Monograph 2005-01

Promising Futures:

Workforce Development and Upward Mobility in Information Technology

Karen Chapple

This material is based upon work supported by the National Science Foundation under Grant No. 0196555.

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Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation.

Institute of Urban and Regional Development
University of California at Berkeley

Acknowledgments

This research was funded by the National Science Foundation (Information Technology Workforce program, Computer and Information Science and Engineering directorate) and the University of California Institute for Labor and Employment.

I would like to thank Ann Markusen, AnnaLee Saxenian, Michael Teitz, and Matthew Zook for their help in framing the research. This report also benefitted tremendously from feedback from Cynthia Kroll; my writing group, Elizabeth Macdonald, Ayse Pamuk, and Rolf Pendall; and the staff of Social Policy Research Associates. Of course, the faults of the study remain mine alone.

For research and technical assistance, I am indebted to Melissa Edwards, Beth Elliott, Charity Espiritu, Annelies Goger, Alycia Jones, Sena Ku, Bill Lester, Katie Landon, Hyojik Lee, Guangyu Li, Sally Librera, Molly Moilanen, Kelli Nero, Euzane Pao, Carrie Ridgeway, Hena Schommer, Pablo Serrato, Enrique Silva, Domingo Vazquez, Jeff Vincent, and Steve Wertheim. For administrative help, I am grateful to Mary Altez and Chris Amado from the Institute of Urban and Regional Development.

Finally, I am deeply grateful to the six training programs (Alexandria Workforce Development Center at Northern Virginia Community College, Bay Area Video Coalition, Byte Back, Per Scholas, Street Tech, and Training, Inc.) and their graduates who participated in the study, as well as the hundreds of other participants in the study's interviews and surveys.

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EXECUTIVE SUMMARY

Introduction

Ruben Díaz worked for ten years as a fast-food chef—twelve hours per day, six days per week—before finally burning out. After quitting his job, he soon lost his apartment in the South Bronx. From a homeless shelter, he was accepted into a computer technician training program at Per Scholas, a Bronx-based nonprofit. The program gave him the skills, confidence, and connections to get his first job in information technology (IT), working at a computer help desk at a nonprofit for $27,500 per year. After three years, Ruben used social networks from his job to move to a larger organization and a new job with more responsibility and pay—$40,000 per year. In four years, with just a high school diploma, he has gone from long hours at a dead-end service job to upward mobility as a knowledge analyst in the New Economy.

Ruben crossed the Digital Divide without government support because an innovative community-based organization responded to regional labor demand and created a job training program with foundation funding. Despite decades of reform in workforce development systems that has gradually shifted responsibility to the local and regional level, such innovative and responsive programs remain the exception, not the rule. Only some regions are able to foster such flexible and responsive workforce development institutions; and even fewer can tap into government funding to support innovation.

This study examines the potential for individuals trapped in dead-end jobs in the service economy to cross the Digital Divide into jobs in the knowledge economy. The conventional wisdom is that the lack of human capital entraps workers in dead-end jobs, unable to capitalize on the demand for high-skilled labor in an increasingly networked—and exclusive—society.[1] Other approaches focus on the demand side, suggesting that IT itself acts to exacerbate societal divisions and ultimately income inequality, particularly in high-tech regions. IT not only drives the bifurcation of the economy into high-end knowledge analyst and low-skill service jobs but also creates a new networked system of economic

organization that has few access points for those who are "switched off."[2] The implication is that as globalization accelerates and IT jobs shift offshore, these patterns of bifurcation, inequality, and job inaccessibility will only grow worse.

I argue instead that a low-wage future is not inevitable for disadvantaged groups. The downskilling of IT work along with the rise of workforce intermediaries creates an opportunity to move large numbers of low-wage workers into jobs with a career ladder, particularly at the peak of the business cycle. Although some entry-level work is disappearing offshore, the economy still offers opportunities for jobseekers with little college education to work in IT. Nonprofit training programs in the "second-chance" employment and training system play an important role in making the transition possible for those whom the educational system has failed.[3] The majority of training program graduates remain in IT four years later, with a clear career trajectory ahead.

But several obstacles prevent us from offering promising futures on a large scale. The devolution of workforce development policy under the Workforce Investment Act of 1998 (WIA) has created an inefficient and fragmented employment and training system that fails the neediest and creates a highly differentiated landscape of opportunity across and within regions. Second, many of the labor market intermediaries within this second-chance system connect poorly with employers and in any case are unable to grow to scale enough to address upward mobility efficiently, particularly for the hard-to-serve. Finally, the ongoing and rapid transformation of entry-level IT work, as IT occupations mature and a new division of labor—regional, national, and international—emerges, presents a challenge by threatening any supply-side program with obsolescence nearly before it graduates a single worker.

The dot-com boom created a window of opportunity for workers with minimal postsecondary education to enter the IT workforce with the help of intermediaries. But since 2000, several factors, including the dot-com implosion, the rise of offshore outsourcing, and the implementation of the Workforce Investment Act (WIA), have altered the landscape of opportunity for entry-level employment in IT. Yet, the training intermediaries that facilitate upward mobility in IT provide important lessons that are likely generalizable across a wide variety of occupations: if the system is responsive to employer demand, targets occupations with career ladders, trains in soft skills, and connects with employers for placement, then "second-chance" programs can succeed.[4] The retirement of the baby boomers in coming years will create widespread worker shortages and reveal considerable skill deficiencies in our workforce.[5] Thus, it is vital that policymakers focus on how to make the second-

chance system more effective and give more jobseekers an opportunity to enter the first-chance system.

This study investigates how recent location patterns are reshaping the entry-level IT job market, how well intermediaries can respond, how training program graduates fare in the workforce, and how policymakers can help create a more flexible, responsive workforce development system. Since the goal of the study is to show what works in terms of helping disadvantaged workers cross the Digital Divide, enter IT, and advance, I structure the study around case studies of nonprofit training intermediaries. I augment indepth interviews of training program graduates with data on regional opportunities for entry-level IT work, the experience of other IT jobseekers, and the effectiveness of training intermediaries generally. The research effort included two surveys, with a total of 470 respondents, plus in-person interviews with over 200 IT employers, jobseekers, workers, training providers, and workforce development policymakers.

Entry-Level Work in IT: The Context for IT and Workforce Development

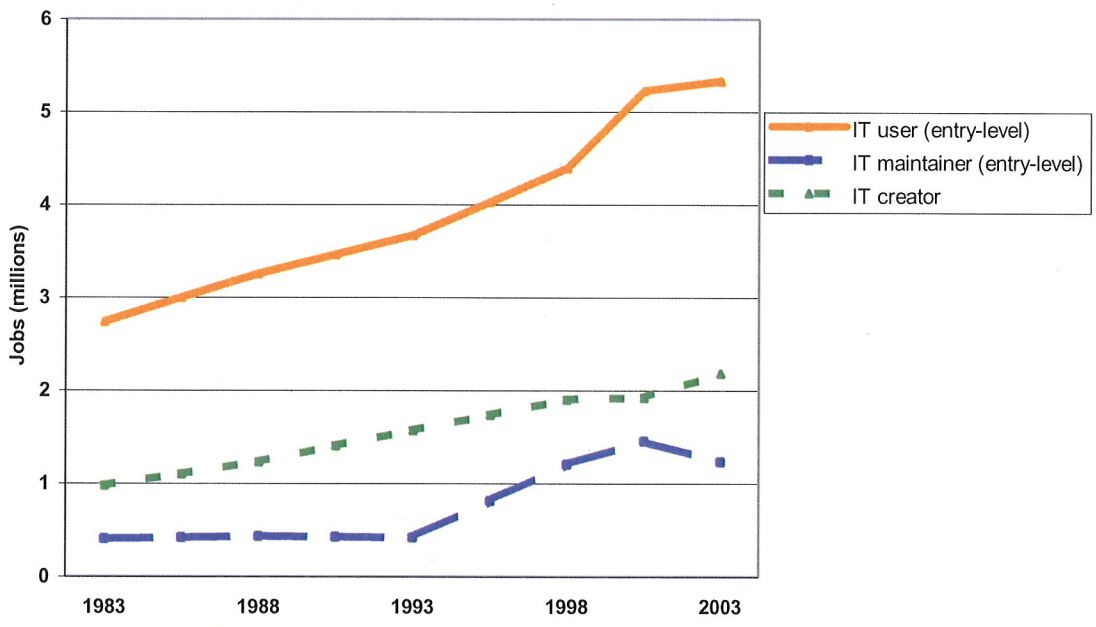
The expansion of the information-based economy is producing new opportunities for disadvantaged, low-skilled jobseekers to participate in the Digital Age. In essence, the bottom rung of the IT job ladder has expanded to include workers with little or no college education, even as changes in global location patterns may be causing the disintegration of the rest of the job ladder. Yet, while IT occupations are continuing to evolve and offer a potential avenue for upward mobility for less advantaged workers, opportunity varies significantly by region, and the emerging global division of IT labor is likely to exacerbate this uneven distribution.

Entry-level occupations in IT are a relatively new phenomenon. As more advanced and traditional IT occupations, such as computer programming, have completed their initial life cycles, some duties have become downskilled, giving rise to entry-level work as the more experienced workers move up the job ladder. The computer support specialist occupation provides an illustration. As computers began to become more commonplace throughout all economic sectors, the computer support specialist occupation emerged to provide technical assistance for users of hardware, software, and systems. At first, the new support tasks were incorporated into existing computer programming jobs in a process of "job enlarging" (i.e., the expansion of job duties). But gradually, the technical support duties shifted to others, such as clerical

workers seeking a promotion who could be trained easily on-the-job, or four-year college graduates with some computer training. Over time, the training for these positions has evolved from computer science degrees at four-year colleges to short-term training often done at community colleges.[6]

The career ladder for IT occupations—at least for workers without an IT-related degree—typically begins with the IT maintainer jobs, the jobs for those supporting computers and networks. These occupations, such as the computer support specialist, require just long-term on-the-job training, vocational education and certification, or an associate's degree. In contrast, IT creator jobs (such as computer programming or software engineering) require at least a bachelor's degree, and the top-level jobs as managers or researchers require graduate education and/or work experience. IT maintainer jobs are not the only pathway into IT careers. There are also IT user positions, low-skill entry-level jobs such as data entry clerks or office clerks that involve computer use. However, only a small proportion of the five million IT users advance into the more technical IT maintainer and creator occupations. By 2003, there were 5.3 million workers in IT user occupations, 1.2 million working as IT maintainers, and 2.2 million IT creators (Figure E-1).

Figure E-1. Change in IT Occupations, 1983–2003



Source: US Bureau of Labor Statistics, Occupational Employment Survey, 1983–2003. Calculations by author.

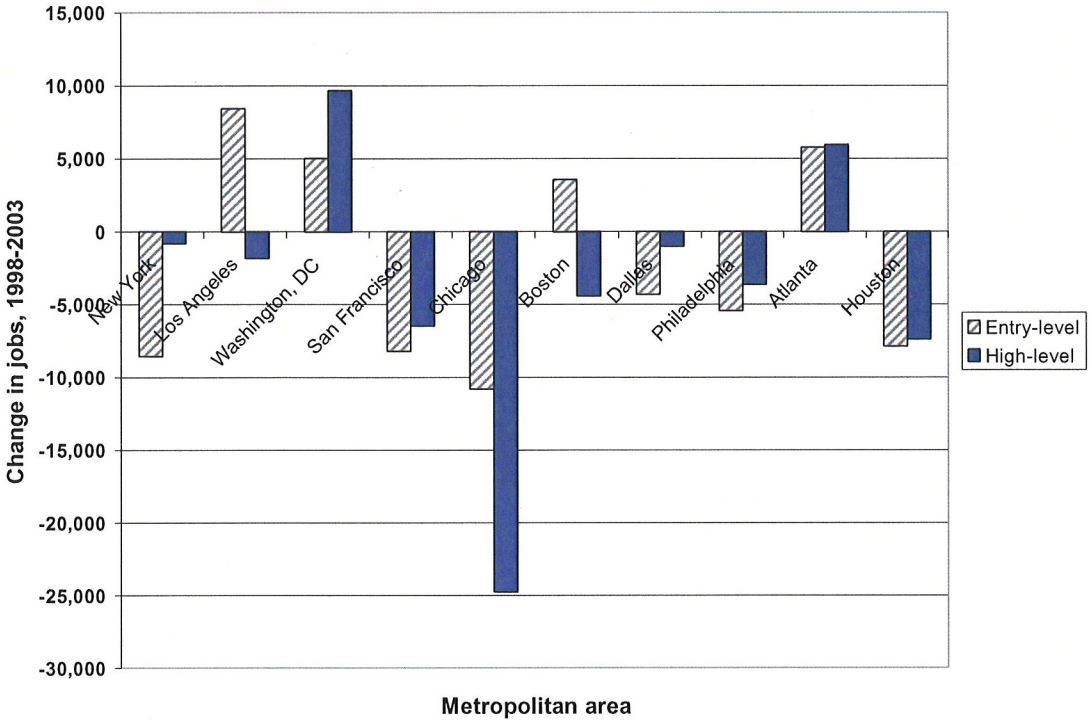
Recent global labor shifts have fostered a debate about the extent to which offshore outsourcing will reshape the IT workforce in the U.S. There is little agreement on the extent of the job movement offshore, whether it is cyclical (due to the recession) or permanent, how many jobs will leave in coming years, and what the shift means for the U.S. workforce. Yet it already seems clear that IT differs from manufacturing in that it may not necessarily seek the least-cost location. Companies continue to keep their IT labor in the U.S. because of increasing productivity, the process of agglomeration, tacit knowledge, and most obviously, the geographic fixity of certain types of tasks, such as hardware repair and even networking, and industries, such as hospitals.[7]

Employer interviews conducted for this study suggest that offshore outsourcing of IT jobs may not have the impact projected by some. Although many companies continue to investigate offshoring routine jobs that are outside their core competencies, some are finding that IT support may actually be core to how the company operates and thus are keeping it in-house. Most of the firms interviewed had already decided whether or not to pursue offshore outsourcing, suggesting that the trend has already peaked, at least in high-tech regions. In general, only the large IT and IT services companies interviewed were still seeking to increase their offshore presence. Many companies described obstacles to offshoring, including conflicts with their business model (for instance, the informal company culture and emphasis on face-to-face interaction); labor problems (such as rising turnover and lack of managerial capacity); and logistical problems (including poor infrastructure and bureaucratic red tape).

Although high-tech metros such as the San Francisco Bay Area were hit particularly hard by the dot-com crash, the recovery has been uneven, with some metros like San Francisco and Chicago losing large numbers of both entry- and high-level IT jobs, and others like Washington, DC, and Atlanta actually gaining both (Figure E-2). This study looks at the change in IT jobs from 1998 to 2003 in order to investigate trends beyond the bubble. What might explain the variation in IT job change among metropolitan areas?

Most importantly, despite job losses at the national level, entry-level IT work is not in decline across all regions; the growth of entry-level occupations will continue (albeit more slowly), particularly in regions with diverse economies and a scarcity of entry-level occupations. Entry-level IT occupations continue to evolve as technological improvements contribute to the downskilling of occupations and create new demand. Where yesterday's computer support specialist repaired IBM 486s, today's installs home computer networks for the cable company.

Figure E-2. Change in IT Jobs by Level, Top Ten High-Tech Metros, 1998–2003



Source: US Bureau of Labor Statistics, Occupational Employment Survey. Calculations by the author.

A regression analysis was performed to determine what explains the change in IT jobs for metropolitan areas. The analysis does not entirely explain recent changes, but it suggests several factors that may be important. First, the metros with a less balanced occupational structure—i.e., a concentration of either entry- or high-level jobs—are more likely to lose jobs. Second, entry-level jobs in large metros are particularly at risk. Third, the distribution of occupations is important. The less vulnerable metros are those that, due to specialization in IT, concentrate their IT occupations in certain sectors, such as the IT sector, rather than dispersing them across sectors (such as finance, insurance, education, health care, etc.). Fourth, region matters. Should patterns from before the bust continue—and there is little reason to expect change, at least in the short-term—metros in the Pacific and South Atlantic regions can expect continued IT job growth, while those in the East North Central and Middle Atlantic regions have cause for concern.

Connecting to Work: The Role of Training Provider Intermediaries in the IT Workforce

In an era of uncertainty about the labor market, labor market intermediaries, particularly training providers, are emerging to help smooth the transition into the workforce. Uncertainty stems from multiple causes related mostly to changes in labor market institutions and technology. What might be called the deinstitutionalization (or reinstitutionalization) of the labor market includes the rise of contingent (part-time, temporary, and contract) work and the various forms of deregulation (a declining minimum wage, massive deunionization, and deregulation of industries).[8] Add to this the rapid changes in information technology that alter the skill requirements for jobs and the widespread failure of urban public schools, and the need arises for short-term training programs that can both respond to employer skill needs and connect graduates with jobs. With over one million entry-level IT jobs currently in the U.S and predicted growth of over five percent per year, employers cannot fill all the new positions with workers from four-year colleges or abroad.

The implementation of WIA has presented an opportunity to develop a network of training provider intermediaries—although with overall funding for job training declining from $24 billion (in current dollars) in 1978 to $6 billion in 2000, WIA has meant that far fewer jobseekers are receiving job training than under previous programs.[9] These training providers constitute the "second-chance" system of employment and training. The type of institution conducting job training in IT ranges from large four-year colleges to tiny community-based organizations (CBOs), but in most regions, proprietary trade schools dominate the landscape of training and thus have received the bulk of the funding. The major difference between types is the role each type plays in placement, from facilitator to gatekeeper. Facilitators (particularly nonprofit providers) play an active role in helping jobseekers transition to work, while gatekeepers (e.g., most colleges) provide training with the expectation that jobseekers will connect with employers on their own.

WIA was meant to improve upon previous programs by being more responsive to employer needs. To what extent is funding for job training channeled to occupations in demand in the regional economy? If the workforce development system is linked to regional economic growth, one might expect to see participants trained for skills in high demand. However, a comparison of the occupations for which WIA trained recipients with employment change in those occupations reveals a substantial mismatch. For instance, in the New York metropolitan region, more than 50 percent of WIA training recipients were trained in office and

administrative support or computer and mathematical occupations from 2000 to 2002, while the region lost more than 34,000 jobs in these categories in that period. Substantial growth occurred in education, training, and library occupations, healthcare practitioners and technical occupations, and other specialties, but WIA only trained a small fraction of its recipients for such jobs.

How effective are these training intermediaries? Research tells us that in order for training to be effective, it must respond to employer demand. Training must occur in a context of labor demand, focus on needed technical and soft skills, and utilize connections to employers for placement.[10]

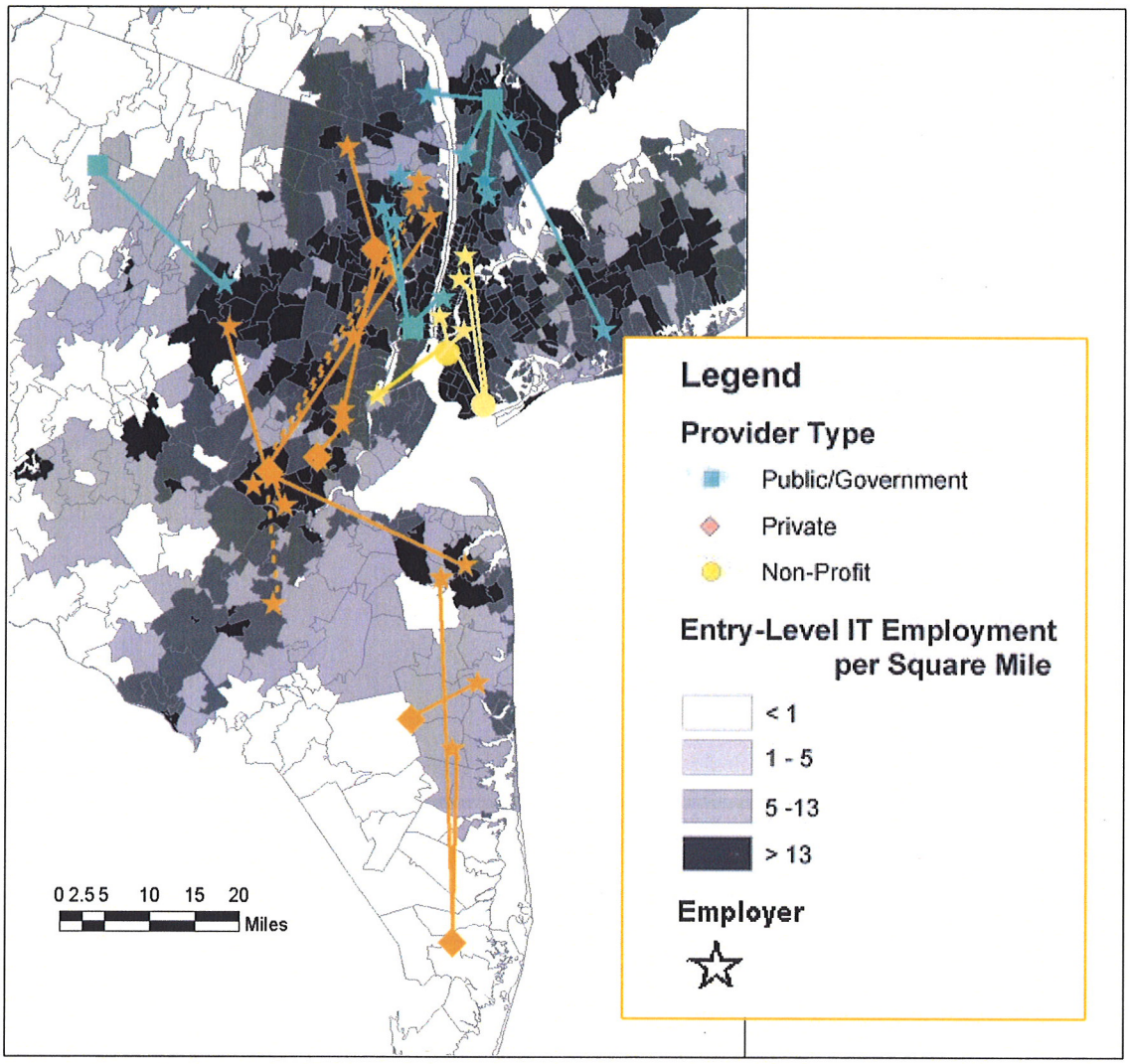
Providers try to develop and maintain close connections to employers in order to get word out about the students they train, stay in touch with necessary skills, find job placements, and keep abreast of industry changes and employer demands. In general, public institutions are the most broadly networked with employers, and nonprofit providers have the strongest relationships. That the public and nonprofit providers are often better connected to employers than the private schools suggests that both may have more political connections and institutional credibility than the private providers do. This helps them persuade firms to rely on intermediaries. Thus they play a critical role in helping the disadvantaged enter the information economy.

Since politics and trust play an important role in developing relationships with employers, proximity becomes key. Trust comes from the ability to have face-to-face interaction. Because of the role of proximity, as well as the inability of low-skilled jobseekers to commute very far, entry-level labor markets are extremely localized, and this is reflected in where providers build relationships and place graduates.[11] Figure E-3 maps the locations of employers where New York area providers have placed graduates. Providers tend to place within a subregion of the metropolitan area; nonprofit providers' networks are particularly localized, public providers' are fairly localized, and private providers' are the most extended. This reflects both the nature of low-wage labor markets and the different target populations for the nonprofit, public and private provider types.

Under WIA, training remains unresponsive to regional labor demand, and the providers receiving the bulk of funding may not have the strongest connections to employers. Overall, the network of educational intermediaries in IT is not as effective as it could be. Much training still fails to respond to the needs of employers. Yet there is clearly a need for the second-chance employment and training system, given the demand for

entry-level IT workers, the failure of public education, and the special role of educational intermediaries (particularly public and nonprofit) in helping the disadvantaged access jobs through soft skills and connections.

Figure E-3. IT Training Providers and Employers Where Graduates Placed, NY Area



Upward Mobility in IT for Disadvantaged Workers

> "Technology is what makes people stand out, so it doesn't matter if they're from a certain area any more. It's the way to progress in the world." —*Aaron, Training, Inc. graduate*

A low-wage future is not inevitable for low-skilled workers. The growth of low-skill IT occupations, particularly in high-tech regions, and the transformation of the IT workplace have created opportunities for a variety of workers to enter and advance in IT. It's "the way to progress in the world" not just for Aaron, who is an African American college dropout with no office work experience, but also for Chia, a Laotian high school dropout who wanted "a decent job where you don't have to get on your knees and scrub the floors," and for Jo, a white woman who says she "struggled all my adult life with what I was going to do," despite a master's degree in environmental policy.[12] All three found work in IT after graduating from free short-term IT training programs at nonprofit organizations. And all three contradict the conventional wisdom about the labor market bifurcation that makes knowledge analyst jobs inaccessible to those not fortunate enough to have both the college education and the social connections to join the IT workforce.

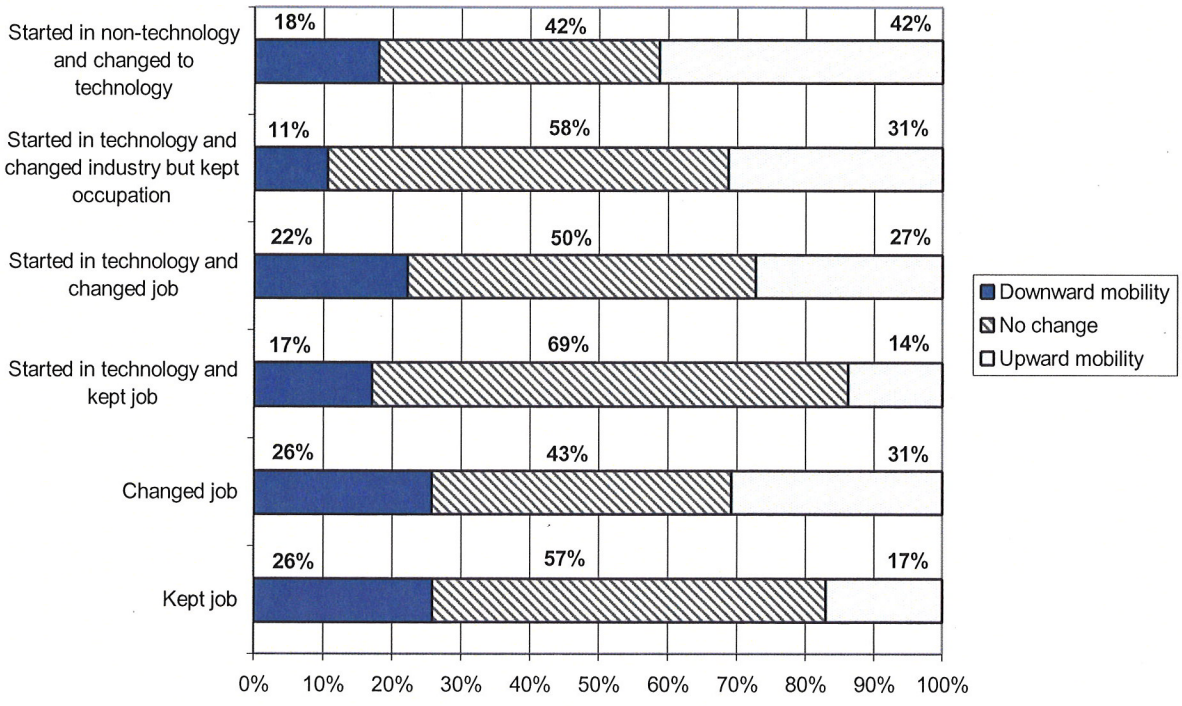
Theorists argue that the spread of information technology allows the global economy to use networks that effectively select only certain places and people to participate in the new economy. The existence of networks thus creates a duality, of the "switched-on" and "switched-off," deliberately and selectively including some groups and excluding others.[13] In contrast, this study shows how it is possible for workers from disadvantaged backgrounds to get the foot in the door and advance in IT, becoming valued contributors to the new economy. Rather than exacerbating social exclusion, the spread of information technology has made upward mobility possible through the changing role of intermediaries, the new emphasis on soft over technical skills, and the growing maturity of workplace culture and career pathways. New training programs have emerged to prepare an IT workforce that looks very different from the college-educated, white, male-dominated computer culture of the past.

Studies debate the extent to which it has become more difficult to move up in today's world, with some finding overall declines in upward mobility and others finding differences in upward mobility by gender, race/ethnicity and education.[14] This study's analysis of short-term economic mobility from 1996 to 2000 shows that overall, 26 percent of U.S. workers moved down at least one income quintile in that period, while 25 percent moved up at least one quintile and 49 percent remained

in the same quintile. Thus, gains in mobility are essentially offset by losses.

There are clear paths to economic mobility. Workers who change jobs, in particular those who move from one industry to another, are more likely to move up.[15] Workers who move into technology-related work from non-technology fields are even more successful at improving their economic status.[16] As Figure E-4 shows, workers who stay in the same job are not able to improve their wages. Just 17 percent of all workers and 14 percent of technology-related workers who kept the same job moved up (compared to 25 percent of workers generally). But those who change jobs are disproportionately likely to move up—31 percent of all workers and 27 percent of technology workers who change jobs move up. Even more effective is to change industry—31 percent of technology workers who moved from one industry to another while staying in the same occupation moved up an income quintile. Finally, moving into technology is the biggest guarantee of upward mobility—42 percent of those who entered technology experienced income gains over the four years.

Figure E-4. Economic Mobility for Technology and Non-Technology Workers, 1996–2000



Source: Survey of Income and Program Participation, 1996 and 2000.
Calculations by the author.

How is it possible for disadvantaged workers to cross the Divide and move up a career ladder in IT? To examine this question, this study relies on repeated interviews over three years with 93 nonprofit IT training program graduates who graduated in 2000 and 2001. Relative to the U.S. IT workforce overall, they are disproportionately minority, female, and uneducated; one-third have just a high school diploma, general equivalency diploma, or less. Yet, three to four years after the training program, most (76 percent) of the 63 graduates who could still be located were still working in IT. Just over one-fourth of the sample didn't succeed, either losing their first job or never even getting the foot in the door. The others are evenly split between those who have held onto their jobs and perhaps improved their wages but are unable or uninterested in moving up further, and those who have added new responsibilities in IT jobs and improved their incomes, typically because of new education.

Most graduates are making substantial wage progress. From their hourly wages in their last job before entering IT (usually in retail, personal services, or construction) to their wages at the time of their last interview in 2004, these training program graduates experience on average about a 56 percent increase in wages, from about $13 to $20 per hour.[17] Educational attainment makes a substantial difference, with the less educated benefitting the most in terms of wages. With just a high school or general equivalency diploma (or less), wages increase by 74 percent, and with a college degree, wages increase by an average of 60 percent, but with an associate's degree, wages increase only by 36 percent. Thus, graduates with little prior education benefit most from these programs, suggesting that programs should avoid the common practice of "creaming," or selecting the least disadvantaged candidates.

How do job training programs help graduates network their way into IT? Nonprofits act as active facilitators by not only matching graduates to employers through personal connections, but also through training in soft skills. Networking is particularly important for graduates with low educational attainment, who lack the credentials to even obtain an interview. The reference from the training program essentially substitutes for work experience, which is critical for those trying to break into IT. As Lucinda from Per Scholas says, "They helped me to get my first job, which is usually really hard because everybody wants you to have experience...It changed my life."

But networking alone is not enough; programs must also prepare their students in soft skills by teaching them ways to convince prospective employers that they "get" IT. As graduate Troy confirms, "Training, Inc. wants to change you from who you are to what they say corporate America wants you to be. They help you walk the walk and talk the talk through teamwork, peer support."

Crossing the Divide is also about becoming comfortable with technology. In their exit interviews three or four years after they finished the program, graduates were most likely to mention exposure to technology—an area they would never have felt comfortable in prior to the program—and new confidence as the biggest impacts of the programs on their lives. As Marcus, an African American graduate from the Alexandria Workforce Development Center at Northern Virginia Community College now earning $85,000 as a systems administrator, says:

> "I had tried everything else. I was a certified nursing assistant, did construction, worked at Foot Locker, did sales, tried to sell alarm systems, tried to be a teller...Computers was the only thing that I never tried. Glory be.... The computer training I got, it got me in the door and allowed me to see that, with training, I can do more. I saw the opportunities and saw the minimal requirements for opportunities."

