

## CHAPTER 3:

# Utah's High-Tech History



High-tech businesses have had a major impact in determining Utah's economic prosperity. High-tech companies in Utah have numbered as many as 3,400, employing more than 60,000 people.<sup>1</sup> This does not include the 133,000 individuals who work in the service industry, many of whom are involved with technology in some fashion.<sup>2</sup> Fifty percent of high-tech companies are professional, scientific and technical service organizations. Twenty-six percent provide information services, with nine percent focused on retail trade.<sup>3</sup>

The high-tech industry's size is not the only reason for its importance to the Utah economy. High-tech jobs are largely responsible for increasing average wages in Utah and comprise a disproportionate amount of the state's overall economy. High-tech jobs in Utah pay an average of more than \$51,000—77 percent above the state's average wage. While its employment makes up 4.9 percent of the state total, high-tech wages account for 8.4 percent of the state's economy.<sup>4</sup>

In the past decade, the nationwide tech industry experienced dramatic gains and losses and has taken regional economies on an unpredictable roller coaster ride. Despite the tech sector's short-term uncertainty, however, most economists are confident in the fact that, over time, the high-tech industry will comprise the majority of sustained economic growth in the nation, and those states that can grow and attract high-tech firms will be the ones to succeed.<sup>5</sup>

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## ***Utah's High-Tech Beginning and Successes***

During the 1980s, Utah was second only to the state of Washington in successful software development.<sup>6</sup> A *Salt Lake Tribune* article reported that, "Some remember a time when Utah rolled off the tongue in any uttering of the nation's high-tech hot spots along with California's Silicon Valley and North Carolina's Research Triangle."<sup>7</sup> Consider these examples:

Novell, perhaps Utah's brightest technology star, "invented the technology that enables personal computers to talk to one another, an innovation that changed the world." Established in Provo in 1983, Novell was a breakout leader in personal computer operating systems and early network solutions.<sup>8</sup>

WordPerfect, also originally located in Utah Valley, led the word processing industry, and its main product was called a "life-changing technology."<sup>9</sup> With 4,000 employees and sales of more than \$500 million in 1991, WordPerfect became a national business leader.<sup>10</sup> The founders of Novell and WordPerfect, Raymond Noorda and Alan Ashton, both graduated from the University of Utah.<sup>11</sup>

Other businesses such as "Iomega Corp. and its once high-flying Zip drive called Utah home. Unisys Corp. and 3Com built a major presence in the state, and Intel and Micron Technology identified Utah as a site for significant expansion...."<sup>12</sup>

Utah also played a role in major technology companies that don't currently have a significant presence in Utah. Adobe Systems, the world leader in desktop publishing and digital imaging software, was co-founded by University of Utah alumnus John Warnock. Located in San Jose, CA, the company employs more than 3,700 and posted annual revenues of \$1.2 billion in 2003.<sup>13</sup> Another U of U alumnus, Ed Catmull, co-founded Pixar Animation Studios with Steve Jobs and serves as the company's president. Located in Emeryville, California, Pixar employs more than 730 skilled personnel.<sup>14</sup>

In the 1980s, the state, understanding the importance of developing strong competency in high-tech in the region, began forming strategic partnerships with businesses and universities. An example is the establishment of economic focus areas by the Utah state government, accompanied by representative industry organizations aligned with these focus areas, including the Utah Information Technologies Association (UITA), the Utah Life Sciences Association and others.<sup>15</sup> While the state dedicated some limited resources to launch these industry groups, they quickly became industry-led and self-sustaining,

and have provided an effective means for Utah's businesses to provide input to the government on an array of issues.

Another example of state investment in research and technology is the Utah Centers of Excellence Program, which is a state-sponsored program that funds late-stage research in order to develop new products, high-tech companies, and skilled jobs. Highlights of the program include:

***Since its inception in 1986, the program has helped create thousands of high-tech jobs, assisted in the creation of spin-off companies, and through improving products and processes has helped hundreds of Utah's high-technology companies experience tremendous growth.***

- The cumulative state funding for the COEP between 1986 and 2001 was \$33.7 million and the cumulative matching funds received was \$356.1 million, resulting in a matching fund ratio of 10.6 to one.
- Over the entire life of the program, intellectual property created by faculty participating in the Centers of Excellence accounts for 170 patents, resulting in 197 license agreements.
- Since the inception of the program, 142 companies have been created and licensed proprietary technology from the program.
- Currently, companies that trace their origins to the COEP employ an estimated 1300 persons in the high technology sector of the economy. The wage for this workforce averages \$68,000 per year.

