
Part Three

Flexibility and Careers

CHAPTER 7: CAREERS IN SILICON VALLEY

Job security is the ability to get a job. Staff people don't have job security; you can be fired whenever the company likes....The social reality is, the staff person has no connections to a next job. They don't have social relationships. They're isolated. A contractor has these relationships. That's real job security.

*--Technical Writer,
quoted in (Kunda, Barley and Evans 1999)*

I never chose temp work voluntarily, but I had to, since I got laid off and couldn't find permanent work. The time I've spent as a temp ruined my financial situation, my self-esteem, and destroyed any sense of my career direction. There is also a psychological damage in having to constantly 'learn' the same old thing over & over. The need to constantly learn can be very stressful, and actually eats away at my creative energy, since I have to become short-term rather than long-term oriented.

--Executive Assistant in Silicon Valley

Up to this point, my concern has been with analyzing the nature of labor market flexibility in Silicon Valley and understanding the increasingly important role of intermediary organizations in shaping these labor market dynamics. In part one, I argued that labor flexibility is best understood by making a distinction between flexible work and flexible employment, recognizing that the forces shaping flexible employment patterns are different in important ways from those shaping flexible work practices. Rapidly changing work demands and skill requirements are primarily driven by broad forces of competition, innovation and technological change. These forces do contribute to the growth in tenuous, temporary and mediated employment relationships, but flexible employment relationships are also heavily influenced by the legal, regulatory and institutional environment shaping employment in the U.S. Both flexible work and flexible employment have contributed to the growth in labor market intermediaries, whose activities I analyzed in part two. In the context of rapid change, unpredictability, and heightened risk, both workers and employers are turning to a range of third party intermediaries to help them navigate through the complex labor market. Through reducing

transactions costs, mediating risk, shaping compensation levels, and building networks, these intermediaries have become a central feature of labor markets in Silicon Valley.

In this section, I turn my attention to the implications of these flexible labor markets and intermediary organizations for the livelihoods of workers (in this chapter) and for public policy (in the following chapter). Flexible labor markets, at least certain aspects of them, are clearly a critical component of Silicon Valley's economic success. The circulation of people and information from firm to firm has helped foster creative innovation in product development and process improvements. It has also helped ensure that new innovations quickly diffuse through the regional economy, contributing to the region's pace of development. While individual firms have grown and died, the regional economy as a whole has been able to thrive remarkably in the midst of the volatility and uncertainty that is inherent in information technology industries. As a result, Silicon Valley has experienced more than four decades of dramatic economic growth and played a critical global role in driving innovation, economic success, and generation of wealth (Castells and Hall 1994; Kenney 2000; Lee et al. 2000; Saxenian 1994).

But what have been the implications of the structure of Silicon Valley labor markets for workers in the region? With so many people having only indirect, temporary, or tenuous ties with their employer, it is clearly not appropriate to simply assume that the economic success of the region's economy is translated into career success for workers in the regional labor market. Flexible labor markets are *risky* labor markets, and workers in the region face high levels of uncertainty in their employment opportunities and career paths. How do rapidly changing work requirements and temporary, mediated employment relationships shape who is able to benefit from the tremendous growth and dynamism in the regional economy? What role do intermediaries play in shaping success for workers in the regional labor market? What patterns of

opportunity and inequality exist in the region? What are the factors that shape workers' ability to cope with increased risk in the labor market while developing rewarding careers?

Ideally, to fully assess outcomes for workers in these flexible labor markets it is important to understand not just patterns of jobs and wages, but patterns of careers and earnings profiles over time (Arthur, Hall and Lawrence 1989). The term *careers* in this context does not assume that work breaks down into neatly ordered patterns with consistent upward mobility, so that engineers, programmers and managers have careers while temporary workers, circuit board assemblers and janitors do not. Instead, the term applies to all workers, fundamentally requiring we incorporate a time-dimension into our analysis of labor market outcomes, trying to understand how work histories reflect employment stability and instability, skills and experience gained or made irrelevant, relationships nurtured or lost, risks or opportunities encountered. A focus on careers requires an understanding of relationships, both within and between firms, and that cut across work and non-work activities (Arthur and Rousseau 1996).

Unfortunately, there are no regular labor market data sources that adequately track individuals' career paths at a regional level, making such an analysis difficult.¹ Nonetheless, through an examination of available labor market data, supplemented by a range of in-depth ethnographic and sociological studies of particular sectors of the regional workforce,² three basic patterns of labor market outcomes in the region are clear. First, while some workers in the regional labor market have clearly thrived, overall the region is characterized by high levels of inequality along with stagnating wages for large sectors of the workforce. Second, the growth in flexible employment relationships is one significant factor in contributing to increasing economic inequality in the region. In the current institutional and regulatory context, these employment relations dis-empower large sectors of the workforce, weakening their bargaining

position in the labor market and making them more vulnerable to changing market conditions and technological obsolescence. The vulnerability of workers has been made particularly evident in the most recent downturn, as firms have rapidly shed workers and unemployment has grown rapidly. Third, intermediaries can play an important role in shaping labor market outcomes, but in contradictory ways, in some cases undermining career opportunities for workers and in some cases helping to build them. This contradictory role can be best analyzed by understanding the ways that each intermediary influences three fundamental factors that shape labor market outcomes: 1) the nature and quality of people's skills; 2) the nature and quality of people's social networks; and 3) the type of power people have in the labor market.