Because the programs are hands-on and results-oriented in a way that many community college and trade school courses are not, they give their graduates the confidence they need to enter technology. Graduates gain confidence not only from staff and peer support but also from working on interpersonal skills while at the program. Even Patrick, who didn't make it in IT, describes it: "Just being able to communicate with people about how to understand something—to ask, relate. I got more out of the life skills, more than anything else."

Ideally, a study of career ladders in IT would follow workers for at least a decade. This study was only able to track students for three to four years after their graduation from a short-term training program, finding that three-quarters remain in IT and half had advanced. The question remains whether they will be able to continue their upward mobility. For most, advancement seems to depend on their ability to obtain a degree, whether a high school diploma or a four-year bachelor's degree in computer science. Without it, IT program graduates living in expensive high-tech regions will likely remain among the working poor.

Conclusion

This study examines the potential for disadvantaged individuals in high-tech regions to cross the Digital Divide into jobs in the knowledge economy. Despite growing bifurcation and inequality, many of the "switched-off" are able to access jobs and achieve upward mobility, in part, through nonprofit job training programs that help them network into jobs. The emergence of entry-level IT jobs has made this transition

possible, and despite recent job losses, the growth of entry-level occupations will likely continue, particularly in high-tech tegions with smaller metros and a scarcity of entry-level occupations. This creates a need to scale-up these IT training programs.

Labor market intermediaries, particularly training providers, play an important role for jobseekers who end up in the second-chance employment and training system. Although this study focused on training for IT occupations, its findings are likely generalizable to others as well. Training providers can be effective if they are responsive to the regional economy and train in technical and soft skills that are applicable across a variety of job environments. Crossing the Divide is about access to new networks and skills, but most importantly, gaining confidence in using technology and interacting in corporate settings. The majority of training program graduates remain in IT four years later, with substantial wage progress. For many, particularly those able to obtain a college degree, a clear career trajectory lies ahead. Because they are in technology occupations, upward mobility may be feasible, particularly if they move between industries.

Unfortunately, these training programs emerged in spite of, not because of, the Workforce Investment Act. Although government funding (such as the H-1B program) supports such programs in some states, these nonprofits rarely qualify for WIA training monies. For instance, Per Scholas, the nonprofit that trained Ruben, the former fast-food chef noted at the beginning, is in New York, which provides training for a smaller share of its WIA participants than almost any other state. Such innovation and responsiveness to labor market opportunity is left to foundations to fund.

Key to provider effectiveness is responsiveness to employer demand, particularly relationships with employers and ability to train in soft skills. However, WIA does not necessarily reward the most effective programs. Because of its emphasis on "customer choice," it funds training in occupations that may not be in demand in the regional economy. Its requirements make participation onerous for both public and nonprofit providers, which is unfortunate because nonprofit providers not only play a critical facilitator role in helping jobseekers transition to work, but also may have stronger relationships to employers, particularly local firms. Finally, it incentivizes programs to cream, despite the fact that the hard-to-serve benefit most from short-term training programs. Although Congress is likely to revise and reauthorize WIA in 2005, it is unlikely to address these problems.

Policy Implications

Although the implementation of WIA makes it more difficult for the system to serve the most disadvantaged, there are ways that the system could support the types of nonprofit training providers shown to work so well in this study. In addition, the system's lack of responsiveness to employer demand suggests the need for intermediaries that can link economic and workforce development more effectively. There are experiments emerging across the country to do just this.

One important reform is changing the WIA performance measures to evaluate the various training program outcomes that help participants progress toward self-sufficiency, instead of the simple numerical outcomes now measured (credentials obtained, placement, wage gains, and retention). To measure how programs are helping graduates progress towards these targets, programs might establish outcome indicators that reflect the observable and measurable milestones toward an outcome target.[18] For instance, milestones for the job placement target could include the number of job applications submitted and interviews attended, as well as indicators of increased self-confidence such as using new skills or making new network contacts.

Second, to make workforce development work for economic development, the system should link training programs more effectively to the regional economy by using data and resources more strategically. This would mean the abolition of customer choice in favor of more guidance. There are also few incentives to connect workforce and economic development because of the scale of the Local Workforce Investment Areas, which are mostly organized around counties or groups of counties. Yet there are few, if any, mechanisms at the county level for economic development, and moreover, as this study shows, successful labor market intermediaries function locally. Thus, only the Local Workforce Investment Boards (WIBs) that coincide with municipalities are properly incentivized and well-positioned to link workforce and economic development.

Another important step is to use the WIB or alternative labor market intermediaries more effectively to build connections and partner with employers. WIBs are generally not effective intermediaries for reasons of history, culture, staffing, and their role as public institutions.[19] Yet workforce intermediaries are emerging across the country in a variety of institutional forms, led by different combinations of businesses, community colleges, CBOs, unions, and government agencies—many working closely with local WIBs.[20] In general, these intermediaries have had much greater success at innovating than stand-alone WIBs have; they

build partnerships from the ground up that leverage resources from a variety of sources.[21] It will likely take intermediaries from both within and outside the workforce development system to reform it—to create what workforce development expert Robert Giloth calls a "performance regime," or a network of stakeholders in the workforce development system who can innovate more freely, given the task of jointly negotiating problem definitions, goals, strategies, and performance criteria against which to hold workforce investments accountable.[22] It will be important to foster the conditions for such involvement in the reauthorization of WIA.

With the help of training provider intermediaries, high-tech regions offer opportunity for disadvantaged jobseekers to enter and advance in the IT workforce. But the devolution of workforce development policy under WIA has created a highly differentiated landscape of opportunity across and within regions. While most agree that the system has eliminated the favoritism and waste under the Job Training Partnership Act (JTPA), the benefits are not reaching the hard-to-serve as effectively as before. However, WIA provides an opportunity to bring more partners to the table. Ultimately, new partnerships and intermediaries may make it possible to integrate the second-chance system more effectively with two- and four-year colleges. Without the foot-in-the-door provided by CBOs and the opportunity to move up through college education, people like Ruben, the former chef, won't ever get that second chance.

CHAPTER 1
Introduction

Ruben Díaz worked for ten years as a fast-food chef—twelve hours per day, six days per week—before finally burning out. After quitting his job, he soon lost his apartment in the South Bronx. From a homeless shelter, he was accepted into a computer technician training program at Per Scholas, a Bronx-based nonprofit. The program gave him the skills, confidence, and connections to get his first job in information technology (IT), working at a nonprofit's computer help desk for $27,500 per year. After three years, Ruben used networks from his job to move to a larger organization and a new job with more responsibility and pay—$40,000 per year. In four years, with just a high school diploma, he has gone from long hours at a dead-end service job to upward mobility as a knowledge analyst in the New Economy.

Ruben crossed the Digital Divide without government support because an innovative community-based organization responded to regional labor demand and created a job training program with foundation funding. Despite decades of reform in workforce development systems that has gradually shifted responsibility to the local and regional level, such innovative and responsive programs remain the exception, not the rule. Only some regions are able to foster such flexible and responsive workforce development institutions; and even fewer can tap into government funding to support innovation.

This study examines the potential for individuals trapped in dead-end jobs in the service economy to cross the Digital Divide into jobs in the knowledge economy. The conventional wisdom is that the lack of human capital entraps workers in dead-end jobs, unable to capitalize on the demand for high-skilled labor in an increasingly networked—and exclusive—society.[23] Other approaches focus on the demand-side, suggesting that IT itself acts to exacerbate societal divisions and ultimately income inequality, particularly in high-tech regions. IT not only drives the bifurcation of the economy into high-end knowledge analyst and low-skill service jobs but also creates a new networked system of economic organization that has few access points for those who are "switched off."[24] The implication is that as globalization accelerates and IT jobs shift offshore, these patterns of bifurcation, inequality, and job inaccessibility will only grow worse.

I argue instead that a low-wage future is not inevitable for disadvantaged groups. The downskilling of IT work along with the rise of workforce intermediaries creates an opportunity to move large numbers of

low-wage workers into jobs with a career ladder, particularly at the peak of the business cycle. Although some entry-level work is disappearing offshore, the economy still offers opportunities for jobseekers with little college education to work in IT. Nonprofit training programs play an important role in making the transition possible for those for whom the educational system has failed. Many training program graduates remain in IT four years later, with a clear career trajectory ahead.

But several obstacles prevent us from offering promising futures on a large scale. The devolution of workforce development policy under the Workforce Investment Act of 1998 (WIA) has created an inefficient and fragmented "second-chance" employment and training system—the educational system for those failed by the "first-chance" K–12 and postsecondary system—that fails the neediest and creates a highly differentiated landscape of opportunity across and within regions.[25] Second, many of the labor market intermediaries within this second-chance system connect poorly with employers and in any case are unable to grow to scale enough to address upward mobility efficiently, particularly for the hard-to-serve. Finally, the ongoing and rapid transformation of entry-level IT work, as IT occupations mature and a new division of labor—regional, national, and international—emerges, presents a challenge by threatening any supply-side program with obsolescence nearly before it graduates a single worker.

This study tells the story of the evolution of opportunity in IT during a period of rapid economic and institutional change. Five years ago, at the peak of the dot-com surge, companies desperate for employees began to hire substantial numbers of workers outside traditional channels such as four-year colleges. The rush to hire offered new opportunities for workers with minimal postsecondary education to enter the IT workforce with the help of intermediaries, specifically nonprofit training providers offering short-term IT training programs.[26] These providers act as part of this second-chance system, the patchwork of short-term training programs for disadvantaged, dislocated, and incumbent workers who cannot take advantage of the "first-chance" system.

Since 2000, several factors, including the dot-com implosion, the rise of offshore outsourcing, and the implementation of the WIA, have altered the landscape of opportunity for employment in IT. Yet, these training intermediaries that facilitate upward mobility in IT provide important lessons that are likely generalizable across a wide variety of occupations: if the system is responsive to employer demand, targets occupations with career ladders, trains in soft skills, and connects with employers for placement, then "second-chance" programs can succeed. The retirement of the baby boomers in coming years will create

widespread worker shortages and reveal considerable skill deficiencies in our workforce.[27] Thus, it is vital that policymakers focus on how to make the second-chance system more effective and give more jobseekers an opportunity to enter the first-chance system. This study investigates how recent location patterns are reshaping the entry-level IT job market, how well intermediaries can respond, what the boom/bust cycle means for training program graduates, and how policymakers can help create a more flexible, responsive workforce development system.

Organization of the Report

The report is organized into five chapters. The remainder of this introduction presents an overview of the research design and methods used in the study. The second chapter examines the nature of the demand for entry-level workers in IT amidst global shifts in the location of the IT workforce. Relying mostly on firm interviews and secondary source data, it explains how the information-based economy evolved to offer opportunity for less-educated workers and then argues that despite a mixed economic picture, including the rapid growth of offshore outsourcing, and a chaotic workforce development system in the early stages of reform, opportunities still exist to cross the Digital Divide and move up in IT.

Chapter III looks at the role of workforce development intermediaries in helping disadvantaged and underrepresented jobseekers transition into IT jobs. A survey of training providers shows how they facilitate the transition through their curriculum, particularly soft skills training; their placement infrastructure, including staff and facilities; and their connections to employers. Compared with the private providers who comprise most of the second-chance system, nonprofit and public providers are generally better connected, more locally based, and better able to serve the disadvantaged.

The fourth chapter presents individual stories of upward mobility in IT, examining how jobseekers got the foot-in-the-door and what obstacles they experience in trying to move up the job ladder. Multiple interviews over three years with 93 graduates of nonprofit IT training programs suggest that contrary to the conventional wisdom about dead-end jobs for less-educated workers, many are able to move up, depending mostly on their access to postsecondary education.

In the final chapter, I turn to policy, with a particular focus on how workforce development policy might best help underrepresented individuals work in IT. Interviews with workforce development officials, as well as secondary data analysis, reveal several obstacles, among them the difficulty for nonprofits to participate in WIA, the unresponsiveness of

the workforce development system to demand, and "creaming," the practice of selecting overqualified participants rather than the most needy.

Research Design

Opportunities to enter information technology differ across regions due to variation in the composition of the regional economy, workforce quality, structure of intermediaries, and workforce development policy. Since the goal of the study is to show what works in terms of helping disadvantaged workers cross the Digital Divide, enter IT, and advance, I structure the study around case studies of nonprofit training intermediaries in different regions. I augment the in-depth interviews of training program graduates with data on regional opportunities for entry-level IT work, the experience of other IT jobseekers, and the effectiveness of training intermediaries generally.

To look at what works, it is necessary to focus on high-tech regions, where there is ample opportunity and capacity to help workers enter and advance in IT. I choose two high-tech regions for my primary case studies: the San Francisco Bay Area and the New York–New Jersey–Connecticut metropolitan region. Chapters III adds two other regions to augment the comparison of training providers: the Washington DC–Maryland–Virginia–West Virginia metropolitan region and the Chicago–Gary–Kenosha metropolitan region. Three selection criteria guided the choice of these regions: high concentration of high-tech employment, variation in economic structure, and high concentration of nonprofit training providers in IT.

The San Francisco, New York, Washington DC, and Chicago metropolitan areas constitute four of the top six in terms of absolute number of IT occupations (the others are Los Angeles and Boston) (see Table 2.1). These regions are generally among the top ten high-tech regions in the country according to multiple rankings of high-tech metros, although the share of high-tech jobs is higher in some smaller, specialized metropolitan areas like Austin.[28] Each of the four regions has 300,000 or more IT jobs. Selecting large high-tech metros is important in order to examine the demand for IT workers, as well as their opportunities to advance.

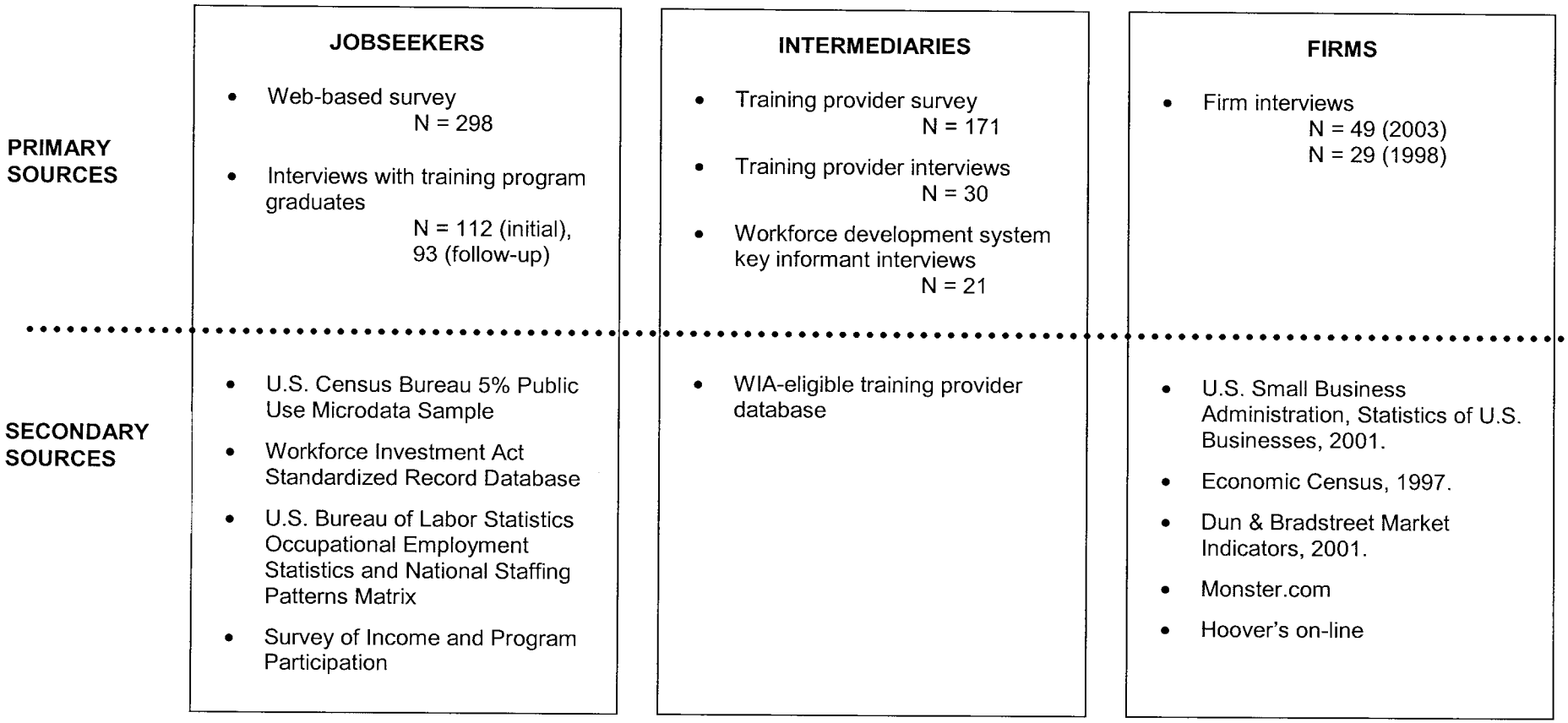
The structure of the IT-related employment opportunities differs among the four regions. The Washington DC, New York and, to a lesser extent, Bay Area regions are highly specialized in terms of IT industries, while Chicago is relatively diverse (as are Boston and Philadelphia). Almost forty percent of Washington DC's high-tech employment is in computer programming businesses, mostly related to government. New

York also specializes in programming, but its highest concentrations of IT workers are in management and public relations, finance, and insurance. In addition to concentrations in these areas, the Bay Area specializes in high-tech manufacturing and R&D. For this study, it is important to examine a variety of regional economies in order to analyze different potential career ladders, as well as different industry location patterns. Thus we selected one diverse and three specialized economies.

The most important criterion guiding the selection of regions was the availability of the nonprofit training providers that have been shown to be effective in providing the foot-in-the-door into IT. An initial scan of the top twenty high-tech regions in the country found 87 IT training programs run by the nonprofit sector. Areas with five or more such programs included San Francisco, Philadelphia, New York, Miami, Los Angeles, Dallas, Chicago, Washington DC, and Charlotte. However, most were too small to provide enough graduates to participate in the study, effectively eliminating most regions. In Chicago, no nonprofit training provider would participate in the study, so no in-depth interviews were conducted in the region.

To answer its questions about how to bridge the Divide and move up in IT, the study draws upon three universes: jobseekers, intermediaries, and firms. Figure 1.1 outlines the data sources used, and Appendix A describes the methodology and protocols used for each. The research effort included two surveys, with a total of 470 respondents, plus in-person interviews with over 200 IT employers, jobseekers, workers, training providers, and workforce development policymakers.

Figure 1.1. Study Data Sources



CHAPTER 2

Entry-Level Work in IT: The Context for IT and Workforce Development

The expansion of the information-based economy is producing new opportunities for disadvantaged, low-skilled jobseekers to participate in the Digital Age. In essence, the bottom rung of the IT job ladder has expanded to include workers with little or no college education, even as changes in global location patterns may be causing the disintegration of the rest of the job ladder. Yet, opportunities in IT are unevenly distributed across regions, and the emerging global division of IT labor is likely to exacerbate this pattern.

This chapter examines the rise and transformation of the demand for entry-level workers in IT and how the new jobs are distributed between and within regions. It begins by looking at the rise of the New Economy, the opportunities it offers for IT employment, and the emergence of IT occupations at the entry-level. Then, based upon interviews from 49 Bay Area and New York firms from a variety of sectors, it examines current trends in IT hiring and the future of entry-level IT employment in the wake of global shifts in location patterns. Overall, IT occupations are continuing to evolve and offer a potential avenue for upward mobility for less advantaged workers, but opportunity varies significantly by region.

Rise of the Information-Based Economy

The New Economy

The term "New Economy" typically refers to a set of changes in macro-economic, institutional, and technological processes. Three different but related conceptions underlie the New Economy: macro-economic changes, including faster growth, lower inflation, and heightened competitiveness fueled by productivity growth; micro changes, consisting of the restructuring of the firm and the associated reorganization of production processes and institutions; and structural changes occurring as new information technologies create a new era of global competition based largely upon information-based goods and services.[29] Although there is much debate about how much of this New Economy is actually new, most theorists agree that these three changes are occurring.

According to the macro-economic view, technology-led productivity growth has led to rapid growth in output, including information-based services but also industrial output, without a concurrent

increase in inflation. Technological change is skill-biased, in that it privileges occupations relying on technical expertise. This skill-biased technological change, along with a wage premium for skilled work, has created a bifurcated occupational structure, with disproportionate growth of both high-wage managerial and technical work and low-skill, low-wage jobs, often filled by immigrants. Among the better paid of these new low-skill jobs are newly deskilled IT jobs—for instance in customer service, desktop support, and computer repair.

The micro view sees the New Economy as originating in a series of organizational changes in firms and institutions. As traditional, bureaucratic, hierarchical corporations began to lose competitiveness in the 1980s, many firms restructured themselves into networks of "lean and mean" producers, permitting the flexibility that leads to market responsiveness and resilience to fluctuations of the business cycle. Accompanying this new horizontally networked structure of small and large firms is a new reliance on a contingent workforce and a concurrent decrease in wage rates, unionization, and job stability. This in turn has devalued entry-level work in IT for college-educated workers, creating openings for jobseekers from more disadvantaged backgrounds.

The third conception of the New Economy sees it as one of a series of technology-driven changes in the economy, beginning with the Industrial Revolution, continuing through the invention of railroads, automobiles, and the military-industry complex to the current information-based society. These structural changes (so-called "long waves of innovation"), which occur once every 50–55 years, mean that businesses, and indeed, entire societies, must take advantage of technological advances in order to compete economically: both products and processes must incorporate IT. Thus, this view sees the production and management of information as the driving force of the economy, as opposed to simply part of a set of organizational changes. As IT penetrates many different occupations—from CEO to security guard—the demand for IT occupations changes as well. For instance, widespread use of computer terminals has meant new demand for computer support specialists, an occupation that grew from 100,000 jobs in 1996 to 500,000 in 2002.

Information technology (IT) can be broadly defined as "the infrastructure and knowledge that is necessary to make information readily available."[30] While in the past IT occupations were often limited to the computer industry, the task of creating, processing and managing information is now integrated into every sector of the economy. However, just 30 percent of IT workers work in the IT sector (including computer systems design, the internet, and other information services); most are dispersed across hundreds of other industries.[31]

Moreover, IT occupations, the focus of this study, are as varied as the sectors that use information technology tools. Positions supporting and creating IT include hardware repair and maintenance, administering computer networks, creating web pages, software development, technical support, 3-D animation, digital video editing, database design, and digital mapping. In 2003, 3.7 million workers, or 3.5 percent of all American workers, worked in occupations maintaining, creating, or managing IT. IT maintainers work at the entry-level, supporting networks, hardware and software, while IT creators and managers are at a more advanced level. An additional 5.3 million workers (herein called the "IT users") were in entry-level jobs relying heavily on computers (such as customer service representatives, computer operators, and office clerks).[32]

The changes that constitute the New Economy have been the basis of much of the economic growth in the United States in recent years. However, they also bring the dual threat of the dispersal and polarization of the workforce. For example, a number of commentators have taken the rapid diffusion of information technologies and globalization to foreshadow the relocation of all types of jobs to lower cost locations, and the newspaper headlines daily broadcast the latest offshoring trends.[33]

Yet, as Matthew Zook and I have argued, most IT jobs are staying in the U.S.[34] To assume that cost-minimization is the only driving force behind firm and employment location ignores the need for firms to learn about and adapt to new technologies and techniques, as well as react quickly to changes in the marketplace. IT labor stays in the U.S. because of increasing productivity, the process of agglomeration that has traditionally characterized regional development, and the tacit knowledge that makes spatial proximity crucial.[35] Illustrating this agglomeration process is a set of high-tech regions that drive the nation's economy, a group generally considered to include the San Francisco Bay Area, Boston, and other metros with a concentration of IT expertise.[36]

Table 2.1 identifies the top 25 high-tech regions based upon the absolute number of IT occupations; many also have a share of IT occupations greater than the national average (3.5%). These concentrations create the opportunity for disadvantaged workers to cross the Divide and move up a career ladder. The following looks in more detail at how, by looking at the availability of entry-level occupations in IT and paths to upward mobility, as well as the variations in regional occupational structure that provide the context for the transition to work.

Table 2.1. Top 25 Metropolitan Regions for IT Occupations, 2003

METROPOLITAN AREA	IT JOBS	TOTAL JOBS	% IT
New York-New Jersey metropolitan area	279,790	9,308,670	3.0%
Washington, DC-Baltimore	232,400	3,977,330	5.8%
San Francisco Bay Area	184,550	3,339,200	5.5%
Los Angeles-Riverside-Orange County	180,820	6,549,700	2.8%
Boston	130,840	2,964,670	4.4%
Chicago	119,950	4,316,740	2.8%
Dallas-Fort Worth	106,360	2,655,050	4.0%
Atlanta	94,930	2,124,780	4.5%
Philadelphia	81,100	2,885,470	2.8%
Seattle	75,240	1,691,840	4.4%
Denver	62,680	1,361,100	4.6%
Minneapolis-St. Paul	60,930	1,686,210	3.6%
Detroit	59,230	2,455,870	2.4%
Houston	51,250	2,220,720	2.3%
San Diego	45,490	1,255,250	3.6%
St. Louis	43,030	1,274,720	3.4%
Phoenix-Mesa	40,960	1,596,920	2.6%
Raleigh-Durham-Chapel Hill	36,510	663,250	5.5%
Miami-Ft. Lauderdale	35,420	1,689,790	2.1%
Austin-San Marcos	34,190	651,670	5.2%
Portland	30,670	1,061,360	2.9%
Tampa-St. Petersburg-Clearwater	29,120	1,201,860	2.4%
Kansas City	28,650	930,340	3.1%
Columbus	28,520	850,370	3.4%
Cleveland	27,640	1,403,150	2.0%
All regions	3,711,450	106,978,190	3.5%

Source: Bureau of Labor Statistics, *Occupational Employment and Wage Estimates*, May 2003. http://stats.bls.gov/oes/home.htm. Calculations by the author.

Rise of New IT Occupations

Despite the predictions of some analysts that a knowledge-based economy would mean that those without higher education would have no recourse other than to take low-wage service jobs, niches in knowledge-based work are emerging for lower skilled workers as well. Some of these are new occupations based upon the appearance of new technology, e.g., there was little demand for web developers before the Internet became widely adopted. But others have emerged as appropriate for entry-level personnel because of the evolution of job requirements over time. For example, computer support specialists, one of the best-paying occupations for people with limited education and training, were initially workers with

bachelor's degrees. Over time, the training for these positions has evolved from computer science degrees at 4-year colleges to short-term training often done at community colleges.[37]

Entry-level occupations in IT are a relatively new phenomenon, as more advanced and traditional IT occupations such as computer programming have gone through an initial life cycle, resulting in first downskilling and then the rise of entry-level work as more experienced workers move up the job ladder. The computer support specialist occupation provides an illustration. As computers began to become commonplace throughout all economic sectors, the computer support specialist occupation emerged to provide technical assistance for users of hardware, software, and systems. At first, the new support tasks were incorporated into existing computer programming jobs in a process of "job enlarging" (i.e., the expansion of job duties). But gradually the technical support duties shifted to others, such as clerical workers seeking a promotion and who could be trained easily on-the-job, or four-year college graduates with some computer training.

Not all entry-level occupations survive: in a process of upskilling and job enlarging, some entry-level occupations become subsumed into higher level occupations. Such is the story of the web designer occupation: defined as an emerging occupation by the BLS in the late 1990s, it is now more often a skill that is incorporated into the work of graphic designers, computer support specialists, and other IT or IT-related occupations.

The career ladder for IT occupations—at least for workers without an IT-related degree—typically begins with the IT maintainer jobs, the jobs for those supporting computers and networks. (Table 2.2 describes the universe of IT occupations in detail.) These occupations, such as the computer support specialist, require just long-term on-the-job training, vocational education and certification, or an associate's degree. In contrast, IT creator jobs require at least a bachelor's degree, and the top-level jobs as managers or researchers require graduate education and/or work experience. IT maintainer jobs are not the only pathway into IT careers: there are also IT user positions, low-skill entry-level jobs such as data entry clerks or office clerks, that involve computer use. However, only a small proportion of the five million IT users advance into the more technical IT maintainer and creator occupations.

Table 2.2. IT Occupations by Employment, Skill Level, and Salary, 2003

OCCUPATION TITLE	EMPLOYMENT	SKILL LEVEL	TYPE	MEDIAN ANNUAL SALARY	CAREER LEVEL
Computer and Information Systems Managers	266,020	Bachelor's degree +	IT creator/ manager	$89,740	Top
Computer and Information Scientists, Research	23,210	PhD	IT creator	$81,600	Top
Computer Software Engineers, Systems Software	285,760	Bachelor's degree	IT creator	$76,240	High
Computer Hardware Engineers	72,550	Bachelor's degree	IT creator	$75,980	High
Computer Software Engineers, Applications	392,140	Bachelor's degree	IT creator	$72,530	High
Computer Systems Analysts	474,780	Bachelor's degree	IT creator	$64,160	High
Computer Programmers	431,640	Bachelor's degree	IT creator	$61,340	High
Network Systems and Data Communications Analysts	148,030	Bachelor's degree	IT creator	$59,120	High
Database Administrators	100,890	Bachelor's degree	IT creator	$58,200	High
Network and Computer Systems Administrators	237,980	Bachelor's degree	IT creator/ maintainer	$56,050	Mid
Technical Writers	44,690	Bachelor's degree	IT creator/ maintainer	$51,590	Mid
All Other Computer Specialists	162,000	Associate's degree	IT maintainer	$54,070	Entry
Telecommunications Equipment Installers and Repairers, Except Line	195,500	Long-term on-the-job training	IT maintainer	$48,230	Entry
Electrical and Electronic Engineering Technicians	177,940	Associate's degree	IT maintainer	$43,650	Entry
Computer Support Specialists	482,990	Associate's degree	IT maintainer	$39,440	Entry
Computer, Automated Teller, and Office Machine Repairers	144,370	Post-secondary vocational award	IT maintainer	$33,780	Entry
Desktop Publishers	33,590	Post-secondary vocational award	IT maintainer	$31,590	Entry
Audio and Video Equipment Technicians	37,370	Long-term on-the-job training	IT maintainer	$30,810	Entry
Computer Operators	160,170	Moderate-term on-the-job training	IT user	$29,970	Entry
Customer Service Representatives	1,902,850	Moderate-term on-the-job training	IT user	$26,500	Entry
Data Entry Keyers	339,010	Moderate-term on-the-job training	IT user	$22,600	Entry
Office Clerks, General	2,926,160	Short-term on-the-job training	IT user	$22,450	Entry

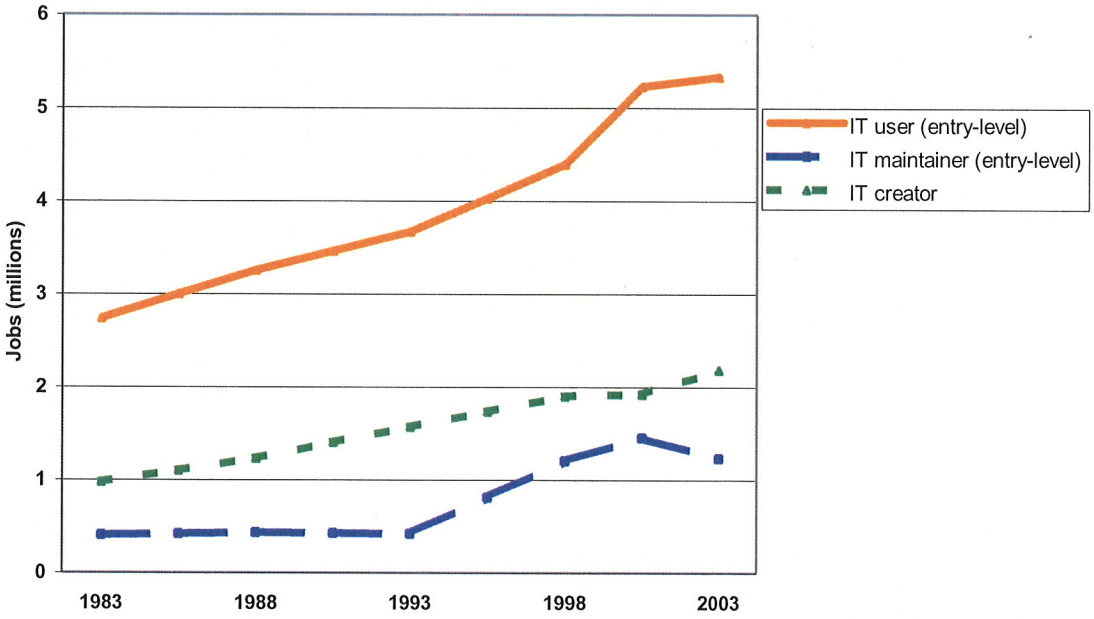
Source: U.S. Bureau of Labor Statistics, Occupational Employment Survey and Occupational Outlook Handbook, 2003.

