

# High Technology

## Overview

The downturn in Utah's high technology sector that began in 2001 gained momentum in 2002. For the first six months of 2002, employment in Utah's technology sector declined by 8.8%, representing a net loss of nearly 5,000 jobs. Companies that manufacture computers and peripheral products and those that design computer systems experienced the largest employment drop in absolute numbers with a combined job loss of almost 3,200 workers. Only two industries -- medical equipment and supplies, and scientific research and development services -- reported positive job growth.

## What is High Technology?

The high technology sector has long been a topic of discussion partly because it is viewed as an engine of growth. However, the high technology sector has no universally accepted definition. The definition developed by the Bureau of Economic Business and Research (BEBR) is a combination of basic research at the individual firm level and use of pre-existing data collected by the National Science Foundation (NSF). Inclusion in the high-tech sector requires that an industry be conducting research and development (R&D) at a rate higher than the average for all industries (1.5 times average) and employ a larger share of its workers in science and engineering activities than the rate for all industries (1.5 times average). Based on NSF data, the ratio of R&D spending as a percentage of total sales for all industries in 2000 was 3.4%. The ratio of R&D scientists and engineers as a percentage of all workers for all industries as of January 2001 was 5.9%. Therefore, to be included in BEBR's high-tech sector, an industry must spend, as a percentage of sales, 5.1% on R&D and classify 8.8% of its workers as scientists and engineers.<sup>1</sup>

The second step in defining Utah's high-tech sector utilizes basic research at the individual firm level. Data collected by BEBR through surveys show that some firms in Utah undertake a significant amount of R&D, but are classified in industries that do not meet the criteria outlined above. Data on these companies are included in the category "other". Likewise, at the national level, some industries that spend heavily on R&D and employ large numbers of scientists and engineers, are not included in Utah's high-tech sector. The most notable example of this is Utah's drug and pharmaceutical industry which is comprised primarily of companies that encapsulate herbal supplements.

The data presented here are not strictly comparable with data presented in earlier years due to the reclassification of all industries from Standard Industrial Classification codes (SIC) to the North American Industry Classification System (NAICS).

## 2002 Summary

Of the 1.1 million jobs in the State of Utah, about 51,000 (or 4.6%) are in the high technology sector. Included in the total are workers in both high-tech manufacturing (computer and peripheral equipment, communication equipment, semiconductor and electronic components, navigational equipment, and medical equipment and supplies) and high-tech services (software development, internet publishing and broadcasting, internet service providers, engineering services, testing laboratories and companies conducting research and development in the physical, engineering and life sciences).

<sup>1</sup> National Science Foundation, Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000: Early Release Tables.

Notably absent from Utah's high-tech list is the drug industry and the aerospace industry (including aircraft parts and guided missiles). Utah's drug industry is comprised primarily of companies that encapsulate herbal supplements. These companies do not have sufficiently large Research and Development (R&D), nor do they employ the requisite number of scientists or engineers to be included in the high-tech sector. Companies that are primarily engaged in medical research are included in the NAICS sector "R&D in physical, engineering, and life sciences". Those companies that are involved in the research and development of drugs have been included in the category "other".

Aerospace has been excluded for similar reasons. In the past, this sector heavily invested in its research and development. However, federal spending for defense-related R&D has been declining and has not been replaced by industry-sponsored research. As a percentage of sales, R&D spending in the Aerospace industry in 2000 was 7.3%, down from 9.3% in 1998. Currently, the ratio of R&D spending to sales in Utah's aerospace industry is less than 1.0% as most of the local manufacturing utilizes "off-the-shelf" technology that was developed during the 1980s. Therefore, Utah's Aerospace industry is no longer included in the high-tech sector, although the industry still employs a large number of scientists and engineers.

Utah's high technology sector is concentrated in only a few industry segments; computer systems design services (21.5%), medical equipment manufacturing (12.4%), and software development (9.7%).

The largest high-tech industry in the state, as measured by employment, is computer systems design services, which accounts for 21.5% of the state's high-tech workers (almost 11,000 people). This industry includes companies that provide expertise in the field of information technologies (firms that test and support software to meet the needs of particular clients), design software systems, and provide on-site management and operation of computer systems. This industry does not include companies that design and manufacture computers and peripheral equipment.

The national economic downturn combined with the dot.com bust has taken a large toll on companies that provide computer systems design services. This segment of Utah's high-tech sector has lost 2,174 jobs locally since 2000. Perhaps the biggest disappointment in this industry has been the rise and fall of TenFold Corp., a company known for its technology used by other companies to develop large scale software applications. Once considered one of Utah's high-tech success stories, TenFold is in the process of restructuring its debt. If unsuccessful, the company could be forced into bankruptcy early next year. In 1999, TenFold employed about 535 workers in Utah. At the present time, TenFold employs fewer than 100 people. Other companies in this industry that announced layoffs in 2002 include Fonix and Caldera/SCO Group.

Although many of the more established companies in Utah's high-tech sector are struggling, there are many up-and-coming companies developing cutting edge technologies that could help strengthen and expand the state's high-tech sector. Furthermore, Utah has experienced some success in marketing itself as a top-tier technology state attracting two new technology companies: Siebel Systems, which plans to locate a 30,000 square foot enterprise data center employing nearly 500 Utahns

by 2005; and Cadence Design Systems, which will provide 300 high-tech jobs over the next few years.

