusted for inflation using the Implicit Price Deflator [IPD]. After conversion it is learned that San Diego total capital outlays in constant 2000 dollars increase from about $609.7 million dollars in 1982 to about $1.55 billion in 1997 – an increase of about 154%. Nationally, in constant 2000 dollars, all local jurisdictions increased their total capital outlays from about $60.5 billion in 1982 to about $119.1 billion in 2000 – an increase of about 97%.

To determine the rate at which capital outlays are spent per resident, the inflation adjusted capital outlay data are divided by the region’s population to obtain capital outlays per capita in constant 2000 dollars. After the computation it is learned that San Diego governments and special districts spent about $308 per capita in 1982 and about $569 per capita in 1997. This represents an increase of about 84% over the fifteen-year period. In short, there have been “real” increases in capital outlays per capita in San Diego. For the U.S., total capital outlays per capita in constant 2000 dollars increased about 70% during the same time period – from $261 in 1982 to about $444 in 1997 [see Figure 21]. For the four years for which we have data, governments in the San Diego region have spent more on total capital outlays than the average observed nationwide. Further, the increase in capital outlays has been at a faster rate in San Diego when compared to the U.S.

Most of the remaining capital outlay analysis in this study uses capital outlays per capita data in constant 2000 dollars. By doing so, we account for inflation and differences in regional populations.

Figure 21

Total Capital Outlays per Capita
in constant 2000 dollars

USA San Diego


Most of the remaining capital outlay analysis in this study uses capital outlays per capita data in constant 2000 dollars. By doing so, we account for inflation and differences in regional populations.
Economic Indicators

The focus of this category is on the economic vitality of San Diego. Indicators include real per capita income, the unemployment rate, inflation as measured by the consumer price index, revenue raised from venture capital [VC], revenue raised from initial public offerings [IPOs], exports, governmental capital outlays on air transport, sea and inland ports, and highways, patenting and the level of educational attainment for the population aged 25 years and older. All of these indicators are chosen because of their direct link to the economic well being of the region.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Excellent</th>
<th>Above Average</th>
<th>Average</th>
<th>Below Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Capita Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Venture Capital [2 indicators]</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Initial Public Offerings [2 indicators]</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exports</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Outlays on Air Transport</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Outlays on Sea and Inland Ports</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Outlays on Highways</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Patenting</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td><strong>SUM OF ECONOMY INDICATORS</strong></td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
<td>15.4%</td>
<td>38.5%</td>
<td>23.1%</td>
<td>23.1%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Strengths

San Diego shows strength in its ability to raise money via initial public offerings where it is ranked 3rd. San Diego’s innovation ability as measured by patenting is rated above average as it is ranked 7th. The ability to raise money via Venture Capital is another San Diego strength as San Diego is rated above average or average depending on the indicator selected. The level of monies raised from IPOs has grown dramatically in San Diego during the last decade. While VC funds also experienced a dramatic increase, the growth of the VC indicator lagged that of the leading regions due to the “dot.com bubble”. In other areas, exports from San Diego are ranked 8th, governmental capital outlays on sea and inland ports are ranked 5th, and capital outlays on air transport are ranked 6th. These capital outlay data are on a per capita basis in constant 2000 dollars.

San Diego is ranked Excellent or Above Average for about 54% of all the comparisons made for all the Economic indicators.
Weaknesses
San Diego was not ranked “poor” for any economic indicator, however, San Diego was rated below average for the unemployment rate, which is ranked 14th, real per capita income, which is ranked 16th, and the level of educational attainment, which is ranked 14th. Although the unemployment rate in San Diego declined between 1993 and 2000, San Diego’s unemployment rate did not decline as fast as that of other metropolitan regions. Further, San Diego continues to add jobs in low paying industries at a faster rate than jobs added in high paying industries. The effect has been a slow increase in real per capita incomes. Only when the numbers of jobs in high paying industries are added as fast as the number of jobs in low paying industries will real per capita income show substantial improvement in the region.

In Figure 23, we can see how San Diego has improved compared to historical San Diego data. The table below shows the results for various economic indicators.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>No</th>
<th>Mixed Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Capita Income</td>
<td>🝅</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>🝅</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation</td>
<td></td>
<td></td>
<td>🝅</td>
</tr>
<tr>
<td>Venture Capital</td>
<td>🝅</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Public Offerings</td>
<td>🝅</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exports</td>
<td>🝅</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Outlays on Air Transport</td>
<td>🝅</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Outlays on Sea and Inland Ports</td>
<td></td>
<td></td>
<td>🝅</td>
</tr>
<tr>
<td>Capital Outlays on Highways</td>
<td>🝅</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patenting</td>
<td>🝅</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>🝅</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SUM OF ECONOMY INDICATORS**

| 9 | 1 | 1 |

**Distribution**

| 81.8% | 9.1% | 9.1% |

Another strong point, San Diego has seen improvement in about 82% of the Economic indicators during the last decade.

1. **Per Capita Income**

How Is San Diego Doing?
Between 1990 and 2000 real per capita income increased from about $27,703 per year to $31,357 [both figures in constant 2000 dollars]. This increase represents a compound annual growth rate of about 1.25% per year.
How Do We Compare?
Below Average for 2000. When compared to 20 other metropolitan regions, San Diego’s ranking fell from 10th in 1990 to 15th in 1995 and 16th in 2000 [see Figure 24]. San Francisco is ranked first during all three periods with the highest per capita income. Austin is ranked last in 1990 while Norfolk is ranked last in 1995 and 2000.

Figure 24

Rank by Real Per Capita Personal Income
base year = 2000

<table>
<thead>
<tr>
<th>Year</th>
<th>San Francisco</th>
<th>San Diego</th>
<th>Austin</th>
<th>Norfolk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>1</td>
<td>10</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>1995</td>
<td>1</td>
<td>15</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>2000</td>
<td>1</td>
<td>16</td>
<td>21</td>
<td>21</td>
</tr>
</tbody>
</table>

highest per capita personal income

lowest per capita personal income
Compared to California and United States data, San Diego’s per capita income is slightly better but still average. San Diego’s per capita income is higher than the US average for every year between 1990 and 2000 [see Figure 25]. However, the US grew at a faster rate (1.5% annual average) between 1990 and 2000. Compared to California, San Diego’s per capita income is less than the state average between 1987 and 1996, then increased above the state average for 1997, 1998 and 1999. The 2000 data reveal San Diego’s per capita income is again below the state average.

**Figure 25**

Real Per Capita Personal Income: 1980-2000

base year = 2000

$20,000  $22,000  $24,000  $26,000  $28,000  $30,000  $32,000  $34,000


San Diego  California  United States

**Have We Improved?**

Yes. Based on historical San Diego data, these per capita incomes are adjusted for inflation, thus, the standard of living improved – but barely. United States per capita income grew faster than San Diego’s, and, since San Diego’s ranking amongst the 21 metropolitan regions declined after 1990, it appears San Diego’s per capita income did not maintain pace with the nation or other regions. To highlight this fact an index is created with 1980 as the base year for San Diego, California and the US. It becomes clear from the graph that San Diego’s rate of increase in real per capita income has fallen behind that of the US since 1980. While the absolute level of income is higher in San Diego compared to the US, the difference between the two has declined over the last 20 years. In fact, there are only six years in the last 20 when the rate of increase in San Diego’s real per capita income has been greater than the increase of real per capita income for the US [see Figures 26 and 27 on the following page].
Between 1990 and 1994 San Diego’s real per capita income declined from $27,703 to $27,018 – a compound annual decline of 0.6% per year. Between 1994 and 2000 real per capita income increased from $27,018 per year to $31,357 – a compound annual growth rate of 2.5% per year. Thus, 1994 marks the turning point where per capita income stopped declining and actually began increasing. What causes real per capita incomes to increase after 1994? Was job growth the driver, or was wage growth responsible for the increase? The Prosperity Strategy from 1998\(^\text{18}\) pointed to an imbalance in job creation where low paying industries were hiring more people than high paying industries. If this trend continued, it would suggest that job growth would not alone lead to income growth.

To investigate these issues, employment and wages by 2-digit Standard Industrial Classification [SIC] code for the years 1991, 1994 and 2000 are selected and analyzed for the San Diego region. By comparing employment and average wage for these three years, we can determine if employment in high paying industries is growing faster than employment in low paying industries. To conduct this analysis, average wages per employee by 2-digit SIC code industry are rank ordered from the highest average wage to the lowest average wage. High paying industries are defined as those industries with the highest wages whose aggregate payroll accounts for 50% of the region’s total payroll. The remaining industries are divided into two categories – medium paying industries and low paying industries.

Figure 28

Average Annual Employment Growth Rates
For San Diego Industries


Results for 2000 reveal that the high paying industries account for about 32% of total employment. Industries with the lowest average wage per employee account for about 34% of regional employment but only 17% of total payroll. The growth rate for employment by the high paying and low paying industries are calculated, and it becomes clear that the number of low paying jobs has consistently grown faster than the number of high paying jobs [see Figure 28, previous page].

Between 1980 and 1994, seven jobs were created in high paying industries for every ten jobs created in low paying industries and the ratio remained almost unchanged between 1994 and 2000\(^{19}\). Since the number of jobs created in low paying industries continues to dominate, what causes the increase in real per capita income? To answer this question we examine the growth rate of average wages for all industries. Results reveal that the average wages in higher paying industries increase substantially faster than wages for lower paying industries - and this is a major factor leading to increases in real per capita income [see Figure 29].

![Figure 29](image)

Between 1991 and 1994 real wages only increased in the high paying industries. Between 1994 and 2000 real wages for the high paying industries increased at an annual average rate of 4.4% compared to 3.3% for the entire region and 2.3% for low paying industries. In other words, real wages in the high paying industries rose 91% faster than real wages in low paying industries for the period 1994 to 2000. While jobs are being created at a faster rate in the low paying industries, the slow growth in wages in the low paying industries are being offset by much faster growing wages in the high paying industries. All of the data for this analysis is contained in the appendices.

\(^{19}\) This ratio is estimated by dividing the growth rate in employment in high paying industries by the growth rate in employment in low paying industries. The ratio for the period 1980 to 1994 ratio is 0.697 while the ratio for the period 1994 to 2000 is 0.714.
Next we seek to understand where the growth in wages and employment is occurring. Rather than use the industry data previously examined, we examine employment clusters in the San Diego region. These clusters are Biomedical Products, Biotechnology and Pharmaceuticals, Business Services, Communications, Computer and Electronics Manufacturing, Defense and Transportation Manufacturing, Entertainment and Amusement, Environmental Technology, Financial Services, Fruits and Vegetables, Horticulture, Medical Services, Recreational Goods Manufacturing, Software and Computer Services, Visitor Industry Services and the Uniformed Military. Data from the Uniformed Military cluster are omitted since local government has no influence on employment or pay for this group. Thus, the analysis focuses on 15 clusters and all of these data are found in the appendix.

The major insights from the cluster analysis:

- Employment is increasing at a faster rate in the clusters when compared to employment outside the clusters.
- Wages are increasing at a faster rate in the clusters when compared to wages outside the clusters [analysis in nominal dollars – see Figure 30].

**Figure 30**

San Diego Employment & Wages:
Average Annual Growth, 1991-2000

In 1991 about 35% of San Diego’s employment was located in the 15 clusters. By 2000 this had increased slightly to 35.7%. The main reason employment in the clusters did not grow faster between 1991 and 2000 is because employment in Defense and Transportation Manufacturing cluster declined at an annual rate of 6.2% between 1991 and 2000. Most of the contraction in this cluster occurred between 1991 and 1995 as employment shrank by about 20,400 people or about

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20 Clusters are defined as groups of complimentary, competing and interdependent industries that drive wealth creation in a region.
50%. Excluding the Defense and Transportation Manufacturing cluster, the remaining 14 clusters grew an average of 4.0% per year for the period 1991 to 2000. The fastest growing clusters between 1991 and 2000 in terms of average annual rate of growth in employment are the following:

- Software and Computer Services, up 15.4% per year
- Recreational Goods Manufacturing, up 13.7% per year
- Communications, up 11.3% per year

The largest clusters in terms of employees in 2000 are the following:

- Business Services with 97,062 employees or 22.7% of the cluster total
- Visitor Industry services with 83,255 employees or 19.5% of the cluster total
- Medical Services with 71,889 employees or 16.8% of the cluster total

In terms of wages, the clusters with the fastest growing average annual wages between 1991 and 2000 are the following:

- Communications, up 21.0% per year
- Computer & Electronics Manufacturing, up 9.9% per year
- Biotechnology & Pharmaceuticals, up 9.5% per year
- Recreational Goods Manufacturing, up 9.3% per year

The clusters with the highest average annual wages in 2000 are the following:

- Communications, with $116,301
- Software and Computer Services, with $79,360
- Computer and Electronics Manufacturing, with $72,616
- Biotechnology and Pharmaceuticals, with $70,259

The average wage for employees in the 15 clusters is $45,549 per year. The average wage for all non-cluster employees is $33,145 in 2000, while the average wage for all employees in the region is $37,571. In short, the clusters are leading the region to higher employment and higher wages.
2. Unemployment Rate

How Is San Diego Doing?
San Diego’s unemployment rate declined from 4.4% in 1990 to 3.0% in 2000. However, the years in between were difficult as San Diego underwent a major restructuring during a period when the economy was sluggish. The unemployment rate peaked in 1993 at 7.7% before falling to the 3.0% level in 2000.

How Do We Compare?
Below Average for 2000. When compared to 20 other metropolitan regions, San Diego’s ranking fell from 9th in 1990 to 19th in 1995 before rising to 14th in 2000 [see Figure 31]. Raleigh-Durham-Chapel Hill is ranked first for all three periods implying it is the best and has the lowest unemployment rate. Miami is ranked last in 1990 and 2000 while Sacramento is ranked last in 1995 implying they have the highest unemployment rates.

Figure 31

Rank by Unemployment Rate

<table>
<thead>
<tr>
<th>1990</th>
<th>1995</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raleigh (1)</td>
<td>Raleigh (1)</td>
<td>Raleigh (1)</td>
</tr>
<tr>
<td>San Diego (9)</td>
<td>San Diego (19)</td>
<td>San Diego (14)</td>
</tr>
<tr>
<td>Miami (21)</td>
<td>Sacramento (21)</td>
<td>Miami (21)</td>
</tr>
</tbody>
</table>
Compared to California and United States data, San Diego’s unemployment rate is slightly better. In fact, San Diego’s unemployment rate over the decade is lower than that of California while there were only three years (1993 and 1995) in which it was higher than the US average [see Figure 32].

![Unemployment Rate: 1990 - 2000](image)

**Have We Improved?**
Yes. Based on historical San Diego data, not only is the unemployment rate lower, but San Diego’s ranking amongst 21 regions improved between 1995 and 2000. In fact, San Diego’s unemployment rate is lower than the United States rate for every year since 1996.
3. Inflation as measured by the Consumer Price Index [CPI]

The consumer price index [CPI] is a measure of the average change in prices over time for a “market basket” of goods and services purchased by all urban consumers. The basket of goods includes food, clothing, shelter, fuels, transportation fares, charges for doctors and dentists’ services, medications, etc.

How Is San Diego Doing?
With 1990 as the base year, the CPI increased from 100 in 1990 to 132.1 in 2000. This is a 32.1% increase in consumer prices over the period for an average increase of 3.2% per year.

How Do We Compare?
Average for 2000. Ranking the CPI for all 21 metropolitan regions reveals that San Diego ranked 2nd in 1995 and 11th in 2000, indicating that its rate of inflation was higher than most of the other metro areas [see Figure 33]. Washington DC ranked 1st in 1995 and Orange ranked 1st in 2000 implying these regions are best with the lowest rate of inflation. Denver is ranked last in 1995 and 2000 with the highest rate of inflation.

Figure 33

Rank by Consumer Price Index
base year = 1990

Washington DC (1)
San Diego (2)
Orange (1)
Denver (21)
Denver (21)

1995
2000
San Diego’s rate of inflation is lower compared to inflation data for the US and California for the years 1990 through 1997. Beginning in 1997 the rate of change in inflation accelerates and by 2000, San Diego’s CPI is very similar to that of California and the US [see Figure 34]. Between 1990 and 1997, San Diego’s CPI increased at an average rate of 2.4% per year. Between 1997 and 2000 San Diego’s CPI increased at an average of 3.7% per year. The major cause of the post-1997 increase has been rising housing costs, which are reflected in a rapid increase in the housing component of CPI.

**Figure 34**

*Consumer Price Index: 1990-2000*

*base year = 1990*
Have We Improved?
No. Based on historical San Diego data, the last few years' inflation has surged with the cost of housing being the main culprit. Between January 1997 and January 2000, the median price of homes sold in San Diego increased to $220,000 from $165,000 – a 33.3% increase or $55,000 in three years [see Figure 35]. By February 2002 the median price of homes sold in San Diego rose to $300,000 – another 36% increase over the 2000 figure.

![Figure 35](image)

San Diego Monthly Median Home Prices
median prices of all homes sold in San Diego County

This increase in housing prices caused the CPI to increase at a much faster rate than other metropolitan regions – and that is the reason San Diego's ranking dropped from 2nd to 11th amongst the 21 regions.
4. Venture Capital [VC]

How Is San Diego Doing?
The number of firms receiving venture capital funding increased almost four-fold from 46 in 1990 to 162 in 2000. At the same time, the amount of money invested increased fifteen-fold from $0.145 billion in 1990 to $2.185 billion in 2000.

How Do We Compare?
Average for 2000. Two comparisons are made. First, the total dollars of VC funding is rank ordered for all 21 regions. In this analysis, San Diego is ranked 4th in 1990, 5th in 1995 and 9th in 2000. San Jose is ranked first in 1990 and San Francisco is ranked first in 1995 and 2000 implying these regions raised the most VC money. Norfolk is ranked last in all three periods implying it raised the least amount of VC funds.
The range of dollars raised is broad as San Francisco raised over $16.0 billion in 2000 while Norfolk raised only 3.8 million. San Diego raised about $2.2 billion. The top three metropolitan regions all raised more than $9.0 billion while Denver, the next highest, raised $4.4 billion.

![Figure 37: Venture Capital Funding: 2000](image-url)
In the second comparison, the ratio of VC dollars invested to Gross Metropolitan Product [GMP] is calculated for all 21 regions. San Diego is ranked 4th in 1990 and 1995, however, its ranking falls to 8th in 2000 [see Figure 38]. San Jose is ranked first for 1990 and 1995 while San Francisco is ranked first in 2000 implying the amount raised from VC is a larger percent of their economies. Norfolk is ranked last for all three years implying it raised the least amount of capital relative to its economy.