Thus, the IT career ladder consists of maintainer occupations, comprising 33 percent of all IT occupations; creator jobs (59 percent of occupations); and managerial/research jobs (8 percent of occupations). Although firms recruit entry-level IT creators from colleges and overseas to fill high-level creator jobs, there is more than enough demand to accommodate all of the IT maintainer workers who wish to move up. Chapter IV of this report looks in more detail at the IT career paths of entry-level IT workers and how policy can aid upward mobility.

Despite the dot-com crash and spread of offshore outsourcing, IT occupations—with the exception of IT maintainers—continue to grow. By 2003, there were 5.3 million workers in IT user occupations, 1.2 million working as IT maintainers, and 2.2 million IT creators. Figure 2.1 depicts the growth in entry-level IT positions in the 1990s. Growth in IT user occupations has slowed somewhat, adding just 100,000 jobs since 2000; most of the recent growth in these occupations is due to the hiring of customer service representatives. The IT "maintainer" occupations—including occupations such as computer support specialists, audio-visual specialists, communications equipment installers, data processing equipment repairers, electrical technicians, and desktop publishers—have lost 220,000 jobs since 2000, but remain above 1998 levels due to the continued growth of desktop computing. High-skilled IT "creator" occupations, such as systems analysts, computer programmers, and software engineers continue to grow steadily, adding over 260,000 jobs from 2000 to 2003, for a total of over one million new jobs from 1983 to 2003.

Although overall 33 percent of IT occupations are entry-level maintainer positions, the proportion varies substantially by region (Table 2.3). Some of the top high-tech metros listed in Table 2.1, such as Washington and San Francisco, have relatively low concentrations of maintainer occupations. The high-tech regions that rank lower in terms of total IT occupations are more likely to have concentrations of entry-level IT workers—metros such as Phoenix, Miami, and Kansas City. This variation in occupational structure has implications for future trends in entry-level IT occupations: as shown in the next section, it is the metropolitan regions with relatively high concentrations of entry-level IT occupations that are most likely to experience job losses in the near future.

Figure 2.1. Change in IT Occupations, 1983–2003



Source: U.S. Bureau of Labor Statistics, Occupational Employment Survey, 1983–2003. Calculations by the author.

After the Bubble Burst: Explaining Change and Looking Ahead

In the first two years after the dot-com bubble burst, approximately 180,000 IT jobs disappeared, 66,000 in California alone (according to Bureau of Labor Statistics data from 2000 to 2002). Although almost all regions have by now recovered their losses and begun to add new IT jobs, some analysts suggest the layoffs that have taken place during the downturn are part of a larger, ongoing structural transformation, whereby "lean and mean" companies reduce excess middle management and transfer low-skill work to lower cost locations.[38] The quest for flexibility is not new to U.S. corporations; what has changed is the pace of layoffs and the type of work eliminated.

Based on an analysis of job trends from before and after the bubble, as well as interviews with firms in New York and the San Francisco Bay Area, I suggest a considerably more nuanced picture, one that offers qualified hope for entry-level workers in IT—but also portends increasing inequality within IT sectors. While some companies have taken advantage of the economic lull to restructure their IT workforce, their adjustments have for the most part been small and temporary, in response to the business cycle. As discussed below, restructuring has

Table 2.3. IT Maintainer, Creator, and Managerial Occupations by Metropolitan Region, Top 25 High-Tech Metros

METROPOLITAN AREA	IT JOBS	% IT	ENTRY (Maintainer)	HIGH (Creator)	TOP (Manager)
New York-New Jersey-CT metropolitan area	279,790	3.0%	30.0%	60.0%	10.0%
Washington, DC-Baltimore	232,400	5.8%	25.2%	65.8%	9.0%
San Francisco Bay Area	184,550	5.5%	25.7%	66.0%	8.3%
Los Angeles-Riverside-Orange County	180,820	2.8%	40.0%	52.3%	7.7%
Boston	130,840	4.4%	32.2%	58.7%	9.2%
Chicago	119,950	2.8%	31.7%	58.3%	10.0%
Dallas-Fort Worth	106,360	4.0%	34.2%	59.0%	6.9%
Atlanta	94,930	4.5%	32.0%	59.8%	8.3%
Philadelphia	81,100	2.8%	33.3%	57.7%	9.0%
Seattle	75,240	4.4%	28.8%	65.8%	5.3%
Denver	62,680	4.6%	34.9%	58.9%	6.3%
Minneapolis-St. Paul	60,930	3.6%	33.6%	56.9%	9.5%
Detroit	59,230	2.4%	34.8%	56.8%	8.3%
Houston	51,250	2.3%	36.2%	56.9%	6.9%
San Diego	45,490	3.6%	35.8%	56.1%	8.1%
St. Louis	43,030	3.4%	34.7%	56.3%	9.0%
Phoenix-Mesa	40,960	2.6%	41.4%	49.7%	8.9%
Raleigh-Durham-Chapel Hill	36,510	5.5%	34.0%	58.2%	7.8%
Miami-Ft. Lauderdale	35,420	2.1%	43.4%	49.8%	6.7%
Austin-San Marcos	34,190	5.2%	31.4%	62.0%	6.6%
Portland	30,670	2.9%	36.7%	56.3%	7.0%
Tampa-St. Petersburg-Clearwater	29,120	2.4%	36.1%	58.1%	5.8%
Kansas City	28,650	3.1%	41.5%	50.3%	8.2%
Columbus	28,520	3.4%	34.5%	56.0%	9.5%
Cleveland	27,640	2.0%	37.2%	54.1%	8.8%

Source: U.S. Bureau of Labor Statistics, Occupational Employment Survey, 2003. Calculations by the author.

meant a new focus on productivity and new location patterns—in particular, the recentralization of IT functions to reconnect them with companies' entrepreneurial core—and continued outsourcing with new growth offshore. But for many, the restructuring means that they will turn to either entry-level or very high-skilled workers when they begin hiring again, in essence creating a new bifurcation within the U.S. IT workforce. The following looks first at recent hiring patterns and then analyzes employment change across and within regions.

Overall Hiring Patterns

One of the most important factors shaping hiring decisions is firm productivity. The economic downturn forced firms to refocus on productivity, and it has increased across all sectors: output per hour continues to increase nationally, and in fact, the rate of annual increase in output per hour is now 50 percent higher than it was during the dot-com boom.[39] Many companies have taken advantage of the downturn to squeeze even more out of their IT workers, particularly in support and operations. As one company from the FIRE (finance, insurance, and real estate) sector told us, it is now doing the same amount of work for $289 million that it used to do for $453 million. This is made possible in part through the process of job enlarging (such as requiring a programmer to maintain the computer network), but also through technological change. Improvements in hardware, software, and operating systems have reduced the need for maintenance and led to a tremendous increase in remote break-fix. Users have become more sophisticated and capable of self-service, the "ATM model." Finally, with declining product costs and rising labor costs, computer repair no longer makes economic sense: according to one institutional employer, "If it can't be fixed within a couple of hours, then it is more economical to just buy a new machine."

What does this mean for workforce structure and future hiring? Firms have delayed hiring at the entry-level and concentrated layoffs in the middle ranks, including management, marketing and sales, and outsourceable programming functions. They are trying to shed excess capacity, such as help desk staff added when company workforce was at a peak. Needing more flexibility, many companies are joining the trend of firing and rehiring existing employees through temporary agencies.

Yet, there are several indications that the entry-level job market will expand again. First, in order to sustain productivity growth, job enlarging will have to end; it will not long be cost-effective for computer programmers and database administrators to perform installation and repair.

Secondly, companies are increasingly taking advantage of the slow pace of economic growth to spend more time cultivating talent in-house. During the boom, companies needed to be able to hit the ground running, but the pressure has diminished. According to one manufacturer/retailer, "We have been buying fully formed talent and we are about to exit that system and start hiring entry-level personnel." The company is currently challenging its IT managers to see if they can replace their units of high-level IT workers with a mix of high-level, mid-level, and entry-level workers.

The rapid hiring of the boom also made some companies feel like they had lost the opportunity to inculcate their workers in company culture and values. Several large IT and IT service companies expressed concern that they were not growing talent in-house; as an IT company noted, "How do you sustain a company with nothing to apprentice?" Another reason growing talent from inside is so important is because of the continued labor shortage for workers with specialized skills; one institutional employer said, "In this economy, it is still a nightmare to have to recruit for IT...for IT positions such as system administrator, we have to steal them from other universities and medical clinics."

Finally, changes in how companies locate and source IT services are reshaping the geography of entry-level hiring. In the 1990s, the expansion of the IT workforce and concurrent occupational specialization meant that firms were able to separate their various IT functions geographically. Specifically, companies began either to relocate their operations and support personnel to branch locations in peripheral regions or to outsource to large IT service subcontractors, while keeping their creative IT workers in-house. The emergence of call centers across less developed regions in both suburban and rural America provides an illustration.[40]

Now, while some firms are continuing to explore relocating and/or outsourcing their IT support and business processes, interviews suggest that others are returning these functions in-house and recentralizing in high-tech regions. In a time of retrenchment and emphasis on productivity, companies are becoming more strategic about which functions can locate where. Part of this location decision-making process is determining the optimal division of labor between in-house and outsourcing, onshore and offshore, as discussed next.

To outsource or not to outsource.

> "But ultimately it comes down to us not being an IT company. We're not producing technology, so why should we be doing so much of it?" —*FIRE sector company*

During the dot-com boom, companies inside and outside the IT sector increasingly embraced the logic of outsourcing (or "alternate sourcing"). Outsourcing of some customer support functions, such as telephone customer service and bill processing, began over a decade ago. But outsourcing of both business processes (such as payroll, accounting, HR, claims processing, document management, and sales) and IT services (such as help desk, networking, legacy programming, and application development) accelerated recently due to labor shortages at the peak of the

business cycle. This has particularly impacted entry-level IT employment, since some IT maintainers (e.g., help desk) don't necessarily need to be on-site.

Companies most often mentioned a focus on their core competencies as the rationale for outsourcing. As an IT company told us, "If you're not good at it, why not outsource it?" The push for cost containment is also key. FIRE sector companies, in particular, described an ongoing process of comparing in-house IT to outsourcing costs because of the need to reduce overhead and justify expenditures in both personnel and space. Companies that are looking seriously at outsourcing are increasingly willing to outsource large components of their organizations where there is synergy, such as the FIRE sector company looking to outsource both application development and infrastructure (help desk, desktop break-fix, and network administration). Other reasons driving the shift include liability protection, since outsourcers assume liability for security problems, and the ability to delegate the complex task of deciding when to update with the newest technology.

In the case of IT functions such as help desk, there is typically continuity of employment, as the outsourcer takes on the firm's workforce. According to one IT service firm, "Many times these brokerage houses, financial services and insurance don't even know their help desk is outsourced." This creates the added benefit of improving career opportunities for the absorbed IT workers, who are relocated to IT service companies with much larger IT workforces and thus greater chances for advancement.

Typically, the outsourcer that is asked to take on a firm's employees can only fire them after a year. But downsizing is the not-so-hidden agenda of many firms turning to outsourcing. Outsourcers are eager to comply, since absorbing a company's workers can be challenging. As one IT services firm told us, "We know that the employees are already fat and dumb or the company wouldn't have tried to outsource them in the first place." In order to cut costs and increase service, the outsourcer manages the "appropriate distribution" of the workforce. In most cases, this will involve laying off some of the original workers as soon as possible after the contractual probationary period is over. Thus, despite the increased potential for career ladders, many will not last long enough to advance.

The new era of cost containment has prolonged the outsourcing trend for some businesses, but slowed it for others. Surprisingly, interviews indicated that most businesses (80 percent of the sample) are limiting the amount of new outsourcing that they do—although half of

these firms are looking at substituting offshore outsourcing for their current domestic outsourcing. At this point, most of those who are considering increasing their outsourcing are mostly looking offshore, as cost savings from domestic outsourcing are no longer competitive. Although this finding may not be generalizable to all IT employers, because the sample of firms is not random, it is indicative of the locational logic that employers in high-tech regions are currently using.

Despite the continued offshore growth, the overall outsourcing trend seems to be reaching its peak. As one executive from the FIRE sector told us, "There's one thing that we know: when you outsource, it starts good and ends bad." Apart from these companies hit hard by the dot-com bust, many large companies have already decided which functions to outsource; six companies we spoke with are actually actively decreasing the amount of outsourcing that they do, at least within the U.S. For some, decreasing outsourcing means bringing functions like desktop support back in-house. Others are simply limiting their relationships with contractors and hiring direct instead of through temporary agencies; these outsourcing relationships are leftovers from a time of more rapid growth. Most often the decrease is due to expense (as much as 20 percent more than performing work in-house) or quality concerns. Even a company expanding its outsourcing admits, "Most of the time it doesn't save money to outsource. People just do it because it sounds like they're doing something."

Company culture or values also drive the slowdown in outsourcing. Many companies are reluctant to outsource customer contact to outsiders who have not experienced the company culture; echoing the thoughts of several other interviewees, an IT company told us, "The point of customer contact is such a critical part of business." For some companies, it is a matter of staying on top of technology and only outsourcing legacy applications. According to a FIRE company, "Our strategy, and it has always worked, is to be as self-sufficient as possible....If it's a new technology, we'll tend to want to do it first." For others, it is important to have a hands-on relationship with outsourcers. An IT company says, "Companies get into trouble when they outsource headaches. They must maintain control of the process even when they outsource work."

For large institutional employers, it is more a question of values. One HR manager at a government agency actively trying to reduce its reliance on IT contractors argued, "We should be sending our people to training, to college, instead of paying contractors $100 or $200 an hour." Values—and politics—also play a role. As one institutional employer told us, "The push is not to outsource. Outsourcing is a dirty word here and we

would never outsource union jobs. [We are] very concerned about the impact on the community."

Because IT services crosscut several industry categories, it is difficult to determine the impact of IT service outsourcing on the location of entry-level IT jobs. However, the information services and data processing services subsector (NAICS 514 in 2001), which includes about 6 percent of IT occupations, can serve as a proxy for IT service outsourcers. This subsector is disproportionately concentrated in several of the metros on the top ten list (such as Dallas, Los Angeles, and Washington, DC, which each have more than 20,000 jobs in this category), but also some of the metros lower on the list (such as Denver, Phoenix, and Detroit, which each have more than 10,000 jobs in the information and data processing services subsector). Thus, large-scale outsourcing of IT services is likely to benefit these metropolitan areas; however, the shift of such jobs offshore would have a disproportionate impact on them.

Offshore outsourcing.

> "...the advent of global delivery models for IT services is an irreversible mega-trend that is here to stay. The momentum will continue as jobs move outside of the United States. The only uncertainty is the velocity."
>
> —*Gartner, Inc.*[41]

Although the subject of offshore outsourcing has received considerable press in recent months, there is little agreement on the extent of the job movement offshore, whether it is cyclical (due to the recession) or permanent, how many jobs will leave in coming years, and what the shift means for the U.S. workforce. While few question that "the momentum will continue," there is no data specifically on impacts on entry-level IT work.

However, the factors driving offshoring are relatively clear. Technological innovations such as new bandwidth, digital technologies, and standardization of software packages—along with their reduced cost—have pulled IT jobs offshore, in part because the round-the-clock business model quickens business response time. As Oracle recently told the New York Times, "Our aim here is not cost-driven. It's to build a 24/7 follow-the-sun model for development and support.[42]

But the major push factor is the drive for cost containment. Estimates of cost savings from offshoring range from 20 percent to 80 percent.[43] Companies are striving to reduce costs not just because of the sluggish economy, but also their own over-investment in technology. As

one consulting firm told us, companies are angry: "The tone is that you sold us this stuff that didn't work." After shedding their excess capacity in the U.S., companies are looking for more flexible ways to expand. With a new baby boomer retirement wave arriving within the next five years and an anticipated labor shortage, companies are already looking outward for labor.[44]

Meanwhile, the offshore model for IT has come of age. Building on the successful precedent set by very large companies like G.E., outsourcers have offered an opportunity to shift activities with minimal disruption.[45] The key has been skilled labor.[46] At the same time that the difficulty of importing foreign-born workers has increased (because of the 9/11-related immigration restrictions and the reduction of H1-B visa availability), companies like Tata and Accenture offer highly skilled and disciplined workforces. Often with the support of government, outsourcers spend liberally on training and develop rigorous developmental and career models.

As one major outsourcer told us, "Our competitive edge is our homogeneity. We have a standard culture, the same in Japan and India. We need to be the same, so we can tell the clients 'Rely on me to decide where to locate.'" A business services company waxed euphoric to us about its Indian outsourcer, Tata: "The employees in the program have a totally different drive than employees here. They are so focused on what they want to do. They are very respectful and attentive, and absorb every word you say...It was almost like they were cloning."

To examine the impacts of offshore outsourcing on entry-level IT jobs, it is necessary to determine the number of jobs shifted offshore. Yet, there is no reliable data to use; most of the numbers available on the extent of offshoring come from management consulting firms, particularly Forrester Research, Inc. and Gartner, Inc. A quick perusal of 31 popular newspaper and magazine articles on offshoring in 2003 and 2004 shows that 16 had relied on either Forrester or Gartner for data; in all, the articles cited fifteen different consulting companies. Mentioned most frequently is the Forrester prediction (2002) that 3.3 million service sector jobs, including 450,000 IT jobs, will be located overseas by 2015; this constitutes about two percent of all U.S. jobs currently, or an average loss of about 290,000 jobs per year, about 15 percent (43,500) in IT.[47] This forecast is considerably more conservative than Gartner's prediction, which suggests that 500,000 of the 10.3 million U.S. IT jobs alone could move just in 2003 and 2004. IDC (2003) predicts an even higher velocity, with a survey suggesting that firms will send nearly a quarter of IT services offshore by 2007, compared to just five percent being handled offshore in 2003.[48]

There are several reasons to doubt these forecasts (besides the fact that some of the consulting firms have already retracted them).[49] Few rely on statistically valid surveys.[50] Yet they do not hesitate to issue impossibly specific predictions, giving them an aura of authenticity. For instance, one firm has actually assigned probabilities to offshore outsourcing that it uses to help companies with strategic planning.[51] Beyond methodological concerns, there are other reasons to question predictions. Most of the companies making these forecasts also advise companies on offshoring (including many of the companies we interviewed), creating a conflict of interest. Indeed, in a time of revenue declines for the consulting industry, some companies report that research and advice on offshore outsourcing of both IT and business processes is their only growth area. Thus, the offshore imperative may be a function more of the bottom line of strategy companies than for U.S. firms as a whole.

Few academic studies have tried to gauge the extent of offshoring. Bardhan & Kroll (2003) estimate the potential extent of offshoring by totaling jobs in occupations at risk for outsourcing because they do not require face-to-face contact or social networking, their work process is information-based and telecommutable, and there are high wage differentials and low setup barriers in other countries.[52] In all, they suggest that 11 percent (14 million) of U.S. jobs are at-risk, including clerical, computer and math, and business, financial, legal, and medical support professions.

For several reasons, this estimate is undoubtedly high. Companies continue to keep their IT labor in the U.S. because of increasing productivity, the process of agglomeration, tacit knowledge, and most obviously, the geographic fixity of certain types of tasks, such as hardware repair and even networking, and industries, such as hospitals.[53] Only some computer professional jobs are routine enough to eliminate the need for face-to-face work; computer support specialists continue to perform most work on-site; and IT workers are distributed across sectors and firms in a way that often makes it cost ineffective to outsource. IT thus differs from manufacturing in that it may not necessarily seek the least-cost location. Moreover, productivity, agglomeration, tacit knowledge, and geographic fixity vary across regions. Thus, vulnerability to offshore outsourcing varies as well, as the analysis of employment change among U.S. regions in the next section begins to clarify.

The future of offshore outsourcing.

Clearly IT has quickened the pace of global labor shifts. As one institutional CIO told us, pointing to the slogan on his wall, "You don't have to change, survival is not mandatory." In the past, companies have survived by seeking low-cost labor abroad. Now, firms are engaging in "transformational outsourcing," whereby offshoring is part of a larger process of restructuring firm organization to innovate how things are done, increasing productivity and improving delivery while still holding down costs. What some call "best-shoring" is part of this transformation: for instance, IBM expanded overseas by 3,000 jobs last year, while creating 4,500 jobs within the U.S.

Yet is offshoring an "unstoppable megatrend" like the 50-year shift of manufacturing to Japan and other Asian countries, as some experts proclaim?[54] More research will be necessary to determine which companies, in which regions, continue to compete mostly on cost, and thus can take advantage of offshore outsourcing. But this study's employer interviews suggest that offshore outsourcing of IT jobs may be instead a mini-trend. Although many companies continue to investigate offshoring routine jobs that are outside their core competencies, some are finding that IT support may actually be core to how the company operates. Most of the firms interviewed had already decided whether or not to pursue offshore outsourcing, suggesting that the trend has already peaked in high-tech regions. In general, only the IT and IT services companies interviewed were still seeking to increase their offshore presence. Many companies described obstacles to offshoring, including conflicts with their business model (for instance, the informal company culture and emphasis on face-to-face interaction); labor problems (such as rising turnover and lack of managerial capacity); and logistical problems (including poor infrastructure and bureaucratic red tape). Appendix B to this report describes these obstacles in more detail.

Considering the resilience of the U.S. economy and the multiple obstacles to offshoring, many argue that in any case the trend is too minor to interfere with the long-term growth of IT in the U.S. Most economists agree that some, and perhaps all, offshore outsourcing is good for the U.S. economy.[55] By offshoring more routine jobs, firm productivity increases and companies can hire more U.S. workers. At least in theory, U.S. workers freed from system maintenance and programming can focus on company core competencies and most importantly, innovation. In any case, with economic forecasts projecting labor shortages beginning as soon as this year due to the retirement of the baby boomers, the recession-fueled debate over the shift of jobs may soon be moot.[56]

The more important question is what the future IT jobs will look like. The more "offshore-proof" jobs will clearly be those that involve a close relationship with the business and require close customer contact, such as systems and network analyst positions. But HR representatives at the firms interviewed see several current growth areas likely to expand even further. In demand are both project management skills and core engineering skills. The demand for business analysis skills stems from the unique U.S. business model. While in other parts of the world product sales and engineering are kept entirely separate, the U.S. high-tech sector has an integrated workforce model, or "vertical expertise"—tacit knowledge about business strategy permeates the entire firm, from the CEO to engineering technicians. In contrast, the need for engineering skills comes from the biggest problems that face the U.S. in coming years. As we increasingly confront issues of power, water, health care, and biotechnology, the most valuable IT workers will be trained in these substantive areas in addition to IT.

This section explored how the rise of outsourcing and offshore outsourcing shapes location, particularly for entry-level jobs. Because there is little reliable data on which jobs have gone where, it is difficult to predict the future. However, interviews suggest that the extent of job shifts will depend on firm-specific factors, such as the value the company places on business culture, the maturity of firms (and the resultant growth of non-core competencies that can be outsourced), and the ability to commodify IT support. Moreover, it is the large IT firms and IT service providers—i.e., the firms with concentrations of similar IT occupations—that are most likely to shift large numbers of jobs offshore, a trend that could disproportionately impact certain regions given the concentrations of the big outsourcers in certain high-tech metros. The next section examines in more detail the role of occupational structure and other factors in recent IT employment shifts.

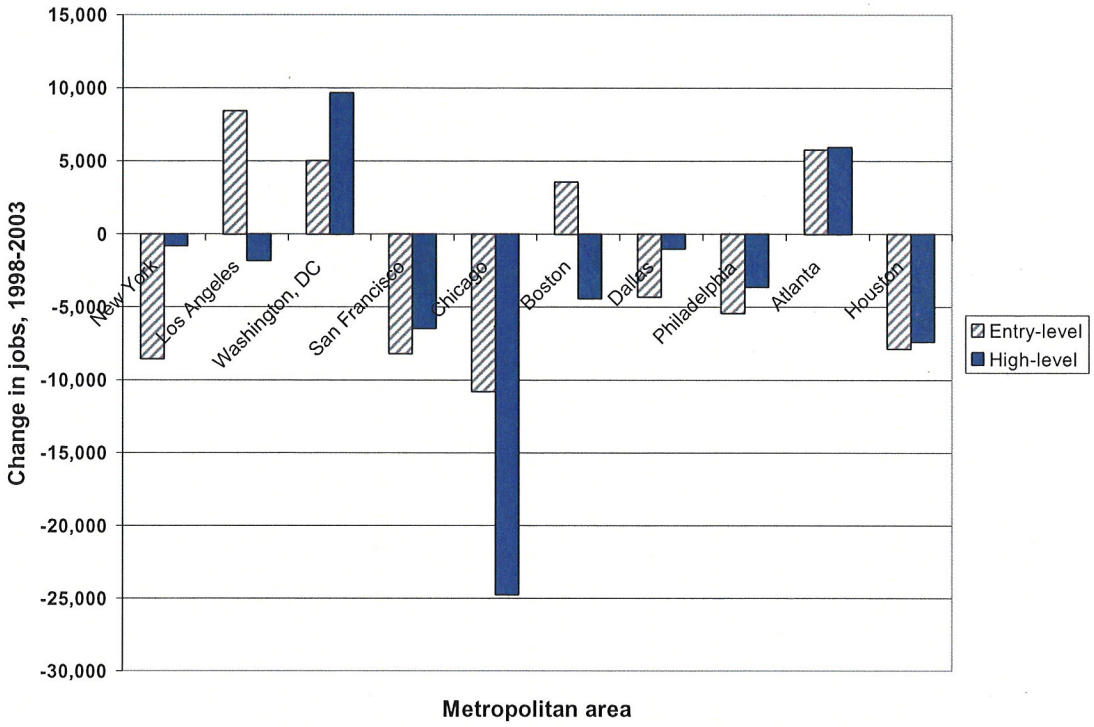
The Changing Geography of the IT Workforce

Although high-tech metros such as the San Francisco Bay Area were hit particularly hard by the dot-com crash, the recovery has been uneven, with some metros like San Francisco and Chicago losing large numbers of both entry- and high-level IT jobs, while others like Washington, DC, and Atlanta actually gained both (Figure 2.4). We look here at the change in IT jobs from 1998 to 2003 in order to investigate trends beyond the bubble.[†]

One way of assessing overall patterns of IT job growth and loss is to analyze changes by region. Table 2.4 shows change for metropolitan

[†] During this time period, the Occupational Employment Statistics (OES) program at the Bureau of Labor Statistics switched from OES codes to Standard Occupational Classification codes, affecting about half of IT occupations. To deal with this issue, the analysis used the OES-SOC crosswalk.

Figure 2.2. Change in IT Jobs by Level, Top Ten High-Tech Metros, 1998–2003



Source: U.S. Bureau of Labor Statistics, Occupational Employment Survey. Calculations by the author.

Table 2.4. Total IT Job Change by Region and Average Change by Metropolitan Area

REGION (Census Division)	TOTAL IT JOBS, 2003		CHANGE IN IT JOBS, 1998–2003		CHANGE IN IT JOBS PER MSA, 1998–2003			
					ENTRY-LEVEL (Maintainer)		HIGH-LEVEL (Creator)	
	Entry-level	High-level	Entry-level	High-level	Mean	Sig	Mean	Sig
Pacific	202,890	348,610	3,360	27,280	84		682	**
Mountain	70,850	99,020	-3,550	-21,820	-142		-873	
West South Central	100,970	156,700	-12,600	4,310	-286		98	
East South Central	37,560	48,740	-240	-820	-10		-36	
South Atlantic	209,450	376,690	12,550	3,610	220	**	63	
West North Central	71,140	102,990	2,090	-6,550	80		-252	
East North Central	137,660	217,840	-40,060	-50,930	-715	***	-909	**
Middle Atlantic	138,230	256,920	-15,180	-5,770	-434		-165	
New England	66,670	116,130	3,770	-6,700	151		-268	
Total	1,035,420	1,723,640	-49,860	-57,390	-151		-173	

Source: U.S. Bureau of Labor Statistics, Occupational Employment Survey, 1998 & 2003. Calculations by the author. *** : $p < .01$, **: $p < .05$, *: $p < .10$.

statistical areas (MSAs) in the nine regions (census divisions) used by the U.S. Bureau of the Census.[57] The regions that have sustained the largest losses are the East North Central region (from Wisconsin to Ohio, with Chicago losing the most jobs), the Middle Atlantic region (New York, New Jersey, and Pennsylvania), and the Mountain region, which has lost mostly high-level jobs. The Pacific region, including the entire West Coast, and the South Atlantic region, from Maryland to Florida, have rebounded, with rapid growth in high-level jobs. Specific MSAs within the region lost an average of 151 entry-level and 173 high-level jobs each, but the changes vary widely, with significant losses in the East North Central MSAs and significant gains in Pacific and South Atlantic MSAs.

What might explain the variation in IT job change among metropolitan areas? In theory, regions that experience agglomeration economies should be less likely to shed jobs than those without because economies mean more output at lower cost (higher productivity). Agglomeration economies might consist of urbanization economies, the reduction in production cost from locating in a concentrated urban area (as measured by city size and/or density), or localization economies, the cost reduction resulting from the concentration of similar activities (as measured by concentration of an industry and/or occupation). So despite their productivity, these metros might also be more prone to job loss because they have more jobs to lose.

Both size of metropolitan region employment base and metropolitan employment density (defined as jobs per square mile) serve as proxies for urbanization economies. As shown in Table 2.5, the absolute change in both entry- and high-level IT jobs is negatively (and significantly) correlated with urbanization economies, probably because the larger regions had more jobs to lose. To measure localization economies, we look specifically at the concentration of IT occupations, both the percentage of all IT jobs that are at the entry-level and the high-level, and the percentage of coterminant employment, or the percentage of IT occupations that are in a single industry, rather than distributed across industries.[58] These variables are generally (but not significantly) negatively correlated with IT job change.

Table 2.5. Correlation Between Entry- and High-Level IT Job Change from 1998–2003 and Selected Variables

VARIABLE	CHANGE IN ENTRY-LEVEL IT JOBS, 1998–2003		CHANGE IN HIGH-LEVEL IT JOBS, 1998–2003	
	Correlation	Sig	Correlation	Sig
MSA employment density, 1998	-0.09	*	-0.10	*
MSA employment, 1998	-0.18	***	-0.23	***
% in coterminant employment	-0.03		-0.08	
% of IT jobs that are entry-level, 1998	-0.07		---	
% of IT jobs that are high-level, 1998	---		-0.14	***
% of entry-level IT workers who came from same metro in 1995	-0.12	*	---	
% of high-level IT workers who came from same metro in 1995	---		-0.01	
Small (20 emps or less) firms' % of total payroll, 2001	0.05		0.03	
Sales per information technology employee, 1997	-0.12		-0.07	
East North Central region	-0.17	***	-0.12	**
East South Central region	0.03		0.01	
Mid Atlantic region	-0.07		0.00	
Mountain region	0.00		-0.08	
New England region	0.06		-0.01	
Pacific region	0.06		0.12	**
South Atlantic region	0.11	**	0.04	
West North Central region	0.05		-0.01	
West South Central region	-0.04		0.04	

Sources: U.S. Bureau of Labor Statistics, Occupational Employment Survey, 1998 & 2003; U.S. Bureau of Labor Statistics, National Staffing Patterns Matrix, 1998; U.S. Bureau of the Census, 5% Public Use Microdata Sample, 2000; U.S. Small Business Administration, Statistics of U.S. Businesses, 2001; U.S. Bureau of the Census, Economic Census, 1997. Calculations by the author. *** : $p < .01$, **: $p < .05$, *: $p < .10$.