Growing Inequality

For many workers, the economic boom of the 1990s created tremendous opportunities. Job growth was remarkably high, especially in the later half of the decade, with job growth averaging 5 percent a year for 1995-1997. Unemployment rates in the Valley were consistently below state-wide and national figures, with unemployment dipping below 5 percent in August 1995, and below 4 percent in December 1995. By August of 1999, the unemployment rate in Santa Clara County dipped below 3 percent, and reached as low as 1.3 percent in December of 2000.

Labor markets in the region, however, have been dramatically impacted by the economic slow-down that began in the second half of 2000. With high numbers of temporary and contract employees, firms have not hesitated to lay-off large portions of their workforce. As a result, the unemployment rate in the region jumped dramatically, rising from 1.3 percent in December 2000 to 5.4 percent in August 2001. The unemployment rate jumped by a whole percentage point

(from 3.3 to 4.3 percent) in the space of one month, from May to June! Silicon Valley unemployment rates remained below U.S. and California levels through most of the 1990s, but by August 2001 they had skyrocketed to levels higher than state-wide and national levels and were expected to go significantly higher (see Figure 7.1).

<Insert Figure 7.1: Unemployment Rates, Silicon Valley vs. California. Vs U.S.>

The tight labor markets through the later half of the 1990s resulted in high wages for large sectors of the region's high-tech workforce. In 2000, according to Joint Venture: Silicon Valley Network, the average annual payroll, including both hourly and salaried employees, in Silicon Valley was \$66,400, up 9 percent in real terms from the previous year and up more than 40 percent from the 1992 level. Silicon Valley payrolls are significantly higher than national averages—a full 84 percent higher than the national average of \$36,100 in 2000. Payrolls in the leading information technology sectors were even higher: in 1999 the average annual payroll in the software cluster was \$124,700, and \$117,000 in the semiconductor industry (JV:SVN 2001). Average payrolls in nearly all information technology industries in the region are significantly higher than those in non-high tech industries. High levels of productivity and growth in information technology industries enable firms to pay wages significantly above the average, while strong demand for highly skilled workers tends to push wages higher as well.

There are many signs, however, that the economic benefits of the region's information technology industries are concentrated in a minority of the workforce. Annual payrolls in many non-high-tech sectors, for instance are quite low. In local and visitor services, for instance, a category that accounts for a full quarter of all employment in the Valley, average payroll in 1999 was only \$24,000 (JV:SVN 2001). Between 1998 and 1999, while overall wages in information technology industries rose 20 percent, in other industries they rose only 1 percent.

Low-wages, however, are not limited to non-high-tech sectors. For instance, out-sourcing services, a category which includes temporary help agencies and other companies providing essential services to the region's core information technology firms, was the second fastest growing sector between 1992 and 1998, yet annual payroll in this sector averaged only \$28,344 in 1998. Annual payroll in contract manufacturing industries was \$54,239, significantly less than that in the computer original equipment manufacturers, where annual payroll averaged over \$107,000 in 1998 (see Table 7.1).³

<Insert Table 7.1: Change in Annual Average Payroll and Employment, SV 1992-1998>

These averages payroll figures, however, understate the level of inequality in the region. An examination of hourly wage data in Silicon Valley, for instance, shows that those in the upper half of the labor market did quite well in the 1990s, while wages in the bottom half of the labor market have stagnated. Wages at all levels declined during the economic downturn in the early 1990s, but during the boom of the late 1990s, wages in the top half of the labor market recovered more than the amount they had lost. Thus, by 2000 hourly wage rates at the 90th percentile were nearly 35 percent higher in real terms than their level in 1990, having grown from \$35.62 (in 2000 dollars) to \$47.98. At the 10th percentile, in contrast, the hourly wage rate in 2000 was \$7.90, still more than 3 percent lower than the figure for 1990 (see Table 7.2). This wage pattern in the 1990s, with wage growth concentrated at the top of the distribution and stagnating wages in the bottom, is in contrast to the 1980s where wages grew across nearly all of the labor market, except at the bottom 10th percentile (see appendix for full year-to-year wage changes).

<Insert Table 7.2: Real Hourly Wage Rates, San Jose, CA 1979-1999>

With both declining wages at the bottom and rising wages at the top, income distribution in the region grew significantly more unequal in the 1990s. The Gini coefficient of wage inequality in the Valley⁴, for instance, rose from .309 in 1989 to .361 in 1999. This makes wage distribution in Silicon Valley more unequal than that of the U.S. as a whole, which had a Gini coefficient of .338 in 1999 (see Figure 7.2).