**Figure 38**

**Rank by VC Funding as Share of GMP**

VC funding as a percentage of GMP

- **Most abundant funding:** largest percent of GMP
- **Least abundant funding:** smallest percent of GMP
Compared to California and the US, San Diego’s VC data appear more volatile and cyclical [VC funding share of GMP]. While the San Diego data is higher than the US share for the decade, it is not always higher than California [see Figure 39]. Beginning in 1996 California VC as a share of GMP accelerates and surpasses San Diego.

Figure 39

![Venture Capital Funding: 1990-2000](image)

**Venture Capital Funding as a percent of GMP**

- **San Diego**
- **California**
- **United States**

Have We Improved?
Yes, dramatically. Based on historical San Diego data, the amount of dollars raised from VC increased fifteen-fold between 1990 and 2000 and the importance of these to the San Diego economy increased ten-fold from about 0.2% of the local economy in 1990 to 2.1% of the economy in 2000\(^1\). However, San Diego’s ranking declined from 4\(^{th}\) to 8\(^{th}\). Thus, while there were large increases in VC funding, the rate of increase in San Diego lagged that of other metropolitan regions.

Preliminary data for San Diego reveal that VC funding declined over 30% to about $1.4 billion in 2001 [from about $2.2 billion in 2000]. Venture Capital funding experienced a slump nationwide in 2001. The California total declined about 62% (to $15.4 billion in 2001, from $40.7 billion in 2000), and the United States total declined about 66% (to $36.5 billion in 2001, from $99.6 billion in 2000). Fortunately, recent data suggests that Venture Capital funding may again be on the upswing.

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\(^{1}\) Dividing the dollars of venture capital by the GMP provides a ratio of the importance of VC to the regional economy. In 1990 this ratio was .0024 implying VC raised represented about 0.2% of the local economy. By 2000 this ratio increased to 2.1% of the economy. Thus, dollars invested in venture capital startups are about 10 times more important to the local economy in 2000 when compared to the same data for the year 1990.
5. Initial Public Offerings [IPOs]

How Is San Diego Doing?
The number of IPOs in San Diego increased from 1 in 1990 to 11 in 2000. The years 1992, 1993 and 1997 each saw 12 firms go public. Over the period, there was a total of 90 IPOs. At the same time, the amount of money raised from these IPOs increased three hundred-fold from $3.3 million in 1990 to $981 million in 2000.

How Do We Compare?
Excellent for 2000. Two comparisons are made. First the total dollars from IPOs are rank ordered for all 21 regions. In this analysis San Diego is ranked 10th in 1990, 7th in 1995 and 3rd in 2000 [see Figure 40]. San Diego has increased the dollar value of its IPOs faster than most other regions. Houston is ranked first in 1990, San Francisco is ranked first in 1995 and Atlanta is ranked first in 2000 implying these regions raised the most money from initial public offerings. Ten regions are tied for the last place ranking in 1990, three regions are tied for last place in 1995, and six regions are tied for the last place ranking in 2000 with no money raised from IPOs. Norfolk and Sacramento are found in the lowest ranking regions for all three periods while Orange is found in the list for two of the periods [1995 and 2000].

Figure 40

Rank by IPO Proceeds

<table>
<thead>
<tr>
<th>1990</th>
<th>1995</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Houston (1)</td>
<td>San Francisco (1)</td>
<td>Atlanta (1)</td>
</tr>
<tr>
<td>Austin, Norfolk, Orlando, Pittsburg, Portland, Raleigh, Sacramento, San Francisco, Seattle, Washington DC (21)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>least money:</td>
<td>most money:</td>
<td></td>
</tr>
<tr>
<td>smallest dollar</td>
<td>largest dollar</td>
<td></td>
</tr>
<tr>
<td>amounts raised by IPOs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>amounts raised by IPOs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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In the year 2000, IPOs in Atlanta raised about $1.83 billion followed closely by Boston with $1.77 billion and San Diego with about $0.98 billion. The six metropolitan regions ranked last had no IPOs in 2000.

Figure 41

IPO Proceeds: 2000
billions of dollars raised

TAM SAC POR PIT ORA NOR RAL WAS MIA STA DEN AUS BAL PHO MIN SFO HOU SJE SAN BOS ATL

WORSE BETTER
In the second comparison, the ratio of dollars raised to GMP is calculated for all 21 metropolitan regions. San Diego’s performance improved steadily as it ranked 10th in 1990, 8th in 1995, and 4th in 2000 and is graded as average for 1990, above average for 1995, and excellent for 2000 [see Figure 42]. Houston is ranked 1st for 1990, San Francisco is ranked first in 1995 and Atlanta is ranked 1st in 2000 implying the amount raised from IPOs is a larger percent of their economies. The same regions ranked last in the absolute dollar values are ranked last in this graphic since the firms had no IPOs in the years in which they are ranked last.

**Figure 42**

*Rank by IPO Proceeds as a Share of GMP*

dollars raised as a percentage of GMP

<table>
<thead>
<tr>
<th>Year</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>San Francisco (1), Norfolk, Orange, Sacramento (21)</td>
</tr>
<tr>
<td>2000</td>
<td>Atlanta (1), Norfolk, Orange, Pittsburgh, Portland, Sacramento, Tampa (21)</td>
</tr>
</tbody>
</table>

1990 1995 2000

San Diego (10) San Diego (8) San Diego (4)

least significant: smallest percentage of GMP

most significant: highest percent of GMP
Utilizing the ratio of IPO money raised to GMP, San Diego and California data appear more volatile than the US data [see Figure 43]. The data appear to move in a cyclical fashion, however, without additional analysis, no definite conclusions are reached.

**Figure 43**

![IPO Proceeds: 1990-2000](image)

**Have We Improved?**

Yes, dramatically. Based on historical San Diego data, the amount of dollars raised from IPOs increased three hundred-fold between 1990 and 2000 and the importance of these monies raised to the San Diego economy increased from about 0.01% of the local economy in 1990 to 0.9% of the economy in 2000\(^2\). Concurrently, San Diego’s ranking amongst the 21 metropolitan regions increased from 10\(^{th}\) to 3\(^{rd}\) in dollars raised and from 10\(^{th}\) to 4\(^{th}\) in IPO proceeds as a share of GMP.

Preliminary results from 2001 reveal that there were three [3] IPOs in San Diego that raised about $390 million – about a 60% decline from the 2000 levels. By contrast, total US IPO proceeds declined about 35% and California proceeds from IPOs declined about 85%.

\(^2\) Dividing the dollars raised from IPOs by the GMP provides a ratio of the importance of IPOs to the regional economy. In 1990 this ratio was .00005 implying dollars raised from IPOs represented about 0.01% of the local economy. By 2000 this ratio increased to 0.9% of the economy. Thus, dollars raised from IPOs were about 94 times more important to the local economy in the year 2000 when compared to the same data for the year 1990.
Overall, San Diego has been able to attract increasing volumes of venture capital funding while companies going public have been able to raise substantially more revenue [see Figure 44]. The importance of both of these to the local economy has grown cyclically during the last decade [see Figure 45].
6. Exports

How Is San Diego Doing?
Merchandise exports more than doubled from $4.35 billion in 1993 to $8.96 billion in 1999 – an increase of about 106%.

How Do We Compare?
Above Average for 1999. To make this comparison, each region’s export share of GMP is estimated [export values for each region are divided by the regions GMP to estimate a share or percent of the economy accounted for by exports]. When these shares are compared, San Diego ranked 11th in 1993 and 1995, and 8th in 1999 [see Figure 46]. Thus, although its export share is still in the middle of the pack, it climbed three places. In short, its rate of increase is faster than some other metropolitan regions. Seattle is ranked first in 1993 and San Jose is ranked first in 1995 and 1999 implying these metropolitan regions are best and have the highest share of exports to their GMP. Norfolk is ranked last in 1993 and 1995 while Baltimore is ranked last in 2000.

Figure 46
Compared to California and United States data, San Diego’s export share of GMP improved. In 1993 San Diego’s export ratio is lower than the export ratio for the California and the US, but by 1998, its ratio is higher than both the California and the United States (see Figure 47).

![Figure 47: Exports: 1993-1999 as a percent of GMP](image)
Have We Improved?
Yes. Based on historical San Diego data, between 1993 and 1999 the dollar value of San Diego’s exports increased at an annual average rate of 17.6%. During the same time period inflation [as measured by the CPI] only increased about 2.5% per year. Thus, there have been “real” increases in exports. Additionally, San Diego’s ranking amongst the 21 regions improved and the ratio of exports to GMP for San Diego is now greater than the US or California average.

Examining San Diego’s export data by product sector for 1999 reveals the following: more than half of all exports fall into two product sectors - Electric and Electronic Equipment [38.8%] and Industrial Machinery & Computers [17.7%]. The next largest category is Scientific and Measuring Instruments with a distant 6.8% of exports [see Figure 48].

Figure 48

San Diego Exports by Sector: 1993 & 1999

<table>
<thead>
<tr>
<th>Sector</th>
<th>1993 Exports</th>
<th>1999 Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric &amp; Electronic Equip</td>
<td>$4.36 billion</td>
<td>$8.96 billion</td>
</tr>
<tr>
<td>Industrial Mach &amp; Computers</td>
<td>20.1%</td>
<td></td>
</tr>
<tr>
<td>Scientific &amp; Measuring Instruments</td>
<td>5.8%</td>
<td>6.8%</td>
</tr>
<tr>
<td>Non-mfg. commodities</td>
<td>2.2%</td>
<td>4.9%</td>
</tr>
<tr>
<td>Chemical prod.</td>
<td>5.8%</td>
<td>4.4%</td>
</tr>
<tr>
<td>Lumber, Wood &amp; Paper prod.</td>
<td>3.6%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Metals: Primary &amp; Fabricated</td>
<td>3.6%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Transportation equip.</td>
<td>5.7%</td>
<td>5.7%</td>
</tr>
<tr>
<td>Other mfg. items</td>
<td>11.8%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Other mfg. items</td>
<td>11.8%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Total Exports</td>
<td>$8.96 billion</td>
<td>$8.96 billion</td>
</tr>
</tbody>
</table>

Total exports more than doubled between 1993 and 1999. The fastest growing sector during this period is Textile Mill Products, which more than tripled or grew 211% from $16 million to $50 million [this sector is very small and only accounts for 0.6% of total exports in 1999]. Ranked second is Electric and Electronic Equipment [includes televisons] which more than tripled from $1.1 billion in 1993 to $3.5 billion in 1999 [it grew 208%]. In 1999 this is the largest export sector for San Diego accounting for almost 39% of all exports. Thus, the largest sector is also one of the fastest growing sectors.
Regarding export destinations, the Americas received 57.7% of all San Diego exports. Europe is ranked second with 19.7% of the exports while Asia is ranked third with 19.1%. By country, Mexico is the destination for 43% of San Diego’s exports [see Figure 49]. Ranked a distant second is Canada receiving about 10% of San Diego’s exports.

Of all the regions, the Americas have the fastest growth rate between 1993 and 1999 as exports more than doubled from $2.4 billion in 1993 to $5.2 billion in 1999 – an increase of about 120%. Thus, the destination accounting for the largest share of San Diego’s exports is also the fastest growing destination.

![San Diego Exports by Destination: 1993 & 1999](image)

**Figure 49**

<table>
<thead>
<tr>
<th>Destination</th>
<th>1993 Exports</th>
<th>1999 Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americas</td>
<td>$4.36 billion</td>
<td>$8.96 billion</td>
</tr>
<tr>
<td>Mexico</td>
<td>43.0%</td>
<td>19.1%</td>
</tr>
<tr>
<td>Europe</td>
<td>21.4%</td>
<td>19.7%</td>
</tr>
<tr>
<td>Asia</td>
<td>19.1%</td>
<td>10.2%</td>
</tr>
<tr>
<td>Canada</td>
<td>9.2%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Near East</td>
<td>1.3%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Africa</td>
<td>2.3%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Other</td>
<td>1.3%</td>
<td>0.7%</td>
</tr>
</tbody>
</table>
7. Capital Facilities Investment on Air Transport

Compiling data on capital outlays for the metropolitan regions is a formidable task. Within a region different jurisdictions have responsibility for different categories of expenditures and this pattern varies between metropolitan regions. In addition, different jurisdictions use different fiscal years, use different schemes to classify their expenditures, and use different accounting systems. Thus, comparing data between metropolitan regions is a major undertaking. To facilitate the process we utilize data from the Bureau of the Census, Governments Division. These data hold merit because of their uniformity and consistency across both geographical and topical areas. The Census Bureau obtains these data from each state’s controller’s office, after which they classify and compile the database. This “census” of government finance is conducted every five years and this study contains data from the 1982, 1987, 1992 and 1997 census. Capital outlays are expenditures to purchase assets or create value that add to the government’s net worth and can include real estate, construction, and other assets that have a useful life longer than one year [automobiles, computers, etc.]. For greater detail on the definitions for capital outlays in this section see the glossary.

Variations in capital outlays, over time, are to be expected if one considers the process of executing a capital project. The project has to be conceptualized, planned, funded and then implemented. Implementation can occur in stages or can be a one-time effort. Because our data are only “snapshots” at four different periods of time, we do not know from which part of this process we are obtaining data, and the results may reflect lump-sum expenditures, or long-term projects.

How Is San Diego Doing?
In nominal dollars, governmental capital outlays for Air Transport increase about fourteen fold to $101.3 million in 1997 from $6.8 million in 1982 – an increase of $95.5 million or about 1,390%.

To determine if there have been any “real” changes in capital outlays, the nominal dollars data presented above are converted to dollars that are adjusted for inflation using the Implicit Price Deflator [IPD]. After conversion it is learned that capital outlays in constant 2000 dollars increase about 800% to $106.3 million in 1997 from $11.8 million in 1982.

To determine the rate at which capital outlays are spent per resident, the inflation adjusted capital outlay data are divided by San Diego’s population to obtain capital outlays per capita in constant 2000 dollars. After the computation it is learned that capital outlays per capita in constant 2000 dollars increase about 554%, to about $39 per capita in 1997, from about $6 per capita in 1982.

In short, there have been “real” per capita increases in governmental capital outlays on air transport in San Diego.

---

23 The Census Department undertakes a sample of jurisdictions every year to compile revenue and expenditure data, however, these sample data are not utilized because they omit jurisdictions that are responsible for certain categories of expenditures. Thus, the sample data are misleading for certain categories of expenditures.
How Do We Compare?
Above Average for 1997. For capital outlays per capita in constant 2000 dollars on air transport in 1997, San Francisco is ranked 1st with $221 while Baltimore is ranked last with no air transport capital outlays and San Diego is ranked 6th with $39 per capita. For the four periods for which we have data, various regions have been ranked 1st implying a changing emphasis on capital outlays for air transport. By contrast, Baltimore is ranked last in three out of the four periods for which we have data and in the period it was not ranked last, it was tied for 19th. Over the 15 years San Francisco has seen its capital outlays per capita in constant 2000 dollars increase about 36,750%. San Diego’s change over the period is about 554%. Within San Diego, over 99% of the capital outlays on air transport come from the San Diego Unified Port District.

Figure 50
Rank Air Transport Capital Outlays Per Capita
in constant 2000 dollars

<table>
<thead>
<tr>
<th>Year</th>
<th>Region</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>Baltimore</td>
<td>21</td>
</tr>
<tr>
<td>1987</td>
<td>Baltimore</td>
<td>21</td>
</tr>
<tr>
<td>1992</td>
<td>Orange</td>
<td>21</td>
</tr>
<tr>
<td>1997</td>
<td>San Diego</td>
<td>6</td>
</tr>
</tbody>
</table>
Compared to California and United States data, San Diego’s capital outlays per capita on air transport in 2000 dollars are below the national average until 1997 when they are higher than the California or United States data [see Figure 51].

**Figure 51**

**Capital Outlays for Air Transport**
in constant 2000 dollars per capita

---

**Have We Improved?**
Yes. Based on historical San Diego data, capital outlays in nominal terms, in inflation adjusted terms, and on a per capita basis adjusted for inflation all reveal that San Diego has improved in the area of capital outlays on air transport.
8. Capital Facilities Investment on Sea and Inland Ports

How Is San Diego Doing?
In nominal dollars, governmental capital outlays for Sea and Inland Ports increase about five fold to $26.4 million in 1997 from $4.3 million in 1982 – an increase of $22.1 million or about 510%.

To determine if there have been any “real” changes in capital outlays, the nominal dollars data presented above are converted to dollars that are adjusted for inflation using the Implicit Price Deflator [IPD]. After conversion it is learned that capital outlays in constant 2000 dollars increase about 270% to $27.7 million in 1997 from $7.5 million in 1982.

To determine the rate at which capital outlays are spent per resident, the inflation adjusted capital outlay data are divided by San Diego’s population to obtain capital outlays per capita in constant 2000 dollars. After the computation it is learned that capital outlays per capita in constant 2000 increase about 168%, to about $10 per capita in 1997, from about $4 per capita in 1982.

In short, there have been “real” per capita increases in governmental capital outlays on sea and inland ports in San Diego.

How Do We Compare?
Above Average for 1997. For capital outlays per capita in constant 2000 dollars on Sea and Inland Ports San Diego is ranked 5th [see Figure 52]. In fact, San Diego’s ranking has improved from 9th in 1982 to 5th in 1987 and 5th again in 1997. Seattle is ranked 1st in 1987, 1992 and 1997 and its per capita capital outlays on sea and inland ports is about $66 in 1997 – or about four times higher than the 2nd ranked region Miami. Nine of the 21 regions have no sea or inland port facilities. Of the regions ranked, only Baltimore and Pittsburgh have sea or inland ports facilities.

Figure 52

Rank Sea & Inland Port Capital Outlays Per Capita in constant 2000 dollars

<table>
<thead>
<tr>
<th>Year</th>
<th>Region</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>Portland</td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>San Diego (5)</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>Seattle (1)</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>Seattle (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seattle (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>San Diego (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>San Diego (9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Atlanta, Austin, Baltimore,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Denver, Norfolk, Phoenix,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pittsburgh, Ralegh, San Jose,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Washington, DC (21)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Portland</td>
<td></td>
</tr>
<tr>
<td></td>
<td>San Diego (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seattle (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seattle (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>San Diego (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>San Diego (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Atlanta, Austin, Baltimore,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Denver, Norfolk, Phoenix,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pittsburgh, Ralegh, San Jose,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Washington, DC (21)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Portland</td>
<td></td>
</tr>
<tr>
<td></td>
<td>San Diego (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seattle (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seattle (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>San Diego (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>San Diego (9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Atlanta, Austin, Baltimore,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Denver, Norfolk, Phoenix,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pittsburgh, Ralegh, San Jose,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Washington, DC (21)</td>
<td></td>
</tr>
</tbody>
</table>
Compared to California and United States data, San Diego’s capital outlays per capita on sea & inland ports in 2000 dollars tend to be above the national average, however, the San Diego data appear to be cyclical with large increases and decreases [see Figure 53].