Another factor that might be related to job loss is productivity. For instance, increases in productivity might cause firms to lay off workers. One way of measuring this is sales per information technology worker, which is indeed negatively (but not significantly) correlated with job change (i.e., higher sales per worker is associated with declining jobs). Table 2.6 demonstrates significant differences in sales per IT worker among U.S. regions, with the Pacific and New England regions experiencing significantly higher sales per worker than the U.S. average, while the West North Central region (comprising the Plains states) has significantly lower sales.

Table 2.6. Sales per IT Worker in US Regions, 1997

REGION	SALES PER IT WORKER, 1997		
	Mean	Number	Sig.
Pacific	$1,022	22	*
Mountain	$911	12	
West South Central	$891	15	
East South Central	$817	9	
South Atlantic	$890	29	
West North Central	$695	7	**
East North Central	$831	22	
Middle Atlantic	$895	18	
New England	$1,115	16	**
All regions	$914	150	

Source: U.S. Bureau of the Census, Economic Census, 1997.
Calculations by the author.

Firm structure may also be important: regions with a higher percentage of payroll devoted to small firms might be more vulnerable to economic downturns—or, conversely, might have fewer IT workers to lay off, since larger firms are more likely to have IT divisions. In fact, Table 2.5 suggests the latter, since the percentage of small firm payroll is positively correlated with change in jobs.

In-migration of workers may also matter. Regions that have to import large shares of workers may be either more likely to lay them off if such workers are considered temporary, or less likely to lay them off if firms are dependent on particular skills in imported workers. Table 2.5 indicates that the latter is true, since the percentage of IT workers that are long-term residents of a region is associated with job loss, not gain. Table 2.7 presents a more detailed picture, showing that all regions are more likely to draw from a local workforce for entry-level IT jobs, but regions such as New England, Mountain, and Pacific are relying disproportionately on an imported workforce for both entry- and high-level jobs.

Finally, region is likely to be important, since some regions are associated with job gains and others with losses. Table 2.5 confirms that the East North Central region is negatively correlated with IT jobs, while the Pacific and South Atlantic regions are positively associated.

Table 2.7. Origin of IT Workers in 2000 by Region

REGION (census division)	RESIDENCE IN 1995					
	ENTRY-LEVEL IT WORKERS			HIGH-LEVEL IT WORKERS		
	Same Metro	Different Metro	Abroad	Same Metro	Different Metro	Abroad
New England	49.7%	42.5%	7.8%	44.9%	40.9%	14.2%
Middle Atlantic	64.8%	28.9%	6.3%	52.4%	32.3%	15.4%
East North Central	68.0%	27.6%	4.4%	60.0%	28.7%	11.3%
West North Central	65.6%	30.0%	4.4%	60.9%	29.4%	9.7%
South Atlantic	58.7%	35.4%	5.9%	51.9%	36.8%	11.3%
East South Central	59.8%	35.6%	4.7%	54.5%	36.7%	8.8%
West South Central	60.2%	34.0%	5.9%	50.4%	39.4%	10.2%
Mountain	50.5%	43.5%	6.0%	42.4%	46.5%	11.2%
Pacific	60.9%	32.9%	6.2%	47.6%	36.6%	15.8%
All regions	60.9%	33.4%	5.7%	51.7%	35.5%	12.8%

Source: U.S. Bureau of the Census, 5% Public Use Microdata Sample, 2000.
Calculations by the author.

A regression analysis was performed to determine which of these factors helps to explain the change in jobs for metropolitan areas. To avoid any bias from the high correlation between number of jobs lost and metropolitan employment, the analysis explained the percent change, rather than the absolute change, in entry-level and high-level IT jobs. Likewise, it excludes MSAs with fewer than 2,500 jobs, which have very different job loss dynamics than the larger metros.

As Table 2.8 shows, the two factors that matter most in explaining percentage change in IT jobs are both related to localization economies: the percentage of all IT jobs that are at the entry- or high-level and the coterminance factor, or the percentage of IT occupations that are in a single industry. The coefficients for percent of jobs at the entry-level and for percent of jobs at the high-level are negative. In other words, metros with localization economies in terms of an occupational structure dominated by entry-level jobs were likely to shed a relatively higher percentage of entry-level jobs during this period, and the same phenomenon occurs for high-level jobs.

However, the other localization economy, the concentration of IT jobs in one industry, has the opposite effect for entry-level jobs. Metros with a relatively large share of their IT occupations concentrated in just one industry (such as IT) are likely to add entry-level IT jobs. This suggests that there could be an agglomeration economy effect at work

Table 2.8. Explaining 1998–2003 IT Job Change (Entry-Level and High-Level) in MSAs

PERCENT CHANGE IN ENTRY-LEVEL (MAINTAINER) JOBS, 1998–2003	Beta	t	Sig.
MSA employment, 1998	-0.18	-2.054	**
Employment density, 1998	-0.06	-0.68	
% in coterminant employment	0.39	4.05	***
% entry-level (maintainer) jobs, 1998	-0.78	-7.99	***
% of entry-level IT workers who came from same metro in 1995	0.12	1.86	*
Small (20 emps or less) firms' % of total payroll	0.03	0.48	
Pacific region	0.06	0.83	
South Atlantic region	0.02	0.33	
East North Central region	-0.15	-2.37	**
Mid Atlantic region	-0.12	-1.85	*
Constant		0.79	
	Adjusted R^2 = .260		

PERCENT CHANGE IN HIGH-LEVEL (CREATOR) JOBS, 1998–2003	Beta	t	Sig.
MSA employment, 1998	0.05	0.48	
Employment density, 1998	-0.02	-0.21	
% in coterminant employment	0.03	0.26	
% high-level (creator) jobs, 1998	-0.32	-3.03	***
% of high-level IT workers who came from same metro in 1995	-0.04	-0.64	
Small (20 emps or less) firms' % of total payroll	-0.18	-2.48	**
Pacific region	0.14	1.97	**
South Atlantic region	0.13	1.84	*
East North Central region	-0.12	-1.73	*
Mid Atlantic region	0.00	0.06	
Constant		1.86	
	Adjusted R^2 = .113		

*** : $p < .01$, **: $p < .05$, *: $p < .10$

making it advantageous to keep jobs local. However, this effect does not occur for high-level jobs, where the coterminance factor is insignificant.

Several other factors matter as well for change in entry-level IT jobs. The larger the metro, the more likely it is to lose jobs, and the more stable its workforce (the higher the percentage of the workforce that already resided in the area five years ago), the less likely it is to lose jobs. Thus, large cities that attract in-migrants to the entry-level IT workforce are also most vulnerable. Finally, region matters. In particular, location in the East North Central or Mid Atlantic regions helps to explain loss of entry-level IT jobs; location in the East North Central region also helps

explain loss of high-level IT jobs; and location in the South Atlantic and Pacific regions helps to explain gain of high-level jobs. For high-level IT jobs, firm structure is also important—with a higher percentage of payroll devoted to small firms, metros lost a relatively higher share of their high-level jobs.[59]

This analysis does not entirely explain recent changes in IT employment, but it suggests several factors that may be important. First, metros with a less balanced occupational structure—i.e., a relatively high percentage of entry- or high-level jobs—are more likely to lose jobs. Second, entry-level jobs in large metros are particularly at risk. Third, the distribution of occupations is important. The less vulnerable metros are those that, due to specialization in IT, concentrate their IT occupations in certain sectors, such as the IT sector, rather than dispersing them across sectors (such as finance, insurance, education, health care, etc.). Fourth, region matters. Should patterns from before the bust continue—and there is little reason to expect change, at least in the short-term—metros in the Pacific and South Atlantic region can expect continued IT job growth, while those in the East North Central and Middle Atlantic regions have cause for concern. Most importantly, despite job losses at the national level, entry-level IT work is not in decline across all regions; the growth of entry-level occupations will continue, particularly in regions with diverse economies and a scarcity of entry-level occupations.

The context of regional occupational and industrial structure shapes the job losses that occur through the changes in the business cycle, improvements in productivity, and globalization. Ultimately, job loss will depend not just on these regional contextual factors but also on the growth markets for offshore outsourcing. This analysis has shown that regions with concentrations of entry- or high-level IT workers are more likely to suffer job losses, and large IT service providers are most likely to expand offshore outsourcing (as suggested in interviews). Future research should build upon this by developing reliable proxies for offshore outsourcing, in order to identify the regions most at risk.

Intra-Metropolitan Location Patterns

The recent changes in entry-level IT employment, including layoffs and outsourcing, have had implications for the location of entry-level jobs not just between but also within regions. In the 1990s, the trend was to separate IT functions, often relocating operations and support personnel to branch locations in the suburbs or peripheral regions. Now, some firms are returning these functions in-house and recentralizing some entry-level employment in high-tech regions. This section examines this pattern in more detail.

In general, entry-level IT jobs follow metropolitan area employment patterns. Since entry-level jobs are dispersed among economic sectors—e.g., almost all types of businesses need help desk workers—they tend not to cluster as do more advanced IT jobs in IT sectors. However, they do concentrate in both urban and suburban job centers. Figures 2.3 and 2.4 show entry-level IT employment patterns in early 2001 (the most recent year for which zip code level data are available) for the San Francisco Bay Area and the New York metropolitan area. The highest concentrations are in the central cities, with subcentering in the metropolitan periphery in locations like Pleasanton and San Rafael in the Bay Area and Stamford and Edison in the New York region.

In contrast to the location patterns of jobs at the peak of the last economic cycle, more recent hiring is taking place primarily in the most central areas of the metropolitan region. Figures 2.5 and 2.6 show the location of entry-level IT job openings posted on Monster.com for an eight-month period (June 2002–February 2003). In this period of very slow employment growth, almost all of the jobs available are in the metropolitan core or subcenters.

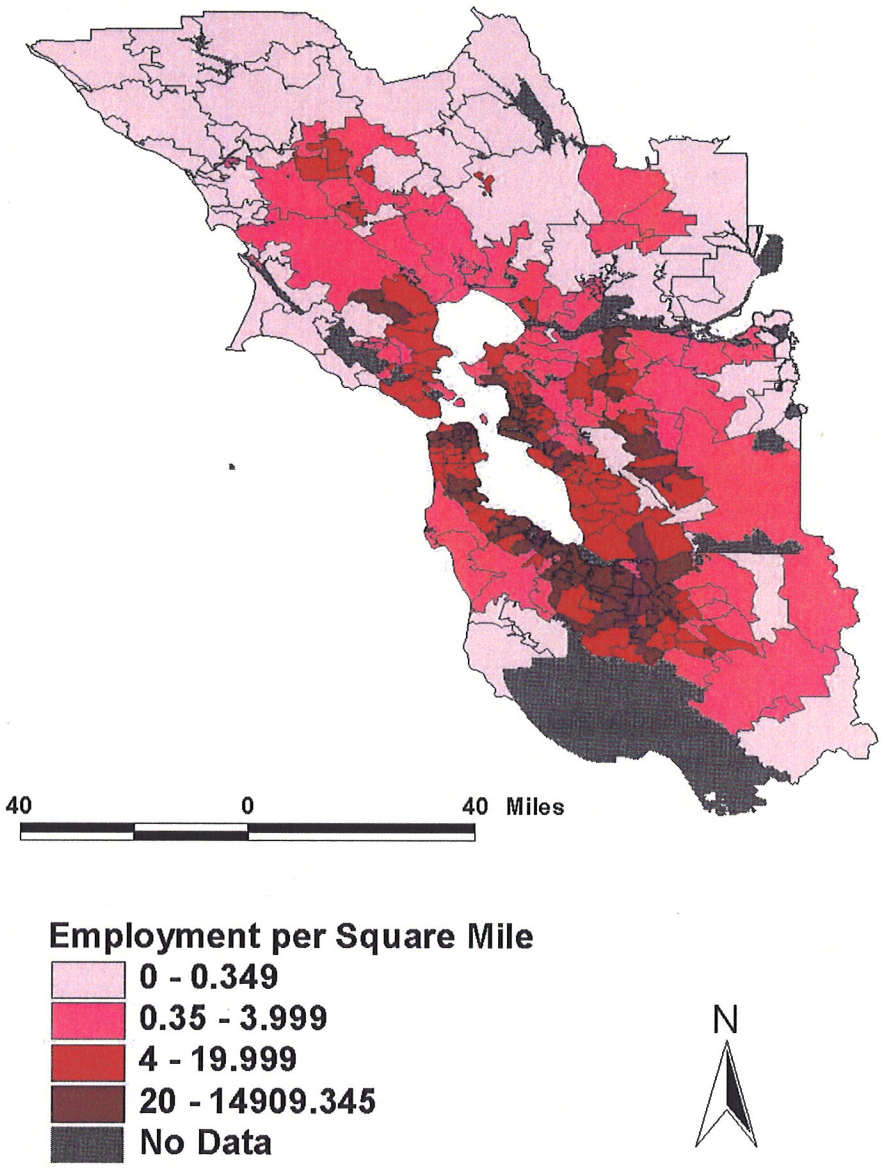
The current trend toward centralization is confirmed by our interviews. The following examines the new pressures to centralize and consolidate IT services and support functions, as well as the reasons some firms continue to decentralize operations.

The new centralization.

Surprisingly, the companies interviewed are mostly consolidating their IT support functions, including data centers, call centers, and desktop support. By a two-to-one margin, companies from a wide variety of sectors are choosing to centralize. Facilitating this trend is new technology that gives companies the ability to perform more support functions remotely. Interviews also revealed three major rationales for locating IT support and operations centrally: cost savings, efficiency, and plans to transform IT divisions into revenue generators.

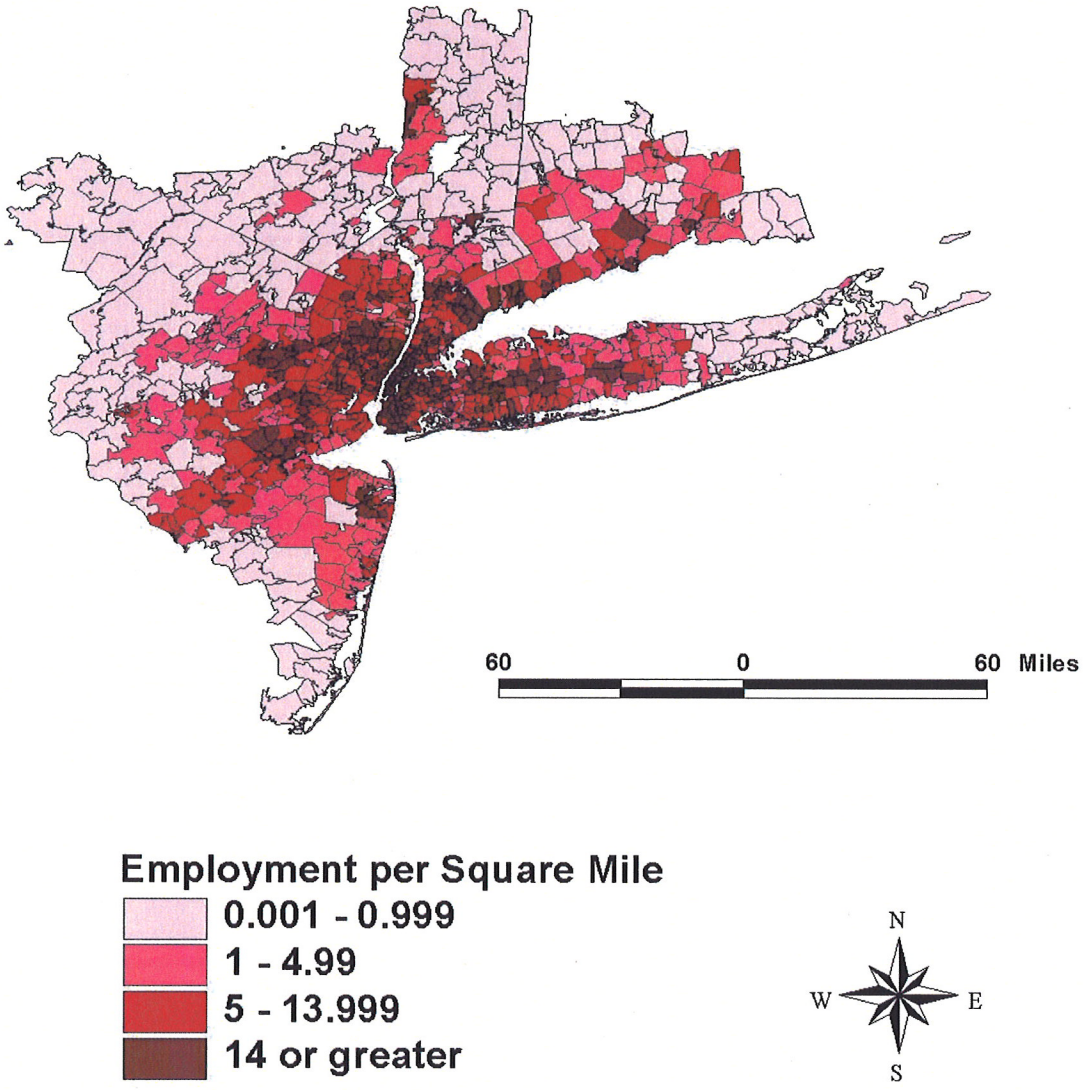
Although most companies continue to locate customer-related support functions in low-cost regions, pressures of cost containment have led some companies to recentralize support at company headquarters; in the process, they have eliminated duplication of effort. Some consolidation has also resulted from the wave of mergers and acquisitions in the late 1990s, which created redundancy in IT support for many.

Figure 2.3. Entry-Level IT Jobs by Zip Code in the San Francisco Bay Area, 2001



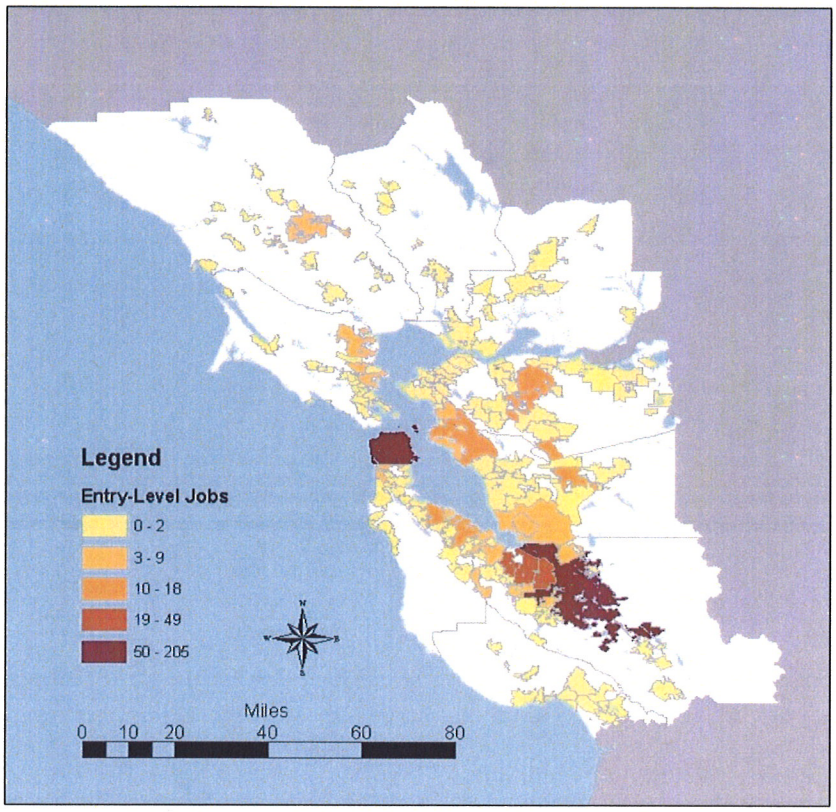
Source: U.S. Bureau of Labor Statistics Occupational Employment Survey, 1998; Dun & Bradstreet Market Indicators, 2001. Calculations by the author.

Figure 2.4. Entry-Level IT Jobs by Zip Code in the New York Metropolitan Area, 2001



Source: U.S. Bureau of Labor Statistics Occupational Employment Survey, 1998; Dun & Bradstreet Market Indicators, 2001. Calculations by the author.

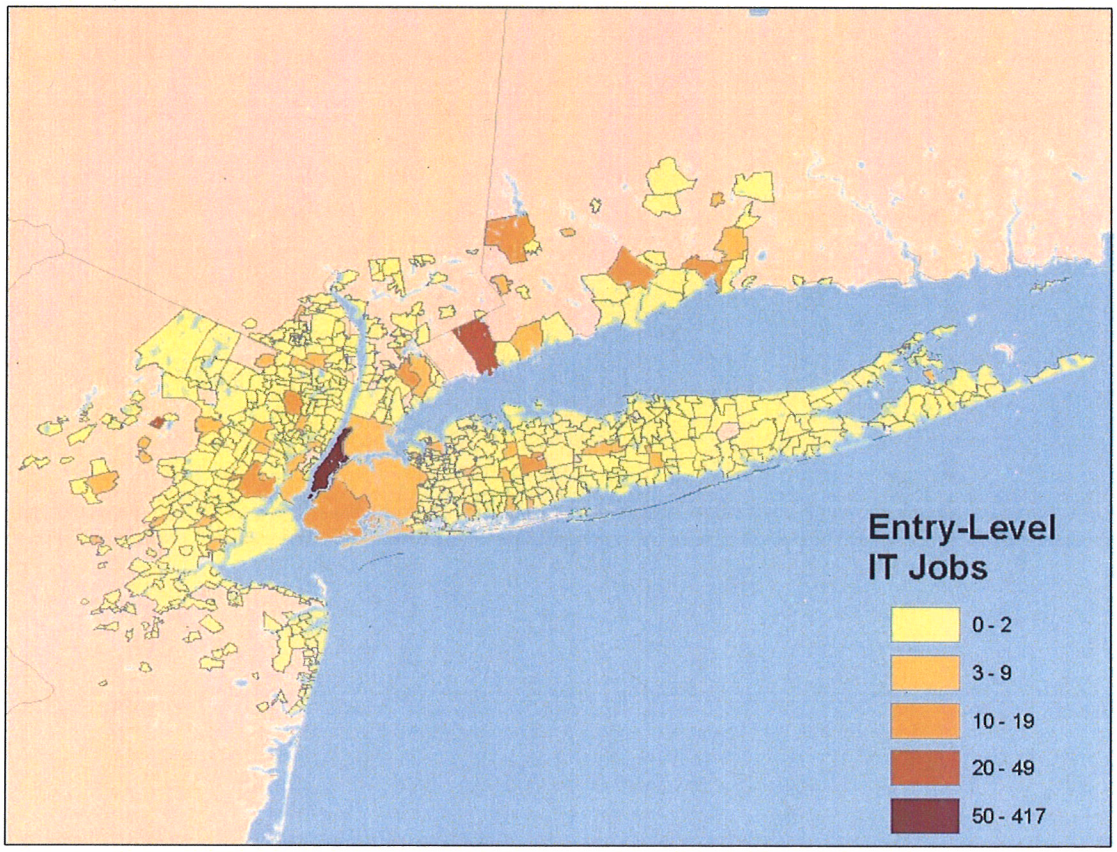
Figure 2.5. Entry-Level Job Openings Posted on Monster.com for the San Francisco Bay Area, June 2002–February 2003



Bringing support in-house also allows companies to integrate the system side into the decision-making process, which speeds implementation (called by some the "parenting advantage"). One IT sector CEO wanted the core group of decision-makers all in one locale because, as he put it, "I want one butt to kick, instead of needing to talk to 20 guys." Face-to-face communication helps companies become more dynamic. "Collaboration over distance in terms of technology hinders spontaneity… Interaction is very subtle. You can't just communicate through email. Distance breeds a little bit of animosity."

Integration is particularly important to forward-looking companies trying to change the nature of their IT divisions from cost centers to revenue generators. Companies looking to generate value-added IT services—i.e., trying to use IT to make their internal operations more

Figure 2.6. Entry-Level Job Openings Posted on Monster.com for the New York Metropolitan Area, June 2002–February 2003



efficient—try to create and reinforce a business mindset by locating support functions adjacent to corporate decision-making. Although not all businesses are so focused on productivity through a more integrated model, it is an emerging trend that seems to be stemming some job loss in more central areas.

Continued decentralization.

A small number of the companies interviewed are continuing to decentralize their IT support functions to low-cost locations. Some move across the country. As a FIRE company told us, "We are pretty much virtual so it doesn't matter where [the IT workers] are located." But most of the Bay Area companies favoring decentralization were staying within northern California.

Most companies give labor-related reasons for decentralizing. A number of firms, including IT companies and local manufacturers and retailers, have shifted call center and desktop support to Sacramento, citing the lower cost of living, the labor pool, and the reduced seismic danger. One FIRE company with a downtown headquarters but a decentralized call center was explicit about workforce concerns: "They didn't want to work, they had no loyalty, and they whined all the time. Just look out on the street [gesturing at downtown]. That's the kind of people." Within the Bay Area, companies continue to move to suburbs like Walnut Creek and Pleasanton in order to be nearer to their workforces; however, companies seeking more specialized workers continue to locate in more central areas.

Decentralization can also be related to business concerns. For instance, one communications company told us that their many suburban locations reflected company values: "One of our ideals is to be like the community we serve."

Long-term trends.

Over the long term, the trend toward centralization may diminish; some companies foresee a dramatic change in the use of office space with the implementation of more flexible work systems. One IT services company calls itself "the computerless computer company," as it is shifting to a system of desk-sharing in its central offices. For the customer-facing positions in IT sales and services, there are seven workers per desk in their downtown office buildings. Similarly, one of its competitors has a system of satellite offices, allowing its workers to check in at convenient decentralized locations rather than Silicon Valley headquarters. Many companies are implementing telecommuting strategies, in part because of quality of life concerns. However, location trends are hard to predict, as IT changes so rapidly. As one telecommunications company told us, "There's no way we'll be here in five years"—meaning both the company and its downtown Newark location. The one certainty in IT is uncertainty.

As discussed previously, many companies are actively increasing their offshore presence. How will this affect intra-metropolitan location patterns? According to our interviews, most firms that are moving work offshore tend to have large shares of entry-level employment and locate in suburban areas. Overall, half of the suburban firms interviewed said they were increasing their offshore employment, but just one-third of the firms located in central city areas. Similar findings are suggested by Bardhan &

Kroll, who project particularly high office vacancy rates in suburban job centers due to the offshoring of employment.[60]

Conclusion: The Future of IT in the U.S.

This chapter has shown that despite the bubble, there are still new opportunities for both entry- and high-level IT work. Entry-level IT occupations have come of age and are unlikely to expand as rapidly in the future as they did in the 1990s—in fact, the Bureau of Labor Statistics predicts that the economy will add 39,000 entry-level IT jobs every year until 2012 (for a total of 64,000 jobs per year including job openings). These occupations continue to evolve as technological improvements contribute to the downskilling of occupations and create new demand. Where yesterday's computer support specialist repaired IBM 486s, today's installs home computer networks for the cable company. Since acquiring a job in technology is one key to upward mobility, the availability of entry-level IT occupations is one key to countering trends in income inequality.

However, IT job growth varies by metropolitan region. Certain regions appear to be vulnerable to job loss, while others are poised to gain more employment. Metropolitan areas that are particularly vulnerable to entry-level IT job loss include those with disproportionate concentrations of entry-level jobs. In addition, regional business culture matters, particularly how much a firm integrates IT into its business model. For some companies, entry-level IT jobs cannot be commodified, because customer contact is so important. As one manufacturer/retailer told us, "When support is used as a real competitive edge, it's important to maintain personal, human contact."

Although it is impossible to predict the future patterns of IT job loss and gain, it seems that metros in the East North Central and Mid Atlantic regions may be more at-risk. For instance, places that meet these criteria include Flint, Michigan; and Atlantic City–Cape May, New Jersey. Other more high-tech regions, such as Seattle, Boston, and Washington, DC, may also be particularly vulnerable. Other regions hard-hit by the recession may be spared additional losses because of their occupational structure. For instance, the relative scarcity of entry-level jobs in the San Francisco Bay Area means that there are few such jobs to offshore (although high-level jobs are at risk). Thus, it will be important for

workforce intermediaries in these regions to continue to help workers enter IT, as discussed in the next chapter.

CHAPTER 3

Connecting to Work: The Role of Training Provider Intermediaries in the IT Workforce

In an era of uncertainty about the labor market, labor market intermediaries, particularly training providers, are emerging to help smooth the transition into the workforce. Uncertainty stems from multiple causes related mostly to changes in labor market institutions and technology. What might be called the deinstitutionalization (or reinstitutionalization) of the labor market includes the rise of contingent (part-time, temporary, and contract) work and the various forms of deregulation (a declining minimum wage, massive deunionization, and deregulation of industries).[61] Add to this the rapid changes in information technology that alter the skill requirements for jobs and the widespread failure of urban public schools, and the need arises for short-term training programs that can both respond to employer skill needs and connect graduates with jobs. With over one million entry-level IT jobs currently in the U.S and predicted growth of over five percent per year, employers cannot fill all the new positions with workers from four-year colleges or abroad.

How effective are these training intermediaries? Research tells us that in order for training to be effective, it must respond to employer demand. Training must occur in a context of labor demand, focus on needed skills, and utilize connections to employers for placement.[62] This chapter looks at how IT training providers are performing in four contrasting high-tech regions—New York, San Francisco, Chicago, and Washington, DC. Based on surveys and interviews of training providers, jobseekers, and firms (see Chapter I and Appendix A for a description of the methodology), it looks at how well providers are meeting labor demand, connecting graduates to employers, and filling the new skill requirements.

The implementation of the Workforce Investment Act of 1998 (WIA) has presented an opportunity to develop a network of training provider intermediaries. These training providers constitute the "second-chance" system of employment and training that mostly serves students for whom public education has failed and college education is out of reach.[63] The type of institution conducting job training in IT ranges from large four-year colleges to tiny community-based organizations (CBOs), but in many regions, proprietary trade schools dominate the landscape of training and thus have received the bulk of the funding.[64] WIA offers vouchers (individual training accounts), so that participants can choose the

appropriate training program, a system that in theory should help direct students to the most effective programs. In addition, it requires that training providers meet high performance standards for their graduates such as high job placement rates and improved earnings. Thus, the training providers in the survey, all of which participate in WIA, will hopefully meet these new standards of demand responsiveness.

This chapter looks first at the context for the rise of training providers: the need for labor market intermediaries in IT, the evolution of workforce development programs, and the responsiveness of WIA to labor demand. Then, after describing the landscape of IT training providers and the study methods, it describes the two main mechanisms through which providers show their responsiveness to employers: their relationships with employers and their ability to prepare graduates for jobs. How well training providers respond to the labor market and assist jobseekers depends mostly on their institutional type—whether they are private, nonprofit, or public—rather than their size or location. Compared with the private providers who comprise most of the second-chance system, nonprofit and public providers are generally better connected, more locally based, and better able to serve the disadvantaged. This, in turn, has implications for WIA, which does not necessarily direct funding to the most effective or responsive training providers.