<Insert Figure 7.2: Gini Coefficient of Wage Inequality>

The decline in wages for a portion of the workforce is clearly partly driven by wage declines in non-high tech industries, which still account for some 60 percent of total employment. The wage declines, however, are not limited to these sectors. Wages for production workers in the computer and electronic components⁵ industries, for instance, also showed significant declines in the 1990s. The average hourly wage rate for production workers in the computer industry, for example, was \$18.14 in 2001, down 12 percent from its value of \$20.64 in 1990 (in 2001 dollars). The average hourly wage rate for production workers in the electronic components industry was \$17.75 in 2001, down 10 percent in real terms from its value in 1990 (see Figure 7.3). As might be expected, these wages declined significantly in real terms during the economic downturn that began in the second half of 2000. The downward trend, however, was consistent throughout the second half of the 1990s, and simply accelerated slightly in 2001. Given that the production workforce⁶ accounted for 52 percent of the total workforce in the electronic components industry, and 47 percent in all manufacturing in 1997, average wages

of nearly half of all workers in the region's computer, semiconductor, and related hardware manufacturers stagnated in the 1990s. This is despite the tremendous economic boom in the last half of the 1990s, and rapidly rising wages for upper tiers of workers in the industry.

<Figure7.3: Average Hourly Wage of Production Workers, Santa Clara County, 1990-2001>

Another indicator of the limited and unequal distribution of the wealth generated in Silicon Valley's information technology industries is provided by comparing trends in productivity to wages. Productivity is an important measure of economic competitiveness, and manufacturing in Silicon Valley has one of the highest levels of productivity of any region in the United States. In 1997, value added per employee (a simple measure of productivity) in manufacturing was \$176,082 compared to a statewide average of \$108,237. Improvements in productivity, however, are not being shared with the workforce within Silicon Valley. From 1982 to 1997, value added per employee in manufacturing grew by over 100 percent (a 4.7 percent annual rate increase). Yet the average wages for production workers (47 percent of the workforce in manufacturing in 1997) grew by only 16.5 percent over the whole 15-year period, while average payroll for non-production workers grew by only 35.6 percent (see Figure7.4).

<Insert Figure7.4: Productivity and Wages in Manufacturing>

One of the most dramatic signs of inequality in the region is the growing discrepancy between the skyrocketing compensation given to top corporate executives compared to stagnating wages of production workers in the same companies. Between 1991 and 2000 the average compensation of the top 100 Executives in Silicon Valley's largest companies grew by

over 2000 percent in real terms, while the average annual income for production workers in the electronics industry declined by 7 percent. The ratio of annual income of the top 100 Executives to the average production worker thus rose from 42:1 in 1991 to 956:1 in 2000 (see Table 7.3).

<Insert Table 7.3: Executive Compensation and Production Worker Wages, 1991-2000>

The exercising of stock options accounts for the majority of this growth in total compensation for top executives. The granting of stock options has become an increasingly widespread practice of firms in the Valley, not only to top executives but to significant portions of their staff as well. Stock options enable the holder to buy stock at a preset price. As long as share prices rise at publicly traded companies, options can be tremendously lucrative. The wealth generated from this is not limited to top executives and in fact has made a large number of Silicon Valley residents millionaires—Cisco Systems alone estimated in 1999 that 2,000 of their 19,000 employees were millionaires based on stock options (Quinn and LaFleur 1999). Stock options are, however, highly concentrated in the upper stratum of the labor market. A 1998 Survey by the National Center for Employee Ownership (NCEO), for instance, found that of 20 Silicon Valley companies studied, top managers held 49 percent of all options. Senior executives in the companies held options worth \$2 million, while professional and technical workers in these 20 companies received stock option packages worth roughly \$58,000, and administrative assistants received packages averaging \$18,000 (NCEO 1998).

It should also be noted that if the share price of the company drops below the option price, the options are valueless. Many stock options, particularly in small start-up companies, end up being worthless if the company goes bankrupt or fails. With the crash in technology and

particularly internet stock prices in 2000, many stock options became entirely worthless. Even during the stock market boom of the late 1990s, the increasing use of stock options as compensation was not resulting in the level of increased wealth in the region that might be expected from some of the popular accounts of their ‘wide-spread’ use. In 1999, for instance, market-research firm Claritas found that twenty-four percent of Santa Clara County residents hold stock received from their employers, the highest percentage of any metropolitan region in the nation, but the *value* of those stocks (\$39,026) was lower than in 13 other metropolitan regions (see Table 7.4).⁷ Of 328 regions around the country, Santa Clara County ranked very high (3rd) in median household income in 1998, yet measured only 26th in median household wealth (Quinn and LaFleur 1999). All of this suggests that while stock options are important as a means of compensation for certain sectors of the population, their importance should not be exaggerated. The vast majority of the workforce still depends on their wages and salaries as their primary source of income.

