

**CBA · NAU**  
College of Business  
Administration  
Northern Arizona University  
Box 15066  
Flagstaff AZ 86011  
520-523-7365

# Tracking Progress in Trans-Border Regional Economic Development

**Working Paper Series 99-01 — Feb. 1999**

**Jerry N. Conover**  
Professor of Marketing  
College of Business Administration  
Northern Arizona University  
Box 15066  
Flagstaff AZ 86011  
Jerry.conover@nau.edu

# Tracking Progress in Trans-Border Regional Economic Development<sup>1</sup>

Jerry N. Conover, Professor of Marketing

## Abstract

*A long-term program to foster economic development in a region encompassing two states in different countries has reached a point where indicators of progress are required. This article describes the development of a wide range of indicators of different aspects of economic activity and quality of life in the region. Sixty-eight separate indicators are grouped into five categories: NAFTA-related, regional economic integration, leading sectors, quality of life, and sustainable development. The article concludes with a discussion of challenges faced in tracking economic development progress in a binational context.*

## Introduction

The neighboring states of Arizona, USA, and Sonora, Mexico, enjoy a long tradition of cultural and economic ties across the international border they share. In 1993, while preparing for implementation of the North American Free Trade Agreement, leaders of the two states met under the auspices of the Arizona-Mexico Commission and its sister organization, Comisión Sonora-Arizona, to plan a bold and innovative program to strengthen the economic partnership between the two states.

The program known as the *Strategic Economic Development Vision for the Arizona-Sonora Region* was initiated in 1994 with an ambitious agenda, funded by the two state governments, focused on the goal of enhancing the region's competitiveness in the world economy. The key assumption underlying this goal is that the two states can work effectively as partners in a regional economic development effort by looking beyond the international border between them to capitalize on their shared and complementary strengths.

Specific strategies for regional economic development were developed through a series of studies conducted between 1994 and 1998. Binational teams of researchers were organized by the Arizona University Consortium (comprised of that state's three public universities) and the parallel Sonora University Consortium to conduct these studies. Thirteen separate studies, each with its own binational research team, examined clusters of industries important to both states and also economic foundations and trade patterns underlying the region's economy.<sup>2</sup> The specific topics included:

- Tourism
- Mining and minerals
- Agribusiness
- Manufacturing and maquiladoras
- Health services
- Transportation and distribution
- Communications and business services
- Physical infrastructure
- Communications infrastructure
- International business services
- Intra- and extra-regional trade flows
- Cross-border data exchange
- The region's quality of life

Each study examined the region's current situation with respect to the topic, identifying strengths and weaknesses in the process. The studies also developed specific recommendations for actions that should be taken to improve the region's competitiveness and economic vitality. To enhance the prospects that these recommendations would be translated into action, for each study an advisory committee was assembled from leaders of the private and public sectors. Each advisory committee provided valuable feedback on the focus of the study and its findings, and also offered suggestions as to actions that ought to be pursued. They subsequently helped promote implementation of the study's recommendations among trade groups, government agencies, and the legislatures.

The leaders of the *Strategic Vision* initiative recognized that monitoring progress toward the program's overarching goals — strengthening regional growth, increasing the region's competitiveness in global markets, and enhancing the quality of life for the region's residents — would require development of a set of indicators. A multifaceted set of indicators would allow tracking of several aspects of progress in this regional economic development program. Moreover, they would serve as a useful aid to public policy makers and business decision-makers.

## Development of Appropriate Indicators

Two primary considerations guided the selection of indicators of progress. First, they should be focused on the *Strategic Vision's* particular goals; general, broad economic indicators might not effectively capture the important aspects of progress in this region. Second, they need to be simple to use so as to be understood easily by a diverse audience.

When the *Strategic Vision* program was created, several broad goals were established that cut across all the *Vision's* components. Moreover, the various individual studies proposed initiatives that should achieve goals specific to more limited aspects of the region's economic development. Drawing upon the broad goals for the entire program and the more focused initiatives emanating from the separate studies, five main areas of interest emerged as needing monitoring through specific indicators of progress. These areas are:

- *Strengthening the economic ties between Arizona and Sonora as a single economic region.* This should be observable in terms of increases in intraregional trade, border crossings, and other interactions between businesses in the two states.
- *Economic performance of the region relative to the NAFTA area and the global economy.* Increased competitiveness of the Arizona-Sonora region should be marked by increases in its share of trade within NAFTA and total world trade.
- *Improvements in the quality of life of the region's residents.* A key concern raised in the development of the *Strategic Vision* program was that economic development should not come at the cost of quality of life; in fact, it should enhance quality of life, and a strong quality of life should attract development. Tracking changes in the diverse aspects of quality of life is thus viewed as crucial to assessing the region's development.
- *Performance of leading sectors of the economy.* Several industrial sectors are recognized as leading components of the Arizona-Sonora regional economy: electronics; transportation and automobile manufacturing; scientific/measurement products; textiles; crops and produce; cattle production; fisheries; mining; and the maquiladora industry. Indicators are needed to track how each of these leading sectors is performing relative to national trends.
- *Sustainable development considerations.* The natural and cultural resources of the Arizona-Sonora region are at the same time bountiful and fragile. An important consideration in the region's development is that growth should occur in a manner that can be sustained over time without depleting the resources on which that growth depends.

Existing sources were evaluated as possible candidates for the types of indicators needed in these five areas. Several of them provided good ideas for defining specific indicators, and some included good sets of indicators covering a particular issue such as health or the environment. Unfortunately, very few existing sources combined data on both Arizona and Sonora, and none in a comprehensive way.

Consequently, a set of indicators was developed especially for monitoring progress toward the goals of the *Strategic Vision* program in the Arizona-Sonora region. Where possible, existing data and sources for the data were specified, favoring recognized sources such as government agencies. In order to monitor progress over time, 1993 data for each indicator were also obtained when available to provide a pre-NAFTA baseline.

The indicators resulting from this process are identified as follows.

## **NAFTA-Related Indicators**

The Arizona-Sonora region constitutes about 2.5% of the land area of the entire NAFTA trade area (Canada, the US, and Mexico) and about 1.5% of its population. Figures greater than these for the region's share of intra- and extra-NAFTA trade would indicate a more-prominent-than-expected impact of the Arizona-Sonora region within the NAFTA trade area. Specific indicators are:

- The region's share of total trade (imports and exports) between the US and Mexico.
- The region's share of exports to NAFTA markets.
- The region's share of exports to NAFTA markets relative to the share of the rest of the US-Mexico border states combined.
- The region's share of total exports from the US and Mexico combined to the rest of the world.
- The region's share of cross-border commodity flows (through Arizona-Sonora ports of entry compared to all US-Mexico border ports of entry).
- The region's share of cross-border commercial truck traffic (relative to all truck crossings along the US-Mexico border).
- The region's share of seaport traffic (through the Port of Guaymas relative to all other US and Mexico seaports).
- The region's share of fresh produce trade (exports of Mexican fresh produce through the region's border ports of entry relative to all other US-Mexico border ports of entry).

## **Regional Economic Integration Indicators**

Informal integration of Arizona and Sonora into a single region has been evolving for many decades as the result of increasing economic and cultural interaction between residents of the two states. In more recent years, the states' governments have institutionalized more formal processes of integration as well, primarily through the operation of the Arizona-Mexico Commission and the Comisión Sonora-Arizona.

Indicators of regional integration generally examine changes in various kinds of activity within the region over time, rather than comparing the region against other border states or NAFTA figures. The specific indicators are:

- Cross-border investment (the number of Sonoran establishments owned by Arizona businesses and vice versa).
- Cross-border commercial truck traffic.
- Air passenger traffic between Arizona and Sonora.
- Telephone calls between Arizona and Sonora.
- Trade between Arizona and Sonora (the combined total volume of exports of Arizona's goods to Sonora and Sonora's goods to Arizona).
- Dual-state tourist visits (the number of visitors from outside the region who include both states in their itinerary when visiting the region).
- The region's share of inputs to Sonora's maquiladora industry (components and parts purchased by Sonora's maquiladora firms that are produced in the region).
- Arizona's share of parent companies of maquiladora firms in Sonora.
- Number of binational cluster organizations (organizations with members drawn from both states focused on the issues and interests of particular industry clusters).

## **Leading Sectors Indicators**

Certain economic sectors — manufacturing of various goods, agriculture, mining, the maquiladora industry, transportation and distribution services, and tourism — are important in both Sonora and Arizona, reflecting both natural resources common to the two states and increased intra-regional integration relative to other sectors. By utilizing the region's complementary resources through increased integration between the two states, these sectors may become more competitive in national and global markets. Moreover, employment in these sectors should increase as

they become more competitive, indicating that the region increases its attractiveness for the location of industry. Thus, many of the specific indicators identified below monitor progress in the leading sectors through increases in employment and in exports to world markets. Unless otherwise noted, the basis for comparisons and for determining "shares" for all Arizona-Sonora leading-sectors indicators is corresponding activity in all ten states along the US-Mexico border.