Context

IT and the Role of Labor Market Intermediaries

A variety of labor market intermediaries broker relationships between workers and employers in this time of rapidly changing skill requirements. Institutions at work include organizations rooted in the for-profit sector (e.g., temporary agencies, for-profit training providers, contractor brokers, professional employer organizations, job search websites), membership-based institutions (e.g., union-based initiatives and membership-based employee associations), and public sector intermediaries (e.g., traditional workforce development organizations, education-based initiatives, and nonprofit efforts).[65]

Labor market intermediaries focused on education arise in response to the "skill-training life cycle."[66] At first, skill training occurs on the job or in special training sessions provided by the producer (e.g., training in networking by Novell). In this initial phase, skill needs are met by "job enlarging," or increasing the job duties of relatively high-level employees. Over time, as more firms adopt the technology, these new skills evolve from firm-specific to general, and are more readily transferable to other companies. Employee turnover increases as a

marketplace for the skills emerges. At this stage, employers can find qualified employees by recruiting from other firms. Firms increasingly expect training to be provided by specialized external programs, funded by government or by the employees themselves. The case of data processing, which emerged in the 1960s and 1970s, is illustrative. Employers initially hired four-year college graduates with some computer training. As training programs in the field developed, they turned to community colleges and proprietary vocational schools to fill the gap.[67]

Is this a new phenomenon in the new economy? The evidence is conflicting. The need for flexibility and skills arguably makes labor market intermediaries more important; intermediaries can provide certainty, deal with high search costs and risks, and tailor skill development to employer needs.[68]

Yet, the evidence that there is a connection between the new economy and intermediaries is mixed at best. For instance, a recent study comparing the use of intermediaries across "old" and "new" economies finds that old economy jobseekers (in Milwaukee) are more likely to use intermediaries than are new economy jobseekers (in Silicon Valley).[69] Overall, though over a quarter of their sample used intermediaries to find jobs, the majority of these used temp agencies rather than community colleges, nonprofits and government agencies, professional associations, and unions. (It should be noted that their study does not classify four-year colleges and proprietary trade schools as intermediaries.) In other words, despite the increasing emphasis on skills, the average worker is not using a training provider intermediary to find work.

Secondly, the reliance on intermediaries such as temporary agencies seems to be related more to periods of rapid growth in the business cycle than structural change.[70] During the dot-com boom, use of contingent workers actually declined, to just 4 percent of all workers, from a peak of 4.9 percent in 1995.[71]

Finally, the use of education-related intermediaries has actually declined substantially over time, according to the web-based survey of IT workers conducted for this study. Asked how they got their first job in IT, respondents who got their first job between 1970 and 1993 relied mostly on friends and acquaintances (42 percent), schools (24 percent), or the newspaper (19 percent) (Table 3.1). In the internet era (since 1994), web-based searches have largely replaced schools (which have declined to 14 percent) and the social contacts (down to 37 percent). Over time, the use of agencies has stayed relatively constant, at 11 or 12 percent. Overall, just over one-fourth of the sample used intermediaries (agencies and

Table 3.1. Getting the First IT Job: 1970–1993 vs. 1994–2002

HOW GOT FIRST JOB	ALL RESPONDENTS (1970–2002)		ALL RESPONDENTS (1970–1993)		ALL RESPONDENTS (1994+)	
	Number	Percent	Number	Percent	Number	Percent
Contact	101	39%	37	42%	64	37%
Direct application	10	4%	4	4%	6	4%
Agency	31	12%	10	11%	21	12%
School	45	17%	21	24%	24	14%
Newspaper	37	14%	17	19%	20	12%
Web	36	14%	0	0%	36	21%
Total	260	100%	89	100%	171	100%

schools) to get into the workforce during the internet era, comparable to the findings of the Milwaukee/Silicon Valley study.

Though the use of educational intermediaries is not increasing overall, some evidence suggests that training providers are particularly effective in helping disadvantaged jobseekers.[72] For instance, nonwhite, low-income, and less-educated jobseekers are disproportionately likely to use nonprofit or government intermediaries, many of whom provide soft skills or advanced training.[73] From the perspective of employers who wish to tap into nontraditional or disadvantaged labor pools, such intermediaries are valuable because they reduce the employer's risk.[74] Chapter 4 explores in more detail the effectiveness of these nonprofit providers in facilitating the transition to IT jobs.

A More Flexible Workforce Development System for the New Economy?

Paralleling the transformation to an information-based economy over the past thirty years is the shift in governance of the welfare state from the national to the state and local levels. Instead of adhering to federal guidelines, counties now have the authority to design and administer their own programs such as welfare and job training, under the guidance of the state and with funding from federal block grants. This devolution serves several purposes; it is supposed to improve the efficiency of service delivery, provide more accountable and democratic policy and program design, and, eventually, reduce costs.

In the late 1990s, welfare reform (the Personal Responsibility and Work Opportunity Reconciliation Act) and the consolidation of workforce development programs under WIA provided an opportunity to test the

newly devolved mode of governance. In response, states and counties designed a diverse array of programs under the broad framework of incentives and sanctions to make the transition to work more effective. The following explores the evolution of workforce development programs that culminated in the passage of WIA, the responsiveness of WIA to regional labor demand, and the myriad workforce intermediaries that have emerged under WIA.

The evolution of workforce development.

In the 25 years prior to WIA, two programs attempted to consolidate and focus the myriad job training programs run through various agencies. The Comprehensive Employment and Training Act (CETA) of 1973 consolidated a variety of different activities, such as subsidized on-the-job training and public service employment, classroom training, and job placement services, into one program. Although studies showed that the subsidized public service employment component of that program was the most effective approach, the 1982 Job Training Partnership Act (JTPA) shifted the focus to employer needs, with private industry councils directing funding to training providers meeting current skill needs of employers.

Studies of job training funded through these two programs have begun to reach a consensus on what works: a mix of technical and soft skills training, with strong commitment from employers. Historically, public-funded job training programs focusing on developing specific technical skills (e.g., word processing or janitorial skills) have failed to produce significantly positive results, whether measured in terms of job placement, job retention, or earnings.[75] These training programs were slow to respond to the changing occupational composition of industries; they often had out-of-date curricula and trained on obsolete equipment for sectors in decline. Their failure also stemmed from a tunnel vision approach to training, which overlooked the importance of other aspects of job preparation, particularly the soft skills (defined as the "skills, abilities, and traits that pertain to personality, attitude, and behavior rather than to formal or technical knowledge") that help workers find a job and adapt to workplace culture.[76] As a result of this and the apparent success of other soft-skills "work-first" programs, such as the Greater Avenues to Independence program in Riverside County, many programs are increasingly integrating soft skills into technical skills training.[77]

Employer commitment to training is most readily developed in the employer-based training model, which has been shown to provide significant increases in both earnings and employment.[78] Some of the

best-known examples of this, such as the Center for Employment Training in San Jose, emerged largely under JTPA.[79] The employer-based approach emphasizes specific vocational skills training, and may take place either on the job or off-site in training programs. Key factors explaining the success of the model are labor market demand, employer involvement and commitment to hire, and strategic targeting of jobseekers, occupations, and industries. Studies of employer-based training programs have found several results that are potential selling points to the industry, including increased productivity, increased profits, improved employee morale, higher retention of employees, and higher customer satisfaction.

Finally, it should be noted that community colleges actually dominate the landscape of vocational training, enrolling nearly 85% of the full-time students who receive post-secondary education in specific vocations.[80] Yet community colleges have also been critiqued for lack of responsiveness to local labor market conditions, such as changes in occupational composition and the unemployment rate. Overall, only half of community college graduates find jobs related to their training, and this lack of market responsiveness is reflected in the income of graduates. Community college graduates often fail to outpace high school or proprietary school graduates in income. Moreover, community college training often does not confer any earnings benefits on its graduates, in part because students with associate degrees are less likely to end up in employment related to their training than those with training certificates.

WIA and the response to regional labor demand.

These failures led to the enactment of WIA in 1998. WIA replaces JTPA with block grants to states to create a system of one-stop centers that simplifies access to a variety of services; uses vouchers (individual training accounts), so that participants can choose the appropriate training program; and meets high performance standards in terms of job placement rates, earnings, employment retention, skill gains, and credentials earned. WIA provides considerable flexibility in the provision of training services and creates incentives in the form of standards enforceable by sanctions. However, with overall funding for job training declining from $24 billion (in current dollars) in 1978 to $6 billion in 2000, WIA has meant that far fewer jobseekers are receiving job training than under previous programs.[81]

WIA was meant to improve upon previous programs by being more responsive to employer needs. To what extent is funding for job training channeled to occupations in demand in the regional economy? If

the workforce development system is linked to regional economic growth, one might expect to see participants trained for skills in high demand. However, a comparison of the occupations for which WIA trained recipients with employment change in those occupations reveals a substantial mismatch (Tables 3.2 and 3.3). For instance, in the New York metropolitan region, more than 50 percent of WIA training recipients were

Table 3.2. Training Recipients and Employment Change, 2000–2002, New York Metropolitan Area

OCCUPATION CATEGORY	WIA TRAINING RECIPIENTS		EMPLOYMENT CHANGE, 2000–2002
	Num	%	
Office and administrative support occupations	3,348	34.3%	-30540
Computer and mathematical occupations	1,666	17.1%	-3770
Healthcare support occupations	1,481	15.2%	-3340
Transportation and material moving occupations	1,293	13.3%	14430
Installation, maintenance, and repair occupations	257	2.6%	16700
Architecture and engineering occupations	249	2.6%	-9120
Healthcare practitioners and technical occupations	245	2.5%	17420
Personal care and service occupations	191	2.0%	14090
Food preparation and serving related occupations	174	1.8%	12060
Production occupations	146	1.5%	-114760
Business and financial operations occupations	105	1.1%	-28490
Education, training, and library occupations	95	1.0%	27160
Protective service occupations	89	0.9%	-19350
Legal occupations	85	0.9%	2560
Management occupations	83	0.9%	-54840
Sales and related occupations	62	0.6%	-140
Building and grounds cleaning and maintenance occupations	58	0.6%	7890
Construction and extraction occupations	58	0.6%	4300
Arts, design, entertainment, sports, and media occupations	31	0.3%	-7860
Life, physical, and social science occupations	19	0.2%	2670
Community and social services occupations	18	0.2%	7700
Farming, fishing, and forestry occupations	0	0.0%	-40

Source: Workforce Investment Act Standardized Record Data, 2000–2002. (Note: this does not include all recipients trained, since 86% of records were missing data on occupation of training.)

Table 3.3. Training Recipients and Employment Change, 2000–2002, San Francisco Bay Area

OCCUPATION CATEGORY	WIA TRAINING RECIPIENTS		EMPLOYMENT CHANGE, 2000–2002
	Num	%	
Office and administrative support occupations	486	29.9%	-36870
Healthcare support occupations	280	17.3%	8140
Transportation and material moving occupations	194	12.0%	-25320
Building and grounds cleaning and maintenance occupations	129	7.9%	-2040
Computer and mathematical occupations	120	7.4%	-70650
Construction and extraction occupations	105	6.5%	-9720
Healthcare practitioners and technical occupations	60	3.7%	5410
Production occupations	60	3.7%	-72080
Food preparation and serving related occupations	38	2.3%	-27980
Installation, maintenance, and repair occupations	29	1.8%	-15830
Arts, design, entertainment, sports, and media occupations	28	1.7%	1360
Architecture and engineering occupations	23	1.4%	-29340
Personal care and service occupations	22	1.4%	8480
Management occupations	19	1.2%	-26550
Sales and related occupations	11	0.7%	-25310
Business and financial operations occupations	7	0.4%	-6870
Education, training, and library occupations	7	0.4%	6090
Protective service occupations	3	0.2%	-2020
Legal occupations	1	0.1%	-2850
Farming, fishing, and forestry occupations	1	0.1%	1510
Life, physical, and social science occupations	0	0.0%	-7140
Community and social services occupations	0	0.0%	2330

Source: Workforce Investment Act Standardized Record Data, 2000-2002. (Note: this does not include all recipients trained, since 63% of records were missing data on occupation of training.)

trained in office and administrative support or computer and mathematical occupations from 2000 to 2002, while the region lost more than 34,000 jobs in these categories in that period. Substantial growth occurred in education, training, and library occupations, healthcare practitioner and technical occupations, and other specialties, but WIA trained only a small fraction of its recipients for such jobs.

In the San Francisco Bay Area, the story is very similar. WIA trained over 40 percent of its participants in office and administrative support occupations and transportation and material moving occupations, both in decline. However, it also trained recipients in healthcare support

occupations, which experienced considerable demand, and it channeled fewer of its resources to computer-related training, which was in serious decline as in the New York area.

In Silicon Valley, in the first quarter of 2001 alone, $1.9 million, or almost 60 percent of training funds, went to computer training—this, in a year when the state of California lost 30,000 computer jobs, most in the vicinity of this San Jose one-stop! As one local one-stop told us, not only did they fail to see the recession coming, but also customer choice means a system driven by supply, rather than demand: "We're dealing with such a wide variety of clients: Russians, Romanians, Chinese... Half to more of the people will not change their field because in their countries the government would find them jobs."

These discrepancies between job demand and training areas reflect the fact that training monies generally go to just a few schools training in a few occupations. The system is based upon the premise that customer choice will lead to training in demand occupations, but in practice, training is driven by what schools are willing to offer. For instance, despite occupational demand, few offer training as janitors, customer service representatives, teachers' assistants, and child care workers. Yet increasingly, employers look for trained and certified workers in these fields to help deal with issues such as liability. Arguably, many occupations, such as electrical assemblers (an occupation in high demand in Silicon Valley), only require on-the-job training. Yet ideally, a demand-driven system would be flexible enough to fund training (i.e., apprenticeships) by employers.

Another question is the extent to which disadvantaged workers are able to access this training. Although some of the training dollars are given out by formula, much is discretionary for local areas to give out. Overall, 65 percent of training recipients in the New York metropolitan region are low-income, while 63 percent of recipients in the San Francisco Bay Area are (Tables 3.4 and 3.5). In both regions, recipients trained in computer occupations are much less likely to be low-income than those trained in most other occupations; yet, over 50 percent are low-income.

Reflecting the higher educational attainment in the Bay Area, almost 30 percent of trainees have at least some college, while just 25 percent in the New York area have attended any college. These educated trainees are disproportionately concentrated in computer training programs, while more disadvantaged workers are more likely to get training in other occupations. Yet, 55 percent of WIA recipients trained in computer occupations in the New York region and 47 percent in the Bay

Area have just a high school diploma or less, reflecting the new accessibility of IT jobs for less-educated workers.

Table 3.4. Income and Educational Characteristics of 2000–2002 WIA Training Recipients by Occupation, New York Metropolitan Area

OCCUPATIONAL CATEGORY	% LOW-INCOME	HIGH SCHOOL OR LESS, NO DIPLOMA	HIGH SCHOOL DIPLOMA OR GED	SOME COLLEGE, NO DEGREE	BACHELORS DEGREE OR HIGHER
Management occupations	45.8%	9.6%	44.6%	28.9%	16.9%
Business and financial operations occupations	64.8%	5.8%	52.4%	13.6%	28.2%
Computer and mathematical occupations	50.8%	5.9%	49.0%	17.4%	27.7%
Architecture and engineering occupations	59.0%	5.2%	39.9%	15.7%	39.1%
Life, physical, and social science occupations	89.5%	0.0%	68.4%	21.1%	10.5%
Community and social services occupations	94.4%	0.0%	83.3%	11.1%	5.6%
Legal occupations	84.7%	30.9%	34.6%	16.0%	18.5%
Education, training, and library occupations	81.1%	26.4%	54.9%	15.4%	3.3%
Arts, design, entertainment, sports, and media occupations	54.8%	0.0%	41.9%	32.3%	25.8%
Healthcare practitioners and technical occupations	60.4%	9.4%	64.6%	22.4%	3.6%
Healthcare support occupations	81.2%	25.3%	60.9%	10.4%	3.4%
Protective service occupations	87.6%	13.8%	68.8%	13.8%	3.8%
Food preparation and serving related occupations	67.8%	21.0%	50.3%	15.0%	13.8%
Building and grounds cleaning and maintenance occupations	74.1%	38.9%	53.7%	7.4%	0.0%
Personal care and service occupations	63.4%	11.5%	73.3%	12.6%	2.6%
Sales and related occupations	82.3%	31.1%	52.5%	11.5%	4.9%
Office and administrative support occupations	79.1%	18.4%	60.8%	10.8%	10.0%
Construction and extraction occupations	79.3%	25.9%	53.7%	18.5%	1.9%
Installation, maintenance, and repair occupations	69.6%	30.0%	59.5%	8.1%	2.4%
Production occupations	59.6%	18.8%	50.0%	18.1%	13.2%
Transportation and material moving occupations	54.1%	25.4%	57.7%	13.2%	3.6%
All voucher recipients with data on occupation of training	68.9%	17.8%	57.2%	13.2%	11.8%
All voucher recipients	64.8%	15.7%	57.1%	15.5%	11.7%

Source: Workforce Investment Act Standardized Record Data, 2000–2002.

Table 3.5. Income and Educational Characteristics of 2000–2002 WIA Training Recipients by Occupation, San Francisco Bay Area

OCCUPATIONAL CATEGORY	% LOW-INCOME	HIGH SCHOOL OR LESS, NO DIPLOMA	HIGH SCHOOL DIPLOMA OR GED	SOME COLLEGE, NO DEGREE	BACHELORS DEGREE OR HIGHER
Management occupations	57.9%	15.8%	21.1%	57.9%	5.3%
Business and financial operations occupations	71.4%	0.0%	28.6%	14.3%	57.1%
Computer and mathematical occupations	55.8%	2.5%	44.2%	30.0%	23.3%
Architecture and engineering occupations	43.5%	4.3%	30.4%	47.8%	17.4%
Legal occupations	100.0%	0.0%	0.0%	100.0%	0.0%
Education, training, and library occupations	71.4%	28.6%	57.1%	0.0%	14.3%
Arts, design, entertainment, sports, and media occupations	75.0%	3.6%	60.7%	17.9%	17.9%
Healthcare practitioners and technical occupations	40.0%	1.7%	60.0%	28.3%	10.0%
Healthcare support occupations	76.8%	21.1%	58.2%	16.4%	4.3%
Protective service occupations	100.0%	0.0%	100.0%	0.0%	0.0%
Food preparation and serving related occupations	97.4%	34.2%	50.0%	10.5%	5.3%
Building and grounds cleaning and maintenance occupations	100.0%	62.0%	20.2%	3.1%	14.7%
Personal care and service occupations	86.4%	27.3%	45.5%	27.3%	0.0%
Sales and related occupations	63.6%	81.8%	0.0%	9.1%	9.1%
Office and administrative support occupations	76.7%	17.5%	47.7%	19.5%	15.2%
Farming, fishing, and forestry occupations	100.0%	100.0%	0.0%	0.0%	0.0%
Construction and extraction occupations	95.2%	35.2%	48.6%	13.3%	2.9%
Installation, maintenance, and repair occupations	55.2%	17.2%	55.2%	17.2%	10.3%
Production occupations	73.3%	21.7%	45.0%	23.3%	10.0%
Transportation and material moving occupations	64.4%	27.8%	50.0%	19.6%	2.6%
All voucher recipients with data on occupation of training	74.7%	23.0%	47.3%	19.0%	10.7%
All voucher recipients	62.9%	20.8%	52.3%	17.9%	8.9%

Source: Workforce Investment Act Standardized Record Data, 2000–2002.

WIA and the emergence of workforce intermediaries.

WIA is implemented by Local Workforce Investment Areas (LWIA), comprised of units of local government designated based on population and commonality of labor market. Each LWIA is administered by a Local Workforce Investment Board (WIB) comprised of representatives from private sector businesses, organized labor, community-based organizations, local government agencies, and local education agencies. To ensure that local workforce development policy is responsive to demand, employers constitute at least 50 percent plus one member of the WIB. The WIB's role is to designate one-stop operators, provide policy guidance, and oversee the job training activities within their local areas.

The structure of the WIB is meant to both foster employer involvement and build public-private partnerships in workforce development. In fact, several states, including California, have used discretionary funding under WIA to finance other workforce collaborations. This reflects an understanding that a diverse set of actors, many with conflicting goals, are engaged in workforce development, the beginning of what Robert Giloth calls a systems approach to workforce development.[82]

The emergence of a new breed of "dual customer" workforce intermediaries is part of this new systems approach. These workforce intermediaries serve both jobseekers and employers; try to alter either the supply- or the demand-side of the labor market, or both; work with low-income groups; provide a variety of services through a mix of funding streams; invest in long-term career advancement; and are multi-purpose organizations (rather than CBOs with stand-alone training programs).[83] Many target specific industry sectors, trying to create a win-win situation by restructuring employment practices in a way beneficial to both employers and low-wage workers.

Nationally, an estimated 243 organizations, or ten percent of the workforce development field, are full intermediaries; most are nonprofits under ten years old.[84] Several of the nonprofit training providers described in Chapter 4, including the Bay Area Video Coalition, Street Tech, Training, Inc., and Per Scholas, act as workforce intermediaries. But before looking in more detail at how intermediaries work, we look at the landscape of training providers eligible for funding under WIA.

Surveying Training Providers

The landscape of IT training providers.

In the second-chance employment and training system, either the educational system has failed students or they cannot shoulder the financial or intellectual commitment of a long-term educational program. Instead, they hope to transition quickly into employment after obtaining training funded by government via WIA or other training programs, foundations, Pell grants, or other student loans.

The second-chance system consists of private, nonprofit, and public training providers. The WIA-eligible providers are those that are accredited or provide a training program with some sort of credential recognized by employers. The private providers are mostly proprietary trade schools (often national chains that advertise widely on billboards and TV), as well as some private four-year universities. Although these schools constitute as much as two-thirds of the providers in the second-chance system, they have largely been ignored by the literature on workforce intermediaries. The nonprofits are mostly CBOs that target a population needing intensive assistance to transition into work. As the CEO of Per Scholas explains, "Of our 102 graduates last year, maybe two would have been able to graduate from community college. Only a few would have been able to even walk through the doors and stay in class." The public institutions are mostly community colleges and four-year universities, but also government-run programs. The colleges generally don't see themselves as part of a workforce development system; many of their trainees will stay on to enter the state university system. They have been slowest to adjust their practices under WIA; bureaucratic hurdles make it difficult to change curricula quickly to adapt to employer needs, and they resist offering the night classes and on-site training in demand by both students and employers.

One major difference between the three types of training providers is cost. Proprietary trade schools are charging as much as $14,000 for the same curriculum that costs about $4,000 at the public institution and may be free at the nonprofit. Another difference is geography: public training providers tend to be dispersed, while nonprofits are concentrated in central city areas and private schools follow the job market (Figures 3.1 and 3.2 provide illustrations for the New York and Bay Area regions).

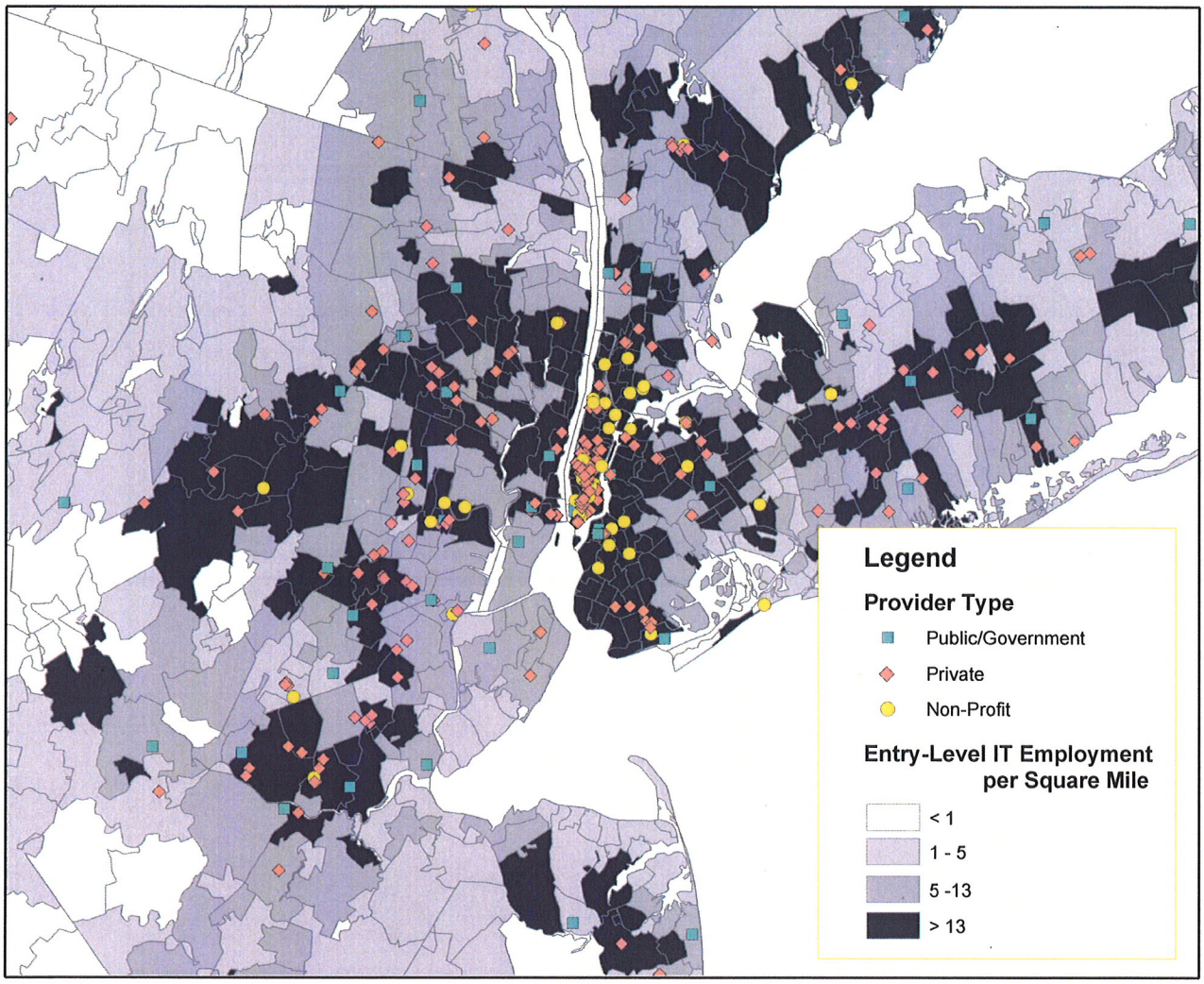
The second-chance system provides short-term technical and soft skills training to a variety of jobseekers and jobholders. A class at a community college or proprietary trade school might include high school or college dropouts, dislocated workers, and workers seeking a new career, all from very different economic backgrounds. Nonprofit training

providers also serve a variety of students, but they are much more likely to target the disadvantaged.

Another major difference is in the role each type plays in placement, from facilitator to gatekeeper. Facilitators play an active role in helping jobseekers transition to work, while gatekeepers provide training with the expectation that jobseekers will connect with employers on their own. Nonprofit providers act as facilitators, in that they make it possible for disadvantaged workers to access the world of information technology through their aggressive soft skills curricula and placement services. As a Bay Area nonprofit college told us, "People come here probably because they need to be told what to do; they need hand-holding to move ahead. Junior colleges are too laid-back; they need more structure." More than the other provider types, they focus on bridging the world of business with low-income communities by building students' communication skills and self-esteem and finding the right job situation for them. These providers see their computer training program as one step in a larger process. As a Bay Area nonprofit told us, "This is like baby steps for them, baby steps to get into the 'real world'."

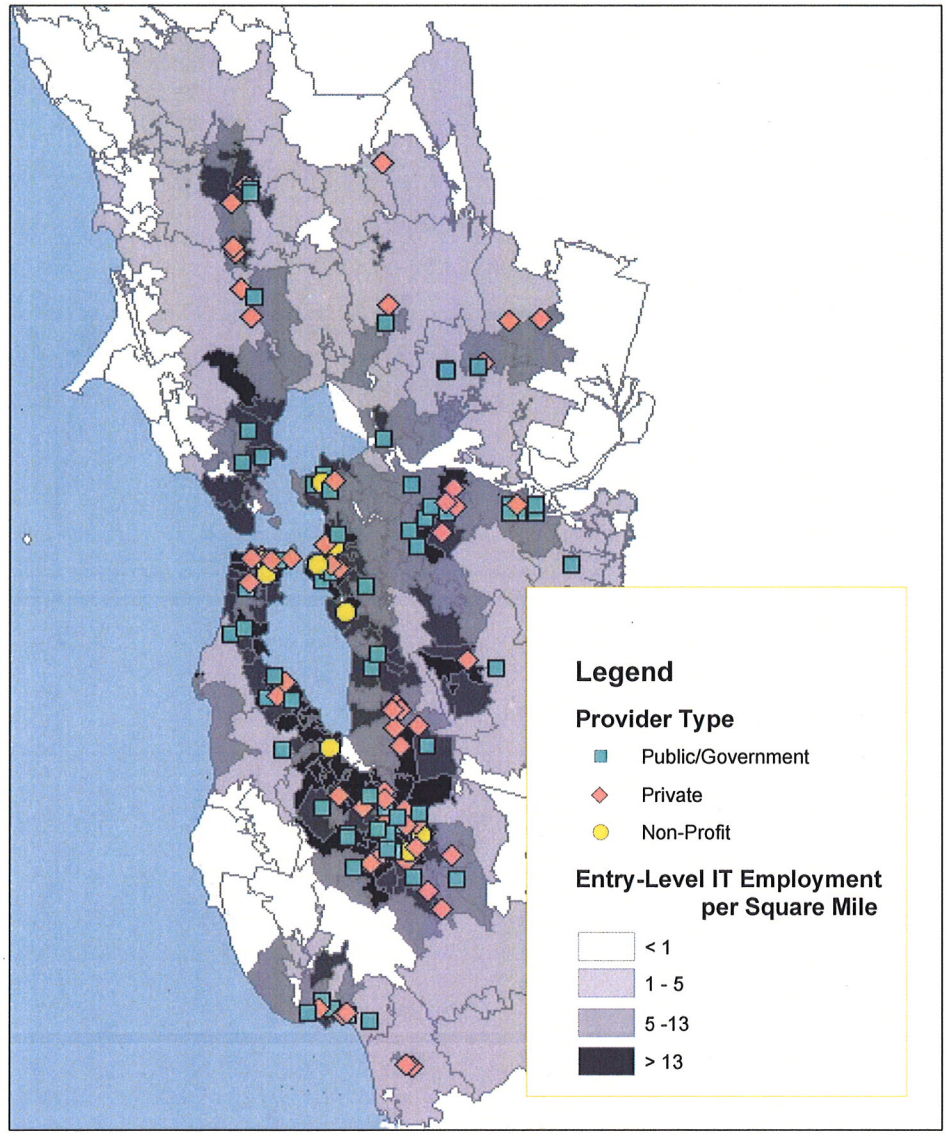
At the other extreme are the community colleges and public institutions, which still play more of a gatekeeper role. As guardians, they play a more passive role in training and placement—although the survey results described below show surprising potential to connect to employers. The public institutions typically do not offer formal placement services, for several reasons. Lack of summer classes, as well as the relatively small proportion of WIA students, makes it logistically complicated to keep full-time placement personnel busy. Many schools have entrenched career services divisions that see their mission as job search assistance rather than active placement as an intermediary using employer connections. Because their students are better prepared—for instance, all have a high school diploma, and many come from other careers—they have less need for soft skills training than do the nonprofit students. Because of the diverse college curriculum, most counselors can advise students to get training in whatever economic sector is hot, rather than simply pushing IT courses. Overall, rather than train students for a job, colleges prefer to focus on what one New York provider described to us as "edutainment": education and training combined. Likewise, community college students may see the IT training program as a first step towards getting a four-year degree.

Figure 3.1. Location of IT Training Providers, New York Region



Source: WIA-eligible training provider lists, New York, New Jersey, and Connecticut Departments of Labor, 2002.

Figure 3.2. Location of IT Training Providers, San Francisco Bay Area



Source: WIA-eligible training provider list, California Employment Development Department, 2002.

On the spectrum from gatekeeper to facilitator, the private universities and proprietary trade schools lean toward the latter. Like the nonprofits, the private providers emphasize soft skills to provide an introduction to the world of business and also offer formal placement services. This helps many of their students, who come from blue collar jobs and thus lack experience with customer service, the business climate, or even interviewing. They also facilitate well because of their flexibility;

they can change curricula to accommodate business much more quickly than can public colleges. However, because of their cost, they can only act as facilitators for those with relatively few needs.[85]

One final difference among the provider types is their relationship to employers. Although some firms may wish to turn to nonprofit providers to tap into a supply of workers from less advantaged backgrounds, a recent study found that employers are wary of working with nonprofit intermediaries and prefer using either community colleges or private vocational trade schools.[86] (In a later section, this study presents a more positive employer perspective on nonprofits.)