<Insert Table 7.4: Top 15 Metropolitan Areas by Average Value Household Ownership of Stocks Receive from Employer>

Factors contributing to Inequality

Thus, an examination of cross-sectional data on employment, wages and earnings in Silicon Valley identifies clear trends. Inequality has grown significantly in the 1990s. This trend would not be so disturbing if wages at all levels in the labor force were rising, with growing inequality simply the result of higher wage growth in upper tiers of the labor market. In truth, however, inequality is partially being driven by wage declines in the bottom half of the labor market. Furthermore, these declining wages are not limited to non-information technology industries. Wages in many sectors of information technology industries have been declining as

well, despite the tremendous economic boom during much of the decade. What are the factors contributing to this growth in inequality?

Clearly one factor is related to changing returns to education and experiences. The high demand for skilled information technology workers has driven up wages for educated workers, while wages for workers with a high school degree or less have declined. Average wages for workers with at least some college education grew 16 percent between 1990 and 2000, while average wages for workers with only a high school degree or less education declined by 12 percent in the same period (see Table 7.5). Clearly changing returns to education and experience can explain a significant portion of growing inequality in Silicon Valley. Though there have been no specific studies on this issue in Silicon Valley, a careful study of growing income inequality in California as a whole found that changing returns to skill, as measured by years education and work experience, could explain roughly one-third of the higher levels of inequality between 1967 and 1997 (Reed 1999).

<Insert Table 7.5: Average Wage by Education Level, Santa Clara County, 1980-2000 (\$2000)>

Another factor that continues to be a major influence in shaping inequality in the region is the continued critical importance of race and ethnicity. In addition to skill levels, social networks play a critical role in shaping workers access to employment, learning communities, and other economic resources. These networks are strongly rooted within particular ethnic communities, but these ethnic communities are often isolated from each other. Thus, for example, Chinese and Indian communities in the Valley have both been able to build strong networks and industry associations that have helped members of each ethnic community prosper,

but there is very little interaction between the different communities (Saxenian 1999; Saxenian 2000).

Thus, racial inequality remains quite strong in information technology industries. In 1990, the latest data available with detailed income and employment breakdowns by race and occupation,⁸ whites made up 81 percent of the managerial workforce and 71 percent of the professional workforce in Silicon Valley high-tech employment. Meanwhile, in semi-skilled production jobs, the largest category of blue-collar work, whites made up only 21 percent of the workforce, with Asians accounting for 40 percent and Latinos for 18 percent (see Table 7.6). The average income for white men in high-tech industries in 1989 was \$52,999 compared to only \$30,037 for Mexican-American men, and \$27,630 for Vietnamese men (see Figure 7.5). Certain groups of Asians, most notably Japanese, Chinese and Indian, have reached upper tiers of the region's information technology industries. Other Asian groups, particularly Vietnamese, Filipino and Korean, remain in low-end assembly work.

<Insert Table 7.6: High-Tech Manufacturing Employment By Race in Silicon Valley, 1990>

<Insert Figure 7.5: Mean Annual Income by Gender and Ethnicity, 1989>

Various surveys taken during the 1990s demonstrate that racial segregation has continued. According to data from the Equal Employment Opportunity Commission (EEOC) in 1996, for instance, in 33 prominent high-tech companies in the region, Blacks and Latinos were significantly under-represented, making up 4 percent and 7 percent of employees, while comprising 8 percent and 14 percent of the Bay Area labor force, respectively. Furthermore, they were concentrated in lower skilled and lower-paying occupations, with Latinos making up 17 percent of the operators and 11 percent of the clerical staff in the high-tech firms surveyed

(see Table 7.3) (Angwin and Castenada 1998). Similar data from the EEOC in 1997 found the same patterns (see Table 7.4)

<Insert Table 7.7: Employment by Race in 33 Silicon Valley High-Tech Firms, 1996>

<Insert Table 7.8: Silicon Valley High-Tech Workforce by Race and Occupational Category, 1997>

There are clearly a range of other factors that drive inequality in the region, similar to nation-wide trends. These include declining unionization, eroding value of the minimum wage, increasing percentage of employment in low-wage service industries, growing immigration and increasing globalization, which are the most prominent causes identified in national studies.⁹ In addition, however, labor market flexibility and the role of intermediaries shape labor market outcomes as well, in ways that I discuss in the following sections.

Flexibility and Labor Market Outcomes

What impact has the growth in labor market flexibility had on the outcomes for workers in the region's labor markets? One clear impact of both flexible work and flexible employment has been an increase in insecurity for workers. In the highly volatile information technology markets, workers have to continually upgrade their skills, through both formal training and informal learning. As the pace of technological change increases, workers frequently discover that their skills are valued less by employers, pushing them to return to school for significant retraining or to develop an entirely new career. Older workers are particularly impacted by this rapid change. High-tech industries tend to be dominated by younger workers, either those

recently out of college or in their prime earning years. As mentioned in chapter two, wages for older workers in information technology industries actually start to decline after approximately 20 years of experience. Older workers who face lay-offs often have a difficult time finding employment again, and face longer periods of unemployment while searching for new jobs. Thus, one of the by-products of rapid technological change is a long-term structural increase in the length of time people are typically unemployed.