**Figure 53**

**Capital Outlays for Sea & Inland Ports**

*in constant 2000 dollars per capita*

---

**Have We Improved?**

Mixed Results. Based on historical San Diego data, it is observed that capital outlays per capita in constant 2000 dollars have not always increased, although there have been increases in nominal dollars every year, and inflation adjusted dollars every year. Thus mixed results are provided as the answer to this question.

Over 92% of the funding for capital outlays on sea and inland ports come from the San Diego Unified Port District.
9. Capital Facilities Investment on Highways

How Is San Diego Doing?
In nominal dollars, governmental capital outlays for Highways increase about four fold to $141.2 million in 1997 from $30.6 million in 1982 – an increase of $11.6 million or about 361%.

To determine if there have been any “real” changes in capital outlays, the nominal dollars data presented above are converted to dollars that are adjusted for inflation using the Implicit Price Deflator [IPD]. After conversion it is learned that capital outlays in constant 2000 dollars increase about 178% to $148.3 million in 1997 from $53.3 million in 1982.

To determine the rate at which capital outlays are spent per resident, the inflation adjusted capital outlay data are divided by San Diego’s population to obtain capital outlays per capita in constant 2000 dollars. After the computation it is learned that capital outlays per capita in constant 2000 increase about 102%, to about $54 per capita in 1997, from about $27 per capita in 1982.

In short, there have been “real” per capita increases in governmental capital outlays on highways in San Diego.

How Do We Compare?
Above Average for 1997. For capital outlays per capita in constant 2000 dollars on Highways San Diego is ranked 9th and its ranking has improved all four of the years for which we have data [see Figure 54]. Minneapolis is ranked 1st in 1992 and 1997 and its per capita capital outlays on highways in 1997 is about $125 in 1997 – or 10% higher than the 2nd ranked region Denver. Raleigh is ranked last for two of the years for which we have data [1982 and 1997].

Figure 54

<table>
<thead>
<tr>
<th>Rank Highway Capital Outlays Per Capita</th>
<th>in constant 2000 dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baltimore (1)</td>
<td>Phoenix (1)</td>
</tr>
<tr>
<td>Minneapolis (1)</td>
<td>Minneapolis (1)</td>
</tr>
<tr>
<td>San Diego (9)</td>
<td>San Diego (10)</td>
</tr>
<tr>
<td>San Diego (13)</td>
<td>San Diego (16)</td>
</tr>
<tr>
<td>Raleigh (21)</td>
<td>Miami (21)</td>
</tr>
<tr>
<td>Boston (21)</td>
<td>Raleigh (21)</td>
</tr>
</tbody>
</table>

Compared to California and the United States, San Diego’s per capita capital outlays on highways in constant 2000 dollars has risen from below both the US and California data, to above California and the US data [see Figure 55].

**Figure 55**

*Capital Outlays for Highways*

*in constant 2000 dollars per capita*

Have We Improved?
Yes. Based on historical data, San Diego’s capital outlays in nominal terms, in inflation adjusted terms, and in per capita inflation adjusted terms all increased. While these real per capita increases were occurring, San Diego’s ranking also increased.
10. Patenting Activity

Patents are a key component of turning research into profits. If an organization or individual invents a new item or process, ownership of the idea can be protected by patenting the idea with the United States Office of Patent and Trademark [PTO]. Once patented, the organization protects any revenues that result from the sales of goods or services based on the idea that was patented.

There are three types of patents that the US PTO awards – utility patents, design patents [ornamental manufacture], and plant patents [agriculture / horticulture]. Utility patents are referred to as patents of invention.

Between 1990 and 1999, there were a total of 12,299 patents awarded to individuals and organizations in San Diego. Of that total, 10,984 patents or 89% are utility patents, 1,190 or 10% are design patents, and 125 or 1% are plant patents. Since utility patents account for the vast majority of all patent documents issued by the US PTO, we examine utility patents for all regions, California and the United States. The Glossary of Terms contains the US PTO definitions for plant patents and design patents. According the US PTO:

A utility patent is issued for the invention of a new and useful process, machine, manufacture, or composition of matter, or a new and useful improvement thereof. It generally permits its owner to exclude others from making, using, or selling the invention for a period of up to twenty years from the date of patent application filing, subject to the payment of maintenance fees.

There is a lag between the time a patent is awarded and the time the patent generates revenue. The length of time between these activities can vary from a couple of years to over a decade depending on the type of patent. For example, patents awarded in the drug arena must be tested and approved by the Federal Drug Administration [FDA] before they can be sold to the public. At any point in the testing process the new drug may be dropped if it is found not to be successful. Even if shown to be successful, the approval process can take years before the drug is finally sold on the open market.

How Is San Diego Doing?
Between 1990 and 1999, the number of utility patents awarded to organizations and individuals in San Diego increased from 761 in 1990 to 1,749 in 1999. This increase represents a compound annual growth rate of about 9.7% per year.

24 17 years before 1995.
25 See the US PTO’s web site: http://www.uspto.gov/web/offices/ac/ido/oeip/taf/patdesc.htm
How Do We Compare?
Above Average for 2000. To make this comparison, the number of utility patents awarded to a region is divided by the region’s population to obtain the number of patents per million population. When compared to 20 other metropolitan regions, San Diego’s ranking fell from 8th in 1990 to 9th in 1995 and then rose to 7th in 1999 [see Figure 56]. San Jose is ranked first during all three periods and in 1999 its ratio of 3,438 patents per million population is roughly 11 times higher than the US average of 308 patents per million. Norfolk is ranked last in all three periods with a ratio of 84.5 patents per million population or about one fourth the national average. San Diego’s ratio in 1999 is 620 patents per million population or about twice the US average.

Figure 56
Rank by Patenting
number of utility patents granted per million population

<table>
<thead>
<tr>
<th>Year</th>
<th>San Jose</th>
<th>San Diego</th>
<th>Norfolk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>1</td>
<td>8</td>
<td>21</td>
</tr>
<tr>
<td>1995</td>
<td>1</td>
<td>9</td>
<td>21</td>
</tr>
<tr>
<td>1999</td>
<td>1</td>
<td>7</td>
<td>21</td>
</tr>
</tbody>
</table>

most patenting

least patenting

1990 1995 1999
Compared to California and United States data, San Diego’s ratio of patents per million population is higher in 1999 – about two times higher than the US ratio and about 22.5% higher than the California ratio. The growth in San Diego’s ratio occurs at a compound annual rate of 8.3% between 1990 and 1999. The US growth rate for the same period is 5.5% while California’s growth rate is 9.1% [see Figure 57].

**Figure 57**

![Patenting graph](chart)

**Have We Improved?**
Yes. Based on historical San Diego data, the absolute number of patents awarded to San Diego residents more than doubled during the 1990s and the ratio of patents per million population also more than doubled. With a ratio of patents per million population that is more than twice the US average, San Diego can be viewed as a “hotbed” of innovation. Since innovation is a key to being competitive in the marketplace, San Diego organizations are laying a solid foundation for future economic growth.

Between January 1, 1990 and December 31, 1999, the US PTO awarded 10,984 utility patents to organizations and individuals in San Diego26. Using the US PTO’s data, it is learned that the organization receiving the most utility patents between 1990 and 1999 is Hewlett Packard27 as it was awarded 421 utility patents or 3.8% of the total [see Figure 58, following page]. Ranked second is the US Navy with 345 patents or 3.1% of the total. Ranked 3rd is Qualcomm, Inc. with 292 patents or 2.7% of the total. Individually owned patents [patents not assigned to an organization] total 2,800 and represent 25.5% of the total. All other patents were awarded to the remaining 1,459 organizations and their share accounts for 61% of the total. A listing of all organizations that received 10 or more patents between 1990 and 1999 is contained in the Appendix.

26 US Patent and Trademark Office.
27 HP has a research office located in the northern part of San Diego County.
When the US PTO awards patents, it classifies the patent according to a system it originally developed in the 1880s. The initial system has been expanded, and today there are over 460 categories in the US PTO’s Original Classification scheme. A complete list of categories with associated class numbers can be found in the Appendix. For this study, this system is referred to as the US PTO’s “Original Classification”. Using the US PTO’s Original Classification scheme, it is observed that San Diego patents are contained in 359 categories and the largest category of patents awarded to San Diego recipients is in Chemistry: Molecular Biology and Microbiology [OR class 435] which contains 809 patents or 7.4% of the total [see table in Appendix for details]. Ranked 2nd is Drug, Bio-Affecting and Body Treating Compositions [OR class 514] with 496 patents or 4.5% of the total. And ranked 3rd is Drug, Bio-Affecting and Body Treating Compositions [OR class 424] with 287 patents or 2.6% of the total. Thereafter, the remaining patents are not concentrated in a category. For example, there are 35 categories having one patent, 19 categories containing 2 patents, 29 categories having three patents, and so forth.

Next we determine the patent categories in which San Diego patent recipients specialize. To make this determination, a statistics called the “location quotient” is computed. The location quotient is calculated by dividing the San Diego share of each patent category by the US share of each patent category. The result is then multiplied by 100. If a San Diego category equals 100, it means that the share of patents in that category in San Diego is the same as the share in the United States28.

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28 Location quotient is a statistical measure of the extent to which a particular economic activity is over- or under-represented in the economy of a region, compared to its representation in the economy as a whole.
Rather than use all 460 categories of the US PTO’s Original Classification scheme, these categories are condensed to 56 Standard Industrial Classification [SIC] codes or groups of SIC codes using an operation the US PTO calls “concordance”. A concordance, in the US PTO’s usage of the word, is a table or list of US patent classifications and their corresponding SIC code(s). This process is inexact and is based on the attributes of the item being patented – not on the SIC code of the organization receiving the patent. As part of the concordance process, the patents are distributed among the 56 SIC-based product fields to which the Original Classification system subclass has been matched. This may result in a “Fractional Count”. Using utility patent data for the years 1995 through 1999, San Diego patents are allocated to the US PTO’s 56 categories and the location quotient is computed for each of the 56 SIC codes groupings. These data used are found in the Appendix.

San Diego’s area of greatest patent specialization is Drugs and Medicine which is SIC code 283. The San Diego location quotient for this category is 774 implying the share of patents in San Diego is almost 8 times higher than the national average. Ranked 2nd is Agricultural Chemicals [SIC code 287] with a location quotient of 638 which imply the share of patents in San Diego is more than six times higher than the national averages. There are several areas where the location quotient is greater than 400 and the top ten areas are contained in Figure 58.

The US PTO developed the list by selecting the most likely SIC code(s) for each US patent classification. There isn't, however, always a good relationship between the two systems, since they are based on different principles. If one were to look at the individual patents from a given U.S. patent classification, they may all correspond to the SIC code(s) or they may represent several different SIC codes. Therefore an individual patent from the U.S. patent classification scheme may not be correctly identified by the SIC code(s) from the concordance. When looking at aggregated data, however, there should be a strong relationship between US patent classification and its corresponding SIC code(s).

For example, if a patent has an "original" classification in a US PTO subclass which is matched to 2 unique SIC-based product fields, that patent would be counted as 0.5 in each of the SICs. "Fractional Counts" are rounded to the nearest whole number. The practical effect is that there are more patents after the concordance process. For San Diego, the original 10,984 patents awarded between 1990 and 1999 become 14,788 patents after the concordance process.
11. Education

The level of educational attainment is selected because of its impact on economic development. Studies have shown that the greater the level of education, the more productive individuals are and the greater their income.

The level of educational attainment data is obtained from the Bureau of the Census for two periods – 1990 and 2000. In its Census, the Bureau compiles individual data based on the following classifications:\(^{31}\):

- Total number of individuals 25 years of age or older
- Those with less than a 9th grade education
- Those completing 9th through 12th grade, but without a diploma
- A high school graduate [including the equivalency]
- Some college, but no degree
- An Associates degree
- A Bachelor’s degree
- A graduate or professional degree

For this study, the seven census categories are condensed into five categories and they are the following:

- **Below High School** – the first two census categories are combined [#1, less than 9th grade education and #2, those completing 9th to 12th without a diploma].
- **High School** – the same category the census uses [#3, high school graduate]
- **Some College** – two census categories are combined, #4, some college and #5, an Associates degree.
- **Bachelors Degree** – same category as census, #6, Bachelor’s Degree.
- **Graduate or Professional** – same category as census #7, graduate or professional degree.

Each category is then given a weight and they are the following:

- **Below High School** = -1
- **High School** = 1
- **Some College** = 2
- **Bachelors Degree** = 3
- **Graduate or Professional** = 4

These weights are then multiplied by the share of the population in each category. The rationale for the weighting scheme [-1 to 4] stems from average wages for persons with the various levels of education. Those below high school had such low wages that they were viewed as a cost to society and subsidies would be involved to assist them. After the computations, we have numbers that range between 1.09 for Miami in 1990, to 2.05 for San Francisco in 2000.

---

\(^{31}\) The Bureau of the Census obtains these data from the “long form” questionnaire distributed to the population. To obtain the actual number of persons, the census uses statistical inference from the sample of individuals receiving the long form. The actual data vary around a mean titled the “Estimate”. The census also provides a “lower bound”, and an “upper bound”. For this study we use the mean or “Estimate” data.
How is San Diego Doing?
San Diego’s overall score increased from 1.57 in 1990 to 1.67 in 2000. This increase is 0.10 or 6.4%.
Findings regarding the distribution of data:
- **Below High School** – the share in this category increases from 18.1% in 1990 to 19.0% in 2000.
- **High School** – the share in this category declines from 22.8% in 1990 to 16.7% in 2000.
- **Some College** – the share in this category increases from 33.9% in 1990 to 34.4% in 2000.
- **Bachelors Degree** – this share in this category increases from 16.5% in 1990 to 18.7% in 2000.
- **Graduate or Professional** – this share in this category increases from 8.8% in 1990 to 11.2% in 2000.

The only category that shows a decline is the category of individuals with just a high school degree and it declines by 6.1% [see Figure 60]. The largest increase occurs in the category graduate or professional, which increases by 2.4%. The 2nd largest increase occurs in the category of bachelor’s degree, which increases 2.2%.

![Figure 60](image-url)

**Figure 60**

San Diego Level of Educational Attainment

for persons 25 years of age and older
How Do We Compare?
Below Average for 2000. San Francisco is ranked 1st in 2000 with a score of 2.05 and San Diego is ranked 14th with a score of 1.67. Miami is ranked last with a score of 1.37.

Figure 61

<table>
<thead>
<tr>
<th>Rank Order Educational Attainment</th>
<th>Washington, DC (1)</th>
<th>San Francisco (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total weighted score</td>
<td>San Diego (11)</td>
<td>Miami (21)</td>
</tr>
<tr>
<td>Total weighted score</td>
<td>Miami (21)</td>
<td>San Diego (14)</td>
</tr>
</tbody>
</table>

1990: San Diego (11) and Miami (21)
2000: San Diego (14) and Miami (21)
San Diego has always had a total score for educational attainment that is higher than the total score for California or the United States [see Figure 62]. What is noteworthy is the fact that the rate of growth for the US is faster than either San Diego or California. The US score increased about 21% during the decade while San Diego increased about 6% and California increased about 9%.

**Figure 62**

Have We Improved?
Yes. Based on San Diego historical data, the total score for educational attainment increased between 1990 and 2000.
➤ Environmental Indicators

Indicators in this category include those that measure air quality and water quality, crime rates, and capital outlays by governmental organizations on sewerage, solid waste management and water utilities. Air and water qualities are presented because these indicators are direct measures of environmental quality. Crime is included as it presents a perspective of the relative safety of our environment. Capital outlays represent governmental expenditures that impact our physical environment. All of these indicators are important to the health of the region. Furthermore, if these indicators deteriorate significantly, San Diego may not be able to maintain its human resources talent, which means it could lose its competitive edge.

Figure 63

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Excellent</th>
<th>Above Average</th>
<th>Average</th>
<th>Below Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Water Quality</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crime</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Capital Outlays on Sewerage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Outlays on Solid Waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Capital Outlays on Water Utilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUM OF ENVIRONMENT INDICATORS</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Distribution | 50.0% | 16.7% | 0.0% | 33.3% | 0.0% |

Strengths

With regard to Capital Outlays, the areas of relative strength for San Diego are governmental capital outlays on sewerage where San Diego is ranked 1st and capital outlays on water utilities where San Diego is ranked 4th. San Diego’s ranking for water quality is tied for the 2nd place ranking, however, the San Diego watershed is subject to “stressors” [as detailed by the Environmental Protection Agency] and could deteriorate quickly. San Diego’s crime rate is ranked 6th [above average] and has shown considerable improvement over the last decade.

For two thirds of the Environmental indicators examined, San Diego is ranked Excellent or above average.

Weakness

Air Quality is a weakness of the region [although San Diego has improved dramatically over the last decade], where San Diego is ranked 17th for 2000 in the number of days not meeting air quality requirements established by the US Environmental Protection Agency. With regard to Capital Outlays, the area of relative weakness for San Diego is investment in solid waste management where San Diego is ranked 15th.
### Has San Diego Improved? - Environment

Compared to historical San Diego data

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>No</th>
<th>Mixed Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality</td>
<td>![↑]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Quality</td>
<td>![↑]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crime</td>
<td>![↑]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Outlays on Sewerage</td>
<td>![↑]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Outlays on Solid Waste</td>
<td>![⇔]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Outlays on Water Utilities</td>
<td>![⇔]</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SUM OF ENVIRONMENT INDICATORS</strong></td>
<td>4</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
<td>66.7%</td>
<td>0.0%</td>
<td>33.3%</td>
</tr>
</tbody>
</table>

Over the last decade San Diego has shown improvement for four of the six Environmental indicators reviewed.

**12. Air Quality**

The indicator used in this analysis is number of days each year that a metropolitan region does not meet the United States Environmental Protection Agency [EPA] ambient air quality standards. The fewer the number of days not meeting EPA air standards, the better the air quality.

The Air Quality Index [AQI] is a measure compiled by the EPA. This Index is composed of five major air pollutants regulated by the Clean Air Act – ground level ozone, particulate matter, carbon monoxide, sulfur dioxide and nitrogen dioxide. For each of these pollutants the EPA has established national air quality standards designed to protect humans against harmful health effects. The higher the value of the AQI, the greater the level of air pollution, and the greater the health danger.

**How Is San Diego Doing?**
San Diego met all EPA air quality standards in 2000 except the 8-hour standard for ozone. Specifically, San Diego exceeded the limits of this standard on 14 days in 2000.
How Do We Compare?
Below Average for 2000 [but improving]. Compared to the 20 other metropolitan regions, San Diego ranked last in 1990, 20th in 1995 and 17th in 2000. San Francisco ranked 1st in 1990, Seattle ranked 1st in 1995, and five metropolitan regions are tied for 1st in 2000 implying these regions are best and had the fewest days not meeting EPA air quality standards. Houston is ranked last in 1995 and 2000 implying it had the worst air quality. Although San Diego is ranked in the lowest quintile, its rate of improvement has been substantial.