Although all types of providers participate in WIA, the playing field is not level: the requirements are particularly onerous for public and nonprofit providers. In some states, such as California, community colleges are effectively excluded from the WIA funding system because of inability to comply with regulations.[87] (In others, such as New York, the Department of Labor has made it possible for the community colleges to participate.) The shift to a customer-based voucher system from the contract system under JTPA has hit nonprofits particularly hard; with just one or two WIA clients in each class, the small providers can no longer offer the programs. These issues are discussed further in Chapter 5.

Survey methodology.

This chapter relies mostly on a mail survey of all of the WIA-eligible IT training providers (800 in total) in the San Francisco, New York, Chicago, and Washington, DC, regions. The 171 responses (a net response rate of 22 percent, excluding providers who had moved or gone out of business) were weighted to reflect this universe of providers.[88] IT training providers were defined as providers training in IT hardware (e.g., computer repair), systems (e.g., Windows NT or Unix), networking (e.g., Novell or Cisco), web design (including web-based graphics) or applications (e.g., advanced Microsoft Office). (Appendix A describes the methodology in more detail and Appendix C presents the full survey results.)

Overall in this universe, 67 percent are private, 10 percent are nonprofit, and 24 percent are public. Fifteen percent are located in the San Francisco Bay Area, 55 percent in the New York metropolitan region, 18 percent in the Chicago region, and 12 percent in the Washington, DC, area. Two-thirds are located in central city areas and one-third in the suburbs; there is little difference in intra-metropolitan location for providers of different sizes. As was shown in Figures 3.1 and 3.2, the private providers mirror this distribution, but the nonprofits are almost all

concentrated in the city and the public institutions are evenly distributed between city and suburb. The distribution of providers and curriculum between city and suburb is similar across the regions except for the Bay Area, which offers relatively more providers in suburban areas.

According to the survey, nonprofits are significantly less likely than public or private providers to offer more advanced computer training in hardware, systems, networking, or web design, while public institutions offer more training in networking than do private providers. There are few significant regional differences in curriculum, except a slight specialization in computer graphics in the Bay Area and in networking and systems among the Chicago providers. (Because of the small sizes of the Bay Area, Washington, DC, and nonprofit sub-samples, it is not always possible to ascertain whether differences are significant; only significant differences are reported below.)

Approximately one-third of the respondent providers graduate 50 or fewer students per year, one-third graduate 50 to 150 students, and one-third graduate over 150 (of which six graduate over 1,000). The nonprofits tend to be small or medium, while the public institutions tend to be large. New York and Washington, DC, host concentrations of small providers, while medium-sized providers are disproportionately located in the Bay Area and large providers in Chicago. Not surprisingly, the larger providers are more likely to offer diverse IT curricula than the small or medium providers.

Training providers act as intermediaries in the IT labor market through connecting jobseekers to IT skills and employers. The following first examines how effective providers are at building relationships with employers, as well as the geography of the employer-provider networks. Then it looks at how different types of providers prepare their students, particularly in terms of technical and soft skills curricula. The analysis relies mostly on the survey of training providers, supplemented by training provider, employer, and jobseeker interviews.

Connecting to Employers

Training providers have historically had strong relationships with employers in certain sectors, such as construction and nursing. Building relationships with employers is key to placement because it helps trainers respond to labor market conditions. How have they succeeded at penetrating a relatively new sector: IT? Providers vary in how they connect to employers, with some more actively facilitating a connection between employers and students and others acting more as passive

gatekeepers. The following first examines training provider perspectives on relationships and then turns to employer views.

Relationships: Training Provider Perspectives

As explored below, training providers vary in how they connect with employers, how long their contact lists are, the type of employers they target, and the strength of their relationships with employers. The conventional wisdom is that large public universities are remote from employers, while private trade schools follow the market closely. However, this study finds that public institutions of medium size have the most extensive relationships with employers, while nonprofits have particularly strong relationships. Private providers perform most poorly.

How providers connect with employers.

The top way to build relationships with employers, used by 79 percent of providers, is "cold-calling" new employers (Table 3.6). As a New York area private provider told us, "Sometimes we just pick up the yellow pages and make some calls to promote ourselves." Other common ways (used by over 60 percent of providers) that relationships develop are when employers call the providers (particularly public or nonprofit) or providers attend networking events.

Less popular means are advisory boards (except at public institutions), government intermediaries, or trade associations. Employers are significantly more likely to contact public providers than private, and public institutions also make more use of advisory boards. Not surprisingly, nonprofits are better connected to city governments than the other types.

Table 3.6. Ways of Establishing and Maintaining Contact with Employers

Ways of establishing contact with employers	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
Provider initiates contact	13	76%	83	80%	30	75%	126	79%			
Employer contacts firm	12	71%	60	58%	31	78%	103	64%			**
Advisory board	5	29%	28	27%	17	44%	50	31%			*
Networking events	12	71%	61	59%	28	72%	101	63%			
Trade associations	5	29%	27	26%	12	30%	44	28%			
Workforce Investment Board	5	29%	39	38%	18	46%	62	39%			
Other city govt. services	6	35%	18	17%	12	30%	36	23%	*		*
Other state/federal services	4	24%	25	24%	9	23%	38	24%			
Don't know	0	0%	4	4%	0	0%	4	3%			

When there are specific job openings, the flow of information reverses; overall 90 percent of providers, particularly larger providers, have employers contact them when there is a job opening. A large Bay Area nonprofit college speculated to us that employers come to them because they don't charge a fee, unlike the for-profit staffing services they compete with. The second most popular way to find out about openings is through web search engines (used by 79 percent of providers), and cold-calling employers is also important (72 percent), especially for small providers. Advisory boards may also play a role in providing job leads—for instance, one nonprofit provider gave us a list of 24 companies where graduates had been placed, eight of which are on their board.

The survey also asked the providers a series of questions about the different ways they interact with employers. Overall, 69 percent have employers as guest speakers; 60 percent involve employers in curriculum development; 55 percent partner with employers for training; 51 percent have employer representation on their board; 30 percent involve employers in grant writing; and 30 percent have a mentorship program (Table 3.7). Public institutions are significantly more likely than private or nonprofit to interact with employers in different ways: as guest speakers, for curriculum input, as advisory board representatives, as partners in training (typically customized training), and as grant writers.

Beyond these formal mechanisms for fostering employer involvement, providers also do a lot of informal networking. Some program directors and job developers come with pre-established employer contact lists. For instance, a Silicon Valley job developer told us how her experience in HR at various IT firms gave her a large network of contacts. Many program directors make an effort to establish relationships through their networks from previous jobs or by serving on local boards or the Chamber of Commerce. Providers with established programs in other areas (such as nursing, office skills, or business) contact those employers

Table 3.7. Ways of Building Relationships with Employers

Ways of building relationships with employers	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
Representation on advisory board	10	59%	44	42%	27	69%	81	51%			***
Assistance in curriculum development	10	59%	59	57%	30	75%	99	62%			**
Assistance in grant writing	8	47%	21	20%	19	48%	48	30%	**		***
Partnering in training	9	53%	49	47%	30	75%	88	55%			***
Guest speaking in classes	12	71%	67	64%	32	82%	111	69%			**
Mentoring program	6	35%	29	28%	13	33%	48	30%			

in order to place their entry-level IT workers. Some staff, particularly instructors, may have IT-related businesses that foster new contacts for the program. Another resource is program alumni, who keep providers abreast of new job openings as well as trends in the field.

Internship or externship programs are another way to build relationships with employers. Although many providers complained to us about the difficulty of finding employers—or government programs—willing to pay for interns, several had established free internship or externship programs. One key to getting employers to participate is to have the training provider cover the cost of workers' compensation. One provider was deluged by calls for interns once employers found out about the program: "Who can resist a well trained and free web designer?"

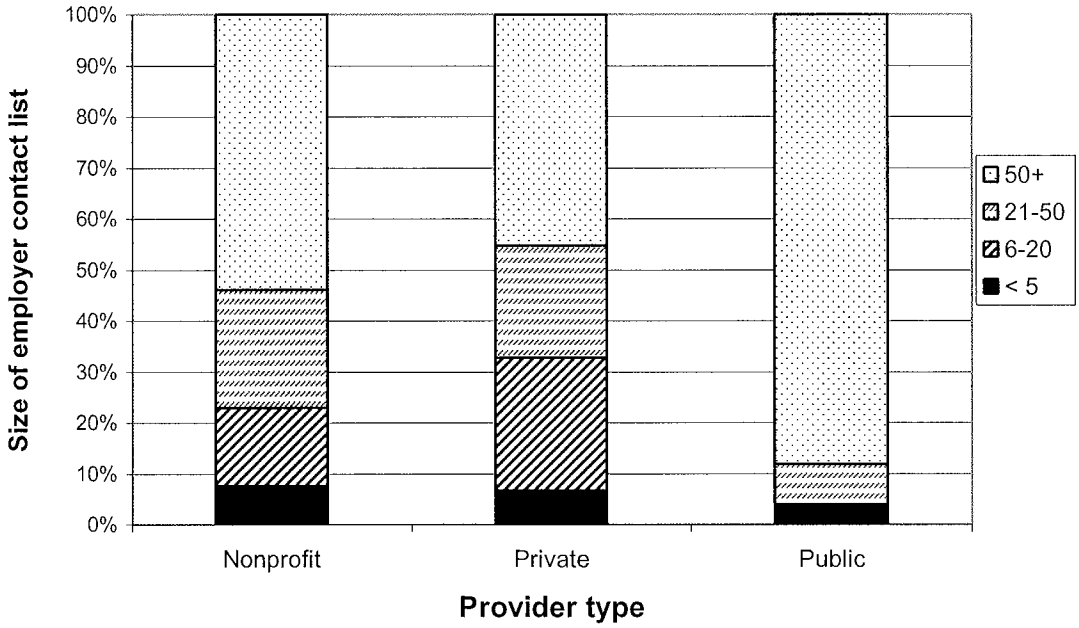
One of the biggest obstacles to establishing employer relationships is the high turnover in HR departments. Said one provider, "Every time we call there is a new person." Large companies frequently shift personnel between locations, complicating relationships. For nonprofit providers serving more disadvantaged jobseekers, one solution is to network at the top; HR and IT departments seem more willing if their CEO issues a directive to establish relationships with training providers.

Providers often experience a conflict of interest in placing students with favored employers; they resist sending mediocre students to important employers because it will reflect badly on them. Thus, several providers spoke to us of the difficulty of balancing their long-term relationship with employers with the need for a quick placement for a student.

Length of contact lists.

Another indicator of connectedness is how many employers providers regularly contact. Asked how many employers are on their contact lists, 40 percent of providers claimed that their lists included 50 or more employers. However, there were significant differences between provider types: 88 percent of public training providers have 50 or more firms to contact, while just 32 percent of private providers and 41 percent of nonprofits do (Figure 3.3). On the other hand, given the large size of the public providers, it is not surprising that their contact lists are so long. Looking at the number of contacts per graduate, it turns out that public training providers have under one employer contact per graduate, while private and nonprofit providers have over three employer contacts per graduate.

Figure 3.3. Size of Employer Contact List



Using a list of 27 employers who had recently had IT job openings in the local area, according to Monster.com, the survey also asked providers to identify firms whose name they recognized, at which they had a contact, or at which they had attempted to place or did place a graduate. Although over 80 percent of the providers recognized the name of at least one employer, half didn't know anybody at the companies and over half hadn't tried to place or actually placed graduates at any of the companies. This suggests that providers are not well connected to labor demand.

Type of employer.

Asked to name the five employers with whom they had placed most people, 98 providers came up with 426 companies or institutions; in smaller areas, many providers place with the same few companies. Among the survey respondents naming employers, public and nonprofit providers, predominantly small in size, were disproportionately able to name employers they had placed with.

In both the survey and interviews, the list of employers hiring IT graduates was mostly comprised of non-IT businesses, including communications and business services, manufacturers and retailers, financial and insurance services, government and health care sector employers, and temporary agencies. The top firms (mentioned three or more times in interviews or the survey) include IBM, AT&T/Comcast,

Wells Fargo, Kaiser Permanente Medical Center, Verizon, UPS, Home Depot, and JP Morgan Chase. Temp agencies constituted just five percent of the firms mentioned. For most providers, no more than 20 percent of the employers to which they have strong connections are in IT or IT services. This in large part reflects the nature of the entry-level IT job market that providers train for; in contrast to advanced systems analyst or programming positions, help desk and network technician jobs are dispersed across many different economic sectors.

The survey also asked providers to name firms that they would like to establish a relationship with. Respondents named about 200 employers, but just 25 percent are in IT or IT services. Providers are more interested in building connections with institutional employers, FIRE, or manufacturing and retailing (Table 3.8). The perception among providers seems to be that the "good" jobs are in these sectors.

Strength of relationships with employers.

Probably the best measure of responsiveness to employers is the quality of provider-employer relationships. For example, Training, Inc. has a very strong relationship with a local insurance company, which has hired 42 different graduates. One of the reasons for the strong relationship is the political pressure for large local corporations to hire locally, particularly from well-connected nonprofits. Another reason is the personal relationships. The job developer at Training, Inc. says, "It takes such a long time to build up a relationship. It's not the company; it's the individual who matters."

Table 3.8. Sectors of Employers that Providers Would Like Relationships With

SECTOR	EMPLOYERS NAMED
Health care/education/government/social services	48
Information technology	37
FIRE	33
Manufacturing/retailing	32
Communications	22
Business services	11
IT services	11
Temporary agencies	2

Of the 98 provider survey respondents who named specific employers, 44 had such strong relationships with employers that they had placed ten or more graduates at just one company or institution. Altogether, of the 6,329 students placed by these respondents at specific employers, 5,576 were placed by these 44 providers at 106 firms. Of the providers, a disproportionate share (27%, for a total of 12) were nonprofit. In other words, the providers with strong relationships with employers are disproportionately likely to be from the nonprofit sector; while public sector providers also had many strong relationships, private training providers did not.

Interestingly, of all the provider types, nonprofits were also significantly more likely to be aware of which employers offer jobs with high pay and career ladders. Asked to name the two employers that pay most for their graduates, as well as the two that offer the best advancement possibilities, all of the nonprofits were able to name some, compared to 59 percent of public institutions and just 44 percent of private providers.

Conclusion.

Providers try to develop and maintain close connections to employers in order to get word out about the students they train, find job placements, and keep abreast of industry changes and employer demands. Most are aggressive about contacting employers. As one private training provider in the Bay Area explained, the trick is to make sure employers keep the providers in mind: "Things happen for them fast. They need to fill jobs sometimes in a day's notice. If you are not there, they go with whomever is on the top of the pile."

In general, public institutions are the most broadly networked with employers, and nonprofit providers have the strongest relationships. Provider size plays an important role: small providers (graduating fewer than 50 students per year) experience difficulty in establishing relationships, while large providers, particularly the institutions graduating thousands of students, experience difficulty in developing strong relationships. That the public and nonprofit providers are often better connected to employers than the private schools suggests that both may have more political connections and institutional credibility than the private providers do. This helps them persuade firms to rely on intermediaries. Thus they play a critical role in helping the disadvantaged enter the information economy.

Relationships: Employer Perspectives

Employer perspectives help shed light on why public and nonprofit providers develop better connections to employers. About half of the firms we spoke with have some kind of relationship with a job training intermediary, either a private, public, or nonprofit training provider or a government agency. The typical company with such a relationship is a service or institutional employer, located in the central city, with a large entry-level workforce. Relationships with training providers peaked during the dot-com craze, as employers were desperate for qualified workers. But still, many maintain contact in order to get provider help with locating and prescreening job applicants.

Despite these relationships, we found many negative views about intermediaries, particularly private providers (proprietary trade schools) and community colleges. Although this finding contradicts an earlier study that found more positive views about community colleges and trade schools than nonprofits, this could reflect the different regions and industries analyzed.[89] Unfortunately, negative experiences with training program graduates can spell the end of a relationship, since companies are not willing to assume the risk that the next candidate won't "get it" as well. Of all the provider types, nonprofits fared best; however, this likely reflected a sampling bias, since the respondents included a number of firms who work with nonprofit providers. The following looks at employer assessments of private, public, nonprofit, and agency training providers.

Private training providers.

For employers, the two major plusses of the graduates from the IT training programs at proprietary trade schools are the type of job candidate that attends the school and the type of training they receive. Trade school graduates have "put their own money on the line" and thus have a little more "urgency" in the job search. Schools like DeVry also have the reputation of having more hands-on programs with a broader range of subjects than a computer science program at a two-year or four-year college.

However, many more firms expressed negative views of the trade schools. In general, those who spoke disapprovingly of these training providers had themselves graduated from four-year colleges. (As one manager who hires most of his interns from Stanford said, "We don't have to go down to that level to hire.") Critiques centered on the lack of hands-on training and the lack of responsiveness to the market.

Hands-on training can substitute for work experience. But program graduates tend not to get the repetition of training that is critical to computer problem-solving. Instead, these "shops" train them only for the certification test. One CEO of an IT services company said that his engineers could walk users through a problem on their cell phone from the car, "but a lot of these training program graduates will only be able to solve the problem if they are in front of the computer figuring it out." He went on, "The programs are flawed. Someone in the board room is creating a list for the curriculum, but more importantly, they have to give the students a perceived value."

Others critiqued the private training providers for relying heavily on government funding and becoming lazy about curricula. "The manufacturers get out curriculum and training very quickly but the schools are a year behind the manufacturers." In IT overall, the job market is shifting from more technical work to more business-related positions, but the trade schools continue churning out cookie-cutter technicians, with little differentiation between the product of different schools.

Public training providers.

A couple of the firms interviewed have strong relationships with local community colleges; in the Bay Area, the UC extensions are also held in high regard. As one IT company that relies heavily on community colleges argues, they are more flexible than the private trade schools, which can't tweak their offerings. "We like to be able to sit down with the curriculum developer and the president of the college. We tell them, we'll deliver the jobs if you deliver the people."

On the negative side, several argued that the community colleges are even less responsive than the trade schools. One large institutional employer in California, desperate for workers, found that the local public colleges didn't even return their phone calls. The longstanding critiques of community colleges still stand, as one HR manager told us, "Community colleges missed the wave in technology training. For instance, they overproduced web designers and thousands were left high and dry." Too often they train in specialized skills like Java, "skills that are not generalizable to other areas in IT."

Nonprofit training providers.

In general, the financial and business services firms interviewed were more likely to have used nonprofit training providers than IT companies. For a couple of these firms, their relationship with the nonprofit was their only ongoing contact with a training provider; but for

most, the nonprofit provider was part of a network of external training providers the firm partners with.

The benefits of hiring through a nonprofit training program include the hands-on, intensive training and the "hungry," diverse, and low-cost pool of graduates. The nonprofit providers that the interviewees have worked with include Training, Inc., Street Tech, Per Scholas, and BAVC, among others. All use a hands-on training model (or in the case of Training, Inc., a simulation program) that guarantees some level of fluency with IT. "Realistically, as an employer, why would you take someone who only has skills on paper? I know for sure that Per Scholas will give folks hands-on training." To those very familiar with the nonprofits, their consistent value system is most important. Behind the hands-on approach at most of these nonprofits lies a philosophy about training and a dedication that comes from many years of experience. Some speculated that the nonprofits are filling a gap in the public educational system. As one manufacturer/retailer said in discussing a particularly competent graduate of Street Tech, "When someone has that kind of confidence, it makes you wonder why they didn't succeed earlier on, and it makes you think that something is really wrong with our schools."

Asked how nonprofit program graduates compare with private trade school program graduates, some argued that the nonprofit program graduates are hungrier for the work, coming from lower income backgrounds. One HR manager at a telecommunications company first responded that "there's a world of difference," since DeVry graduates come from affluent suburbs and Training, Inc. graduates come from public assistance. But then he admitted that both are equally likely to pass the written test in soft and technical skills.

Nonprofit training programs offer several advantages in recruitment. They provide access to a diverse pool of candidates, particularly in terms of race/ethnicity. Unlike longer IT training or educational programs, they offer a relatively unformed worker for firms that prefer to grow their own talent. As one financial service firm who hires from nonprofits explained, "We are not the norm here compared to other organizations. I actually sought out entry-level people who had no bad habits...Although we are dealing with high-level technology, I wanted to hire people in order to mentor and train up." Finally, nonprofit training program graduates come cheaper than graduates of other IT programs and are essentially a "captive labor force" which wants to grow in one place, as opposed to that "network engineer taking a pay cut who's not going to stay for long."

The main critiques of nonprofit programs are that, like the private and community college programs, they do not respond quickly to the market; and that they are asking employers to take on the risk that these workers from disadvantaged backgrounds will prove reliable. As one IT services firm stated bluntly, "It is always scary when people call and tell you they'll give you things for free." A couple of companies had encountered experiences with training program graduates who didn't know how to relate professionally with coworkers because of their "poor family environment." One institutional employer spoke candidly of the barriers put up by his HR department, which is not comfortable hiring from a local nonprofit because its graduates are seen as "different" and in fact do have lower levels of basic skills than other applicants. Though many nonprofits try to educate potential employers about the talent of their graduates, some HR departments would rather rely on recruiting relationships that have worked for them in the past than take on risky new employees.

The Role of Space in Connectedness: Regional and Intra-Metropolitan Differences

How providers connect with employers depends in part on their location in different regions and parts of the metropolitan area; space filters the opportunities to access IT jobs. However, complicating the analysis of regional and intra-metropolitan differences are the location patterns of different types of providers. As mentioned previously, the nonprofits are relatively concentrated in central city areas, and in this sample, the Bay Area has a disproportionately large share of public providers.

Keeping these in mind, there are still some significant regional and city-suburb differences. In general, training providers in Chicago, and to a lesser extent New York, have stronger connections to employers; they are significantly more aggressive about contacting employers, and employers with job openings are significantly more likely to contact them than those in the San Francisco Bay Area or Washington, DC. Chicago providers attend more networking events, particularly than Bay Area providers, and both Chicago and New York area providers are more likely to use government agencies. New York providers are particularly likely to have employer representation on their advisory boards.

In general, Bay Area providers have the weakest connections to employers; in addition to lacking the multiple strategies of connecting to employers that Chicago and New York providers utilize, they have shorter contact lists of employers and their instructors are least likely to have an

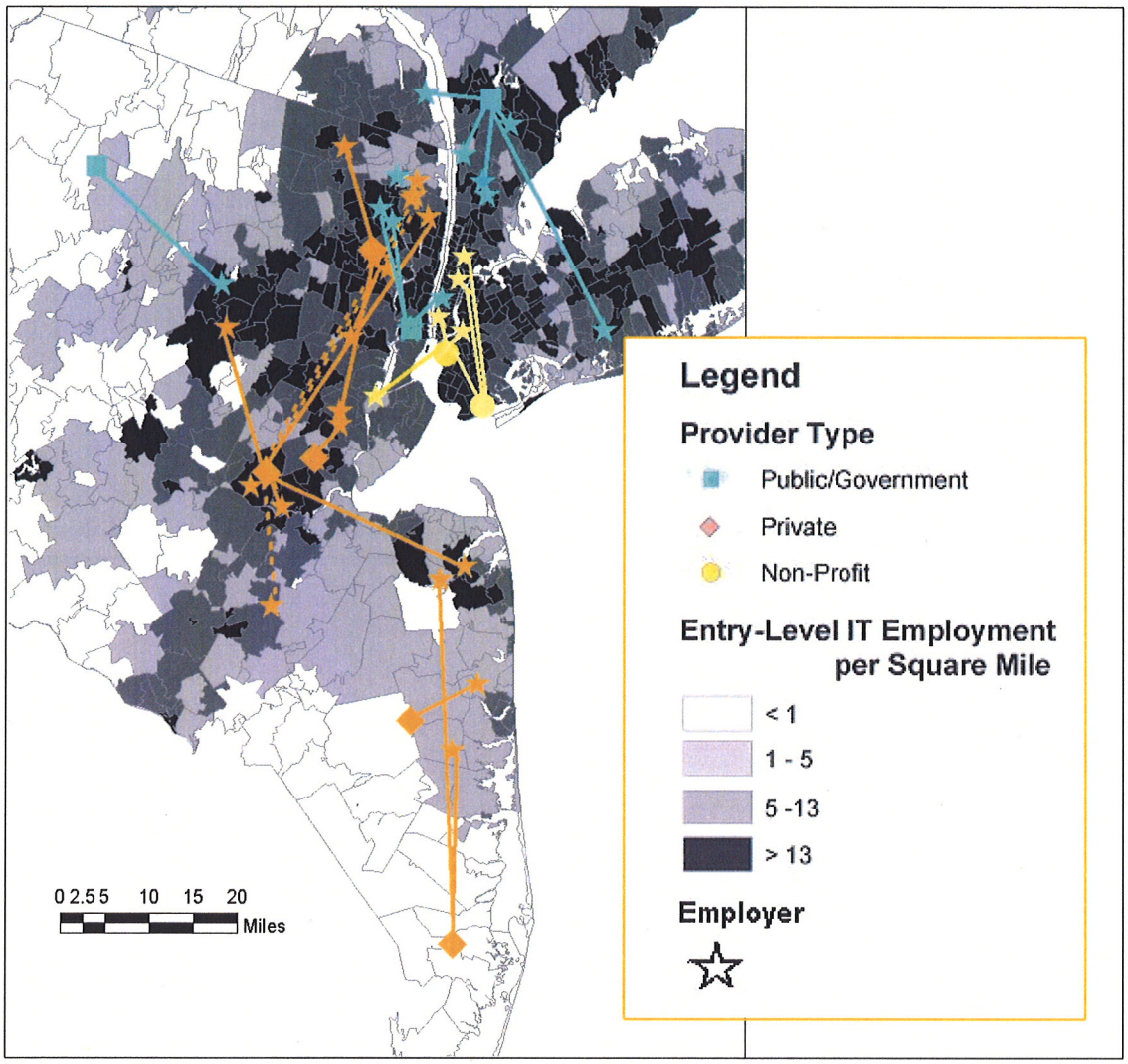
IT background. On the other hand, Bay Area providers are overrepresented among the 44 providers with strong employer relationships. These differences may reflect the different structure of the IT labor market in Chicago and New York, which have a larger share of entry-level IT jobs than do San Francisco or Washington, DC.

There are few city-suburb differences in terms of the strength of employer connections overall. The 44 providers with strong employer relationships are distributed across city and suburb just as providers overall are, with about two-thirds in the city and one-third in the suburb. However, providers based in the suburbs have significantly longer employer contact lists than do city-based providers; 66 percent of suburban providers (mostly public) have contact lists of 50 or more employers, versus just 34 percent of city providers.

Also, interviews suggested that the nature of employer relationships differs between city and suburb. Since politics and trust play an important role in developing relationships with employers, proximity becomes key. Trust comes from the ability to have face-to-face interaction. Small areas are better able to foster these relationships than large cities because it is easier to become acquainted with the major political figures and employers. Thus, in some cases suburban providers are more readily able to build relationships with local firms. For instance, one New Jersey private provider is a member of her suburb's Rotary and Chamber of Commerce, which has made her an established figure in the local community.

Labor markets are extremely localized, especially for entry-level jobs.[90] This is reflected in where providers build relationships and place graduates. Most target local employers for outreach, in part because it is easier to meet with local companies, but also because many jobseekers just entering the job market are not willing or able to commute far. Figures 3.4 and 3.5 map the locations of employers where a sample of providers have placed most graduates.[91] In both the New York and San Francisco regions, providers tend to place within a subregion of the metropolitan area. For instance, New Jersey providers tend to place within northern New Jersey, and Silicon Valley within the San Jose area. Nonprofit providers have particularly localized networks, public providers have fairly localized, and private providers have the most extended. Although further research is needed to understand why these networks differ in their extent, the fact that public and nonprofit providers have better connections to employers suggests that their graduates make use of local connections while graduates of private providers conduct a metropolitan-wide search using other means, such as the web.

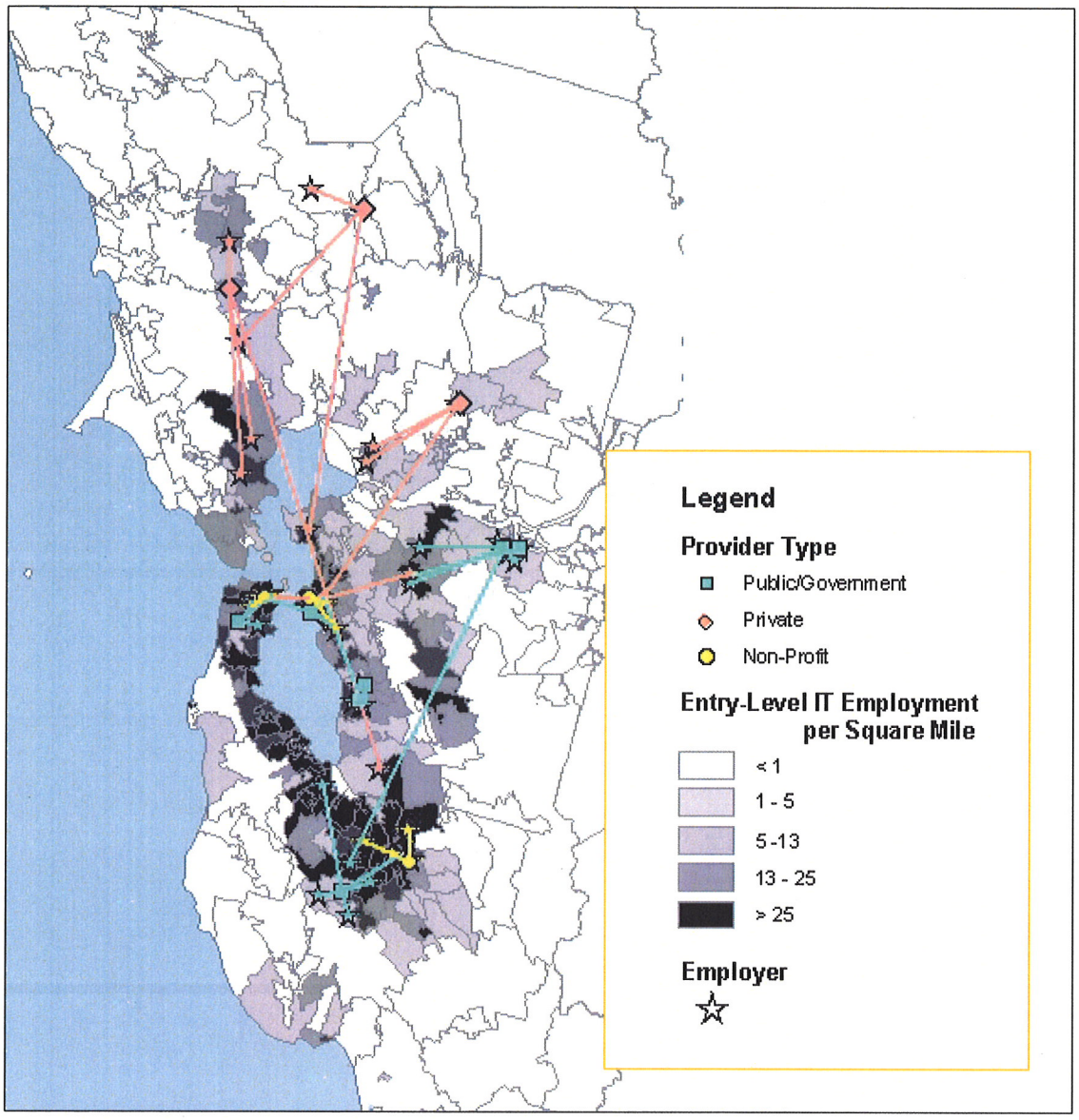
Figure 3.4. IT Training Providers and Employers Where Graduates Placed, New York Metropolitian Area



Preparing Students: Soft Skills, Job Search, and Placement Services

Besides their connections to employers, training providers offer their students several different tools with which to access IT jobs. Apart from the technical training itself, the most important is soft skills, including motivation, flexibility, social interaction, and other skills. Also critical are provider resources to assist with the job search and placement.