An increase in the pace of technological change contributes to increasing length of unemployment for a number of reasons. When a firm changes technology, it may temporarily lay off workers while it closes to retool its facilities, or may permanently lay off workers with some skills and hire new workers with different skills. Some workers, particularly those who have the hardest time acquiring new skills, may be unable to take advantage of the new job opportunities and thus face long-term unemployment. Even in cases of more incremental technological change that doesn't require retooling facilities, firms may also not consider it cost-effective to retrain some types of workers—particularly less-educated and older workers—to keep up with technological change. Firms believe it is not cost-effective to retrain older or less-skilled workers, either because the retraining costs are higher or because the workers will not be on the job long enough or will not be productive enough for firms to recoup the costs of retraining. This preference not only leads to an increase in the share of the unemployed labor force made up of workers with high retraining costs, but it also threatens them with permanent unemployment or at least a long period of job search before they are able to find a new jobs.

Baumol and Wolff (1998) have documented these trends at a national level. The average duration of unemployment in the 1970s for men was 13.1 weeks, while in the 1980s it was 17 weeks. The increase in unemployment is particularly dramatic for older workers, as unemployed

men aged 55-64 were unemployed an average of 19 weeks in the 1970s, 23.8 weeks in the 1980s, and 25.6 weeks in the early part of the 1990s. Related to this, and a more disturbing problem, is the increase in the number of people who face long-term unemployment. In 1993 for example, 21 percent of the unemployed were unemployed 27 weeks or more, compared to only 9 percent in 1979 and less than 5 percent in 1969.¹⁰

<Insert Table 7.9: Mean Duration of Unemployment, Period Averages>

The growth in flexible work and flexible employment relations has also served to undermine firms' investment in training. The intense pace of competition means that firms' feel they have little "luxury" for providing training for people without readily identifiable valuable skills, and thus they expect to hire people with the exact match of skills required for a particular job or project. For companies with older computer programmers in need of developing certain new skills, the typical solution for many firms is to get rid of them and hire new programmers instead. Most employers are reluctant to make the investments in retraining of their workforce in fear that the workers will leave and take the skills with them or, even if they stay, that the demand for the skills will not remain long enough to make the investments worthwhile. The lack of retraining exacerbates imbalances between supply and demand when markets shift because employers have to wait for employees to train themselves in the new skills, typically waiting for the next generation of graduates (Cappelli 2000).

Thus, rapidly changing work requirements can create significant labor market shocks for people, increasing the risk of serious misfortune. The most negative impact of flexibility on workers' outcomes in the labor market, however, is primarily related to flexible employment, not flexible work (Masters 1999). The growth of out-sourcing and the increased use of temporary employees severely weakens the ability of workers to bargain over their employment

relationships, making them more vulnerable to market downturns and less likely to demand higher wages from their current employer. This is clearly evidenced in statistics on wages for temporary workers, which are significantly lower than wages of ‘permanent’ workers with similar educational and demographics characteristics (Barker and Christensen 1998; Hudson 1999a).

Temporary workers also face serious problems in relation to occupational health and safety issues. Their legal employer, the temporary agency, is responsible for paying workers compensation insurance and for ensuring the safety of the worksite. The temporary agency, however, has little or no effective control over working conditions in the worksites where they place people. In one particularly poignant example in 1999, an assembly worker who was employed by Manpower Temporary Services in a warehouse packing Hewlett Packard printers, became concerned about respiratory problems. He discovered that one of the chemicals in the ink cartridges used in Hewlett Packard printers had been linked to respiratory irritation and was a possible carcinogen. When he asked that an air quality check be conducted in the warehouse, he lost his job. He filed a complaint with the California Industrial Relations Board, which took more than 20 months to determine whether to fine Hewlett Packard or Manpower or both. Ultimately the California labor commissioner ruled that Manpower, as the legal employer, had violated the employees right to express health safety concerns at work. In this case, however, Manpower had no power to order an air safety check at the plant or to improve air circulation systems in the facility (Jayadev 2000).

Temporary employees are only one example of poor working conditions facing workers in flexible employment relationships. Janitors provide a clear example of the problems that outsourced service workers in Silicon Valley face. During the 1970s, the janitorial workforce was composed of two groups—‘in-house’ janitors who are employed directly by the companies for which

they cleaned, and contract janitors, who were employed by private janitorial firms and contractors. In-house janitors usually had the same working benefits as other employees in their respective companies. Contract janitors generally had somewhat lower wages, but the existence of unions assured that working conditions were comparable to conditions for other unskilled occupations, and unionized janitors also received fringe benefits. By the early 1980s, however, when information technology firms began contracting out for cleaning and building maintenance services, working conditions worsened for both groups of janitors. The result in the 1990s was a three-tiered system, with reduced wages and conditions for all three tiers. The first major group consisted of janitors who worked for large unionized companies, with low wages but access to health insurance and some other fringe benefits. The second group consisted of janitors employed by medium-and small-size cleaning contractors, most of whom are non-unionized, and who typically provided minimum level wages with no medical or fringe benefits. The third group was composed of self-employed contractors who informally employed a small crew of workers to fulfill their contracts. These small contractors usually clean small business offices and independent restaurants, laundries and the like, with payments in cash and working conditions that frequently violate minimum wage and health and safety standards.¹¹