**Figure 65**

**Rank by Air Quality Index**
number of days not meeting EPA standards

<table>
<thead>
<tr>
<th>1990</th>
<th>1995</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Diego (20)</td>
<td>San Diego (21)</td>
<td>San Diego (17)</td>
</tr>
<tr>
<td>San Diego (21)</td>
<td>San Diego (20)</td>
<td>San Diego (17)</td>
</tr>
<tr>
<td>Houston (21)</td>
<td>Houston (21)</td>
<td>San Diego (17)</td>
</tr>
</tbody>
</table>

best air quality: fewest days not meeting standards

worst air quality: most days not meeting standards

Miami, Minneapolis, Portland, San Francisco, and San Jose (1)
The EPA does not compile data on average air quality for the state of California and the United States. To obtain data to perform this time series analysis, the number of days exceeding EPA standards are averaged for the five California regions [to obtain the California average], and the number of days exceeding the EPA standards are averaged for the 21 metropolitan regions [to obtain the United States average]. San Diego’s has improved substantially since 1990, bringing it in line with the state and national averages [see figure 66].

**Figure 66**

Air Quality Index: 1990-2000

<table>
<thead>
<tr>
<th>Year</th>
<th>San Diego</th>
<th>CA 5 metro area average</th>
<th>US 21 metro area average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>96</td>
<td>200</td>
<td>60</td>
</tr>
<tr>
<td>1991</td>
<td>70</td>
<td>150</td>
<td>30</td>
</tr>
<tr>
<td>1992</td>
<td>50</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>1993</td>
<td>30</td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td>1994</td>
<td>20</td>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td>1995</td>
<td>10</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>1996</td>
<td>5</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>1997</td>
<td>5</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>1998</td>
<td>10</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>1999</td>
<td>5</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>2000</td>
<td>5</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

Have We Improved?
Yes, dramatically. Based on historical San Diego data, there were 96 days in 1990 when San Diego’s air quality did not meet EPA air quality standards. The decline to 14 days in 2000 represents an 85% decrease in the number of days of poor air quality [see figure 66].
To see how San Diego’s air quality has changed over time, the concentration of ozone per square kilometer [sq. km.] and by resident is compiled. Ozone is one of five air quality measures compiled in San Diego County\textsuperscript{32}. Ozone is selected because of the difficulty San Diego has experienced in meeting US EPA requirements for this item. Between 1983 and 1999 there is a stunning 90% decline in ozone concentration per sq. km and a dramatic 97.5% decline in ozone exposure per capita. This air quality improvement occurred despite San Diego’s location downwind of the large Los Angeles metropolitan region, which is among the cities with the worst air quality in the United States. Further, this improvement occurs while the San Diego economy grew from about $43 billion in 1983 to about $92 billion in 1999 [constant 1996 dollars, see Figure 67]. The implication of this data is that it is possible to have economic expansion while reducing pollution.

\textsuperscript{32} The other air quality measures are particulate matter, carbon monoxide, sulfur dioxide and nitrogen dioxide.
13. Water Quality

Two sets of indicators are used for this analysis – one indicator is compiled by the United States EPA and is called the “Index of Watershed Indicators [IWI]”. The second set of indicators measure tap water quality and are compiled by the City of San Diego Water Department.

The term watershed or drainage basin refers to a geographic area where water and sediment drain to a common outlet eventually leading to a body of water. A watershed is defined by natural hydrology [the science of the flow and distribution of water] and represents a logical unit for managing natural resources. Watersheds are those land areas bounded by topographic features on the landscape that catch falling rain and snow which drains to creeks, rivers, lakes, estuaries, lagoons, marshes, the ocean or groundwater basins. The quality of the natural environment is the cumulative result of activities within a drainage basin. Human disturbances in watersheds, such as residential, commercial and industrial development and the construction of roadways alter natural drainage patterns and accelerate the rate of erosion and drainage through the watershed. Watersheds provide useful geographic units for managing natural resources aimed primarily at protecting aquatic ecosystems. The different types of aquatic ecosystems in any watershed are determined by physical characteristics such as variation of slope in the terrain, amount, frequency, and intensity of precipitation; soil type; and vegetation within the watershed.

Activities in each watershed impact areas that are miles away, as runoff, sediment, and pollutants flow through the watershed toward its outlet. For example, the conversion of land in its natural state to developed land affects the amount and type of pollutants that are generated and then flow through watershed to water bodies and the oceans. In whichever direction the watersheds extend, land use decisions in those areas affect the natural resources and water quality in the region.

The IWI is a compilation of information on the "health" of aquatic resources in the United States. It combines a variety of indicators that point to whether rivers, lakes, streams, wetlands and coastal areas are "well" or "ailing" and whether activities on the surrounding lands that affect the waters are placing them at risk. Examples of indicators include the occurrence of contaminants in surface or groundwater and the percent of rivers and lakes supporting drinking water use. The IWI is composed of three components and each watershed is ranked on a scale of 1 to 6 where 1 is best and 6 is worst. The data compiled by the EPA spans the years 1997 through 1999.

The EPA compiles the IWI for over 2,000 watersheds in all 50 states of the United States; however, many metropolitan areas encompass more than one watershed. Since watersheds follow geographic rather than political boundaries, we examine the geographical setting for each metropolitan area and take steps to select the watersheds that most closely represent it. A complete list of all watersheds for the 21 metropolitan areas is contained in Appendix B.

The US EPA recognizes six watersheds falling within (or partially within) the borders of San Diego County and they are the following:
- 18070301 Aliso-San Onofre
- 18070302 Santa Margarita
- 18070303 San Luis Rey-Escondido
- 18070304 San Diego
- 18070305 Cottonwood-Tijuana
- 18100200 Salton Sea

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33 For detail on the process of computing the IWI visit the EPA web site at http://www.epa.gov/iwi/help/.
34 For details on the metropolitan areas and their associated watersheds, see the water quality documentation form in Appendix B.
Watershed number 18070304 is chosen to represent regional water quality for San Diego because its area covers the range most closely associated with the San Diego region. The boundaries of the San Diego watershed fall entirely within the county, while the remaining EPA watersheds cover large portions of Orange, Riverside and/or Imperial counties.

Watershed number 18070304 from the US EPA map corresponds to the six watersheds titled Otay, San Diego, Pueblo-San Diego, Sweetwater and Penasquito and San Dieguito in the SANDAG map [see Figure 68].

Figure 68
Watersheds In and Around San Diego County

This SANDAG map is used because it is easier to read than the US EPA map, however, we use the EPA boundaries so we can use the EPA Index of Watershed Indicators.

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35 SANDAG recognizes 11 watersheds in San Diego County five of which extend beyond the County borders.
How Is San Diego Doing?
In 1999, San Diego’s IWI was 2 indicating **better water quality, high vulnerability**. The EPA’s description of this evaluation is the following:

**Watersheds with Better Water Quality** – Watersheds where data are sufficient to assert that the designated uses are largely met and other indicators of watershed condition show few problems.

**Watersheds with Higher Vulnerability to Stressors** – Watersheds where data suggest significant pollution and other stressors and, therefore, a higher vulnerability to declines in aquatic health. These watersheds have the greatest need for actions to protect quality and prevent decline.

In short, data are sufficient to state that the region’s water quality is currently good; however, there are significant polluters that stress the ecosystem. On its web site, the EPA lists 133 sites that release toxic substances into the San Diego watershed and thousands of sites that release hazardous wastes into the same watershed. Caution should be used when saying the San Diego watershed is doing well as the evaluation suggests there is potential for decline in watershed quality.

How Do We Compare?
Excellent for 1999. San Diego ranked 5th in 1997 and 2nd in 1999 – a significant improvement during the two year period. Denver is ranked 1st in both periods, implying its watershed is the cleanest, while five metro areas are ranked last in 1997 and two are ranked last in 1999. Boston and Minneapolis ranked last in 1997 and 1999.

---

**Figure 69**

**Rank by Index of Watershed Indicators**

<table>
<thead>
<tr>
<th>EPA index - 1 is best, 6 is worst water quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
</tr>
<tr>
<td>San Diego (5)</td>
</tr>
<tr>
<td>Denver (1)</td>
</tr>
<tr>
<td>Boston, Houston, Minneapolis, Norfolk, Seattle (21)</td>
</tr>
</tbody>
</table>

| 1999                                          |
| San Diego (2)                                 |
| Denver (1)                                    |
| Boston, Minneapolis (21)                      |

---

36 See web site http://www.epa.gov/iwi/hucs/18070304/score.html#
37 See web site http://oaspub.epa.gov/surf/surffac?huc=18070304&idip=17&name=San%20Diego
38 See web site http://oaspub.epa.gov/surf/surffac?huc=18070304&idip=01&name=San%20Diego
The range of IWI scores reveals only Denver metro area has a score of 1.0. San Diego is grouped with several other regions with a score of 2.0. The scores for the US and California were estimated by SANDAG by averaging the IWI scores for all reported watersheds in the US and California.

**Figure 70**

*Index of Watershed Indicators: 1999*

EPA index - 1 is best, 6 is worst water quality
Have We Improved?
Yes. Based on historical San Diego data, San Diego’s IWI score declined [improved] from 4.0 in 1997 and 1998 to 2.0 in 1999. The result is an increase in our ranking [from 5th to 2nd].

Figure 71
Index of Watershed Indicators: 1997-1999
EPA index - 1 is best, 6 is worst water quality

It is important to recall that the EPA noted that the watershed in which San Diego resides is subject to “stressors” which could harm the ecosystem. With thousands of sites that pollute, it is easy to understand how the IWI ranking could deteriorate fairly rapidly in the future. In fact, the EPA’s definition specifically states: These watersheds have the greatest need for actions to protect quality and prevent decline.

The second set of indicators deal with tap water quality and data are compiled to get a sense of San Diego’s tap water quality during the last decade. Each jurisdiction monitors its own water quality, according to state and local (as well as federal) standards. Thus, no data are compiled for the other 20 metropolitan areas.

Drinking water, in any region, can reasonably be expected to contain traces of dissolved minerals, organic matter, or other “contaminants.” These contaminants, when found in tiny quantities, pose no health risk. However, long term exposure to elevated quantities of harmful contaminants can pose a severe health risk. Therefore, the government (at both the federal and state levels) imposes quality regulations to protect drinking water quality.
Within the region, regular monitoring reveals that San Diego tap water meets both US EPA and California State Department of Health Services standards. Over the past decade, the majority of regulated contaminants are found to be completely absent\(^39\) from the water supply. Of those that are detected on a regular basis, total trihalomethanes (a class of organic chemical pollutants), turbidity (muddiness), and coliform bacteria (a biological contaminant) levels are consistently below both federal and state health related standards, implying high overall tap water quality in the region [see Figure 73].

Total trihalomethanes (TTHMs) are an important indicator of tap water quality, since persons who use water containing trihalomethanes in excess of the MCL [maximum contaminant level] over many years may experience liver, kidney, or central nervous system problems, and may have an increased risk of contracting cancer.\(^40\)

The state and federal standards for this contaminant require that the detectable levels remain below 100 parts per million (ppm). Over the past decade, San Diego’s tap water has consistently met this standard.

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\(^39\) Reported as “ND” or “not detectable at testing limit”.

\(^40\) City of San Diego Water Department, Consumer Confidence Report: 2000.
The State of California Recommended Maximum Contaminant Level for “Dissolved Solids” (an aesthetic standard\(^{41}\)) was set at 500 ppm until 1998.\(^{42}\) The upper limit was set at 1,000 ppm. While San Diego’s tap water quality was well within the 1,000 ppm limit, it did not consistently meet the more rigorous (500 ppm) standard [see Figure 73]. However, in the late 1990s, both the state and federal government adopted the 1,000 ppm level as the new standard for Recommended Maximum Contaminant Level. Thus, these data suggest that San Diego’s tap water has been acceptable (though not superior) in terms of its aesthetic characteristics.

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41 Tap water is measured according to Primary and Secondary standards. Primary standards are mandatory health related standards, and include clarity, as well as microbiological, radiological and chemical contaminants. Secondary standards are aesthetic standards, and have little or no known health effects.

42 In 1999 the standard Maximum Contaminant Level (MCL) for total dissolved solids was raised from 500 ppm to 1,000 ppm for both the state and federal standards. 1,000 ppm was formerly considered the “upper limit.”
14. Crime

The total crime rate is composed of two items: violent crimes rate and property crimes rate. Violent crimes are composed of four offenses: murder and non-negligent manslaughter, forcible rape, robbery and aggravated assault. Property crimes include burglary, larceny-theft, and motor vehicle theft.43

The crime rate is calculated by dividing the number of crimes per 1,000 population. There are three crime rates: the violent crime rate, the property crime rate and the total crime rate [violent crime rate plus property crime rate]. These rates are computed for all 21 metropolitan regions, California and the United States.

How Is San Diego Doing?
Between 1990 and 2000, the number of violent crimes in San Diego declined 35% to 13,746 [from 21,213] while the number of property crimes declined 49% to 80,662. Total crimes declined 47%. Of the total number of crimes in 2000, about 85% are property crimes and this share is similar throughout the ten-year period.

How Do We Compare?
Above Average for 1998. When compared to 20 other metropolitan regions, San Diego is ranked 12th in 1991, 10th in 1994 and 6th in 1998. Boston is ranked first in all three periods implying it is safest and has the lowest crime rate. Miami is ranked last in 1991 and 1994 and Phoenix is ranked last in 1998. While San Diego is ranked in the middle of these 21 metropolitan regions, its rate of improvement has been faster than other metropolitan regions, thus, its ranking has improved over the last decade [see Figure 74].

---

**Figure 74**

Rank by Total Crime Rate
violent and property crimes per 1,000 population

<table>
<thead>
<tr>
<th>Year</th>
<th>Boston</th>
<th>San Diego</th>
<th>Miami</th>
<th>Phoenix</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>1</td>
<td>12</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>1</td>
<td>10</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>1</td>
<td>6</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

43 All definitions are from the Federal Bureau of Investigation. 1998 is the most recent year we have complete crime rate data for all 21 metropolitan regions.
Compared to California and United States data, San Diego’s total crime rate has declined faster over the last decade [see Figure 75]. In 1990 San Diego’s total crime rate was higher than the US and California rate. By 2000, San Diego’s total crime rate was lower than that of California and the United States. The United States total crime rate fell 29% between 1990 and 2000 while the California total crime rate declined 43% and the San Diego rate declined 53% during the same period.

**Figure 75**

Total Crime Rate: 1991-2000
violent and property crimes per 1,000 population
Have We Improved?
Yes. Based on historical San Diego crime rate data, it is observed that the violent crime rate declines 39% between 1990 and 1999 and the property crime rate declines 53% during the same period [see Figure 76]. At the same time, San Diego’s ranking amongst the 21 regions increased from 12th in 1991 to 6th in 1998.

Figure 76

Crime in San Diego

<table>
<thead>
<tr>
<th>Year</th>
<th>Violent Crime</th>
<th>Property Crime</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>25,000</td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>22,500</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>20,000</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>17,500</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>15,000</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>12,500</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>10,000</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>7,500</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>5,000</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>2,500</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
15. Capital Facilities Investment on Sewerage

Compiling data on capital outlays for the metropolitan regions is a formidable task. Within a region different jurisdictions have responsibility for different categories of expenditures and this pattern varies between metropolitan regions. In addition, different jurisdictions use different fiscal years, use different schemes to classify their expenditures, and use different accounting systems. Thus, comparing data between metropolitan regions is a major undertaking. To facilitate the process we utilize data from the Bureau of the Census, Governments Division. These data hold merit because of their uniformity and consistency across both geographical and topical areas. The Census Bureau obtains these data from each state’s controller’s office, after which they classify and compile the database. This “census” of government finance is conducted every five years and this study contains data from the 1982, 1987, 1992 and 1997 census. Capital outlays are expenditures to purchase assets or create value that add to the government’s net worth and can include real estate, construction, and other assets that have a useful life longer than one year [automobiles, computers, etc.]. For greater detail on the definitions for capital outlays in this section see the glossary.

Variations in capital outlays, over time, are to be expected if one considers the process of executing a capital project. The project has to be conceptualized, planned, funded and then implemented. Implementation can occur in stages or can be a one-time effort. Because our data are only “snapshots” at two different periods of time, we do not know from which part of this process we are obtaining data, and the results may reflect lump-sum expenditures, or long-term projects.

How Is San Diego Doing?

In nominal dollars, governmental capital outlays for Sewerage increase about 260% to $327.9 million in 1997 from about $91 million in 1982.

To determine if there have been any “real” changes in capital outlays, the nominal dollars data presented above are converted to dollars that are adjusted for inflation using the Implicit Price Deflator [IPD]. After conversion it is learned that capital outlays on Sewerage in constant 2000 dollars increase about 118% to $344.4 million in 1997 from $158.2 million in 1982.

To determine the rate at which capital outlays are spent per resident, the inflation adjusted capital outlay data are divided by San Diego’s population to obtain capital outlays per capita in constant 2000 dollars. After the computation it is learned that capital outlays per capita in constant 2000 increase about 57% to $126 per capita in 1997 from $80 in 1982.

In short, there have been “real” per capita increases in governmental capital outlays on Sewerage in San Diego.

---

44 The Census Department undertakes a sample of jurisdictions every year to compile revenue and expenditure data, however, these sample data are not utilized because they omit jurisdictions that are responsible for certain categories of expenditures. Thus, the sample data are misleading for certain categories of expenditures.
How Do We Compare?
Excellent for 1997. In 1997 San Diego is ranked 1st with about $126 per capita, and Tampa is ranked last with $0.08. Four different regions are ranked 1st for this indicator for the four periods indicating a change in emphasis over time. In 1992 Portland is ranked 1st with about $88 while Raleigh is ranked last with about $1 and San Diego is ranked 3rd with about $78. Within the San Diego region in 1997, San Diego City accounts for about 94% of all capital outlays on sewerage. This is quite different from 1992 when San Diego City accounted for about 65% and San Diego County accounted for about 9%.

Figure 77
Rank Sewerage Capital Outlays Per Capita
in constant 2000 dollars
Compared to California and the United States, the per capita expenditures on sewerage have always been higher in San Diego. Since 1987, there has been a significant difference between San Diego, California and the US with San Diego spending increasingly more [see Figure 78].

**Have We Improved?**
Yes. Although capital outlays on sewerage declined between 1982 and 1987 [on a per capita basis in constant 2000 dollars], they have increased dramatically and now stand about 50% higher than in 1982.
16. Capital Facilities Investment on Solid Waste Management

How Is San Diego Doing?
In nominal dollars, governmental capital outlays for Solid Waste Management increase about 1,082% to $7.2 million in 1997 from about $0.6 million in 1982.

To determine if there have been any “real” changes in capital outlays, the nominal dollars data presented above are converted to dollars that are adjusted for inflation using the Implicit Price Deflator (IPD). After conversion it is learned that capital outlays on Solid Waste Management in constant 2000 dollars increase about 614% to $7.5 million in 1997 from $1.1 million in 1982.