Figure 3.5. IT Training Providers and Employers Where Graduates Placed, San Francisco Bay Area



Soft Skills

> "You could get a perfect score on a computer certification exam, but knowing computer programs is really a small component of training." —*Bay Area nonprofit*

Most providers show a lot of savvy about the soft skills they need to teach, from customer service to behavior and attitude to familiarity with corporate culture. Per Scholas teaches troubleshooting by sabotaging the students' computers before they arrive for class. Street Tech has students

sign a code of conduct upon entering the program, including a pledge to pay a five-dollar fee for each instance of tardiness. Many providers, particularly the nonprofits, have dress codes and a three- or four-strikes and out attendance policy. A public university in New York pushes the personal approach with weekly one-on-one meetings with students. The program tries to get students excited and engaged about what they are learning, connecting the "inside person" with the "infectious" world of IT. One of the best-known models is at Training, Inc., which offers workplace simulation curriculum modules that create a "culture of work."

The background of the instructors is key to teaching soft skills. Over half of the instructors, particularly in private providers, have an IT background; 42 percent work part-time, with instructors at private providers most likely to work in the IT industry. Many instructors also have experience in education and social services; at the nonprofits, many only have a social services background.

The growing creativity and sophistication of these programs in providing soft skills suggests how important such training is in facilitating access to IT jobs. At the nonprofit and private providers, who typically play such a facilitator role, soft skills training typically constitutes 20 percent—and as much as one-third—of the curriculum. Most (88%) provide soft skills training of some kind; the top three types of training are resume writing, interviewing skills, and cover letter writing, all provided by over 80% of providers. Nonprofits are significantly more likely to provide specialized assistance, including personal presentation skills, videotaping, and motivational counseling.

Our interviews suggested that some of the programs that don't offer soft skills training are recently certified WIA-eligible training providers who had not yet worked with many WIA clients but had apparently become WIA-eligible in order to qualify for government funding. These providers seemed unaware of the difficulty of transitioning into IT for some jobseekers; as a national retailer who is training in computer repair told us when asked about soft skills, "We will only select the best students...We're here basically to teach computer skills...We're training specialists."

The Job Search

The top three ways to assist graduates in the job search, provided by 80 percent or more of the providers, are contacting employers directly, supplying computers for the search, and providing references. In general, nonprofits and small- to medium-sized providers are more likely to give

references. One reason we were told that larger providers hesitate to provide references is to avoid the suggestion of preference and any related liability issues; small providers operate much more informally. However, public and large providers have more assistance in terms of resources (computers for search, job fairs).

The search process consists of looking for jobs, landing the interview, preparing for the interview, and following up. For most providers, looking for jobs is not a simple matter of pointing students to a computer. As all types of training providers told us, it depends on a close relationship between job developer and student. Job developers may spend hours tutoring students individually on where to look for jobs on web search engines and how to access and respond to job listings on a company's web page. Some large providers handle the actual application themselves or perform initial candidate screening for employers.

Landing the interview is a question of persistence—in addition to networks. Just as temporary agencies told us that they are more likely to respond to applicants who pester them, training providers counsel jobseekers to be aggressive. According to a private provider, "It's all in the attitude—I tell my students to treat themselves as a business and market yourself. It's hard to make yourself responsible to yourself." Part of the process of getting an interview is developing a phone presence and making sure that the rest of the household is prepared to take phone calls from employers. One job developer teaches her student's families how to answer the phone and take messages from potential employers.

Soft skills training will typically include mock interviews, with the job developer playing the employer role and taking on the position of the "devil's advocate" with the students to simulate the work environment. Training for the interview also means becoming aware of unattractive personal habits and learning how to dress, often using borrowed clothes from the provider's closet of donated suits. This can be a challenge, particularly for the nonprofits who are dealing with very low-income groups. (As one New York nonprofit told us, "It's a war to get them to wear skirts, they curse!")

The final step is following up after the interview. The most effective providers teach students to follow up to potential employers after the interview. As a Bay Area private provider told us, "People expect to just be handed a job, but you have to work for it." A few job developers go so far as to write thank you notes on behalf of their graduates.

Over 60 percent of providers, particularly those of small or medium size, continue to provide job placement assistance over a year after graduation. Since most providers receiving government funding are

reimbursed for training by the end of a 90-day retention period, there is little incentive to keep helping a jobseeker. Although a couple providers told us that they don't care about graduates after that time period, for the most part job developers at all provider types establish such strong personal ties with students that they keep the door open. Chapter IV explores the role of these soft skills further.

Placement

Effective placement depends not just on this preparation, but on a variety of other supply- and demand-side factors. Asked to list the top three important factors that make placement work well, the providers that answered emphasized employer relationships beyond all other factors. The quality of technical skills training and the availability of soft skills training also help make the difference in getting graduates jobs (Table 3.9).

Another factor mentioned by many is the dedication and quality of the staff. Although some are undoubtedly referring to persistence of some job developers in connecting to the IT job market, the importance of staff

Table 3.9. Factors That Make Placement Work Well

FACTORS THAT MAKE PLACEMENT WORK	TOTAL
Employer relationships	62
Technical skills training	36
Soft skills training	24
Staff quality and dedication	20
Graduate motivation	18
Job search resources (e.g. staff, facilities)	15
Labor market/state of economy	13
School reputation	13
Internships	10
Staff assessment of students	9
Networking, references	7
Strategic targeting, job match	7
Certification	5
Support services to reduce barriers	4
Job search information, internet access	4
Job fairs	4
Basic skills	3
Other	11

is most in evident in their role as social workers. For instance, a job developer at a private provider described her "many hats": job placement; personal counseling; nutrition counseling; baby sitting arranging; translating; explaining U.S. laws, rules and customs; finding housing; and getting people the right attire to go to job interviews. Akin to this is the emphasis on school reputation. Some providers claimed that local employers hold them in high regard, and one even told us proudly about a call from a new employer who had been referred to them from another employer when they met on a golf course.

A program's job developer and director help the most with placement; less than half of providers allow the instructor to work on placement. Overall, nonprofits spend significantly more staff hours on placement: 36 percent spend over 60 hours per week, as compared to just 16 percent of private providers and 13 percent of public providers. But in general, the larger the institution, the more staff hours spent on placement.

Jobseeker motivation is a major issue that emerged in interviews as well as the survey. Some students enter training with no intention of getting a job at the end; others have family responsibilities, transportation problems, or other complications that delay them from the job search. Some miss interview appointments and blame the employer; others "sit home and wait around for a phone call." In these circumstances, there is little a program can do. "We can't hand-feed them," says a private provider in the Bay Area.

One way to avoid the problem of unmotivated students is to screen more carefully at the onset of the program. Because WIA in particular makes payment contingent upon placement, providers increasingly engage in "creaming," or selecting overqualified (and relatively undeserving) applicants to participate in their programs. Providers also assess motivation in IT by finding out about hobbies, for instance whether students tinker with computers at home.

Surprisingly few providers mentioned the labor market or the economy as a major factor in placement. Apparently most training providers see either the connection to employers or the supply-side (i.e., jobseeker preparation) as the most important factors, rather than labor demand. This may actually reflect their lack of awareness of the economy and IT jobs in particular. In our interviews, we found considerable confusion among providers about what jobs were currently hot. Some claimed that programming or computer repair continued to experience strong demand, while others claimed that these areas were in decline.

How effective are training providers at placement? Our interviews found wide discrepancies within the same region, with some reporting placement rates of 90 percent or higher, and others admitting to a 20 percent rate.[92] As described further below, part of the problem may be that providers use different metrics to calculate placement. However, given the poor economic conditions at the time of the interviews (summer and fall of 2002), we suspected that some providers were embellishing the truth—not just to us, but also to the government, which has ineffective mechanisms in place for tracking performance in placement.[93]

In fact, the survey suggested that placement is more problematic than interview respondents suggested (Table 3.10). One-third of respondents—and almost half of the public providers—didn't even know their placement rate. Some of these simply don't do placement for one of several reasons: they rely on the one-stops or other partners; they haven't yet graduated any WIA clients; or a central career services office does placement without coordinating with the IT training program. Overall, just one-third had placement rates of 75 percent or higher in 2002; the private providers were the most successful and the public providers least successful at placement. For most providers, placement rates declined between 2001 and 2002.

Conclusion

Thus, training provider intermediaries play multiple roles in helping underrepresented individuals enter the IT workforce. Apart from technical training, providers offer intensive soft skills curricula, job search, and placement services to help their graduates get the foot in the door in IT. The most successful ones draw heavily from their networks

Table 3.10. Placement Rates, 2002

Placement rate	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
25%	0	0%	1	1%	0	0%	1	1%			
33%	1	6%	5	5%	2	5%	8	5%			
50%	1	6%	6	6%	2	5%	9	6%			
66%	6	35%	18	17%	3	8%	27	17%	*	***	
75% +	5	29%	39	38%	8	20%	52	33%			**
don't know	3	18%	29	28%	19	48%	51	32%		**	**

to place graduates. This is what differentiates this new, mature era of training for IT occupations from the earlier training that took place exclusively at four-year colleges; the focus is on the job and the business culture, rather than computer science per se.

Conclusion

There is clearly a need for the second-chance employment and training system, given the demand for entry-level IT workers, the failure of public education, and the role of educational intermediaries (particularly public and nonprofit) in helping the disadvantaged access jobs through soft skills and connections. But this chapter has shown that the network of educational intermediaries in IT is not as effective as it could be. Although studies have established the importance of connecting to employers and providing training in soft skills, many trainers seem not to recognize the importance of these factors.

Under WIA, training is unresponsive to regional labor demand and funding goes disproportionately to private providers, in part, because the requirements make participation onerous for public and nonprofit providers. This is unfortunate because public and nonprofit providers may actually have stronger relationships to employers, particularly local firms.

But are these providers really more effective? In the absence of reliable data on placement, it is difficult to know. The best way to understand their impact is to see how their graduates fare over time. Thus, the next chapter follows a sample of nonprofit and public training program graduates to find out whether these programs—with their employer connections and soft skills training—make a difference.

CHAPTER 4
Upward Mobility in IT for Disadvantaged Workers

> "Technology is what makes people stand out, so it doesn't matter if they're from a certain area any more. It's the way to progress in the world." —*Aaron, Training, Inc. graduate*

A low-wage future is not inevitable for low-skilled workers. The growth of low-skill IT occupations, particularly in high-tech regions, and the transformation of the IT workplace have created opportunities for a variety of workers to enter and advance in IT. It's "the way to progress in the world" not just for Aaron, who is an African American college dropout with no office work experience, but also for Chia, a Laotian high school dropout who wanted "a decent job where you don't have to get on your knees and scrub the floors," and Jo, a white woman who says she "struggled all my adult life with what I was going to do," despite a master's degree in environmental policy.[94] All three found work in IT after graduating from free short-term IT training programs at nonprofit organizations. And all three contradict the conventional wisdom about the labor market bifurcation that makes knowledge analyst jobs inaccessible to those not fortunate enough to have both the college education and the social connections to join the IT workforce.[95]

Theorists such as Castells argue that the spread of information technology allows the global economy to use networks that effectively select only certain places and people to participate in the new economy. The existence of networks thus creates a duality, of the "switched-on" and "switched-off," deliberately and selectively including some groups and excluding others.[96]

Yet, this chapter shows how it is possible for workers from disadvantaged backgrounds to get the foot in the door and advance in IT, becoming valued contributors to the new economy. Rather than exacerbating social exclusion, the spread of information technology has made upward mobility possible through the changing role of intermediaries, the new emphasis on soft over technical skills, and the growing maturity of workplace culture and career pathways. New training programs have emerged to prepare an IT workforce that looks very different from the college-educated, white, male-dominated computer culture of the past.

The following first provides an overview of the context for IT training, specifically the difficulty of upward mobility in increasingly unequal regions. Then, the chapter introduces six training programs, in

the New York metropolitan region, the San Francisco Bay Area, and the Washington, DC region and takes an in-depth look at program graduates—where they come from, how they enter the workforce, and how well they fare. The remainder of the chapter examines the factors behind their success: their ability to network into the workforce, acquire soft skills, and advance in their careers.

IT, Inequality, and Upward Mobility: The Context for IT Training

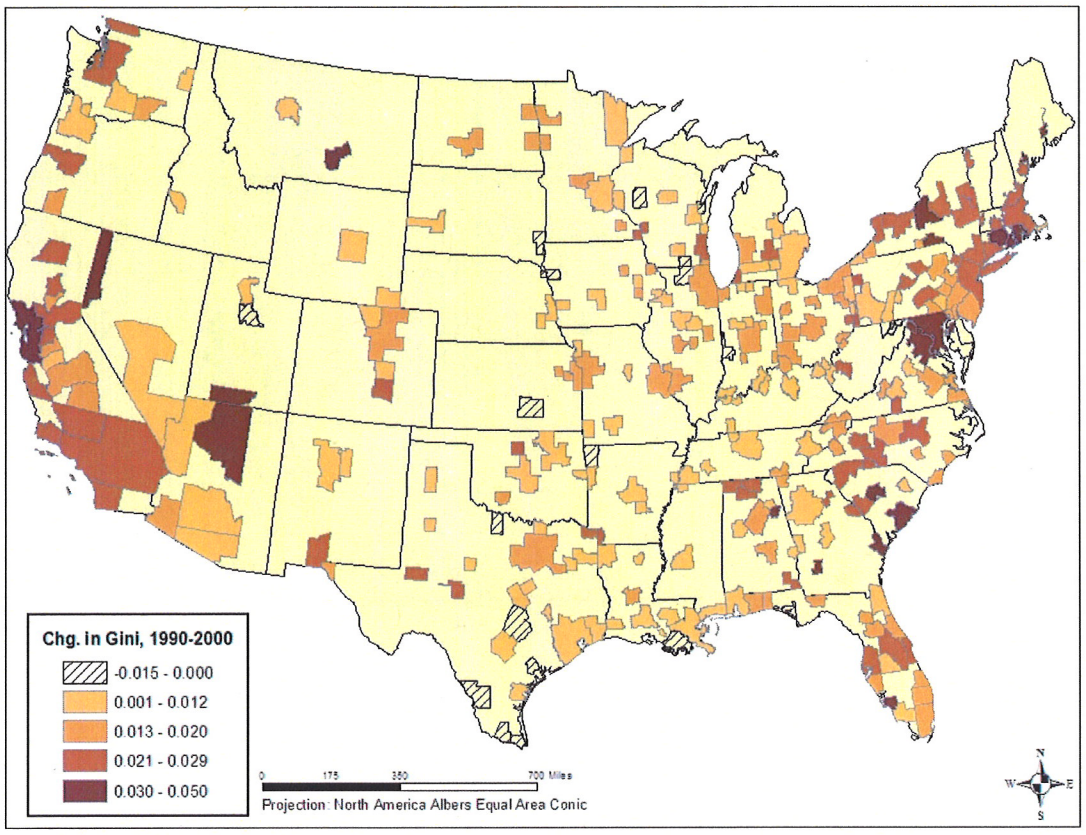
Although IT has brought increased productivity and prosperity to the U.S. economy, not all people have benefited from this economic growth.[97] Nationwide, from the late 1970s to the late 1990s, the average real income of the lowest income families fell by over six percent, the income of the middle fifth of families grew by five percent, and the income of the highest fifth of families grew by over 30 percent.[98] With the exception of a few years in the late 1990s, the general trend of increasing income inequality has continued through the beginning of the 21st century.[99]

Increases in income inequality are uneven across regions. The U.S. regions experiencing the biggest increases in income inequality from 1980 to 1990 included the Middle Atlantic area (especially the New York metropolitan region), the Midwest (especially Illinois and Michigan), and the Pacific (especially California).[100] From 1990 to 2000, the increases in income inequality (as measured by gini coefficients) were even more concentrated on the two coasts (Figure 4.1).

Many of these regions with high income inequality are also high-tech regions experiencing rapid wage and employment growth, suggesting an association between high-tech economies and inequality (as predicted by New Economy theorists).[101] Yet, despite higher levels of income inequality, these regions may have relatively low overall poverty. Areas that specialize in the information sector have lower poverty rates than regions with more traditional economies.[102] There is also some evidence that looks not at poverty and inequality as a result of growth, but the reverse, showing that regions that are able to reduce their poverty rates grow faster.[103] This adds up to a mixed picture of prosperity: a rising tide does lift all boats, but it lifts some boats a lot higher than others, creating a challenge for upward mobility.

Accompanying this increase in income inequality has been a shift in the nature of work—i.e., job stability and security has been eroded by the rise of contingent and part-time work. Job stability, or the probability of holding a job for several years consecutively, is declining in particular

Figure 4.1. Increases in Income Inequality (gini coefficients), 1990–2000



Source: U.S. Bureau of the Census, SF3, 1990 and 2000. Calculations by the author.

for less educated, older male workers and African-American workers, while involuntary part-time male employment has grown rapidly—although a rise in job stability and hours for women counteracts this trend.[104] Overall, about four percent of all workers in the U.S. (in 2001) are contingent workers, or individuals who do not have an explicit or implicit contract for ongoing employment.[105] This employment instability may be a major factor explaining rising income inequality because it increases the share of part-time jobs, decreases unionization, and increases the number of self-employed workers, or contractors working (often for their former employers) at lower wages than stable jobs offer.[106]

Related to the issue of income inequality in the United States is an inequality in terms of access to digital technologies, often referred to as the Digital Divide. Since facility with information technology tools is critical to participating in the labor market, unequal access to digital

technologies has important implications for employment patterns across socioeconomic groups. The leading source on the state of technology access in America is the Department of Commerce's series of studies entitled *Falling Through the Net*, which measures the level of access to telephone, computers and the Internet from 1994 to 2000. Although these studies demonstrate that the national penetration rates for computer ownership have risen from 24.1% in 1994 to 51% in 2000, distinct disparities in access based on income, educational level, race, household type, and geography remain. For instance, the West continues to be the most on-line region of the country, with household Internet access of 46.6%, followed by the Northeast (43.0%), Midwest (40.9%), and South (37.9%). Poor technology access may be related to income inequality within regions—for instance, northeast central cities had the lowest household access rate (33.1%) among both urban and rural areas.

Increases in income inequality are also associated with decreases in upward mobility. Although studies debate the extent to which it has become more difficult to move up, with some finding overall declines in upward mobility and others finding differences in upward mobility by gender, race/ethnicity and education, most agree that education has become much more important for upward mobility.[107] But there is no simple recipe for moving up. Both the declining returns to work experience and job instability that characterize the New Economy mean that education alone is not enough to guarantee upward mobility.[108]

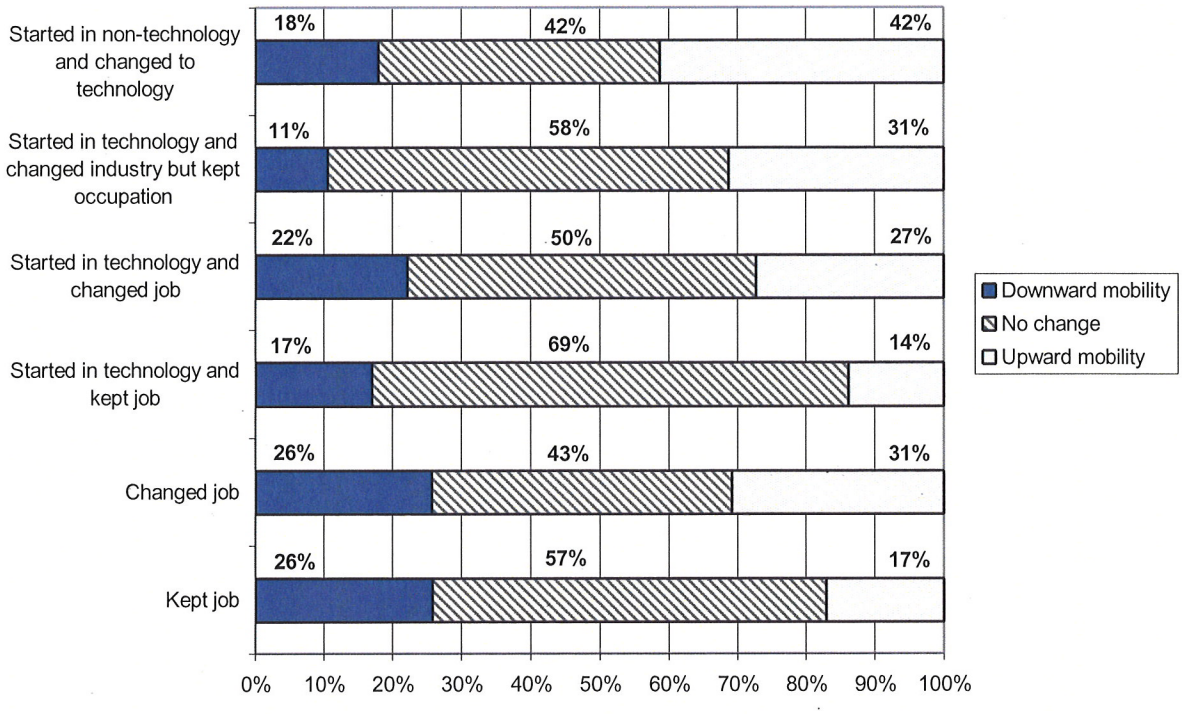
Although it seems intuitive that industrial structure would shape opportunities to move up, only one study examines upward mobility by specific industry, finding that men benefit from working in industries such as construction or manufacturing, and women from working in the service sector.[109] It is not simply working in a particular industry that helps promote workers. Rather, upward mobility depends on local labor market conditions, corporate culture, union pressure, and other factors that often vary between regions; while some employers may compete based upon labor cost, others choose to increase productivity by investing in worker skills.[110]

There is little or no research looking at the relationship between IT and upward mobility for low-wage workers. In fact, there are few longitudinal datasets that are appropriate for looking at income changes for individuals over time, and none that offer detailed information on IT occupations or industries. However, the Survey of Income and Program Participation (SIPP) offers panel data and basic (one-digit) industry and occupation categories that can provide a rough estimate of upward mobility in technology.[111]

An analysis of short-term economic mobility using the SIPP from 1996 to 2000 shows that overall, 26% of U.S. workers moved down at least one income quintile in that period, while 25% moved up at least one quintile and 49% remained in the same quintile. Thus, gains in mobility are essentially offset by losses.

However, there are clear paths to economic mobility. Workers that change jobs, in particular those that move from one industry to another, are more likely to move up.[112] Workers who move into technology-related work from non-technology fields are even more successful at improving their economic status.[113] As Figure 4.2 shows, workers who stay in the same job are not able to improve their wages. Just 17% of all workers who kept the same job moved up, and 14% of technology-related workers (compared to 25% of workers generally). But those who change jobs are disproportionately likely to move up; 31% of all workers and 27% of technology workers who change jobs move up.

Figure 4.2. Economic Mobility for Technology and Non-Technology Workers, 1996–2000



Source: Survey of Income and Program Participation, 1996 and 2000. Calculations by the author.

Even more effective is to change industry; 31 percent of technology workers who moved from one industry to another while staying in the same occupation moved up an income quintile. Finally, moving into technology is the biggest guarantee of upward mobility; 42 percent of those who entered technology experienced income gains over the four years.

If moving into technology is the clearest path to upward mobility, then IT training programs may prove of particular benefit to low-wage workers. The next section describes how workers move into IT and into self-sufficiency.

The Nonprofit IT Training Programs

The New York area cases include Per Scholas in the South Bronx and Training, Inc., in Newark. Per Scholas is a community-based, nonprofit organization founded in 1995 with the mission of repairing computers and donating them to schools that could not afford high-cost technology. Within a couple of years, it evolved into a 15-week PC technician training program, targeting extremely disadvantaged groups such as the homeless, welfare-to-work clients, and others with very low income and education. The curriculum includes some networking, hardware, and software components, as well as the A+ certification; it graduates 100–150 students per year, with a placement rate that remains consistently around 80 percent. As with all the nonprofit training providers in the study, tuition is free of charge; Per Scholas' program is funded almost entirely by foundations and corporations.

Like the nonprofit providers described in Chapter 3, Per Scholas tends to concentrate its placements at a dozen or so employers with whom it has strong connections. It has particularly good relationships with the nonprofit sector, as well as a few IT and telecommunications companies. Per Scholas has a transformative effect on its students, as the gratitude of a graduate like Fernando testifies: "I love Per Scholas. They are a part of my family; they help me. Here, it's very hard that you'll find somebody that will help you, no matter what. [They say,] 'I don't need your money; I want to help you.'" Altogether, 20 Per Scholas graduates participated in the study. This is the highest response rate of all of the programs in the sample, perhaps reflecting its success in touching the lives of its graduates. (As described in Appendix A, Methodology, all of the programs offered a sample of 50 graduates for this study.)

Training, Inc. (at Essex County College in Newark) is a branch of a national nonprofit job training organization that offers a unique workplace simulation approach to learning. By the late 1990s, it began

offering two 20-week computer-based training programs: the PC troubleshooter (leading to the A+ certification) and the software applications specialist. It targets a wide array of groups, from welfare-to-work clients to dislocated workers, and graduates about 100–150 students per year from the two programs, placing about 80 percent. A combination of private and public funders sponsors the program, including foundations and city and county government economic and workforce development programs.

Even more than Per Scholas, Training, Inc. relies on strong connections to a few employers, in particular large financial and insurance companies outside the IT sector. Because it runs several training programs, it is able to leverage contacts in these local non-IT firms for IT placements. Its strength is soft skills, as graduate Troy confirms: "Training, Inc. wants to change you from who you are to what they say corporate America wants you to be. They help you walk the walk, talk the talk through teamwork, peer support." Altogether, 11 Training, Inc. graduates participated in the study, a relatively low response rate due to the lack of reliable contact information for its graduates.

In San Francisco, the Bay Area Video Coalition (BAVC) was founded in 1975 to serve the nonprofit sector with low-cost technical assistance, equipment access, and training on the newest communications technologies. During the late 1990s, BAVC began conducting job training in web design in its MediaLink program. The 16-week program teaches HTML, web-based graphics, and project development and targets mostly the working poor, dislocated workers, and incumbent workers.[114] Graduating from 60–100 students per year, its placement rates have varied widely, from 90 percent at the peak of the dot-com boom to 60 percent at its trough. Funding comes half from the public sector (mostly the H-1B visa program and state training monies) and half from foundations.

BAVC's forte is leveraging its long-term connections to the technology, communications, and multimedia industries into placements for its graduates. Employers are confident in the BAVC education; as Chandra testifies, "MediaLink gave me legitimacy. Now I could point to technical skills and people would believe that I had them." Like Per Scholas, the response rate from BAVC graduates was very high, probably reflecting the loyalty of its graduates. Nineteen BAVC graduates are in the sample.

Also in the Bay Area, in the impoverished inner-ring suburb of San Pablo, is Street Tech, which opened its doors in March 2000. A nonprofit computer training center, Street Tech offers a six-month PC technician training and A+ certification class for adults from extremely

disadvantaged communities. It graduates 30–50 students per year, with placement rates that also have fluctuated with the business cycle, from 50 percent to 80 percent. Like BAVC, it has benefitted from H-1B funds. Overall, Street Tech derives roughly equal support from the government, corporations, and foundations.

Street Tech's placement pattern is similar to that of the other CBOs. It makes use mostly of strong connections with several large non-IT sector firms in the local area, as well as a couple of IT firms. As graduate Shandon says, "Street Tech is like a family. They inspire, push and motivate you. The teachers care; they're there to help you. At college, they don't even care if you show up. Street Tech is one of the greatest things that ever happened to me." There are 11 Street Tech graduates in the sample. The low response rate is due in part to the recession. At the time of the initial interviews, in 2002, many graduates were temporarily unemployed and did not wish to be contacted.

Per Scholas, Training, Inc., BAVC, and Street Tech all emphasize soft skills, with as much as one-third of the curriculum devoted to communication and workplace protocol, with the explicit goal of job placement. In contrast, the two Washington, DC cases, Byte Back and Alexandria Continuing Education and Workforce Development at Northern Virginia Community College offer little or no formal soft skills training and job placement.

Since the mid-1990s, Byte Back has provided advanced computer training to low-income adults in a yearlong internship program. While interning at Byte Back's community technology centers, students learn network administration, programming (Visual Basic), database development, web development, and PC hardware. The program targets low-income DC residents with a heavy focus on immigrants. It graduates 5–15 students per year and thus is much smaller than the other programs in the study. Although placement is not tracked systematically, roughly half enter computer-related jobs at the conclusion of training. Foundations and private donations support the program.

Unlike the other nonprofits, Byte Back has relatively poor connections to employers and does little formal placement. This reflects its origins as a community technology center and lack of experience in job training. However, its graduates praise its combined education and work experience approach. As Jamain says, "We were getting a pretty good bargain because ain't too many other places that you can go to that's gonna pay you, to teach you. It gave us an education and job experience. And it gave me the chance to work under pressure." Solomon adds, "It gives you community and a place to get acquainted with the American

system." Twenty-six Byte Back graduates were in the initial sample, but nine were excluded because they did not finish the program.[115]

Alexandria Continuing Education and Workforce Development at Northern Virginia Community College offers short-term training in hardware (including A+ certification), networking, web design, and database development. (Since it is affiliated with the community college, it technically is a public provider, not nonprofit.) The program started in 1998 and graduates about 1,200 students per year. Students come from a variety of backgrounds. The availability of some scholarships (funded by government programs) ensures that students from disadvantaged backgrounds can attend, although most students pay at least partial tuition. Although Alexandria offers job fairs, there are very few resources for placement, so it is largely informal. In general, its graduates recommend its courses as high quality but otherwise feel little connection to the institution. The initial sample included 19 Alexandria graduates, but four were excluded because they already had degrees in IT.

From Training to the IT Workforce: A Sample of Program Graduates

This study relies on interviews with 112 graduates who graduated in 2000 and 2001. Interview respondents were drawn from a random sample; however, some nonrespondent bias may have occurred as the least successful students were reluctant to share their experiences and the most successful students declined to participate because of lack of time. (See Appendix A for the methodology.) Of the initial interviewees, 19 were disqualified for the study because of extenuating factors such as not completing the training program, leaving 93 in the sample.[116] Program personnel agreed that the sample is generally representative of program graduates, who represent a broad cross-section of the working poor. Initial interviews took place about a year after the student graduated from the program, and most of the sample was interviewed several times over the course of this three-year study.

Relative to the U.S. IT workforce overall, they are disproportionately minority, female, and uneducated (Table 4.1); one-third have just a high school diploma, general equivalency diploma, or less. Most are in their late twenties or thirties; the average age is 35. Most (76 percent) came from jobs in low-paying and/or low-skill sectors, such as retail, clerical, or blue-collar work. Most (80 percent) were working in IT, a year after this one training program. Three to four years after the program, most (77 percent) of the 64 graduates who could still be located were still working in IT. If we assume conservatively that the thirty

Table 4.1. Characteristics of the Sample (Graduates of Nonprofit Training Programs)

RESPONDENT CHARACTERISTICS		NUMBER	PERCENT
RACE / ETHNICITY	African American	38	41%
	First-generation immigrant	19	20%
	Latino	10	11%
	Other	5	5%
	White	21	23%
GENDER	Female	41	44%
	Male	52	56%
EDUCATIONAL ATTAINMENT	Less than HS	4	4%
	HS/GED	25	27%
	Some 2-year college	20	22%
	Associate's degree and/or some 4-year college	21	23%
	Bachelor's degree and/or some graduate school	23	25%
AGE GROUP	19–29	26	28%
	30–39	40	43%
	40–49	23	25%
	50+	4	4%
EMPLOYMENT STATUS ONE YEAR AFTER PROGRAM	Entry-level IT	59	63%
	Entry-level IT related	8	9%
	Mid-level or advanced IT	8	9%
	Non-IT occupation	8	9%
	Unemployed	10	11%
EMPLOYMENT STATUS 3–4 YEARS AFTER PROGRAM	Employed in IT or IT-related	49	77%
	Employed, not in IT	12	19%
	Unemployed	3	5%
OCCUPATION PRIOR TO IT	Blue-collar or military	14	18%
	Clerical	19	25%
	High-end "helping" (e.g., nursing, social work)	7	9%
	High-end office	11	14%
	Low-end service or retail	25	33%
PROGRAM	BAVC	19	20%
	Byte Back	17	18%
	Alexandria/NVCC	15	16%
	Per Scholas	20	22%
	Street Tech	11	12%
	Training, Inc.	11	12%
REGION	San Francisco Bay Area	30	32%
	New York Metropolitan Area	31	33%
	Washington, DC	32	34%

nonrespondents are not in IT, then 52 percent were still in IT. However the percentage still in IT is likely much higher, given the distribution of

nonrespondents. Almost half came from Alexandria, which had high initial success rates, and the others came equally from BAVC, Per Scholas, and Byte Back.