The institutional framework governing employment relationships provides no mechanism for contract janitors to demand higher wages from the companies whose buildings they are cleaning. These client firms are frequently highly profitable high-tech companies, but under the current labor relations system, janitors are bound to only negotiate with their legal employer—the building service firms whose profit margins are typically razor-thin. This situation applies to many occupations providing services to information technology firms in the area, including security guards, cafeteria workers and landscapers. The employment relationship for all these

workers have changed, resulting in lower wages and poorer working conditions in outsourced firms, but their work itself has largely remained the same.

Assembly workers in the region's printed circuit board industry are also highly disadvantaged by their flexible employment relations, as major hardware firms in the Valley have increasingly out-sourced their manufacturing operations. This process started in the 1980s, when there was a major change in the technology of printed circuit board assembly work, with the rapid development and expansion of surface mount technology replacing the older pin-through-hole systems (Sturgeon 1999). As a result, assembly work became more automated and demand for assembly workers declined in Silicon Valley. Many assembly jobs moved overseas. The increasing sophistication of the technologies and the shortened time to market, however, has contributed to the growing electronic manufacturing services (EMS) industry, with major companies like Solectron, Flextronics and Sanmina growing rapidly in recent years. The importance of close communication between the engineers in these EMS firms and the original equipment manufacturers that design the equipment, has prevented all assembly work from leaving the Valley, and employment in these contract assembly firms has actually grown rapidly in recent years. The work itself can be highly volatile, contributing to the insecurity of flexible work described elsewhere. The problems that emerge with the employment relationship, however, are two-fold. First, to deal with the rapid fluctuations in production runs, EMS firms maintain a high level of temporary employment, typically running from 20-30 percent of total employment in the firm (Chun 2001; Ewell and Ha 1999; Ha 1999b). Second, these assembly workers are legally separated from the firms designing the products they are making, preventing them from receiving the generous wages and benefits packages enjoyed by many employees in these original equipment manufacturers. For example, 20 years ago Hewlett Packard managed

most of their own manufacturing operations, and production employees received many of the benefits of HP's famed management practices (Packard, Kirby and Lewis 1995). Now, profit rates in EMS firms are tight, averaging 4-6 percent, while profit rates in Hewlett Packard and other major design firms in the Valley are 40 percent and higher. These workers who are assembling products of the major firms in the Valley have no ability to negotiate any significant wage increases from their operations. They play a critical role in the network production systems that produce these high-value products, but are significantly disadvantaged in their employment relationship from making increased wage demands.

Thus, given the current institutional and regulatory framework surrounding the employment relationship, the growth in flexible employment has significantly disadvantaged growing portions of the workforce in the last decade. Low-wage temporary workers, outsourced service workers, and workers in complex production supply-chains all face lower wages that are in large part related to their changing employment contract. In some cases, such as the growth of the EMS industry, it could be argued that these changed employment relationships are linked with promoting flexible work practices and thus contribute to the pace of innovation in the valley. In other cases, most prominently in the case of janitors in the region, the flexible employment practices provide essentially no performance improvements and result simply in lower wages for vulnerable sectors of the labor market.

Intermediaries and Labor Market Outcomes

What role do intermediaries play in shaping these labor market outcomes? It is easiest to think about this by examining the role intermediaries play in shaping three fundamental factors that broadly determine labor market outcomes:

- 1) The nature and quality of people's skills, information and knowledge. This refers to both the formal education and training that workers have, and the accumulated knowledge, experience and skills that are gained in the workplace or through on-the-job learning.
- 2) The nature and quality of people's social networks and particularly how this shapes job-search strategies and learning opportunities.
- 3) The type of power people have in the labor market. Firms and individuals make decisions around work and employment in response to a complex set of forces, not simply responding to price signals from the market. The level of power workers have in the labor market and the way it is wielded can push employers to make human resource choices that reflect higher wages, better employment conditions, and a greater investment in their workforce, while constraining options they may have for simply cutting costs and lowering wages.

Each type of intermediary will be briefly discussed in the context of each of these factors shaping labor market outcomes.

Skills Development

The intermediaries that play the greatest role in formal skills development are obviously the community colleges in the region. The increasing integration of the community college system with employer human resource requirements helps ensure that these training programs are oriented more towards employers' needs, thus providing more immediate employment opportunities for those people getting training. The community-based intermediaries and public-sector training programs also provide training. These programs are limited, however, by having to respond to the eligibility and structural guidelines of funding agencies, rather than responding directly to the needs of employers in the area. Certainly, the goal of JTPA and more recently the WIA is to provide training that meets employers needs, but historically they have demonstrated only a limited ability to do so.¹² Being constrained to work only with disadvantaged workers may strengthen their expertise in understanding the problems these sectors of the workforce face, but it limits their ability to build relationships with employers at middle and upper levels of the labor market. As a result, they tend to build relationships with employers that simply provide entry-level, and frequently low-paid, employment opportunities.