- The region's total production (pooled Gross State Products of Arizona and Sonora). Note that this indicator represents all economic sectors combined, not separate sectors.
- The region's share of manufacturing production.
- The region's share of exported manufactured products.
- The region's share of electronics industry employment.
- The region's share of exports of electronics products.
- The region's share of employment in the transportation equipment/automotive industry.
- The region's share of exports of transportation equipment/automotive products.
- The region's share of employment in the scientific/measurement instrument industry.
- The region's share of exports of scientific/measurement instruments.
- The region's share of textiles industry employment.
- The region's share of exports of textile products.
- The number of start-ups of high technology firms.
- The region's share of agricultural production.
- The region's share of agricultural exports to world markets.
- The region's share of cattle production.
- The region's share of beef exports to world markets.
- The region's share of exports of fishery products to world markets.
- The region's share of mining production.
- The region's share of mining exports.
- The region's share of all maquiladora plants located in US-Mexico border states.
- The region's share of total value added in the maquiladora industry.
- Productivity of Sonora's maquiladora industry relative to maquiladoras in all Mexican border states combined.
- Salaries in Sonora's maquiladora industry relative to maquiladoras in all Mexican border states combined.
- Relative share of the transportation sector in the pooled gross state product of the region.
- The region's share of employment in the trucking and warehousing sector.
- The region's investment in highway infrastructure.

## Quality of Life in the Region

One of the major factors attracting people to the Arizona-Sonora region is the quality of life (QOL) its residents enjoy. A recent study found that residents generally perceive the region's QOL favorably, and that business executives and economic development professionals do consider QOL in their facility location decisions.<sup>3</sup>

Quality of life is an inherently subjective, multidimensional construct. Indicators of QOL in the Arizona-Sonora region, identified below, reflect the major dimensions suggested by prior research to be relevant in this context. Definition of QOL indicators for the combined region proved to be particularly challenging for several reasons, including the great disparity between the two states in socioeconomic conditions, as well as other factors discussed later in this article. Unless otherwise noted, the basis for comparisons for all Arizona-Sonora QOL indicators is corresponding data in all ten states along the US-Mexico border.

- Percentage of population 15 and older who have completed primary education.
- Percentage of adults over age 25 who have completed high school (12<sup>th</sup> grade).
- Percentage of adults over age 25 who have completed college (bachelor's degree).
- Unemployment rate in the civilian labor force for persons 16 years and older.
- Percentage of population with incomes below the federally-defined poverty level.

- Average income per capita. (Note that work is still under way to develop a suitable index combining data from Sonora and Arizona into a single regional indicator.)
- Percentage of workers who can afford a median-price home.
- Relative cost of living in metropolitan areas of Arizona and Sonora.
- The region's childhood mortality rate (deaths of children age 1-4 per 100,000 children).
- Percentage of the region's population with convenient access to medical services (development of this indicator is still under way).
- The region's mortality rate (deaths per thousand inhabitants).
- Percentage of the region's population with adequate nutrition (work is in progress to refine this indicator).
- Percentage of the region's population with reliable service from fire and police departments (work is in progress to refine this indicator).
- Property crime rate per 100,000 households.
- Violent crime rate per 100,000 residents.
- Percentage of the region's population whose drinking water meets national standards (work is in progress to refine this indicator).
- Percentage of the region's population living in areas that meet national air quality standards (work is in progress to refine this indicator).
- Percentage of the region's population with access to sanitary sewer systems.
- Percentage of the region's population with residential electric power.
- Percentage of the region's population with residential telephone service.
- Percentage of the region's population with health insurance coverage (work is in progress to refine this indicator).

## Indicators of Sustainable Development

As mentioned above, the long-term sustainability of the Arizona-Sonora region's growth is a major goal of regional development efforts. Encouragement of development is desired to the extent that the region's natural and cultural resources are not depleted in the process. Work is currently under way to establish a set of indicators of the sustainability of development in the region.