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Utah's stature in IT, however, waned in the 1990s. Novell and WordPerfect merged in an effort to fend off challenges to their technology by Microsoft Corp. The attempt failed. WordPerfect became part of Canada's Corel Corp. Iomega moved its headquarters from Roy, Utah, to San Diego, California; neither Intel nor Micron has yet realized more than a fraction of their original expansion plans for Utah. And Novell, though

still located in Provo, has moved its headquarters to Massachusetts and has restructured several times, resulting in a series of layoffs.<sup>17</sup>

Referring to Utah's technology successes and failures, former Governor Mike Leavitt said, "While we have a rich history of innovation, let's be honest about it. While the number of jobs that have been created are in the tens of millions out of Utah technologies, too few of them have been created [or remained] here."<sup>18</sup>

### ***Utah's High-Tech Industry in the Dot-Com Era***

Many former employees of Utah's early tech ventures invested their severance packages into other start-up companies, some of which became successful. These, along with a collection of Internet and health industry start-ups, kept Utah's reputation in the tech sector alive. In 1998, Utah received national recognition when *Newsweek* placed Salt Lake City in a class of 10 cities worldwide as "hot new tech cities," described as "high fliers whose success at attracting and nurturing high-paying, high-tech jobs is dramatically changing their regions' demeanor." According to industry experts, the main element needed for such cities is the presence of a major research university. The article cited the value of the University of Utah, one of the first institutions to link up to the Internet's predecessor.<sup>19</sup>

High-tech interest was just as strong in Utah during the '90s. The Utah-Silicon Valley Alliance, championed by then-Governor Mike Leavitt, developed a strategy to lure California-based companies to Utah with the state's cheaper real estate, skilled labor force, and access to major research universities. In reference to the Alliance, Gov. Leavitt said, "We are planting seeds now that will bear fruit later. We are creating more than just jobs. We are creating 21<sup>st</sup> century careers so our children and grandchildren can flourish in the New Economy."<sup>20</sup>

### ***Utah Recession and the Falter of High-Tech***

"When high technology gets the sniffles, Utah's economy gets pneumonia," said Utah Technology Industry Council member Brad Bertoch.<sup>21</sup> During the nationwide recession that can be traced to March 2001, that assessment proved especially true. According to the 2004 Economic Report to the Governor, the decline of high tech in Utah was listed as one of three major factors of overall economic decline in Utah, along with the national recession and the closing of the 2002 Olympics.<sup>22</sup>

Utah's technology sector lost almost 10,000 jobs between 2001 and 2003. That represents a 15 percent loss of typically high-wage jobs.<sup>23</sup> Computer systems design, computer and peripheral equipment, aerospace and software publishing all have average salaries above \$60,000. In one year (2002), nearly 4,700 jobs were lost in these four high-wage subsectors.<sup>24</sup> According to the Utah Department of Workforce Services, "...It's the loss of the higher spending power from tech workers that's having a disproportionate influence on the economy. It's the loss of that spending power that has reached into retail sales, car and clothing purchases and service industries, and that's prolonging the economic downturn."<sup>25</sup>

Assistance from state government in promoting high-tech also has slowed, according to some. "We have not put together a strategic plan to focus on high technology," Bertoch said. UTIC council member Suzanne Winters concurred: **"Utah, five years ago, was ranked in the top five of high-tech business economic development programs. Today we're not even in the top 20."**<sup>26</sup>

The picture created by recent tech indicators seems bleak, but it is not the entire picture. Although there have been undisputed losses in the tech sector, most of those losses have been confined to the information technology industry, which is barely one-fourth of the entire Utah tech sector. In fact, **in** 2003 three technology industries were posting gains on the year: medical equipment and supply, engineering services, and scientific research.<sup>27</sup> Many companies in these important growing industries have even closer ties to and reliance on Utah's research universities.