To determine the rate at which capital outlays are spent per resident, the inflation adjusted capital outlay data are divided by San Diego’s population to obtain capital outlays per capita in constant 2000 dollars. After the computation it is learned that capital outlays per capita in constant 2000 dollars increase about 419% to $2.77 per capita in 1997 from $0.53 in 1982.

In short, there have been “real” per capita increases in governmental capital outlays on Solid Waste Management in San Diego.

How Do We Compare?
Below Average for 1997. For this indicator in 1997, Minneapolis is ranked 1st with about $30 per capita and Tampa is ranked last with $0.09. Of note is the fact that Tampa is ranked 1st in 1982 and 1987, thus its earlier capital outlays may be the reason it is investing less today in solid waste management. San Diego is ranked 18th in 1982 and 1987, 11th in 1992 and 15th in 1997. Within the San Diego region in 1997, San Diego City accounts for more than 98% of the capital outlays with an even higher share in 1992.
Compared to California and the United States, San Diego per capita capital outlays on Solid Waste Management have always been lower [see Figure 80].

**Figure 80**

*Capital Outlays on Solid Waste Management in constant 2000 dollars per capita*

$0$ $1$ $2$ $3$ $4$ $5$ $6$ $7$ $8$


San Diego, CA  California  United States

**Have We Improved?**

**Mixed Results.** Based on historical San Diego data, it is not clear if there has been improvement. There have been increases in capital outlays in nominal terms in every period. Using inflation adjusted dollars, capital outlays on Solid Waste Management decline between 1992 and 1997. On a per capita basis, capital outlays on Solid Waste Management also decline between 1992 and 1997.

A topic intimately related to solid waste management is recycling. In 1990, the Governor of California signed into law California law AB 939 or the “California Integrated Waste Management Act”. This law uses a proactive approach to solid waste management by requiring each California City and County to develop and implement plans to reduce the amount of waste sent to landfills by 25% by 1995 and by 50% in 2000 using 1990 as the base year. The law thus seeks to have recycling reduce the amount sent to landfills by the amount specified above.
Results reveal that only Lemon Grove failed to meet the 1995 requirement. By 2000, Coronado, El Cajon, Encinitas and National City met the state requirement. As a region, San Diego met the 1995 requirement and came close to the 2000 requirement with a regional recycling average of 46% in 2000 [see Figure 81]. The complete set of data are contained in the appendix.

Figure 81

San Diego Region Recycling

Note: Share of solid waste that is recycled in the San Diego region.
17. Capital Facilities Investment on Water Utilities

How Is San Diego Doing?
In nominal governmental dollars, capital outlays for Water Utilities increase about 245% to $223.1 million in 1997 from about $64.7 million in 1982.

To determine if there have been any “real” changes in capital outlays, the nominal dollars data presented above are converted to dollars that are adjusted for inflation using the Implicit Price Deflator [IPD]. After conversion it is learned that capital outlays on Waste Utilities in constant 2000 dollars increase about 108% to $234.2 million in 1997 from $112.4 million in 1982.

To determine the rate at which capital outlays are spent per resident, the inflation adjusted capital outlay data are divided by San Diego’s population to obtain capital outlays per capita in constant 2000 dollars. After the computation it is learned that capital outlays per capita in constant 2000 dollars increase about 51% to $86 per capita in 1997 from $57 in 1982.

In short, there have been “real” per capita increases in governmental capital outlays on Water Utilities in San Diego.

How Do We Compare?
Excellent for 1997. Houston is ranked 1st in 1997 with capital outlays per capita of $95. San Diego is ranked 4th in 1997 and 1st in 1992. Tampa is ranked last in 1997 after being ranked 1st in 1982 [see Figure 82]. Within the San Diego region in 1997, San Diego City accounts for about 32% of the capital outlays with the San Diego Water Authority accounting for an additional 30%. In 1992 the San Diego Water Authority accounted for about 56% of the total with all the cities in the region accounting for an additional 16%.

Figure 82
Rank Water Utilities Capital Outlays Per Capita
in constant 2000 dollars

<table>
<thead>
<tr>
<th>Year</th>
<th>City</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>Pittsburgh (21)</td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>Baltimore (21)</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>Baltimore (21)</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>Tampa (21)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>San Diego (7)</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>San Diego (10)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>San Diego (4)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Houston (1)</td>
<td>1</td>
</tr>
</tbody>
</table>
Compared to the United States data, San Diego’s capital outlays per capita on Water Utilities have always been higher and in 1997 they were more than twice as large. Compared to California, San Diego’s capital outlays per capita have varied above and below the state average [see Figure 83].

Figure 83

Capital Outlays on Water Utilities
in constant 2000 dollars per capita

Have we Improved?
Mixed Results. San Diego’s capital outlays are larger in 1997 than in 1982 using nominal dollars, inflation adjusted dollars or per capita dollars. However, the dollar values actually declined between 1982 and 1987, and again between 1992 and 1997.
Equity Indicators

The focus of this category is on the distribution of tangible and intangible assets among the region’s population and includes income distribution, housing and housing affordability, health care, education, transportation and capital outlays on mass transit. Compared to earlier results, the equity area is where San Diego lags.

Figure 84
How Does San Diego Compare? - Equity
To 20 Other Metropolitan Regions

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Excellent</th>
<th>Above Average</th>
<th>Average</th>
<th>Below Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income Distribution</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing [3 indicators]</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Health Care</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education [3 indicators]</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Transportation [3 indicators]</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Outlays on Mass Transit</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SUM OF EQUITY INDICATORS</strong></td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Distribution</td>
<td>8.3%</td>
<td>8.3%</td>
<td>25.0%</td>
<td>33.3%</td>
<td>25.0%</td>
</tr>
</tbody>
</table>

Strengths
San Diego’s strength in Equity issues is found in transportation where the average commute time is 49 minutes and is ranked 4th [excellent]. Also, San Diego is rated above average in education [ranked 5th] for the percent of students in the general population attending institutions of higher education.

For only 16% of the Equity indicators examined is San Diego ranked excellent or above average.

Weaknesses
Housing fares badly as three indicators are ranked poor or below average. Health care is another area of weakness where San Diego is ranked 14th [below average] on the number of beds per thousand population. San Diego is ranked poor in one of the education indicators - the percent of children aged 3-4 in early childhood education programs. This poor rating is ominous since longitudinal studies have shown that children who are in these early education programs are more likely to be successful adults. The other area of weakness is governmental capital outlays on mass transit where San Diego is ranked 16th [below average].

Equity issues are San Diego’s weakness. For the indicators examined in the Equity arena, San Diego is ranked poor or below average on 58% of the comparisons made.

45 See the education part of this section for details of the studies.
Figure 85

<table>
<thead>
<tr>
<th>Has San Diego Improved? - Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to historical San Diego data</td>
</tr>
<tr>
<td>Indicator</td>
</tr>
<tr>
<td>Income Distribution</td>
</tr>
<tr>
<td>Housing</td>
</tr>
<tr>
<td>Health Care</td>
</tr>
<tr>
<td>Education</td>
</tr>
<tr>
<td>Transportation</td>
</tr>
<tr>
<td>Capital Outlays on Mass Transit</td>
</tr>
<tr>
<td><strong>SUM OF EQUITY INDICATORS</strong></td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
</tr>
</tbody>
</table>

Another disturbing trend – there has not been any solid improvement in Equity indicators over the last decade. While four of the indicators reveal mixed results, none has shown improvement and two have deteriorated.

18. Income distribution

Two indicators are used to examine income distribution:

- The ratio of the mean [average] household income to the median [middle or central point of the data] household income.\(^{46}\) Both of these statistics measure central tendency. If the mean and median values are the same, the ratio = 1.0 and there is a “normal distribution” of incomes. If the households at the upper end of the distribution have disproportionately more income than households at the lower end, the values at the top will outweigh those at the bottom, and the mean will be larger than the median. Thus, the higher the ratio above 1.0, the more unequal the distribution. These data are collected for all 21 metropolitan regions for the year 1999.

- The percent of individuals in middle income. For this analysis we assume “middle income” has a range of $10,000 around the midpoint of per capita Adjusted Gross Income [AGI].\(^{47}\) The lower boundary is roughly $5,000 less than the median while the upper boundary is about $5,000 more than the median. For this $10,000 range, we compute the number of individuals and the share of individuals in the middle income bracket. If income inequality is increasing, this indicator will assist in determining the manner in which the distribution is changing.

It should be noted that these income data are all in nominal dollars [not adjusted for inflation]. However, these two measures are based on ratios or the changing median value and using these methods mitigates the effects of changes due to inflation. Additionally, AGI does not include monies contributed to sheltered retirement accounts such as traditional individual retirement accounts and company sponsored retirement accounts such as 401(k) accounts. Thus, individuals who contribute to these accounts have higher income, but it is not reflected in AGI.

\(^{46}\) US Department of Commerce, Bureau of Census.
\(^{47}\) Data from tax returns published by the California Franchise Tax Board.
How Is San Diego Doing?
It appears income distribution is deteriorating. The percent of individuals in middle income shrank between 1990 and 1999 while the share of people above middle income increased and the share of people below middle income increased. The news is not all bad as the number of individuals in the category where tax filer AGI is less than $10,000 declined 38.6% between 1990 and 1999 [from 438,055 people in 1990 to 268,825 people in 1999].

How Do We Compare?
Average for 1999. Data for the ratio of mean household income to median household income comes from the Census Bureau. A ratio of 1.0 implies that the mean and median are equal and the distribution is “normal”. Numbers greater than 1.0 imply greater income inequality. In 1999 San Diego is ranked 12th with a ratio of 1.32. Norfolk is ranked 1st with a ratio of 1.19 while Washington DC is ranked last with a ratio of 1.53 [see Figure 86].

Figure 86

The second indicator tracks the share of the population in the middle income range. For this analysis we assume “middle income” has a $10,000 range – the lower boundary is about $5,000 below the midpoint of per capita AGI while the upper boundary is about $5,000 above the midpoint of per capita AGI. In 1999 the middle per capita AGI is $16,987 and the middle income

---

48 The data are only available for 1999.
49 Median per capita AGI is calculated for each year by determining the point at which the population is divided into halves, with roughly one half of the persons falling into income brackets below the median, and one half falling into brackets above the median. In all cases, the midpoint is set such that it falls between two brackets (in other words, no brackets are "split" to balance the halves of the population). In some cases, this results in slight imperfections in "halving" the populations; however, doing so preserved the integrity of the income brackets as reported by the FTB. In all cases, care is taken to obtain the most accurate "halves" possible. Upon
range is $11,785 to $21,646 per capita\textsuperscript{50}. In 1990 the middle per capita AGI is $12,600 and the middle income range is $7,897 to $17,749 per capita.

What is clear when examining our definition of middle income is that the share of the population in this $10,000 range declines between 1990 and 1999 from about 46% in 1990 to about 35% in 1999 [see Figure 87]. The number of people in the middle income range declines by about 17% or about 170,000 people from just over one million individuals in 1990 to approximately 830,000 in 1999. Furthermore, since the total number of individuals in San Diego also increases during this period\textsuperscript{51} the share of the people in “middle income” decreases considerably. The data are even more pronounced at the state level where the share declines from about 41% in 1990 to about 31% in 1999. This finding points to greater income inequality statewide.

\textbf{Figure 87}

\textbf{Share of Population in Middle Income}  
middle income range is $5,000 above and $5,000 below median AGI

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure87}
\caption{Share of Population in Middle Income}
\end{figure}

\textsuperscript{50}The upper and lower boundaries for the middle income range do not fall at precisely $5,000 above and below the midpoint of per capita AGI. The reason is that Franchise Tax Board income distribution data are reported in income brackets. In almost all cases, the upper and lower boundaries are drawn so that those brackets are not split.

\textsuperscript{51}The number of individuals whose family or household filed tax returns increases from 2,172,217 in 1990 to 2,351,706 in 1999 - an increase of 179,489 or 8.3%.
In broad terms, the share of the individuals whose per capita AGI is greater than the middle income range [described above] increases from about 25% of all individuals in 1990 to about 33% in 1999\(^2\) [see Figure 88].

![Share of Population Above Middle Income](image)

The number of individuals in the highest tax bracket [where tax filer AGI is $100,000 or more] increases 190% between 1990 and 1999 from 99,107 in 1990 to 287,018 in 1999\(^3\). In 1999 the number of individuals where the tax filer AGI is $100,000 or more represents 12.2% of all individuals. This is a significant increase from 1990 when the number of individuals where the filer AGI is $100,000 or more represents 4.6%. While the share of people in the highest AGI tax bracket is increasing, the share of people in middle income is shrinking.

\(^{52}\) The total number of people with incomes greater than the middle income category increases from 538,428 in 1990 to 784,276 people in 1999 - an increase of 245,848 individuals or 46%.

\(^{53}\) In San Diego in 1990 there are 34,354 tax filers that have an AGI of $100,000 or more. By contrast, in San Diego in 1999 there are 102,243 tax filers with an AGI of $100,000 or more.
In broad terms, the share of the individuals whose per capita AGI is less than the middle income range [described earlier] increases about 2% between 1990 and 1999 [see Figure 89]. As already noted, there is a movement out of the lowest brackets [below $10,000]. However, the number of individuals below the middle income category increases from approximately 632,000 individuals in 1990 to just under 737,000 individuals in 1999 – an increase of 155,000 individuals or 16.6%. Since this is a faster increase than the increase in population, it means that the share of individuals below middle income increases from 29.1% in 1990 to about 31.3% in 1999. At the state level, there is a rapid increase in the share of the population below the middle income category as the share increases from about 30% in 1990 to 35% in 1998.

Figure 89

**Share of Population Below Middle Income**

Middle income range is $5,000 above and $5,000 below median AGI

<table>
<thead>
<tr>
<th>Year</th>
<th>California</th>
<th>San Diego</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>27%</td>
<td>29%</td>
</tr>
<tr>
<td>1991</td>
<td>27%</td>
<td>29%</td>
</tr>
<tr>
<td>1992</td>
<td>27%</td>
<td>29%</td>
</tr>
<tr>
<td>1993</td>
<td>27%</td>
<td>29%</td>
</tr>
<tr>
<td>1994</td>
<td>27%</td>
<td>29%</td>
</tr>
<tr>
<td>1995</td>
<td>29%</td>
<td>31%</td>
</tr>
<tr>
<td>1996</td>
<td>31%</td>
<td>33%</td>
</tr>
<tr>
<td>1997</td>
<td>33%</td>
<td>35%</td>
</tr>
<tr>
<td>1998</td>
<td>35%</td>
<td>37%</td>
</tr>
<tr>
<td>1999</td>
<td>37%</td>
<td>39%</td>
</tr>
</tbody>
</table>

**Have We Improved?**

Mixed results. Without the ratio of mean household income to median household income for two time periods it is not clear how San Diego’s income distribution is changing. For the one period for which we have data, San Diego’s ratio of mean household income to median household income is rated Average. However, based on historical income tax data for San Diego, there are significantly fewer people in the lowest income bracket and this is an improvement. At the other end of the spectrum there are more people in the highest tax bracket and this can be also be viewed as beneficial. The fact that the share of people in "middle income" decreases is viewed as negative since a large middle class is viewed as the backbone of the economy.

These data are in nominal dollars and are not adjusted for inflation. Thus, an individual working the same job will see his income increase gradually over time due to inflation and part of the movement out of the lower AGI bracket is caused through general increases in pay.
19. Housing

Three indicators are used to examine housing. The median sales price provides an indicator of the cost of housing. The Housing Opportunity Index provides a measure of housing affordability by comparing housing costs with income levels. Finally, the homeownership rate provides a broad-based perspective on quality of life, as it provides clues as to housing affordability, as well as providing information about a region’s stability. Thus the rate provides general information about local quality of life.

How Is San Diego Doing?
The median sales price for all homes sold in San Diego in January 2000 is $220,000. The compound annual growth rate for the period January 1998 to January 2000 is 10.3% - well ahead of the 4.7% annual increase in the CPI for the same period. By February 2002 the median price increased to $300,000 - another 36% increase.

How Do We Compare?
Poor for 2000. Rank ordering median home prices from lowest price [best] to highest price [worst] for 20 other metropolitan regions, San Diego is ranked 18th in 1995 and 2000, thus, San Diego is consistently ranked in the lowest quintile with relatively high median home prices. Ranked 1st in 1991 is Tampa while Pittsburgh is ranked 1st in 1995 and 2000. Ranked last in all three years is San Francisco with the highest housing prices [see Figure 90].

Figure 90

<table>
<thead>
<tr>
<th>Year</th>
<th>Rank</th>
<th>City</th>
<th>Median Home Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>20</td>
<td>San Francisco</td>
<td>20</td>
</tr>
<tr>
<td>1991</td>
<td>18</td>
<td>San Diego</td>
<td>18</td>
</tr>
<tr>
<td>1991</td>
<td>1</td>
<td>Tampa</td>
<td>1</td>
</tr>
<tr>
<td>1995</td>
<td>21</td>
<td>San Francisco</td>
<td>21</td>
</tr>
<tr>
<td>1995</td>
<td>18</td>
<td>San Diego</td>
<td>18</td>
</tr>
<tr>
<td>1995</td>
<td>1</td>
<td>Pittsburgh</td>
<td>1</td>
</tr>
<tr>
<td>2000</td>
<td>21</td>
<td>San Francisco</td>
<td>21</td>
</tr>
<tr>
<td>2000</td>
<td>18</td>
<td>San Diego</td>
<td>18</td>
</tr>
<tr>
<td>2000</td>
<td>1</td>
<td>Pittsburgh</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: only 20 metros are ranked in 1991 - Orange County data are not available

---

54 Home equity is the largest single source of household wealth for most Americans and homeowners tend to be more active in their communities, and make investments toward the improvement of their communities.
Compared to similar data for the US and California, the median sales price of a home in San Diego is above the median sales price for the US, but just under the California price (see Figure 91). San Diego and California both experienced a comparable rate of increase in home prices, and both are increasing much more quickly than the US.

**Figure 91**

Median Home Prices: 1991-2000
San Diego is rated Poor for Housing Affordability in 2000.

Relating median home prices to median household income provides a sense of affordability and this is captured in the Housing Opportunity Index or HOI\textsuperscript{55}. When compared to 20 other metropolitan regions using the HOI, San Diego is ranked 19\textsuperscript{th} in 1991, 20\textsuperscript{th} in 1995 and 19\textsuperscript{th} in 2000. Thus, San Diego’s performance is graded Poor for affordability in all three periods. Ranked first in all three periods is Minneapolis implying it is the most affordable region of the 21 metropolitan regions. San Francisco is ranked last in all three periods implying it is the least affordable of all 21 metropolitan regions [see Figure 92].