Closely aligned with the design services industry is software development. Companies that develop and publish software are also casualties of the sluggish economy and victims of an industry that is increasingly dominated by a handful of very large players. Over the past two years, employment at software development companies in Utah has dropped by more than 900 workers (from 5,819 workers in 2000 to 4,898 workers as of mid-year 2002). The largest company in this industry is Provo-based Novell Inc., a computer networking software and consulting company. Once the leading network software maker in the U.S., Novell has struggled to maintain its position but lost significant market share to MicroSoft in the late 1990s. Seeking to broaden its product base, Novell acquired Cambridge Technology Partners (an eSolutions consulting company) in 2001 and more recently acquired SilverStream Software, an internet services-oriented applications development company located in Massachusetts. Novell currently employs about 6,000 worldwide, and 2,000 workers in Utah.

Medical equipment manufacturing is one of only two high-tech industries that reported positive growth during the first half of 2002. This industry has long been an important component of Utah's high-tech sector with such stalwarts as Utah Medical Equipment, Abbott Labs and Becton Dickinson. Growth in this industry has helped offset layoffs in other high-tech industries. For example, Fresenius USA, manufacturer of kidney dialysis products, last year hired manufacturing and administrative employees who were laid off from Autoliv and Iomega. Fresenius employs roughly 1,000 workers.

Other high-tech companies that have not fared well include Evans & Sutherland (E&S), Intel, Iomega, and Autoliv. Since September 2001, E&S has sustained three major staff reductions. The latest will reduce employment at the Utah headquarters by 100 workers, bringing the Utah-based employment total to 500, a decline of almost 30% from its total Utah-based workforce six years ago.

Iomega, once a star of Utah's high-tech sector, early on developed ZIP data storage products for personal computers. As PC drives became bigger, consumer demand for the company's products declined. Last year, Iomega undertook a major restructuring that moved the company's headquarters from Roy, Utah to San Diego and shifted virtually all manufacturing from the Roy facility to Penang, Malaysia. Over the past four years, Iomega has laid off roughly 1,200 workers. Currently, the company employs fewer than 700 people in Utah.

One of Utah's largest private employers -- Autoliv, Inc. -- has also cut its Utah labor force over the past two years. During 2001, Autoliv pared its work force by 860 with the relocation of its Ogden air bag cushion production operation to Mexico and closure of its air bag component manufacturing operations in North Ogden. The company currently employs about 4,500 workers in Utah, a 35% decrease from its peak of roughly 7,000 workers five years ago.

## Conclusion

Utah's high-tech sector performed well throughout most of the year 2000. However, economic downturns, which began in the latter half of 2001 have worsened in 2002. When averaged, high-tech employment appears more stable than is actually the case. A month-by-month analysis shows that the level of employment decline in high-tech is accelerating.

In addition to the economic factors, there are other issues affecting the overall stability and vitality of the state's technology sector. For example, with very few exceptions, Utah has no large corporate headquarters conducting research and development activities in the technology industry. This is a vulnerability. Rather than attracting technology companies, many of Utah's premier high-tech companies have been acquired, bought out or moved beyond Utah's borders. Many of the technology companies that once formed Utah's elite high-tech core are either gone or struggling. Identifying the reasons and implementing solutions, may pose one of Utah's greatest challenges.

Table 80  
High Technology Employment Additions and Reductions

High-Tech Employment Additions		High-Tech Employment Reductions	
Fresenius Medical	200	Enterasys	180
HyClone Laboratories	279	Citrix	50
Ingenix	117	Whizbang	50
Siebel Systems	158	Evans & Sutherland	185
SabiOso	50	Fonix	40
Cadence Design Systems	50	NextPage, Inc.	36
		Paradigm Medical	20

Source: Department of Workforce Services

Table 81  
Utah's High Technology Sector Employment Trends: 2000-2002

NAICS Sector	Sector Description	Employment			00-02 Net Change
		2000	2001	2002	
3341	Computer and Peripheral Equipment	3,575	3,181	1,623	(1,952)
3342	Communications Equipment	2,286	2,393	2,375	89
3344	Semiconductor and Electronic Components	4,110	4,215	3,534	(576)
3345	Navigational, Measuring and Electromedical	3,211	3,242	3,132	(79)
3391	Medical Equipment and Supplies	6,210	6,159	6,293	83
5112	Software	5,819	5,348	4,898	(921)
516	Internet Publishing and Broadcasting	1,052	707	566	(486)
5181	Internet Service Providers	3,476	3,276	3,052	(424)
54133	Engineering Services	5,559	5,806	5,591	32
54138	Testing Laboratories	1,182	1,214	1,137	(45)
5415	Computer Systems Design	13,059	12,526	10,885	(2,174)
54171	R&D in Physical Engineering and Life Sci.	2,247	2,740	3,145	898
	Other	5,443	4,741	4,383	(1,060)
	Total	57,229	55,548	50,614	(6,615)

Source: Utah Department of Workforce Services, Annual Labor Market Information Report