For-profit intermediaries rarely provide any substantial training. At best, they provide opportunities for self-paced computer-based tutorial programs around particular software packages, typically the dominant Microsoft office software (Word, Excel, PowerPoint), along with database and desktop publishing software packages. This ‘training’ is usually made available for free. The only workers who are able to take advantage of this, however, are those workers who are already somewhat familiar with computers, who have the motivation to take advantage of these opportunities, and who have the time and resources to pursue these opportunities without financial support. As mentioned previously, some studies of such training programs have argued that for staffing services firms, training essentially serves as a screening device, helping them to identify workers that are likely to be successful placements, while weeding out the more difficult to place workers (Autor 1999; Autor, Levy and Murnane 1999).

Professional associations and unions, in contrast, provide a valuable infrastructure for building the learning communities that are so essential for developing and sharing both tacit and explicit knowledge in work practices. The role of these associations in ensuring rapid sharing of information and knowledge through the regional production complex has been documented, both here and in other places (Saxenian 1996). These associations are somewhat more limited in their provision of more formal skills training programs, though some of them do provide formal training programs.

Social Networks

Intermediaries can both *substitute* for social networks and *build and strengthen* social networks. In acting as a substitute for social networks, intermediaries may improve workers’ employment opportunities if they can provide linkages to better jobs. If the linkages are to similar or poorer jobs than would be otherwise available through workers’ existing social

networks, their contribution is simply reducing transactions costs for workers' who may feel they have few alternatives. In acting as an organizational infrastructure for building and strengthening social networks, however, intermediaries play a critical role in shaping workers' social capital.¹³ This role is particularly valuable if these social networks are both built around occupational communities, helping to facilitate the creation of learning networks, and include people from different socio-economic levels, helping to create an infrastructure for career mobility.

Private sector intermediaries primarily *substitute* for social networks in the labor market, playing a critical role in helping workers gain access to employment. Skilled workers generally don't lack good social networks and the use of private sector intermediaries thus serves as a substitute for social networks in their job search process, providing access to employment in a more rapid and efficient way than through personal contacts. For workers with poor social networks, temporary agencies may help them gain access to types of employment that they may otherwise never find. In essence they use private sector intermediaries as a substitute for poor social networks that are less effective in finding employment. The temporary agencies themselves, however, do little to help workers build and improve their own social networks. Workers are generally left to their own resources to build ties in the workplace that might lead to improved employment opportunities over time. Temporary workers often feel a desperate pressure to identify, meet and impress the 'right people' in a new position, in order to be able to 'network' their way into better employment, but temporary agencies typically provide no assistance in these areas.

Professional associations and unions, in contrast, are good at *building the infrastructure to support social networks*. Through creating opportunities for workers to meet each other, share

information about job opportunities, changing skill requirements, training opportunities and so on, they provide the organizational infrastructure to support workers long-term career advancement. They complement and strengthen workers' own social networks. They are limited, however, in the extent to which they are able to build bridges to lower levels in the labor market. None of the membership intermediaries identified were able to demonstrate long experience in providing opportunities for truly disadvantaged workers. A possible exception to this is the Working Partnerships' temporary employment program, which has shown some initial success in reaching ethnic minorities, women and high school drop-outs in its work. It is too early, however, to assess the extent to which this will translate into improved employment opportunities or simply be an alternative temporary agency providing access to more temporary employment opportunities.

The non-profit intermediaries are the most effective in reaching truly disadvantaged workers in the labor market. In this sense, they are effective in 'networking across boundaries', in a way similar to that described by Harrison and Weiss (1998). They are limited, however, in the extent to which they retain on-going relationships with workers once these workers are no longer directly enrolled in their training programs. Thus, while they network effectively across boundaries, they do little to explicitly help workers build on-going social networks. The role of other public sector intermediaries in building social networks is also mixed. Through the social interaction involved in training opportunities, workers can make important contacts, but these connections are typically short-term in nature. The organizations provide no on-going opportunities for building and strengthening social networks in the ways that the membership intermediaries do.

Labor Market Power

The third area of impact intermediaries have in shaping labor market outcomes is their effect on workers' power in shaping the nature of flexible employment relations. As Osterman (1999) describes, employers have gained significant power over the past 30 years in the labor market, while workers have become increasingly vulnerable. This situation creates opportunities for employers to use exploitative employment relations *simply because they can*. Supporting workers in the labor market is a critical way of ensuring that flexible employment is actually being used in cases that are linked with flexible work, rather than simply being a cost cutting strategy. To be sure, empowering workers doesn't in itself *promote* flexible *work* practices, but it doesn't necessarily prevent them either, and it can help ensure that the benefits of a vibrant regional economy are shared more broadly.