\textbf{Figure 92}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure92.png}
\caption{Rank by Housing Affordability}
\end{figure}

\begin{itemize}
\item \textbf{most affordable:} highest Housing Opportunity Index
\item \textbf{least affordable:} lowest Housing Opportunity Index
\end{itemize}

Note: only 20 metros were ranked in 1991 - Orange County data were unavailable

\textsuperscript{55} Computed by the National Association of Home Builders [NAHB], the HOI is defined as the share of homes sold in an area that would have been affordable to a family earning the median income.
San Diego is rated Below Average for Home Ownership in 2000.

Home ownership provides another measure of affordability, and indicates, in broad terms, the quality of life of a region. San Diego ranks low compared to the 20 other metropolitan regions, ranking 17th in 1990, 18th in 1995 and 16th in 2000 [see Figure 93]. Ranked first in all three periods is Minneapolis implying that home ownership is highest among its population when compared to the 21 metropolitan regions. Miami is ranked last in 1990 and 1995 and San Francisco is ranked last in 2000 implying these regions have the lowest rate of home ownership amongst their populations.

Figure 93

Rank by Home Ownership Rate

<table>
<thead>
<tr>
<th>Year</th>
<th>City</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>Minneapolis (1)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>San Diego (17)</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Miami (19)</td>
<td>19</td>
</tr>
<tr>
<td>1995</td>
<td>Minneapolis (1)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>San Diego (18)</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Miami (21)</td>
<td>21</td>
</tr>
<tr>
<td>2000</td>
<td>Minneapolis (1)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>San Diego (16)</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>San Francisco (21)</td>
<td>21</td>
</tr>
</tbody>
</table>

Note: only 19 metros were ranked in 1990 - Austin and Raleigh were missing data
Comparing home ownership rates in San Diego to similar data for the United States and California reveals that San Diego ownership rates are consistently lower than that of the United States, but vary around the California average [see Figure 94]. In San Diego the percent of households owning their homes stood at 51% in 1990 and increased to 59% in 2000. In general, homeownership rates are fairly stable.

Figure 94

Home Ownership Rate: 1990-2000

Have We Improved?
No. Based on historical San Diego data, median home prices rose sharply between 1997 and 2000 even though these prices were stable between 1991 and 1997. This trend continues, and in February 2002, the median sales price of all homes sold in San Diego stood at $300,000 – a 36% increase over January 2000. San Diego’s median housing prices are amongst the highest when compared to 20 other metropolitan regions. Not only have home prices increased, they have increased faster than incomes resulting in a decline in affordability.
20. Health Care

Two indicators are used to evaluate San Diego’s health care status. One indicator is the number of hospital beds\textsuperscript{56} per 1,000 residents and the other indicator is the percent of the population without some type of medical coverage\textsuperscript{57}. These two indicators are selected due to their inter-relationship. Generally, stays in hospitals are covered under most standard health insurance plans. From this perspective we attempt to evaluate the supply of services [hospital beds] and the portion of the population not able utilize those services [percent of population without health coverage].

How Is San Diego Doing?
The number of hospital beds in San Diego in 1999 was 6,897 or 2.45 beds per thousand residents. In 1997, about 22% of San Diego’s population was not covered by any form of health insurance.

How Do We Compare?
Below Average for 1999. With regard to the number of beds per thousand population, Tampa ranked 1\textsuperscript{st} in 1992 while Pittsburgh ranked 1\textsuperscript{st} in 1995 and 1999 implying these metro regions had the highest number of beds per thousand population. Ranked last in 1992 is Atlanta with Baltimore ranked last in 1995 and Austin in 1999. San Diego ranked 5\textsuperscript{th} in 1992, and dropped to 13\textsuperscript{th} in 1995 and 14\textsuperscript{th} in 1999.

\textbf{Figure 95}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{rank_by_healthcare_resources.png}
\caption{Rank by Healthcare Resources}
\end{figure}

\textsuperscript{56} Data from the American Hospital Association. For this study, hospitals exclude institutions where the average length of stay is greater than 30 days [typically called long term care]. What are included are all institutions where the average length of stay is less than 30 days [includes general medical and surgical hospitals; hospitals for the mentally retarded and psychiatric hospitals; hospitals for tuberculosis and other respiratory diseases; hospitals for obstetrics and gynecology; hospitals for eye, ear, nose and throat; rehabilitation hospitals, orthopedic hospitals, and alcoholism and other chemical dependency institutions].

\textsuperscript{57} From the Bureau of the Census, these data are only available on a statewide basis. The appropriate statewide data are used for each metropolitan region.
What is occurring in San Diego is part of a larger trend of consolidation in the hospital industry. When San Diego data are compared to United States and California data, it becomes clear that the trends are the same [see Figure 96]. The San Diego ratio of hospital beds per 1,000 population is always lower than the US data but very similar to the California data.

**Figure 96**

Hospital Beds per Thousand Population

![Graph showing hospital beds per thousand population over time for San Diego, California, and the United States.](graph.png)
Regarding the percent of the population without health insurance, historical time series data are compiled at the state level\textsuperscript{58}. In California, the percent of the population without some form of health coverage declined from about 19% in 1990 to about 18% in 2000, however, the rate increased to about 22% in 1998 before declining to the 2000 level [see Figure 97]. There does not appear to be a trend over the last decade because increases are offset by decreases.

**Figure 97**

*Health Care Coverage: 1990-2000*

The single point plotted on the graph represents San Diego and comes from a one-time study that uncovered the fact that more than 600,000 San Diego residents or 22% of the population do not have some form of health insurance\textsuperscript{59}. Implication: the rate of individuals without insurance in San Diego is higher than in 45 of the 50 states of the United States. The “typical” uninsured resident is most likely to be one of the following\textsuperscript{60}:

- A child currently eligible for, but not enrolled in a government-supported health care coverage program [Medi-Cal or Healthy Families]
- A low-income adult working for a small or medium-sized employer that does not offer health care coverage

\textsuperscript{58} Compiled by the Bureau of Census in its annual survey, the original data is The Percent of Population Covered by Private or Government Health Insurance.


\textsuperscript{60} Ibid., page 1.
Have We Improved?
Not Clear. Based on historical San Diego data, we are unable to ascertain with certainty if there has been improvement, however, in 1990, the number of hospital beds in San Diego stood at 8,378, thus, the 2000 data [6,465 hospital beds] represent a 22.8% decline from 1990. The number of hospital beds per 1,000 population in San Diego was 3.33 beds in 1990, thus, the 2000 level [2.30] is a 30.9% decline from 1990. The large decline in the ratio is the combination of the decline in the number of hospital beds coupled with an increase in population.

Finally, the number of people without health insurance in San Diego appears to be greater than the national average, however, incomplete data make this statement difficult to substantiate. What is clear is that the portion of the population without health insurance in California is always much higher than the portion of the population in the US without health insurance.

21. Education

Four indicators are used for education. The first indicator is the percent of pre-school children in kindergarten or nursery school. The second indicator is the number of educational institutions, including two-year institutions and four-year institutions [which include graduate programs]. The third indicator is the percent of the regional population that are students enrolled in the institutions. The fourth indicator is the total number of college degrees conferred per thousand population.

Equity is concerned with the distribution of benefits and opportunities for the population and education is a key area for improving an individual’s ability to succeed and be a productive member of society. Two longitudinal studies supported by the US Department of Education document the positive impact of preschool on children’s school success, and thus is the first indicator examined [the percent of young children in preschool or nursery school]. Incomes and education are also related, thus the emphasis on the number of programs, the number of persons enrolled in programs and the number of degrees conferred.

How Is San Diego Doing?
In 2000 there were 81,547 children aged 3 and 4 in the San Diego region. Of that total, 36,652 were enrolled in Nursery or Preschool. Thus about 45% of all 3 and 4 year olds in San Diego were enrolled in early childhood educational programs.

In 2000, San Diego had the following higher educational programs:

- **Associate of Arts programs**
  - Community, junior or two year colleges - 11 campuses with 178,000+ students.

- **Baccalaureate programs** - those where the highest degree awarded is Bachelor’s Degree:
  - California State University - 3,600+ students full-time & 750 part-time student
  - Christian Heritage College - 586 full-time students

- **Comprehensive programs** - the Masters Degree as the highest degree granted:
  - Coleman College - 1,500 undergraduate students & 17 graduate student
  - National University - 5,300 undergraduate students & 6,252 graduate students
  - Point Loma Nazarene College - 2,205 undergraduate students & 632 graduate students

Doctoral Degree programs:
- California School of Professional Psychology - 637 graduate students
- San Diego State University - 26,200 undergraduate students & 6,786 graduate students
- US International University - 505 undergraduate students, 1,313 graduate students
- University of California - 15,212 undergraduate students & 3,481 graduate students
- University of San Diego - 4,307 undergraduate students & 2,375 graduate students

In San Diego in 2000, about 260,000 students or 9% of the population were enrolled at institutions of higher education. For the same year, about 26,700 degrees were conferred on residents of the region.

How Do We Compare?
San Diego is rated Poor for the percent of population aged 3 & 4 in early childhood programs. Washington DC is ranked 1st with about 69% of all children aged 3 & 4 in early childhood programs. Sacramento is ranked last with about 35% and San Diego is ranked 18th with about 45% [see Figure 98].

Figure 98

Rank by Early Childhood Education
Percent of Ages 3-4 Enrolled in Nursery or Preschool

- Washington, DC (1)
- San Diego (18)
- Sacramento (21)

2000
San Diego is rated Average for the number of institutions of higher education in 2000.

San Diego is ranked 11th in 2000, for the number of institutions of Higher Education [includes 2-year and 4-year institutions], with a total of 21 institutions. Ranked 1st is Boston with 91 institutions while Austin is ranked last with 8 institutions [see Figure 99]. In 1995 San Diego is ranked 8th while Boston is ranked 1st and Austin last.

**Figure 99**

**Rank by Number of Institutions of Higher Education**

<table>
<thead>
<tr>
<th>Year</th>
<th>San Diego</th>
<th>Boston</th>
<th>Austin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>8</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>2000</td>
<td>11</td>
<td>1</td>
<td>21</td>
</tr>
</tbody>
</table>

It is apparent that larger regions, such as Boston, have more institutions than smaller communities such as Austin. To account for the large differences in population sizes, the number of students and the total number of college graduates are divided by their region’s population.
San Diego is rated Above Average for the number of students in higher education per regional population in 2000.

Dividing the number of students by the population reveals that San Diego is ranked 5<sup>th</sup> in 2000 while San Francisco is ranked 1<sup>st</sup> and Atlanta is ranked last [see Figure 100]. The 259,818 students in San Diego in 2000 represent about 9.2% of the region’s population. For 2000, San Francisco’s share is 11.8% while Atlanta’s share is 4.2%. In 1995 San Diego is ranked 7<sup>th</sup> while San Jose is ranked 1<sup>st</sup> and Atlanta is ranked last.

**Figure 100**

Rank by Students in Higher Education

<table>
<thead>
<tr>
<th>Students per Population</th>
<th>San Jose (1)</th>
<th>San Francisco (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>San Diego (7)</td>
<td>Atlanta (21)</td>
</tr>
<tr>
<td>2000</td>
<td>San Diego (5)</td>
<td>Atlanta (21)</td>
</tr>
</tbody>
</table>

most: highest percentage of students in population

least: lowest percentage of students in population
Compared to California and the United States, the number of degrees conferred per 1,000 population is higher in San Diego in 1997. The San Diego ratio is consistently higher than the California ratio [see Figure 101]. However, the San Diego ratio varies around the United States ratio during the eight years for which we have data. The San Diego ratio rose above the United States ratio in 1995 and it appears they have been following differing trends – the United States ratio is declining while the San Diego ratio is increasing.

Have We Improved?
Mixed results. Based on historical San Diego data, the number of local institutions of Higher Education declined from 23 in 1995 to 21 in 2000. However, the number of graduates of institutions of Higher Education in San Diego increased 15.5% between 1990 and 1997 [from 23,141 in 1990 to 26,735 in 1997].
22. Transportation

To track San Diego’s performance in transportation, the indicators of average commute time, roadway congestion and the annual number of per capita trips on public transit vehicles operating during peak hours are examined. Each provides important information about quality of life. Increased roadway congestion and longer commute times can lead to pollution, and inefficient use of time resources, as well as driver frustration. Public transportation provides a widely accessible alternative to traditional automobile travel.

How Is San Diego Doing?
The average commute time for San Diego residents was about 48 minutes in 1999. Roadway congestion is measured by examining the volume of traffic to the supply of roadway and the measure used is called The Roadway Congestion Index (RCI)\(^{62}\). A lower value suggests less congested roads. For San Diego the RCI is 1.25 in 1999 implying roads are congested for more than 11 hours per day and this figure has increased about 5% during the last decade.

How Do We Compare?
Excellent for the average commute time for 1999. Compared to 20 other metropolitan regions, San Diego’s average commute time is ranked 4th in 1999 at 48.7 minutes. Ranked 1st with the shortest average commute time is Norfolk with an average of 46.1 minutes. Atlanta is ranked last in 1999 with an average commute of 72.3 minutes [see Figure 102].

---

Figure 102

<table>
<thead>
<tr>
<th>Rank by Commute Time</th>
<th>Average Commute to and from Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>shortest commute</td>
<td>Raleigh (1)</td>
</tr>
<tr>
<td>longest commute</td>
<td>Washington DC (21)</td>
</tr>
<tr>
<td>San Diego (6)</td>
<td>Norfolk (1)</td>
</tr>
<tr>
<td>San Diego (4)</td>
<td>Atlanta (21)</td>
</tr>
</tbody>
</table>

---

\(^{62}\) Computed by the Texas Transportation Institute, The Roadway Congestion Index (RCI) is a ratio of daily traffic volume to the supply of roadway.
The Bureau of the Census compiles the average morning commute time every ten years and data are currently available for 1990. The afternoon commute tends to be about 20% longer than the morning commute. The data presented here are total commute times - the sum of the morning and estimated afternoon commute. The average commute time for 1999 is estimated by increasing the average commute time for 1990, by the increase in congestion for the period 1990 to 1999. For San Diego, congestion got worse by about 5% during the decade.

For Roadway Congestion, San Diego is Below Average for 1999. Compared to the other 20 metropolitan areas, San Diego is ranked 15th in 1999 with a Roadway Congestion Index [RCI] of 1.25. Pittsburgh is ranked 1st with an RCI of 0.78 while Orange, CA is ranked last with an RCI of 1.58.

**Figure 103**

**Rank by Roadway Congestion Index**

<table>
<thead>
<tr>
<th>Year</th>
<th>Pittsburgh</th>
<th>Boston</th>
<th>San Diego</th>
<th>Orange</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>(1)</td>
<td></td>
<td>(15)</td>
<td>(21)</td>
</tr>
<tr>
<td>1995</td>
<td></td>
<td></td>
<td>(15)</td>
<td>(21)</td>
</tr>
<tr>
<td>1999</td>
<td></td>
<td></td>
<td>(15)</td>
<td>(21)</td>
</tr>
</tbody>
</table>

The Roadway Congestion Index (RCI) is a ratio of daily traffic volume to the supply of roadway compiled by the Texas Transportation Institute. The RCI compares the number of hours of daily roadway congestion in a particular area to a standard 7 hours per day of rush hour traffic (3.5 hours in the a.m. and 3.5 hours in the p.m.) If an area’s RCI is close to 0.6, its roadways are generally congested in the mornings and evenings during peak hour travel, but not during other parts of the day. The roads of an area with an RCI value of 1.0 are generally congested for approximately 11 hours each day.
San Diego’s RCI is very similar, but slightly higher than California’s RCI. Compared to RCI data for the United States metro average, the San Diego RCI is consistently much higher, suggesting that its roads are more congested than the average US metropolitan area [see Figure 104].

Figure 104

Roadway Congestion Index: 1990-1999

The Roadway Congestion Index (RCI) is a ratio of daily traffic volume to the supply of roadway. The RCI compares the number of hours of daily roadway congestion in a particular area to a standard 7 hours per day of rush hour traffic (3.5 in the a.m. and 3.5 in the p.m.) If an area’s RCI is close to 0.6, it’s roadways are generally congested in the mornings and evenings during peak hour travel, but not during other parts of the day. The roads of an area with an RCI value of 1.0 are generally congested for approximately 11 hours each day.

San Diego’s congestion has been worsening, but it appears to be doing so at a rate similar to that in other metropolitan regions.

Public transport provides an alternative to auto-based commuting, and can help alleviate roadway congestion. The indicator used here is called unlinked passenger trips and is defined as the following:

The number of passengers who board public transportation vehicles in a year. Passengers are counted each time they board vehicles no matter how many vehicles they use to travel from their origin to their destination.

These data are compiled by the Federal Transit Administration for buses and trolleys, commuter rail, heavy rail, light rail, demand response and other. We summarize all categories to obtain unlinked passenger trips for the entire metropolitan region. All of these data, including the number of vehicles by type at peak period of operation, are contained in the appendix. Finally, we divide each region’s total unlinked passenger trips by the region’s population to get the annual number of unlinked passenger trips per capita.

63 The definitions of all these transport types are on page 115-116.
How Do We Compare?
Above Average for 2000. Ranked 1st in both periods is San Francisco with the highest number of unlinked passenger trips per capita with about 179 in 2000. San Diego is ranked 8th with about 37 unlinked passenger trips per capita in 2000 and Tampa is ranked last with 8 unlinked passenger trips per capita [see Figure 105]

![Figure 105]
Compared to California data, San Diego has always been below the California average but its unlinked passenger trips per capita is growing more rapidly than the California average. Compared to the United States, San Diego began with a rate below the US average in 1994, surpassed the US average in 1996, and continues to grow faster than the US average [see Figure 106].

**Figure 106**

![Total Unlinked Passenger Trips Per Capita](image)

To gain some insight into the type of transportation modes used in San Diego and the United States, the distribution of unlinked passenger trips is compared. The various modes are defined by the American Transportation Association and are the following:

- **Bus** – a transit mode comprised of rubber tired passenger vehicles operating on fixed routes and schedules over roadways. Vehicles are powered by diesel, gasoline, battery or alternative fuel engines contained within the vehicle.

- **Commuter Rail** is a transit mode that is an electric or diesel propelled railway for urban passenger train service consisting of local short distance travel operating between a central city and adjacent suburbs. Service must be operated on a regular basis by or under contract with a transit operator for the purpose of transporting passengers within urbanized areas, or between urbanized areas and outlying areas. Such rail service, using either locomotive hauled or self propelled railroad passenger cars, is generally characterized by multi-trip tickets, specific station to station fares, railroad employment practices and usually only 1 or 2 stations in the central business district. It does not include heavy rail rapid transit or light rail/street car transit service. Inter city rail service is excluded, except for that portion of such service that is operated by or under contract with a public transit industry for predominantly commuter services [means that for any given trip segment (i.e., distance between any two stations), more than 50% of the average daily ridership travels on the train at least three times a week]. Only the predominantly commuter service portion of an inter city route is eligible for inclusion when determining commuter rail route miles.
• **Demand Response** is a transit mode comprised of passenger cars, vans or class C buses operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations. A demand response operation is characterized by the following: (a) The vehicles do not operate over a fixed route or on a fixed schedule except, perhaps, on a temporary basis to satisfy a special need; and (b) typically, the vehicle may be dispatched to pick up several passengers at different pick-up points before taking them to their respective destinations and may even be interrupted en route to these destinations to pick up other passengers. The following types of operations fall under the above definitions provided they are not on a scheduled fixed route basis: many origins-many destinations, many origins-one destination, one origin-many destinations, and one origin-one destination.