## The Arizona-Sonora Report Card

The 68 indicators described above (not counting yet-to-be-developed indicators of sustainability) comprise a rich set of measures by which to evaluate progress toward the goals established in the *Strategic Economic Development Vision for the Arizona-Sonora Region*. As separate indicators, however, this set may prove too complex and detailed to be reviewed carefully by those in positions to influence public policy and private-sector economic decisions. Consequently, the leaders of the *Strategic Vision* program proposed that a simple means of summarizing this information be devised to help convey overall progress toward the *Vision's* goals.

In response to their request, the Arizona-Sonora Report Card was developed. The Report Card, which will be compiled and presented annually to leaders of the trans-border regional development effort, distills the numerous discrete indicators into a set of four (and eventually five) summary indexes. These summary measures convey the region's performance in terms of a NAFTA Index, a Regional Integration Index, a Leading Sectors Index, and a Regional Quality of Life Index; a Regional Sustainability Index will be added later.

Each summary index is synthesized from the various individual indicators addressing the corresponding *Strategic Vision* goal. For each individual indicator, a change-index will be computed annually to reflect the extent to which the particular measure has increased (index>100), decreased (index<100), or remained the same (index=100). These change indexes are then assigned ratings of "satisfactory," "passing," or "failing" based on the *Vision's* goals. The various ratings of the individual indicators are combined, using a letter-grade format, into a single overall "grade" for the broad summary index. Thus, for example, the preliminary data on changes from 1997 to 1998 in

such separate factors as the region's share of NAFTA markets and the region's share of cross-border commodity flows lead to a tentative summary NAFTA Index grade of C+ for the Arizona-Sonora region.

The Leading Sectors Index and the QOL Index each are reported along with some sub-indexes based on smaller groupings of individual indicators. For example, sub indexes and corresponding grades are reported for manufacturing, agriculture, mining, maquiladora industry, and transportation/distribution as components of the Leading Sectors Index. Similarly, the QOL Index is accompanied by separate sub-indexes for Education, Economic Well-being, Public Safety and Health, Environmental Factors, and Other Aspects of QOL.

It should be noted that the individual indicators and the data on which they are based will be included in the Report Card along with the summary indexes so users have access to detailed as well as summarized information. The annual Arizona-Sonora Report Card will be disseminated by the Arizona-Mexico Commission and the Comisión Sonora-Arizona to the governors and legislatures of both states, along with private-sector leaders. Armed with the Report Card's findings, these leaders will be better informed as they work to cultivate growth in the region.

## Challenges and Future Work

Development of the Arizona-Sonora Indicators of Progress has been a challenging undertaking for several reasons. Perhaps foremost is the fact that concepts are frequently measured differently on the two sides of the border. For example, unemployment in Sonora is defined in two different forms, neither of which is exactly comparable to the standard definition used in the US. These discrepancies sometimes make it difficult to combine data from the two states into single indicators.

The fact that several of the indicators rely on data that are compiled by different states poses a related challenge. To the extent that these independent state agencies report a given type of information in disparate ways, the construction of an indicator comparing the Arizona-Sonora region to the whole border area again becomes difficult.

In light of these kinds of challenges, and the fact that not all of the indicators described here have been fully operationalized, work continues to refine the indicators of progress. Moreover, as the region's leaders gain experience using the indicators and the summary Report Card, they will undoubtedly be able to suggest areas for further revisions of existing indicators.

Finally, various agencies and organizations will be charged with collecting the data from which the regional indicators are constructed. Much of the needed information is already maintained by agencies of the state or federal governments. Some indicators, however, require periodic surveying of industry participants to obtain the needed raw data.

Tracking progress in an innovative trans-border regional development program is a challenging task. Through continuing data gathering and revision of indicators as needed, efforts to strengthen the Arizona-Sonora region's economic vitality and quality of life should experience improved prospects for success.

---

## Notes

<sup>1</sup> Much of the content of this article is discussed in more depth in Vera Pavlakovich and Jerry Conover, *The Arizona-Sonora Vision: Indicators of Progress*. Phoenix: Arizona-Mexico Commission, 1998. This work was made possible through financial support from the Arizona-Mexico Commission.

<sup>2</sup> Reports of these studies are available from the Arizona-Mexico Commission, 1700 West Washington #180, Phoenix, AZ 85007 (602.542.1345). Summaries are available on the Web at [www.azcentral.com/community/azmex](http://www.azcentral.com/community/azmex).

<sup>3</sup> Jerry Conover and Ernesto Peralta, *Quality of Life and Economic Development in the Arizona-Sonora Region*. Phoenix: Arizona-Mexico Commission, 1996.