In this regard, the membership associations are the only intermediaries who include empowering workers as an explicit goal of their efforts. The union intermediaries aim to do this through clear advocacy efforts, trying to explicitly alter firm hiring and employment practices. Professional associations aim to empower workers in a more diffuse way, helping raise the status of members of the occupation in the labor market more broadly and providing them with information and skills that strengthen their own individual negotiations with employers.

The effect of private sector intermediaries is much more contradictory. Clearly temporary agencies have been a key component of the decline in wages for large sectors of the workforce. Temporary workers earn lower wages and have more insecure employment, even controlling for all demographic and industry variables (Hudson 1999a; Kalleberg et al. 1997). On balance, temporary agencies must be seen as having a net negative influence on wages. Nonetheless, in tight labor markets, at least for workers with adequate skill levels, some private

sector intermediaries actually can strengthen workers' ability to negotiate with their employers. The rapidity with which workers are able to find new employment opportunities means that they face little if any cost of switching jobs. They are thus much less likely to put up with unpleasant employment conditions and employers are more likely to be sure that employment conditions meet the needs of their skilled temporary workers.

Public sector intermediaries seem to do very little to empower workers in the labor market. Certainly providing access to improved skills provides greater leverage in their employment negotiations and to the extent they provide placement opportunities their impact is similar to that of private sector intermediaries. Nonetheless, these public sector intermediaries typically make no explicit effort to actively negotiate with employers on the behalf of workers, and instead exhibit a widespread willingness to accept the demand side of the labor market as given. In interviews, program managers in non-profit intermediaries complained significantly about employment conditions through temporary agencies and poor employment opportunities in the labor market more generally, but had developed few strategies to try to change that situation.

Conclusion: Significant Problems Exist

The implications for workers' livelihoods of flexible employment and work practices are obviously complex. Clearly many workers in the region's labor markets are doing well, and average payrolls continue to rise as the information technology industries have grown dramatically and the regional economy as a whole has thrived. It would be seriously mistaken, however, to conclude that the region's economic growth is benefiting all of the labor force. This chapter has argued that Silicon Valley's flexible labor markets are also associated with high levels of inequality and economic insecurity. Problems of navigating a career in these labor

markets are not limited to low-wage workers, but are also faced by many workers at middle and upper-level positions. Workers at all levels cannot depend on finding stable employment to help provide economic security, and are highly vulnerable to general economic downturns, or restructuring within particularly industries. In response to the volatility in the region's labor markets, workers are increasingly turning to intermediaries for help. These intermediaries in some cases undermine opportunities for upward mobility, and in other cases help build that opportunity. Both the rise in flexibility and the growth of intermediation in the labor market raise important implications for policy directed at improving labor market outcomes for workers, which are addressed in the next chapter.

Appendix

<Insert Appendix: Silicon Valley Wage Data>

¹ The way that government data sources are gathered, it is extremely difficult to gain an accurate detailed statistical picture of changing patterns of career paths in regional labor markets. The available statistics are inadequate for this type of analysis for at least three reasons. First, most available data on labor market outcomes are based on changing cross-sectional samples of workers. They can provide information on changes in wages over time, but do not allow researchers to follow an individual's wages or total earnings over time. Second, the few data sources that do track individuals over time are either national samples that are not large enough to make analysis at a regional level possible, or lack detailed demographic characteristics essential for interpreting changes at a regional level (for instance basic earnings data provided through the unemployment insurance system). Finally, there are no existing data sources that look at all forms of compensation at a regional level, particularly stock options which is an important form of compensation for a growing sector of the workforce in Silicon Valley.

² Chun (2001), Douglass (1991), Hossfeld (1988), Luethje (1998) Chapple, Zook, Kunamneni, Saxenian, Weber and Crawford (2000), Engardio and Burrows (1997), Gregory (1984), Saxenian (1996), Saxenian (1999)

³ These figures are based on my own industry cluster analysis, using slightly different industry classifications from those used by Joint Venture Silicon Valley. See appendix to chapter two for details.

⁴ The Gini Coefficient is a common measure of inequality, which measures the overall distribution of wages or income on a scale of 0 to 1, where a value of 1 means that one person receives all the income and value of 0 means that all income is equally shared.

⁵ Including semiconductor and printed circuit boards.

⁶ As defined by the Census of Manufacturers

⁷ Though 'stocks received from employer' is not a direct measure of stock options, exercised stock options are likely to be a significant portion of this.

⁸ At the time of writing, the employment data from the 2000 Census was not yet publicly available.

⁹ Bernstein and Mishel (1999), Levy (1998), Mishel, Bernstein and Schmitt (2001), Moss (1999)

¹⁰ Baumol and Wolff (1998) Original data from U.S. Bureau of Labor Statistics, *Employment and Earnings* (Washington DC: Government Printing Office) Note that these are national figures.

¹¹ Zolniski (1994)

¹² Bloom, Orr, Bell, Cave, Doolittle, Lin and Bos (1997), Grubb (1996), Lafer (1994)

¹³ Putnam (2000), Wellman, Salaff, Dimitrova, Garton, Gulia and Haythornthwaite (1996)