• **Heavy Rail** is a transit mode that is an electric railway with the capacity for a heavy volume of traffic. It is characterized by high speed and rapid acceleration passenger rail cars operating singly or in multi-car trains on fixed rails; separate rights-of-way from which all other vehicular and foot traffic are excluded; sophisticated signaling, and high platform loading.

• **Light Rail** is lightweight passenger rail cars operating singly (or in short, usually two-car, trains) on fixed rails in right-of-way that is not separated from other traffic for much of the way. Light rail vehicles are driven electrically with power being drawn from an overhead electric line via a trolley or a pantograph. Also known as “streetcar,” "tramway," or “trolley car”, this category covers the San Diego trolley.

• **Other** - refers to all other transit vehicles to include automated guideway, cable car, ferryboat, inclined plane, jitney, monorail, publico and vanpool.

Comparing San Diego and the United States distribution of unlinked passenger trips for 2000 reveals that bus transport makes up the largest category for both [see Figure 107].

![Figure 107](image_url)

**Figure 107**

**Distribution of Unlinked Passenger Trips for 2000 by type of trip**

- **Bus and Trolley**
- **Commuter Rail**
- **Demand-Response**
- **Heavy Rail**
- **Light Rail**
- **Other**
For San Diego the mode ranked 1st is bus and trolleybus with about 69% of all unlinked passenger trips. Ranked 2nd is light rail with about 28% of the total. Together these two categories account for over 98% of all unlinked passenger trips in San Diego. For the US, the mode ranked 1st is bus and trolleybus with about 59% of the total. Ranked 2nd is heavy rail with about 30% and ranked 3rd is commuter rail with about 5%.

Have We Improved?
Mixed Results. Based on historical San Diego data, roadway congestion deteriorated between 1990 and 1999 and this implies the average commute time also deteriorated. However, the total number of unlinked passenger trips per capita increased about 40% between 1994 and 2000 [from 26.1 in 1994 to 36.5 in 2000].

23. Capital Facilities Investment on Mass Transit

Compiling data on capital outlays for the metropolitan regions is a formidable task. Within a region different jurisdictions have responsibility for different categories of expenditures and this pattern varies between metropolitan regions. In addition, different jurisdictions use different fiscal years, use different schemes to classify their expenditures, and use different accounting systems. Thus, comparing data between metropolitan regions is a major undertaking. To facilitate the process we utilize data from the Bureau of the Census, Governments Division. These data hold merit because of their uniformity and consistency across both geographical and topical areas. The Census Bureau obtains these data from each state’s controller’s office, after which they classify and compile the database. This “census” of government finance is conducted every five years and this study contains data from the 1982, 1987, 1992 and 1997 census. Capital outlays are expenditures to purchase assets or create value that add to the government’s net worth and can include real estate, construction, and other assets that have a useful life longer than one year [automobiles, computers, etc.]. For greater detail on the definitions for capital outlays in this section see the glossary.

Variations in capital outlays, over time, are to be expected if one considers the process of executing a capital project. The project has to be conceptualized, planned, funded and then implemented. Implementation can occur in stages or can be a one-time effort. Because our data are only “snapshots” at two different periods of time, we do not know from which part of this process we are obtaining data, and the results may reflect lump-sum expenditures, or long-term projects.

How Is San Diego Doing?
In nominal dollars, governmental capital outlays for Mass Transit decreased about 89% to $4.5 million in 1997 from $40.1 million in 1982.

To determine if there have been any “real” changes in capital outlays, the nominal dollars data presented above are converted to dollars that are adjusted for inflation using the Implicit Price Deflator [IPD]. After conversion it is learned that capital outlays in constant 2000 dollars decreased about 93% to $4.7 million in 1997 from $70.1 million in 1982.

To determine the rate at which capital outlays are spent per resident, the inflation adjusted capital outlay data are divided by San Diego’s population to obtain capital outlays per capita in constant 2000 dollars. After the computation it is learned that capital outlays per capita in constant 2000 decreased about 95% to about $2 in 1997 from about $35 in 1982.
In short, there have been “real” per capita decreases in governmental capital outlays on Mass Transit in San Diego.

**How Do We Compare?**

Below Average for 1997. For capital outlays on mass transit (per capita in constant 2000 dollars) in 1997, Portland is ranked 1st with about $119, Baltimore, Norfolk and San Jose are all ranked last with $0, and San Diego is ranked 16th with about $2. San Diego’s rank has actually fallen from 5th in 1982 to 10th and 11th in 1987 and 1992 to 19th in 1997. During this period, several regions have claimed the top spot for mass transit capital outlays, whereas both Baltimore and Norfolk are ranked last in three years with no capital outlays. Within the San Diego region in 1997, National City accounted for about 36% of mass transit capital outlays, San Diego City accounted for about 28%, and San Diego County accounted for about 21%. This is very different from 1987 when the San Diego Metropolitan Transit Development Board accounted for about 84% of mass transit capital outlays. In 1982 the San Diego MTDB and the North San Diego County Transit Development Board accounted together for about 77% of mass transit capital outlays in the San Diego region.

**Figure 108**

<table>
<thead>
<tr>
<th></th>
<th></th>
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<td>Baltimore, Norfolk (21)</td>
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<td>San Diego (11)</td>
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<td>Baltimore, San Francisco (21)</td>
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<tr>
<td>Baltimore, Norfolk, San Jose (21)</td>
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Compared to California and the United States, San Diego capital outlays on mass transit have fallen below both [see Figure 109].

**Figure 109**

**Capital Outlays on Mass Transit**

in Constant 2000 dollars per capita

Have We Improved?
No. San Diego’s capital outlays on Mass Transit decrease in nominal dollars, in inflation adjusted dollars, and on a per capital basis in constant dollars.
Measuring Technological Innovation

Over the past two decades of the 20th century, there has been a fundamental shift in the economic and social landscape. This dramatic change has been led by the rise of global markets, the fast pace of technological development, alterations in lifestyles and demographic changes.

No longer is the U.S. the unchallenged leader in the world economy. Regions in the U.S. once insulated from international competition today stand toe-to-toe with regions in other nations that are competing successfully for virtually every good and service we produce.

At one time, firms competed based on factor costs (e.g., labor, raw materials, capital, and infrastructure), and the firm with the lowest factor costs won. The changing nature of competition has superseded this model. Globalization allows firms to source factors such as raw materials, capital, and even generic scientific knowledge from international markets, and to locate selective activities overseas to take advantage of low-cost labor or capital. At the same time, technological change and innovation have given firms the ability to eliminate, nullify, or circumvent weaknesses in local factors. For example, high product quality and meeting extraordinary technical standards can offset high wages.

Thinking on regional competitiveness is undergoing a transition. Historical efforts to enhance competitiveness were tied to lowering the cost of inputs as regions focused on holding down wages, reducing taxes, and recruiting new companies using financial incentives. This model has been recognized as self-defeating. Prosperity comes from the ability to utilize a region’s inputs more productively than other regions in the production of goods and services. Low wages do not yield fundamental competitiveness, but they hold down the standard of living. Financial incentives are easily matched by competing regions, and erode the tax base needed to invest in education and local infrastructure.

A study from the Council on Competitiveness “Clusters of Innovation Initiative: San Diego”, authored by Harvard economist Michael Porter, makes the following points when discussing the determinants of regional prosperity.

“The most important sources of regional prosperity are created, not inherited. Inherited competitive advantages such as natural resources, location or a supply of labor are becoming less important in determining prosperity, especially in advanced economies. Globalization has expanded the supply of natural resources, and technology has created new substitutes for them as well as bringing distant locations into the economy. A supply of labor is no longer an advantage in a world where low-skilled workers are plentiful. Prosperity depends not on inherited inputs themselves, but on creating the conditions that allow firms operating in the region to be highly productive in the use of inputs”.

American businesses are winning in today’s marketplace, not by demanding protection in the form of import tariffs, but by constantly innovating – by repeatedly creating and improving products and services, inventing more efficient production systems and technologies, identifying and penetrating new markets, and where appropriate, collaborating both nationally and internationally for mutual benefit. Under the new terms of global competition, businesses need to draw on essential services and resources found in their local regions – from skilled workers to technology to venture capital to efficient and high quality physical infrastructure. Increasingly, efficient management of well-developed local resources has become the determinant of a region’s economic, social and environmental well being.

Clearly, the paradigm that determines competitiveness for regions has shifted. The competitive advantage today is driven by the ability of firms to continuously innovate and upgrade. And, innovation is the driving force behind improvements in productivity, a key component of competitiveness in nearly all firms. Although, industries producing enabling technologies such as computers, computer chips, software, communication devices, and medical research, drugs and instruments have received much of the attention, opportunities to apply advanced technology are present in nearly all fields of business. As pointed out in the report from the Council on Competitiveness, there are no low-tech industries, only low-tech companies that fail to incorporate new ideas and methods in their products and services, failing to innovate and improve productivity. Indeed, innovation stretches beyond the better-known science and technology and into all aspects of production, distribution and service.

In response, the San Diego region is transforming itself by creating a new economy. Today, we’re attracting attention as an international model for strategic economic development in technology oriented industry clusters. What is the new economy? According to the San Diego Regional Economic Development Corporation it is a set of fast-moving, knowledge based industry clusters that will enjoy their strongest growth in the 21st century. It is made up of the kind of companies that every region wants – companies that pay high wages, are internationally oriented, and are engines of sustained growth.

San Diego’s economic history is characterized by waves of technological innovation: defense, aircraft and aerospace, pharmaceutical research, medical devices and instruments, wireless communications, and software. Much less known are the benefits from the technological advances in drip irrigation systems to our horticultural and avocado industries. Each wave has been or will be interrupted or altered by a competitive or external shock. But each wave built the technological innovation networks of talent, suppliers and financial service providers necessary to make the next wave of technological innovation possible. In this way, a salient feature of technologically innovative companies is that they are self-regenerating.

One measure of the technological innovation that drives competitiveness is the level of patenting in a region. Patents are a way of registering an entirely new product, a new way of producing, or a change to an established process. A patent protects the economic rights or value of the innovative idea.

**Patent Activity 1990-1999**

The US Patent and Trademark Office [US PTO] awarded 10,984 utility patents to organizations, companies and individuals in San Diego between 1990 and 1999. Of that total, 2,800 patents or 25.5% were awarded to individuals leaving 8,184 utility patents awarded to 1,463 organizations that could be organized by industry using the Standard Industrial Classification [SIC] coding system. In addition to utility patents, the US PTO awarded 125 plant patents to organizations, companies and individuals in San Diego between 1990 and 1999. Of the total, 33 patents or 26.4% were awarded to individuals leaving 92 plant patents awarded to 8 organizations.

Our research targeted organizations that received 10 or more patents between 1990 and 1999, ultimately matching 275 organizations to SIC codes – about 18% of the total. These 275 organizations were awarded over 66%, or 5,512 to the utility and plant patents awarded to organizations. Of the remaining organizations not matched to a SIC code about 44% were awarded only one patent, while another 11% were awarded two patents. Further research will attempt to assign the SIC does to all companies with 10 or more patents and will take a sample of

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the organizations with less than 10 patents to determine the distribution of their patents by SIC code.

**Patent Activity by Industrial Cluster**

One way to assess our region’s potential future competitiveness is to identify the industries, organizations and companies that are annually awarded the largest number of patents. To evaluate this, companies are assigned to clusters and the ratio of the number of patents per 1,000 employees is estimated for each of the 11 clusters than contain companies receiving utility or plant patents\(^{68}\). Patents are a measure of early stage innovation and, our future prosperity rests upon these industries providing the region with the capacity for continuous technological innovation.

In 1999, the most recent year for which data are available, inventors in San Diego were awarded 1,749 utility patents, ranking the region fourth compared to 20 other US regions. San Diego produced 12.9 patents per 10,000 workers, more than twice the national average of 6.3, but well behind competitor regions like Boston (20.9) and Austin (22.2). Between 1990 and 1999 San Diego’s annual patent growth rate per 10,000 employees of about 13% was nearly double the national rate (7.7%), faster than Boston (8.5%) but significantly slower than Austin (34.4%)\(^{69}\).

The largest share of patents awarded between 1990 and 1999 went to organizations in the Biotechnology and Pharmaceutical cluster (34.3%). Organizations in this cluster receiving the largest number of patents include Scripps Research Institute, University of California, San Diego, Isis Pharmaceuticals, and Salk Institute. The second largest number of patents awarded was in the Defense and Transportation cluster (20.4%). Organizations in this cluster receiving the largest number of patents include the U.S. Navy, Hughes Aircraft and General Atomic. Other clusters registering a large number of patents include the Computer and Electronics Manufacturing cluster, the Communications cluster and the Biomedical cluster [see Figure 110].

<table>
<thead>
<tr>
<th>Rank</th>
<th>Clusters with SIC Codes</th>
<th>Number</th>
<th>Shares</th>
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<tr>
<td>1</td>
<td>Biotechnology &amp; Pharmaceuticals</td>
<td>1,629</td>
<td>34.3%</td>
</tr>
<tr>
<td>2</td>
<td>Defense &amp; Transportation Manufacturing</td>
<td>970</td>
<td>20.4%</td>
</tr>
<tr>
<td>3</td>
<td>Computer &amp; Electronics Manufacturing</td>
<td>907</td>
<td>19.1%</td>
</tr>
<tr>
<td>4</td>
<td>Communications</td>
<td>631</td>
<td>13.3%</td>
</tr>
<tr>
<td>5</td>
<td>Biomedical Products</td>
<td>362</td>
<td>7.6%</td>
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<tr>
<td>6</td>
<td>Environmental Technology</td>
<td>82</td>
<td>1.7%</td>
</tr>
<tr>
<td>7</td>
<td>Software &amp; Computer Services</td>
<td>63</td>
<td>1.3%</td>
</tr>
<tr>
<td>8</td>
<td>Horticulture</td>
<td>56</td>
<td>1.2%</td>
</tr>
<tr>
<td>9</td>
<td>Recreational Goods Manufacturing</td>
<td>39</td>
<td>0.8%</td>
</tr>
<tr>
<td>10</td>
<td>Business Services</td>
<td>10</td>
<td>0.2%</td>
</tr>
<tr>
<td>11</td>
<td>Medical Services</td>
<td>5</td>
<td>0.1%</td>
</tr>
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</table>

Total Patents in Clusters Using Company SIC Code 4,754 100.0%

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68 The methodology for assigning company patents to the clusters is detailed in the Methodology.


70 The SIC codes contained in each cluster are enumerated in the glossary.
Regarding patents per 1,000 employees, the range of data varies from about 71 patents per 1,000 employees in the Biotechnology and Pharmaceuticals cluster to 0.1 patents per 1,000 employees for Medical Services. The Software Cluster has a relatively low ratio of 3 patents per 1,000 employees, however, most software is protected by Copyright and this cluster is included in the analysis due to this fact. The Business Services and Medical Services clusters were found to be least important to sustaining the region’s edge in technological innovation based on a review of the patents awarded over the last 10 year, thus, these two clusters are dropped from the analysis.

Therefore, our most technologically innovative clusters are the following:

1. Biomedical Products
2. Biotechnology and Pharmaceuticals
3. Communications
4. Computer and Electronic Manufacturing
5. Defense and Transportation Manufacturing
6. Environmental Technology
7. Horticulture
8. Recreational Goods Manufacturing
9. Software and Computer Services

The focus of our work is to understand major trends while building on established concepts. Compiling patent data to represent innovation and aligning those data with cluster information provides insights on the impact of innovation on the San Diego economy. This is not perfect as 14% of the patents for which we have SIC codes do not fall within the region’s industry clusters [754 / 5,512]. However, the vast majority of the patents are assigned to clusters and the major trends
outlined in the following analysis are intended to indicate the manner in which the innovative firms impact the economy.

**Economic Impact of the Technologically Innovative Clusters**

**Employment**

Total employment in our most technologically innovative clusters grew at an average annual rate of 1.6% between 1991 and 2000. By contrast, growth outside these innovative clusters grew at an average annual rate of 2.6%. Thus, the share of total employment in these technology clusters decreased from 12% in 1991 to 11.3% in 2000. The primary reason the technology sector did not grow faster was the contraction in the defense cluster. During the early 1990s there was a significant contraction in the defense cluster, and employment declined at an average annual rate of about 6.2% between 1991 and 2000. Excluding the Defense cluster, employment in the remaining technology clusters grew an average of 5.8% per year between 1991 and 2000 [see Figure 112].

**Figure 112**

![Average Annual Growth Rates in Employment in San Diego Technology Clusters & Non-Technology, 1991-2000](image)

Between 1991 and 1994 employment in the Defense and Transportation cluster contracted at an annual rate of 14.6% per year while employment at the Recreational Goods Manufacturing cluster expanded at an average annual rate of 23.4%. During this same time period employment in the Biotechnology cluster expanded at an annual average rate of 10.9% while the Software cluster expanded at an annual average rate of 9.3%.

After the 1990-1994 recession ended, the Software cluster continued to grow at an annual average rate of 14.4% per year, while the Communications cluster expanded at a rate of 11.5% per year. Also between 1994 and 2000 the Defense cluster continued to shrink as its employment declined 3.5% per year and the Biomedical Products contracted at an annual rate of 2.0%.
These changes in growth rates mean that the number of employees in each cluster changed dramatically and the distribution of employees by cluster also changed. In 1991 there was a high concentration of employment in one cluster as about 34% of all technology employment was in the defense cluster. By 2000 the defense cluster share shrank to about 13.5%. While defense was shrinking, other clusters were expanding – and expanding rapidly. Software, the fastest growing technology cluster, accounted for 7.6% of the technology sector employment in 1991 and about 16% in 2000. The Communication cluster grew from 10.5% of the technology sector in 1991 to 18.6% in 2000. The Biotechnology & Pharmaceuticals cluster grew from about 10.5% of the technology sector in 1991 to about 17% in 2000.