### ***State Outlook: The Re-emergence of High-Tech***

According to economic experts, dramatic losses in the high-tech sector may be at an end. The 2004 Economic Report to the Governor says, "The rate at which high technology jobs are declining appears to be slowing," while the Utah Information Technology Association (UITA) is yet more optimistic: "Utah's IT industry may have taken a beating along with the rest of the country's, yet it continues to grow steadily larger." In a recent study UITA found that Utah's overall IT industry increased 13 percent since 1999, and the number of IT jobs is increasing as well; the 57,442 IT employees in Utah is an increase of 34 percent since 1999.<sup>28</sup> Also, according to investor relations specialist David Politis, recent increases in venture capital funding in the state provide additional evidence that Utah's tech sector is rebounding.<sup>29</sup>

Continued state investment in high-tech has helped Utah weather the recent recession and move toward a high-growth potential once again. For example, Utah is participating with other forward-looking states in bridging the venture capital gap. In 2003 the “Fund of Funds” was established by the Utah legislature. The Utah Capital Investment Corporation is authorized under the legislation to use \$100 million in contingent tax credits to induce venture capital firms to establish and maintain a presence in the Utah market. Revenue from the tax credits will not be directly invested in ventures but will be available to banks and financial institutions under secured instruments to make investments to venture funds in the state. As much as \$200 million dollars could become available under this program for investments in new Utah enterprises, but it could also attract a pool of over a billion dollars of existing venture capital assets to the state.<sup>30</sup>

Recently, the state’s reorganization under the Utah Technology Alliance resulted in the establishment of new “ecosystems,” including Web Services, Biotechnology, Medical Devices and Digital Media. This new structure emphasizes the state government’s perception that increased attention must be paid to Utah’s infrastructure needs.

Two of these ecosystems represent major existing industry sectors. Biotechnology and biomedicine are growing at a rapid pace throughout the nation and will be responsible for more than 3.5 million jobs in the U.S. by 2014. Utah stands to benefit disproportionately from that growth; according to the Milken Institute, biopharmaceutical employment in Utah grew at a significantly faster rate, 194 percent, between 1993 and 2003 that for the nation (28.1 percent).<sup>31</sup> Biotechnology’s future is impressive, considering the following:

- Biopharmaceuticals are responsible for 2.7 million jobs and 2.1 percent of total employment in the nation. Each job in the industry creates another 5.7 jobs elsewhere in the economy, substantially above the average for all industries.
- The biopharmaceutical industry paid an average annual wage of \$72,600 in 2003 and is among the most productive sectors in the U.S. economy with real output per worker of \$157,300.
- Many state economies are highly dependent on the biopharmaceutical industry, including New Jersey, Massachusetts, Indiana, North Carolina, Connecticut, Pennsylvania, California, Utah, Maryland, New York, Rhode Island, Illinois, and Washington.<sup>32</sup>

Both Salt Lake City and Provo have established strong clusters in biomedical research and in biotech—with Provo hosting the second-fastest-growing cluster in the Southwest

(as of 2000). Companies that comprise these important clusters include TheraTech, Myriad Genetics, Echelon Biosciences, and Applied Biosciences. Each of these companies had its beginning in a university-based Center of Excellence. For example:

- Myriad Genetics, created in 1991 from work done at the University of Utah, has grown to become a leading biopharmaceutical company in the medical industry.<sup>33</sup> Myriad guides the development of new healthcare products that treat major diseases, leading to proprietary targets for human drug discovery.<sup>34</sup> Myriad currently has a professional oncology product sales force of 100 people and recently formed a partnership with Abbott Laboratories.<sup>35</sup> In 2004, Myriad reported sales of \$34.3 million, up 25 percent from FY 2003, and recent sales indicate that this growth rate will continue into 2005.<sup>36</sup>
- TheraTech, founded in 1985 on research conducted at The University of Utah, has made a name for itself in the biotech industry as a leader in the development of innovative products based on controlled release drug delivery technologies, such as patches and mild electric pulses. TheraTech has developed two transdermal products and is working on a wide range of drug delivery products.<sup>37</sup>
- Idaho Technology, incorporated in 1990 on research conducted at The University of Utah, created a high-speed thermal-cycling instrument to match the speed of biochemical reactions. In 1999, the company began working with the U.S. Air Force to develop the world's first Ruggedized Advanced Pathogen Identification Device to detect or study disease-causing organisms.

During the early nineties, while these companies were just emerging, Utah relied on its strong background in software development and computer connectivity to set the state's economic pace. While our pre-eminence in information technologies has waned, the newer entrants to Utah's high-tech showcase have more than made up for those losses.