Figure 113

San Diego Technology Cluster Employment
in thousands of employees

- Commo
- Comp & Elec Mfg
- Biotech & Pharm
- Software
- Defense Mfg
- Horticulture
- Biomed Products
- Rec Goods
- Envt Tech

1991 2000

These changes in growth rates mean that the number of employees in each cluster changed dramatically and the distribution of employees by cluster also changed. In 1991 there was a high concentration of employment in one cluster as about 34% of all technology employment was in the defense cluster. By 2000 the defense cluster share shrank to about 13.5%. While defense was shrinking, other clusters were expanding – and expanding rapidly. Software, the fastest growing technology cluster, accounted for 7.6% of the technology sector employment in 1991 and about 16% in 2000. The Communication cluster grew from 10.5% of the technology sector in 1991 to 18.6% in 2000. The Biotechnology & Pharmaceuticals cluster grew from about 10.5% of the technology sector in 1991 to about 17% in 2000.

Figure 113

San Diego Technology Cluster Employment
in thousands of employees

- Commo
- Comp & Elec Mfg
- Biotech & Pharm
- Software
- Defense Mfg
- Horticulture
- Biomed Products
- Rec Goods
- Envt Tech

1991 2000
Today's employment distribution in the technology sector is far less concentrated than that observed in 1991 [see Figures 114 and 115]. In 2000, the technology cluster with the most employees is Communications with about 24,900 employees or about 19% of the technology total. Computer and Electronics Manufacturing is a close 2nd with about 24,200 employees or about 18% of the total. Ranked 3rd is Biotechnology and Pharmaceuticals with about 23,000 employees or about 17% of the total.
Payroll
“Payroll” represents total wages and salaries paid to employees\textsuperscript{71}. The payroll data shows that technology cluster employees have a disproportionate share of the region’s payroll. The technology cluster accounts for 11.2\% of regional employment in 2000 and 21.7\% of regional payroll. Not only is payroll disproportionately higher, it has grown faster during the last decade. Payroll in the technology clusters grew an average of 14.4\% per year between 1991 and 2000. Part of the significant rise in payroll is explained by employee “stock options”. These options allow employees to purchase company stock at a price set by management at the time the option is granted [called the strike price]. The option has value if the market price is higher than the strike price. For some technology cluster employees, 1999 and 2000 were years when stock options were exercised.

![Figure 116](image)

Wages per Employee
Dividing payroll by employment provides average annual wages and this statistic highlights the importance of the technology sector to the region. In 2000, the average wage for all employees in the technology clusters is $72,978. For employees outside of the technology sector the average wage is $33,115. Thus, wages for employees in the technology sector are more than double the average for employees outside the technology sector.

Between 1991 and 2000 wages grew fastest in the Communications cluster where they increased an average of 21.0\% per year. Ranked 2\textsuperscript{nd} is the Computer and Electronics Manufacturing Cluster where wages grew an average of 9.9\% per year. The Defense cluster, which experienced substantial declines in employment, experienced wage increases averaging 5.0\% per year between 1991 and 2000 [see Figure 117 following page].

\textsuperscript{71} Includes monies from exercising stock options.
Because employee stock options for Qualcomm and other communications firms were exercised in 1999 and 2000, the annual growth rate for the Communication cluster is extremely high. In fact, the average wage for employees in the Communications cluster is about $116,300 for 2000. To see how fast technology wages grew excluding the Communications cluster, this cluster was removed from the data set. After this adjustment, technology, excluding Communications, had annual wages of about $63,100 in 2000 – about 90% higher than non-technology wages. Further, the growth rate between 1991 and 2000 is about 8.4% – significantly higher than the growth rate of non-technology wages.

It is important to remember that only 11.2% of San Diego employment in 2000 is in the technology sector. Targeted efforts by regional organizations such as the San Diego Workforce Partnership and the San Diego Regional Technology Alliance attempt to increase the share of regional employment in the technology sector. Such efforts seek to increase the region’s standard of living by increasing the number of employees in the technology sector.

Looking forward, recent events with terrorism and the military build up imply that the defense sector might be an area of growth. Another possible area of growth would be the area of bio-terrorism – and for that work, the Biotechnology cluster is well positioned. Thus, there is a good chance that there will be faster growth in the San Diego technology clusters than in the rest of the region’s economy. Whether or not average wages continue to increase at the rapid rate seen in the past will likely be determined by the ability of the technology clusters to produce new products and services and sell them in the marketplace. Likely the region will not see a repeat of the “stock options” that dramatically raised wages in the Communications cluster. Although, technology clusters do have that potential, so there is always a chance.
Funding Innovation

The graphic presented in this section is a simplification of part of the process that funds technological innovation. The process is circular and for this discussion we start with research institutions in San Diego [see Figure 118]. In San Diego County about $6.1 billion was spent on Research and Development (R&D) between 1993 and 1999 that was funded from federal government grants. Of that total, about 39% or approximately $2.4 billion was spent by research institutions that are public educational institutions or non-profit non-educational institutions [for example, the Salk Institute]. The average size of these grants is about $160,000 and the appendix contains data on R&D expenditures by types of organizations. To describe the process, we select the University of California at San Diego (UCSD) where research is an on-going effort. UCSD is currently undertaking research from grants already received. R&D Expenditures from all sources at UCSD grew from about $237 million in 1990 to about $462 million in 1999 – a compound annual growth rate of about 7.7%.

At some point, the University has a finding of significance – at which time it would file a patent application with the US PTO. The US PTO would grant a patent assuming the application meets all the requirements. In 1995 UCSD filed 107 patent applications and this total grew to 150 in 2001 – an annual growth rate of about 5.8%. Patents awarded to UCSD by the US PTO grew from six in 1990, to 59 in 2001 – an annual growth rate of 27.1%.

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Having received a patent, UCSD may not want to undertake its commercial application. Rather, it may pursue the commercial development by signing a licensing agreement with a company - either (1) an established company or (2) a new company that UCSD helps create. At UCSD, licensing revenue increased from about $2.97 million in 1995 to about $8.35 million in 2001 – a compound annual growth rate of about 19%.

If the University opts to sign a licensing agreement with a new company, it will work with the company founders to help develop a business plan to commercialize a product for which UCSD holds the patent. According to the California Healthcare Institute, there have been 64 biotechnology companies that have spun off from UCSD. Other non-profit research organizations, such as Scripps Research Institute and the Salk Institute follow a similar process where research leads to findings of significance and eventually a firm may be spun off to develop the commercial application of the finding. For Scripps Research Institute there have been 26 such spin-offs, while there have been 15 such spin-offs at the Salk Institute.

Although patents can measure technological innovation, this does not necessarily mean that a region is fully benefiting from the opportunities presented by this innovation. A region must work to capture the economic value of the productivity generated by the innovative technology. The ability of a region to commercialize new ideas and technologies will determine its ability to improve its prosperity and standard of living. Some regions, like San Diego, have high levels of R&D investments, numerous specialized research centers, and high levels of patenting activity; however, they still lag behind other regions in terms of commercialization. The reason: knowledge is not effectively or rapidly transferred to companies, or the companies receiving the patents do not have production facilities in the region.

In the San Diego region, the linkage between UCSD and local technology companies is one way as companies commercialize technological innovation. Recent literature on this topic provides details for the San Diego region and the success with which this linkage has been achieved. At UCSD, there is an organization called “UCSD CONNECT” whose purpose is to link academics [who have the ideas], with entrepreneurs, business service providers and venture capitalists. In other words, UCSD CONNECT facilitates the process of creating a new functioning business selling a product or service, where the product or service is based on the idea protected by the patent. CONNECT is fully funded by over 1,000 companies and sponsors more than 80 events per year.

For new companies, obtaining finance and guidance early in their existence is critical for success. The evolution of San Diego’s technology sector could not have taken place without the assistance of economic development organizations that addressed these needs. Such organizations are designed to nurture young businesses and provide hands-on management assistance, as well as access to financing, marketing, consultants, technical assistance, and networking opportunities. UCSD has been a prime mover in revitalizing the San Diego region.

In addition to UCSD CONNECT, economic development organizations such as the San Diego MIT Enterprise Forum, the San Diego Regional Technology Alliance, and industry-specific organizations such as BIOCOM and the San Diego Telecom Council have played a key role in the growth of the technology sector. These organizations offer seminars and events that guide entrepreneurs in commercialization and growing their businesses, while providing opportunities for firms, service providers, and suppliers to interact.

74 Ibid., page 28.
The San Diego region appears to have the critical mass of service providers to help new technology firms succeed. This fact is supported when examining new company formation in San Diego. In the technology clusters, the number of companies increased from 2,412 in 1991 to 3,788 in 2000, a growth rate that averages 6.3% per year. In the San Diego economy outside the technology sector, the growth rate of new companies averages 1.0% per year for the same time period [see Figure 119]. In short, within the technology sector there is a process in place to convert ideas to products and services and establish companies that will develop and market those products.

**Figure 119**

![Average Annual Growth Rate in Number of Firms in San Diego Technology Clusters & Non-Technology, 1991-2000](image-url)
For new businesses to grow they need access to capital and one avenue open to a business in the high technology arena is the Small Business Innovation Research Program [SBIR]. In San Diego this program awarded about $216.9 million to 1,010 companies between 1993 and 1998. Our research shows that about 76% of the monies awarded went to 711 firms in 7 of the technology clusters. In fact, the only technology clusters to not receive SBIR awards are Horticulture and Recreational Goods Manufacturing. The technology cluster receiving the largest amount of SBIR funding is Biotechnology and Pharmaceuticals with about $73.3 million or 34% of the total [see Figure 120]. Ranked 2nd is Communications with about $30 million or 13.7% and ranked 3rd is Biomedical Products with about $13.8 million or 6.3% see Figure 120.

**Figure 120**

<table>
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<tr>
<td>$216.9 Million</td>
</tr>
<tr>
<td>Biotechnology &amp; Pharmaceuticals = 33.8%</td>
</tr>
<tr>
<td>Communications = 13.7%</td>
</tr>
<tr>
<td>Computers &amp; Electronic Mfg = 4.9%</td>
</tr>
<tr>
<td>Environmental Tech = 3.7%</td>
</tr>
<tr>
<td>Software = 12.6%</td>
</tr>
<tr>
<td>Non Technology = 24.3%</td>
</tr>
<tr>
<td>Defense = 0.6%</td>
</tr>
<tr>
<td>Biomed = 6.3%</td>
</tr>
</tbody>
</table>

Another way new firms can obtain funds is in the form of Venture Capital [VC]. As pointed out in the Monitoring Our Progress section, the amount of dollars companies received from VC increased fifteen-fold between 1990 and 2000 and San Diego does well compared to other regions. Analysis of the VC data reveals that about 75% of the funds distributed to companies in San Diego went to technology start-ups.\(^76\)

\(^76\)The allocation of VC dollars by industry receiving the VC $ is classified by PriceWaterhouseCooper [PWC] in their MoneyTree analysis of Venture Capital. Those categories are compared to the 9 San Diego technology clusters. Though not identical, there is a great deal of similarity in some of the categories and certain categories defined by PWC are used as technology clusters for this study. Appendix C contains the data.
Between 1995 and 2000, about $5.1 billion was invested by Venture Capitalists in San Diego. Of that total, five technology clusters received about $3.8 billion with the balance [about $1.28 billion or 25.2%] going to non-technology firms. The technology cluster receiving the largest portion is Biotechnology & Pharmaceuticals with about $1.15 billion or about 22.5% of the total. Ranked 2nd is Biomedical Products with about $0.87 billion or 17% of the total and ranked 3rd is Communications with about $0.72 billion or about 14.2% of the total [see Figure 121].

Preliminary results for 2001 indicate the amount of money received by San Diego firms from Venture Capital declined about 33% from about $2.1 billion in 2000 to about $1.4 billion in 2001. Surveys\(^7\) indicate that less money is going into telecommunications and network equipment and more into biotechnology, medical devices and healthcare services. Further, it also appears more money is going to maintaining companies rather than funding new start-ups.

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\(^7\)PWC MoneyTree and GrowThink [a Los Angeles market research firm].
Another way for firms to raise capital is by selling shares of their stock to the public. The first time a company does this it is referred to as an Initial Public Offering or IPO. Going public usually occurs after a firm has proven its business model. As noted earlier in this report, there was about a 300-fold increase in the dollars raised from San Diego IPOs in the 1990s. Our research shows that about 60% of the money raised from IPOs went to companies in the technology sector with Communications ranked 1st with about 24% of the total [see Figure 122]. Ranked 2nd is Software and Computer Services with about 11.6% of the total and ranked 3rd is Biotechnology and Pharmaceuticals with about 11.5% of the total.

Initial results for 2001 reveal three companies went public in San Diego and they raised about $390 million – a 60% drop from the $981 million raised from IPOs in San Diego in 2000. One of the IPOs in 2001 was in the technology sector – in the Biomedical Products cluster while the other two were outside the technology sector.
Looking Forward

The technology sector is vibrant in San Diego and appears to be leading the regional economy toward improved prosperity. The recession in the early 1990s saw the Defense and Transportation cluster shrink dramatically. Today, the technology sector is poised to grow and is more balanced now than it was in the early 1990s when the defense cluster accounted for about 34% of all technology sector employment. Today there are five technology clusters each having 14% or more of the technology sector employment. Well-established research capabilities, a fully developed network to incubate new businesses, an ability to attract SBIR funds and venture capital from investors all point to an opportunity for future prosperity.

The University of California at San Diego and other research institutions have well-established research programs that are continually awarded research grants. This links well to the Biotechnology and Pharmaceuticals cluster, which is well positioned to take advantage of all sorts of new discoveries in the new millennium. Likewise, the Communications cluster is well established and continues to make inroads internationally with its products78. The terrorist events of September 11 have increased federal government expenditures on the military, so the Defense and Transportation cluster may actually see employment growth in the coming years. In addition, efforts to counter bio-terrorism may utilize some of the research facilities already in place in San Diego - and this could also add a boost to the Biotechnology and Pharmaceuticals cluster.

If there is a negative, it is that future growth in employee compensation in the technology sector may not be as fast as that experienced in the previous decade. A significant portion of employee compensation in the late 1990s in the technology clusters [especially in the Communications cluster] was derived from stock options, not the commercialization of products and resulting growth in the middle income jobs that support product production. However, wage growth in the technology clusters is likely to out-pace the average for the regional economy.

78Recent articles in the San Diego Union Tribune highlight Qualcomm’s ability to penetrate the Chinese mobile phone market.
Methodology – Identifying the Relationship Between Innovation, Technology and Prosperity

There is a five-step process to defining companies that are most innovative.

- **Step 1** – Identify organizations that were awarded patents between 1990 and 1999
- **Step 2** – Assign the Standard Industrial Classification code to organizations awarded patents
- **Step 3** – Distribute patents among the SIC codes based on the organization’s SIC code
- **Step 4** – Allocate patents to the San Diego clusters based on the organization’s SIC code.
- **Step 5** – Evaluate the clusters to determine which are most innovative.

**Step 1 – Identify organizations awarded patents between 1990 and 1999.**

This was accomplished by obtaining a list of organizations awarded patents from the US PTO. There are a total of 10,984 utility patents awarded between 1990 and 1999. Of the total, 2,800 patents or 25.5% are awarded to individuals leaving 8,184 utility patents awarded to 1,463 organizations. For plant patents, there are a total of 125 awarded between 1990 and 1999. Of the total, 33 patents or 26.4% were awarded to individuals leaving 92 plant patents awarded to 8 companies.

**Step 2 – Assign SIC codes to organizations awarded utility and plant patents.**

By using information from the California Employment Development Department, Securities and Exchange Commission listings, organization web sites, information from the San Diego Economic Development Corporation, and the SIC manual, SIC codes are assigned to 275 organizations [about 18% of all organizations receiving patents]. Complicating this process is the fact that some companies merge or get purchased and their SIC code changes, or some companies go out of business. Nevertheless, these 275 companies account for over 66% of all patents awarded to organizations.

**Step 3 – Distribute patents among SIC codes based on the organization’s SIC code.**

Another complexity is found with multifunction organizations where different parts of the organization operate in different clusters. For example, Scripps Clinic and Research Foundation was awarded 43 patents and operates in two SIC codes – one dealing with the provision of medical services and one dealing with research in biotechnology & pharmaceuticals. Its patents are all allocated to the SIC code associated with research in biotechnology & pharmaceutical because its research is done in biotechnology while most of the work in the medical services field is in providing services to clients – not undertaking research. For the US Navy, there are at least four SIC codes to which its 345 patents could be assigned. Rather than attempting to allocate its patents amongst the various SIC codes, it was decided to allocate all of them to a category called defense.

**Step 4 – Allocate patents to the San Diego clusters based on the organization’s SIC codes.**

Of the 5,512 patents for which we obtained data, about 86% were assigned to 11 San Diego clusters. A difficult aspect in assigning company patents to clusters is that a firm may operate in more than one cluster. Judgments were made regarding the cluster to which the company’s patents were assigned. These judgments were based on information about the individual firm from the company’s web page, the Securities and Exchange’s web page for the company involved, and other relevant information. In most cases it was relatively straightforward to distribute the patents among the appropriate clusters. For a small number of organizations [seven companies with 20 patents] this was not possible. These firms had been assigned SIC code 8731 and there was relatively little information about them, in fact, three had gone out of business. Their 20 patents are distributed to three clusters [the Biotechnology & Pharmaceuticals cluster, the Software Computer Services cluster, and the Communications cluster], based on the relative share of employees in each of the three clusters. Definitions of the clusters using the SIC codes are contained in the glossary.
Step 5 – Evaluate the clusters to determine which clusters are most innovative.
To evaluate if patenting is an on-going part of a cluster’s work, the number of patents awarded per thousand employees is calculated for each cluster. Those clusters with a ratio of patents per thousand employees that is significantly lower than the average are dropped from the clusters considered most innovative. An exception was made for the Software and Computer Services cluster since software firms protect their ideas via the Copyright system. This step yields nine clusters that are considered the most innovative.
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WHAT IS SUSTAINABLE COMPETITIVENESS?

The paradigm governing national and international competitiveness has shifted in the last several decades. Competitiveness can no longer be evaluated solely on its economic elements, such as natural resources, access to labor, economies of scale and historical market position. Today, competitiveness is multi-dimensional. What determines competitiveness is the potential for a region to achieve balanced sustained success in three broad areas: the Economy, the Environment and Equity. These elements interact synergistically to make a place livable.

Helping local leaders evaluate our competitiveness and whether it is sustainable is what this study is all about. We combine performance indicators of the Economy, the Environment and Equity into one Index that measures a region’s competitive position and whether that position is balanced and sustainable.

Results from the Index reveal that our poor performance in the equity area may reduce San Diego’s future competitiveness. Compared to the nation and 20 other metropolitan regions, San Diego’s 9th place ranking on the Index comes about from a 19th place ranking for the Equity Element, a 3rd place ranking for the Environment Element, a 10th place ranking for the Economic Element and a 12th place ranking with regard to achieving a balanced and sustainable position among the three “E”s. Austin, Texas came out on top and did not rank below 6th in any of the three “E” areas. Miami, Florida came out at the bottom, and did not rank above 9th in any of the three “E” areas.

Source: San Diego Association of Governments