**The question Utah is faced with today is, "Where will Utah's resources need to be directed for economic success in the 2010s?" The answer to that question lies on the lab benches and in the computers of our state's research universities.**

Despite the sometimes volatile nature of the tech sector, it remains a vital component of Utah's growing economy. Overall, the majority of sustained economic growth nationwide will be in high-tech industries. Utah, which is in even greater need of high-wage jobs, must rely on the tech sector to create them. According to a recent article in *Connect* magazine,

*“White-collar jobs that will be strong in the future will not be the standard high-tech jobs of the past. Rather, they’ll be high-concept and high-touch. Former programmers will become ‘IT designers,’ required to understand the bigger picture of business and relate to a larger group of people. The job becomes more of a synthesis of skills.”<sup>38</sup>*

Also, other industries—mining, farming, ranching, and manufacture—that have been the traditional mainstay of Utah’s economy, are predicted to continue declining over the coming years.

### **State Technology and Science Index: Utah’s Standing in High-Tech**

The State Technology and Science Index was created by the Milken Institute as a benchmark assessment for states as a means to monitor high-tech economic progress. The index encompasses a comprehensive inventory of technology and science assets that can be leveraged by a state to promote economic development. The five equally weighted components of the index include:

1. Research & Development Inputs
2. Risk Capital and Entrepreneurial Infrastructure
3. Human Capital Investment
4. Technology and Science Workforce
5. Technology Concentration and Dynamism.

According to the Milken Institute, the single most important variable in explaining technology outcomes across states is the Risk Capital and Entrepreneurial Infrastructure composite.<sup>39</sup> For 2004, rankings for western states were as follows:

California .....	2
Colorado .....	3
Washington .....	6
<b>Utah .....</b>	<b>9</b>
New Mexico .....	14
Arizona.....	17
Oregon.....	19
Idaho .....	30
Wyoming .....	41
Nevada.....	43

Utah's best placement was in technology concentration and dynamism, where it secured the highest number of *Inc* 500 companies per 10,000 business establishments. Utah is currently taking action to enhance its position in the future. Utah voters recently passed a constitutional amendment, which will permit universities to take ownership in private business exchange for intellectual property. Utah's lowest ranking of 17 fell under Technology and Science Workforce Composite. This composite indicates the amount of

research and development the scientific workforce converts into commercially viable products and services.

***Despite Utah's high ranking on the overall index, the low score on the Technology and Science Workforce Composite is hurting Utah's opportunity to become a true technology magnet.***

According to the Milken Institute, when skilled technical and science workers migrate from other regions to a geographic cluster or remain in a cluster after graduating from local institutions, localized growth is stimulated as they reinforce the initial advantages of the region.

Regions that can retain their highly skilled technical and science workforce can attract new firm formation and sustain mature technology firms, eventually defining the region as a technology pole. Despite Utah's high ranking on the overall index, the low score on the Technology and Science Workforce Composite is hurting Utah's opportunity to become a true technology magnet. In states that offer both the relevant job opportunities and a vibrant, growth-oriented business environment such as

California (3), Colorado (5), and Washington (7), the tech workforce is gathering intensity and attracting more and more firms to the region.<sup>40</sup>

***For state and local economic development, the message is this: the quality of scientists, engineers, physicists, system engineers and other creative technical workers that states train and retain, and attract from other locations, will profoundly impact a region's future technology industry development.***<sup>41</sup>

Utah did score in the top ten of the index on the Technology Concentration & Dynamism Composite Index, which measures the degree to which a state's economy is driven by the technology sector and the success of technology outcomes in that state. Just because technology is prevalent in a state does not necessarily mean that technology is growing in that state. With so many *Inc* 500 Companies, Utah has a high percentage of business births and many privately held companies begin in Utah, but we cannot retain these firms for the long-term. On the Technology Concentration & Dynamism Composite Index, Colorado ranked #2 with California at #4.

As Utah continues its economic recovery, many high-tech issues will need to be resolved.

- First, Utah's diversity of high-tech industries needs to be recognized and celebrated. Though information technology has been the most visible industry, many other companies are emerging with promise of significant economic impact.
- Second, Utah continues to suffer from a low level of willing venture capital investors, which leads to an inability for research and technology to create commercial outcomes.
- Finally, Utah does not exhibit the same level of networking and partnership that commonly occurs in highly successful business clusters.

To help remedy these issues, methods and partnerships must be established to start-up and incubate potential successful businesses. Utah's research universities are ready to help accomplish this, leading towards Utah's next sustained economic boom.