Most importantly, all of these groups are making substantial wage progress (Table 4.2). From their hourly wages in their last job before entering IT (usually in retail, personal services, or construction) to their wages at the time of their last interview, in 2004, these training program graduates experience on average about a 56 percent increase in wages, from about $13 to $20 per hour. (Mean starting wages are inflated because of the workers dislocated from high-paying jobs, for instance construction, and the lack of reliable wage data for temporary or informal workers—thus, for many, the increase is even greater.) Interestingly, these increases are similar to or greater than increases noted by another recent evaluation of sectoral initiatives (employer-based job training programs focused on specific industry sectors).[117] Due perhaps to these high wage levels prior to entering IT, whites generally experience the least wage progress (an average of 43 percent). In contrast, African Americans gain about 46 percent in wages, and immigrants, Latinos, and Asians see an increase of as much as 80 percent. However, unlike the other groups, the wage growth for the African Americans in the sample seems to stagnate: the average gain was just two percent between their first interview (in 2001 or 2002) and last (in 2004), compared to 20–30 percent for the other groups.

Educational attainment also makes a substantial difference, with the less educated benefitting the most in terms of wages. With just a high school or general equivalency diploma (or less), wages increase by 74 percent, and with a college degree, wages increase by an average of 60 percent, but with an associate's degree, wages increase only by 36 percent. Not surprisingly, workers in low-paid service, retail, or clerical occupations experience the largest wage increases.

Finally, increases differ substantially by program, although these figures should be viewed with caution because of the small sample size. Graduates of the Alexandria program experienced by far the largest increase, at 148 percent—but since the response rate was very low for the exit interviews, the increase may not be significant. Training, Inc. and Per Scholas graduates also experienced disproportionately high increases (130 percent and 82 percent, respectively), due to the low starting wages of their students. It is perhaps not surprising that the largest returns come

Table 4.2. Wage Progress, Before and After Entering IT, by Race/Ethnicity, Gender, and Educational Level

RESPONDENT CHARACTERISTIC		HOURLY WAGES IN LAST JOB PRIOR TO ENTERING IT (1999–2001)[a]		HOURLY WAGES AT TIME OF FIRST INTERVIEW (2001–2002)		HOURLY WAGES AT TIME OF LAST INTERVIEW (2004) (pre-IT wage sample)[b]		HOURLY WAGES AT TIME OF LAST INTERVIEW (2004) (full final sample)[c]		WAGE PROGRESS, PRE-IT TRAINING TO FIRST INTERVIEW[a]	WAGE PROGRESS, PRE-IT TRAINING TO LAST INTERVIEW[b]	WAGE PROGRESS, PRE-IT TRAINING TO LAST INTERVIEW[c]
		$	Num	$	Num	$	Num	$	Num			
RACE / ETHNICITY	African-American	$11.02	26	$15.88	26	$15.57	15	$16.09	18	44.1%	41.4%	46.0%
	First-generation immigrant	$13.47	16	$19.68	16	$22.72	13	$22.76	14	46.1%	68.7%	69.0%
	Latino or Asian	$11.73	11	$17.24	11	$18.67	6	$21.00	7	47.0%	59.2%	79.1%
	White	$16.11	18	$17.59	18	$24.35	10	$22.95	12	9.2%	51.1%	42.5%
GENDER	Female	$11.74	32	$16.30	32	$19.89	17	$20.58	21	38.8%	69.4%	75.3%
	Male	$13.98	39	$18.26	39	$20.23	27	$19.95	30	30.6%	44.7%	42.7%
EDUCATIONAL ATTAINMENT	High school diploma, GED or less	$10.65	24	$14.44	24	$18.54	16	$18.54	16	35.6%	74.1%	74.1%
	Some 2-year college	$14.53	17	$17.74	17	$23.03	10	$23.03	10	22.1%	58.5%	58.5%
	Associate's degree and/or some 4-year college	$13.68	15	$19.58	15	$18.33	11	$18.67	16	43.1%	34.0%	36.4%
	Bachelor's degree and/or some graduate school	$14.20	15	$19.47	15	$22.27	7	$22.79	9	37.1%	56.8%	60.5%
OCCUPATION PRIOR TO IT	Blue-collar	$12.71	13	$16.39	13	$18.60	7	$18.60	7	29.0%	46.3%	46.3%
	Clerical	$11.09	16	$16.68	16	$20.62	13	$20.14	14	50.4%	85.9%	81.6%
	High-end "helping"	$14.50	5	$19.50	5	$15.00	2	$16.00	3	34.5%	3.4%	10.3%
	High-end office	$21.25	8	$20.17	8	$26.77	6	$27.70	8	-5.1%	26.0%	30.4%
	Low-end service or retail	$12.23	21	$18.05	21	$20.21	11	$20.21	11	47.6%	65.2%	65.2%
PROGRAM	BAVC	$18.17	15	$18.40	15	$21.00	9	$21.33	12	1.3%	15.6%	17.4%
	Byte Back	$15.43	8	$18.69	8	$20.67	3	$20.05	5	21.1%	33.9%	30.0%
	Alexandria/NVCC	$13.95	15	$19.56	15	$34.65	6	$34.65	6	40.2%	148.4%	148.4%
	Per Scholas	$9.73	16	$15.67	16	$17.73	11	$17.73	11	61.0%	82.1%	82.1%
	Street Tech	$10.95	11	$15.59	11	$16.56	10	$16.56	10	42.3%	51.2%	51.1%
	Training, Inc.	$6.58	6	$15.46	6	$13.00	5	$15.14	7	134.8%	97.5%	130.0%
REGION	New York Metropolitan Area	$8.88	22	$16.12	19	$16.25	16	$16.72	18	81.6%	83.1%	88.4%
	San Francisco Bay Area	$15.12	26	$17.26	25	$18.66	19	$19.16	22	14.2%	23.5%	26.8%
	Washington, DC	$14.46	23	$19.29	22	$29.99	9	$28.01	11	33.4%	107.3%	93.6%
Total		$12.97	71	$17.40	71	$20.10	44	$20.21	51	34.2%	55.0%	55.8%

[a] Includes earnings for all respondents in the year prior to the IT training program.

[b] Includes only the respondents who provided their hourly wages in the last job prior to entering IT.

[c] Includes all respondents interviewed in 2004 who were working and willing to provide their current wages.

from investing in the programs that target the hardest-to-serve so effectively. On the low end (at 17 percent) is BAVC; however, there are extenuating factors that caused BAVC to perform relatively poorly. It was hit hardest by the dot-com crash, it is more likely to serve dislocated workers than the other programs are, its graduates are often self-employed with part-time hours, and it trained for an occupation (web designer) that did not grow as rapidly as anticipated.

Outcomes vary widely among program graduates, but interestingly, overall educational background does not necessarily predict success in the IT workforce. The sample is divided into six types along two dimensions: success in IT and educational attainment. Success in IT is defined as a combination of wage progress, career progress (as measured by new work experience and/or the pursuit of further education), and stated ambition to progress in IT or a related field. Those with high success (dubbed herein "the rising stars" and "the second lives") are not only improving their wages but also adding job responsibilities, while planning to advance in IT. Those with low success ("the complacent" and "the creamers") have made little or no wage progress but are pursuing or have plans to pursue new educational or job goals. Those with no success ("the discouraged" and "the unlucky") either never made it in IT, are unemployed, or are no longer in IT. Educational attainment is high for those having a college degree (associate's or higher) and low for those with at most some college.

Table 4.3 looks at success in IT one year after graduation (the initial interview with the graduate). Over one-fourth of the sample is highly successful, and program graduates who began with relatively low educational attainment (a high school diploma, GED, or less) are relatively more likely to experience high levels of success than those with some college education—perhaps because they have further to climb.

Table 4.3. Success in IT by Educational Attainment, One Year After Graduation

EDUCATIONAL ATTAINMENT	SUCCESS IN IT									
	NONE			LOW			HIGH			TOTAL
LOW	9	18.4%	"The discouraged"	23	46.9%	"The complacent"	17	34.7%	"The rising stars"	49
HIGH	8	18.2%	"The unlucky"	28	63.6%	"The creamers"	8	18.2%	"The second lives"	44
TOTAL	17	18.3%		51	54.8%		25	26.9%		93

By the time of the exit interviews, three or four years after graduation, considerably more respondents (27 percent) experienced no success in IT (Table 4.4). In other words, some of those with low success lost or left their jobs within the next few years. However, almost three-quarters of the sample still experienced low or high success. Program graduates with low educational attainment are more likely to fail. Overall, nine moved down one category between the first and last interviews, while just four of those with high educational attainment moved down. Conversely, graduates with high educational attainment were more likely to become more successful. Ten moved up between interviews, compared to just five of those with low educational attainment.

The study measured success in two other ways as well. During the first interview, respondents were asked what their job goal was. Answers varied from "start college so I can apply for another job" to "get certified in networking" to "keep my job." By the time of the exit interview, just one-third of the sample had met their goal, suggesting both the difficulty of advancing and the ambition program graduates feel.

Finally, during the exit interview, we asked, "Looking back at your time at the training program, did it change the direction of your life in any way?" Overall, almost three-fourths of the sample felt that it had. Of the remainder (those who were either negative or lukewarm about the program), half were disappointed because they had lost their jobs during the downturn, and the other half were overqualified for the programs and felt that their time would have been better spent in college or more advanced training.

Outcomes also vary by training program (Table 4.5). The programs with the highest concentration of highly successful graduates are BAVC (63 percent) and Alexandria (60 percent). These two programs

Table 4.4. Success in IT by Educational Attainment, Three or Four Years After Graduation

EDUCATIONAL ATTAINMENT	SUCCESS IN IT									
	NONE			LOW			HIGH			TOTAL
LOW	15	30.6%	"The discouraged"	15	30.6%	"The complacent"	19	38.8%	"The rising stars"	49
HIGH	10	22.7%	"The unlucky"	17	38.6%	"The creamers"	17	38.6%	"The second lives"	44
TOTAL	25	26.9%		32	34.4%		36	38.7%		93

Table 4.5. Success in IT by Training Program

PROGRAM	% LOW EDUCATIONAL ATTAINMENT	SUCCESS IN IT, 3–4 YEARS AFTER GRADUATION						
		NONE		LOW		HIGH		TOTAL
BAVC	31.6%	4	21.1%	3	15.8%	12	63.2%	19
BYTE BACK	64.7%	4	23.5%	9	52.9%	4	23.5%	17
ALEXANDRIA/NVCC	46.7%	2	13.3%	4	26.7%	9	60.0%	15
PER SCHOLAS	70.0%	8	40.0%	5	25.0%	7	35.0%	20
STREET TECH	90.9%	2	18.2%	6	54.5%	3	27.3%	11
TRAINING, INC.	54.5%	5	45.5%	5	45.5%	1	9.1%	11
ALL PROGRAMS	52.7%	25	26.9%	34	36.6%	34	36.6%	93

also graduated most of the students who had met their initial job goal by the time of the exit interview. However, they also have the lowest percent of graduates with low educational attainment.

Per Scholas, Street Tech, and Byte Back also have quite a few highly successful graduates, which is particularly notable because these programs train a disproportionate share of students of low educational attainment. Although Training, Inc. did not perform as well as the other programs over this period, it should be noted that several of the respondents interviewed lost their jobs due to events related to the September 11, 2001, World Trade Center bombing and were subsequently unable to re-enter IT; in addition, another study has shown Training, Inc. to be one of the most successful sectoral initiatives in the country.[†] The next section discusses the trajectories associated with the two dimensions (success in IT and educational attainment) and six different types.

Low Educational Attainment, No Success in IT: The Discouraged

Overall, just 16 percent of the sample came into the IT training program with little education and then were unsuccessful at entering and/or advancing in the workforce. In general, the programs that target very disadvantaged groups—Per Scholas, Street Tech, and Training, Inc.—account for most of this group, which might be called the "discouraged."

There are three basic types of stories behind the failure. One is simply that IT was not a good fit. As one Per Scholas graduate working in customer service for computer repair admitted, "I'd like to get out of computers. This job doesn't stimulate me. I don't get to use my

[†] "Gearing Up: An Interim Report on the Sectoral Employment Initiative by Mark Elliott, Anne Roder, Elisabeth King and Joseph Stillman, September 2001, 32pp.

creativity." Still, she and some others like her have been able to leverage their work experience in IT to move up in other fields.

A second trajectory is experienced by students who were never able to get a permanent job after graduation. These unemployed graduates typically feel resentment toward the program and exhibit a sense of entitlement. As one BAVC graduate says, "We feel like [the program] made us a lot of promises that it didn't keep. At the beginning of the program, they told us that if we did well, there'd be a job for us at the end. Then, most people didn't get anything." Others never intended to get a job. As Cynthia says about Training, Inc., "Some people weren't serious because they had to do it for the government."

The final type of story is the graduate who enters IT but is unable to stay in the workforce because of a low overall educational level. For example, one Per Scholas graduate, a top-notch computer technician, worked for two years but then lost his job because of the economic downswing. With experience but without a GED, he has not been able to find another IT job since.

High Educational Attainment, No Success in IT: The Unlucky

A smaller group of students (11 percent of the sample)—the "unlucky"—have some college education but still are not able to make it in IT; most attended BAVC or Byte Back. Like the first group, many of them have simply found that they're not interested in IT, especially since the wage gains offered by the dot-com surge have evaporated. Likewise, several lost their jobs during the recession and were unable to compete against college graduates with years of IT work experience in a tight labor market. Another group of graduates with relatively high educational attainment weren't able to succeed in IT because of life circumstances. For instance Jamain, from Byte Back, got a temporary job upon graduating from his program, but then was incarcerated for a year, which complicated his job search not just by damaging his record but also by removing him from the IT "scene," with its insider jargon and networks.

Low Educational Attainment, Low Success in IT: The Complacent

The "complacent"—at 16 percent—typically have entered the IT workforce successfully, but seem to be content with simply keeping their jobs. Most have graduated from programs like Per Scholas, coming from troubled histories such as homelessness or drug addiction. For them, becoming fluent in IT is not so much about upward mobility as it is about getting the foot-in-the-door and surviving; bridging the divide is enough. For instance John, from Street Tech, dreams of becoming a policeman: "I

want to bust dealers and gangbangers." Asked how to move up the ladder at the bank where he works, he has no idea.

Some in this group actually are trying to move up, but aren't sure of the right skill sets. Danita, from Per Scholas, is frustrated that her job is part-time, but she can't seem to figure out the skills she needs to gain a permanent position; for instance, she took a Cisco course at a time when the market was deluged with Cisco trainees.

A final group of the "complacent" consists of graduates that are simply happy with what they have achieved and are reluctant to give up their autonomy by chasing work. Beth, also from Per Scholas, has the job goal of keeping her $38,000/year job as a technician: "Once I get certified, I can go somewhere and make $80,000; but I like it here because I can make mistakes. We get chewed out, but it's not like you're fired."

High Educational Attainment, Low Success in IT: The Creamers

About 18 percent of graduates might be called the creamers, after the practice of "creaming," in which programs select students who are most likely to succeed and often least in need. These are the students who need some additional training in order to enter IT, but could take out a loan for a college course rather than attending a free job training program. These creamers, who mostly attend BAVC, Alexandria, and Byte Back, have no real barriers to entering the workforce. For instance, Kenyon says, "Training, Inc. was a detour. If I hadn't gone there to get some quick training for a job, I would have finished college." Because these graduates are not particularly wedded to IT, they tend not to advance very far. Instead, they look for the next opportunity, wherever it strikes. Not all of the creamers are ungrateful; as Peter, a BAVC graduate who has worked for several years in web design, says, "BAVC gave me skills from which I could get a job. I could not have the lifestyle I have without my time at BAVC. I think about what I'd be like now. I'd probably be some administrative assistant. I have a degree in art history but I had kind of loser jobs [before]."

Low Educational Attainment, High Success in IT: The Rising Stars

About one fifth of the sample—the largest category of those with low educational levels—might be described as rising stars, coming from very disadvantaged backgrounds to be stars in the IT workforce. The programs with a disproportionate share of rising stars are Alexandria, Per Scholas, and Street Tech. Take Marcus, a 22-year-old African American initially working in construction:

> "After making seven dollars working in the hot sun everyday in construction, you can't believe in yourself—like other people can make better money, but not me...I saw an ad in the paper for A+ classes for computer technician, did some research to find out what was going on. And I read about it and I said, 'This is some pretty huge stuff.' I mean, I had never even used a computer. Mom, Dad, my sister and myself put the money down so I could go to those A+ classes."

Four years later, after taking several short certification courses in networking and hardware at Alexandria, he is making $85,000 as a senior network administrator; he has also gone back to college to get an A.A.S degree in Information Systems.

Unlike Marcus, who is a self-starter, graduates like Cheryl, a 23-year-old African American woman, have their lives transformed by the training program:

> "I went to Street Tech for basic computer training, but then I was told about A+ and all the other programs. I didn't know what it was. I just knew I had to have it...At 18, I didn't care much about college, but since I was 21 at the time, I was thinking about school more seriously. And it was because of Street Tech that I was hired at ___ Bank. The bank pays for my school now. They trained me to be certified in Dell and Dell server, and they pay for my school at [the University of] Phoenix, so Street Tech really opened up one door after the other."

High Educational Attainment, High Success in IT: Second Lives

The final category (at 18 percent) might be called the "second lives," who have substantial education but are unable to fit into the workplace either because they were educated in another country or they have the wrong skill sets. Most of the second lives are either immigrants who attended Byte Back or Per Scholas, or working poor who graduated from BAVC or Alexandria. Fernando was educated as a lawyer in Colombia, but needed Per Scholas' help to help him move out of the service sector:

> "When you come here as a Latino, 90 percent work as a housekeeper or construction or like a waiter, or something like that. They need to for the money. As a waiter, you can get $150 a day. And in construction, they can get more than you and me together, working in asbestos. But...what about in 50 years? I can't do that job at 40 or 45. And I

think: we need to approach computers, learn to repair computers, to make databases."

Marianne came to Alexandria from a background in nursing:

> "Well, you need some extra training or a refresher course or something. And that's when I decided, I enjoyed nursing but it's hard work, the scheduling is terrible, and I thought here I am, trying to raise three children. I love computers—this is really my chance to try something different. And I just happened to be reading a flyer...and saw this program, and I said, 'That's the way to get into it.'"

Unlike most of the creamers, the second lives are deeply grateful to the training program, which literally changed the direction of their lives. Says BAVC graduate Teresa, "It helped to kick us back into professional mode. The training gave us an opportunity to make a living." Further, they have strong ambitions in IT, with clearly articulated job goals and plans for how to reach them.

Overall, about 73 percent of program graduates—and 69 percent of those with no college degree—are somewhat or highly successful in IT, even a few years after finishing the program. What explains their success? Both the organization of the IT workplace and the preparation by training programs play a role in getting workers from disadvantaged backgrounds to bridge the Divide. The following looks at the factors explaining this success, including the ability to network into jobs, the acquisition of soft skills and technical skills, the availability of career ladders, and the workplace culture.

Entering IT: Perspectives on the Job Search from Firms and Jobseekers

Though the web is reducing the importance of schools as labor market intermediaries, as discussed in Chapter 3, networking through individuals, agencies, and schools remains an important way for different types of jobseekers to enter the IT workforce. The following first describes how firms recruit and how jobseekers find their way into IT initially. It then looks at how nonprofit training programs help their graduates get a foot in the door.

The existing literature shows that roughly half of all jobs, whether low-skill or high-skill, are found through contacts, but low-income, minority and/or female jobseekers will obtain a slightly smaller proportion of their jobs via contact.[118] Our initial study of recruitment for IT workers, conducted in 1998, confirmed the importance of social contacts

in the job search, but also suggested that web or internet postings were popular methods to recruit workers.[119]

Overall, patterns have changed little since that study (Table 4.6). However, interviews suggested that employers increasingly prefer using the web to personal contacts. Five years ago, as well as today, about two-thirds of all firms use the web as their primary recruitment method, but the share preferring referrals has declined from about two-thirds to just one-half. The greater reliance on contacts in previous years may reflect the tightness of the skilled IT labor market at that time; companies reported that, while they were deluged by resumes, they were having a difficult time finding workers with the right skills, such as Java and database administration. Using personal networks allowed them to screen potential workers. (As one financial firm told us, "We believe in nepotism here.")

Our interviews indicated that generally the more traditional manufacturers/retailers, financial and other service firms rely on referrals, while IT companies and temporary agencies, especially those located in suburban areas, are more likely to use the web. Interestingly, the web-based survey of IT workers conducted for this study also indicates that they were more likely to get the foot in the door in more traditional sectors like manufacturing via contacts, although other types of intermediaries still play an important role (Table 4.7).

From the 1998 to the 2003 interviews, we found slight declines in the use of temporary agencies, college job fairs, and job training programs, perhaps due to the downturn in the labor market. The use of intermediaries decreases in times of labor surplus. Among those who still are likely to use temp agencies are IT firms, while Old Economy companies and institutions are more likely to use job fairs. At this point, both our firm interviews and the jobseeker survey suggest that it is mostly

Table 4.6. Employer Recruitment Methods

EMPLOYER RECRUITMENT METHODS	1998	2003
Job search web sites, company web site, internet groups	21	23
Personal referrals and internal postings	20	18
Colleges/job fairs	10	9
Temp agencies or headhunters	9	8
Job training programs	6	6
Newspaper advertisements	5	4
Total firms:	29	36

Table 4.7. Getting the First Job by Industry, 1970–2002

HOW GOT FIRST JOB	HEALTH/ EDUCATION/ GOVERNMENT		COMMUNICATIONS/ FINANCE		MANUFACTURING/ WHOLESALE/ TRANSPORTATION/ RETAIL/OTHER		SOFTWARE/ HARDWARE		INTERNET	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
CONTACT	20	34%	14	42%	29	42%	21	35%	15	40%
DIRECT APPLICATION	1	2%	0	0%	2	3%	3	5%	2	5%
AGENCY	2	3%	6	18%	8	11%	9	15%	6	16%
SCHOOL	19	33%	5	15%	7	10%	11	19%	2	5%
NEWSPAPER	4	7%	5	15%	17	24%	7	12%	3	8%
WEB	12	21%	3	9%	7	10%	8	14%	10	26%
TOTAL	58	100%	33	100%	70	100%	59	100%	38	100%

the more traditional financial and institutional sectors, many with personal relationships with or political obligations to government-funded programs, that are still turning to job training programs for potential candidates.

Looking specifically at the type of entry-level, low-end IT occupations that the nonprofit training program graduates enter, and only at the period from 1994 on, clarifies the role of intermediaries for this group. Table 4.8 shows significant differences among different occupations in the use of networks and intermediaries. Social contacts and agencies are most important for respondents working in networking or systems administration, while computer technician jobseekers rely on a variety of means, including schools. This difference is important because nonprofit training program graduates often seek technician and help desk jobs. Workers entering web design occupations for the first time rely somewhat on contacts but also, not surprisingly, on the web.

Thus, the web is gaining in importance in the job search, but intermediaries continue to play an important role particularly for entry-level workers going into relatively low-wage IT occupations. Among this study's sample of nonprofit training program graduates, almost 60 percent found their first jobs through the program itself. Most of the remaining 40 percent, who were equally likely to use contacts, agencies, or the web, had some background or friends working in computers and attended the two programs without soft skills training or job placement (Byte Back and Alexandria).

How do job training programs help graduates network their way into IT? Nonprofits act as active facilitators by not only matching

Table 4.8. Getting the First Job by Occupation Type, 1994+

HOW GOT FIRST JOB	WEB-RELATED		HELP DESK/ TECHNICIAN		NETWORKING/ SYSTEMS		PROGRAMMING/ ADVANCED	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
CONTACT	31	40%	22	35%	19	53%	23	35%
DIRECT APPLICATION	1	1%	6	10%	0	0%	1	2%
AGENCY	8	10%	8	13%	6	17%	7	11%
SCHOOL	8	10%	15	24%	5	14%	13	20%
NEWSPAPER	8	10%	8	13%	4	11%	12	18%
WEB	22	28%	4	6%	2	6%	9	14%
TOTAL	78	100%	63	100%	36	100%	65	100%

graduates to employers through personal connections, but also by more formal processes of job development and mentoring. Networking is particularly important for graduates with low educational attainment (i.e., the poster children and the complacent), who lack the credentials to even obtain an interview. But networking alone is not enough; programs must also prepare their students by teaching them ways to convince prospective employers that they "get" IT.

As described in Chapter 3, programs often develop connections with employers either through local politics or personal relationships. Whatever the origin, the connection provides the trust that makes placement work. As Cynthia says, "It was the connections Training, Inc. had with ____ [a large insurance company]. My degree didn't have anything to do with it. The company gave us a chance when others wouldn't." Because programs like Training, Inc. have solid relationships with well-respected employers, graduates are able to leverage their initial placements into IT careers. For instance, Training, Inc. graduate Shaniya has moved up from her job at one university to another and credits the initial placement at a "prestigious" school for giving her a career ladder within the relatively high-paid educational sector.

The reference from the training program essentially substitutes for work experience, which is critical for those trying to break into IT. As Lucinda from Per Scholas says, "They helped me to get my first job, which is usually really hard because everybody wants you to have experience...It changed my life." The arm-twisting that the program director does has another function as well—building confidence in the jobseeker. As Ruben says, "I knew I had the job before I even came here.

I can sense things and I knew what was going on already and that helped, too. And I was recommended highly by the people at Per Scholas."

Good job development is critical to networking. Sarah credits the BAVC job developer: "I couldn't have done it on my own. That's the part that I was really worried about. But they had this person that did it all for you—you just told her what type of job you wanted, and she found leads for you." Mary adds, "I've been through programs where they're supposed to help you. And there's always been like missing steps. Not really knowing who to talk to, how to bridge that gap. And that's what BAVC helped me do." And from Naomi: "Before BAVC, I was trying to get into the technology field. I had some skills and connections, but I didn't know how to put it together. You can figure some things out on the web, but if you don't know what you need to do, you can't even start."

The job developer role becomes particularly important in training programs because placement has to occur quickly, before software versions become obsolete and trainee skill sets fade. On the other hand, relying on a job developer can become a liability, particularly for those with high educational attainment. As Cynthia says, "Training, Inc. can't visualize you making more than they do—their intake people make under 30—so they don't push you to go for better jobs." As described in Chapter 3, job developer networks are also geographically limited, constraining the types of opportunities available. As Troy says, "You have to go outside Newark to get a good job, and Training, Inc.'s connections are mostly in the city."

Other forms of direct networking intervention come from corporate involvement in a program, such as mentoring. An executive producer at an e-commerce firm helped Gene, a graduate of Street Tech, fix up his resume. He attributes the assistance to helping him get the foot in the door for the first time: "I've always been kinda lackadaisical about work, but he helped me be more professional."

Finally, networking with peers is important. Two years after attending BAVC, Jessica feels that the network that she built both with BAVC staff and with other graduates from her year has been critical to her job success. All of her jobs have come through people associated with the program, and she is beginning to connect graduates with opportunities as well. Graduates also initiate their own networking with acquaintances. As Byte Back graduate Ken says, "I'm concentrating on churches and nonprofits. Churches have money...They have collections. They have computers in poor repair; [they] get viruses, they don't know what to do." Likewise, Shandon from Street Tech found a job through acquaintances:

> "Well, I was going to church and a friend of mine from church had her car break down and someone called me to use my AAA card to help her and while we were waiting she gave me $10 and I went to Subway and in Subway I was randomly talking to this guy [from a computer retailer] who was going to China and that he was leaving, and I thought that this must be God or something. I went down there the next day. I got the job within a couple of days."

Another way that graduates network into jobs is by using their newly acquired soft skills to signal in the interview that they "get" IT. This signal might take several different forms. The correct appearance helps—business dress and, on a more subtle level, nerdiness. But perhaps most important is sensitivity to the language and culture of IT. From intensive training in soft skills, jobseekers gain three important characteristics: fluency in the jargon, meaning not just ease with IT acronyms but enthusiasm about discussing details such as the difference between serial and parallel ports; customer service, or the ability to listen patiently and respond carefully; and cultural ease or "whiteness," the ability to dress and speak like white corporate America.

Jabari is an example of perfect technical fluency. In our interview, he was reticent until the subject of technology came up. He became passionately animated on the subject of the evolution of operating systems, the comparative virtues of NT and XP, and why one needs a firewall with a DSL line. To an employer, this animation suggests a worker with the motivation to jump into a problem and do whatever research is necessary to solve it. As one IT firm told us, "There is a certain type of person I look for, ones that look like they spent their summers at UNIX camp."

Communication skills are particularly critical for help desk jobs. Like many of the women entering IT, Maria came from a helping profession—social work. She sees this background as key to her ease working in customer service as a help desk technician. Asked about the types of skills that got her the job, she says: "It's about personality." Her social work background showed through, and her co-workers still tease her: "Are you doing counseling again? That should be $80 per hour." Evidence of communication skills can come in the application process itself. For instance, temp agencies told us of their preference for candidates who call frequently and are chatty on the phone.

The programs grill all of their graduates on the expectations of the business culture. As noted in Chapter 3, nonprofits are more likely than other types of organizations to use techniques such as videotaping. At his program, John heard himself on a tape recorder for the first time, and felt

like his voice was "too ghetto." So now he makes a conscious effort to change the way he talks. From the firm perspective, behavioral interviewing techniques, such as role playing with irate users, can help screen for culturally appropriate attitudes.

Credentialing is another way to signal that you get it. Almost all of these programs offer a certification, and that beefs up the resume for those without any degrees. Less than 10 percent of jobs are requiring certifications according to our analysis of Monster.com data, but these program graduates wouldn't get in the door without it. Take Michelle:

> "I said, 'Okay, I've taken the A+ class and the N+ class, and I've achieved one of the certifications and am working on the others.' That was enough to get me in the door for an interview...If it hadn't been for that, I don't know, because I sent in this resume that was covered with neuroscience. They said the cover letter was so funny."

Are networks and networking skills enough to level the playing field for those without any college? Not for everyone. Troy, who says he learned how to walk the walk at Training, Inc., then says:

> "But then you're out on your own, and you start feeling like you're not sharp enough. You get down on yourself because you're not sure you have what it takes. When you look at the ads in the computer area, you realize that nothing at Training, Inc. qualifies you for those jobs. They want you to know servers, networking."

So networks may not be enough for all of the "switched-off." However, this is, for the most part, a success story. Because of networking and soft skills, it is possible to take someone with no college, give her three months of training in how to repair a computer, and place her in a job making $20,000 a year. Should she choose to return to college for a degree, the job may offer a career ladder.

Making It in IT: The Role of Qualifications

> "I love my job. Everything. It's challenging every day. Everything I do is different. Every year there are different challenges, new responsibilities, the experience continues to grow. I get more to do based on experience and trust."
> —*Cheryl, Street Tech graduate*

The two key factors shaping the qualifications required for an entry-level job in IT are the life cycle of IT occupations—i.e., the new maturity of IT occupations described in Chapter 2—and the increasing emphasis of employers on soft skills. Although research has established

the growing importance of soft skills in many occupations, there is little or no literature on the role of soft skills in entry-level IT jobs.[120]

The following looks at the types of skills in the entry-level workforce, including soft skills, technical skills, college degrees, and IT certifications, from the perspective of both employers and training program graduates. Compared to our interviews five years ago, employers are now placing even more emphasis on soft skills in their entry-level workers. This is likely due to several factors, such as bad hiring decisions made during the cycle's peak; the offshoring of more routine work, leading to more emphasis on company culture; and the abundant labor pool of workers with similar technical skills, which makes soft skills more important at the margin. Reflecting the growing maturity of entry-level IT occupations, companies are also relying less on formal credentials, with fewer requiring a college degree than did four years ago. These factors add up to continued opportunity for workers from disadvantaged backgrounds to enter IT.

At the same time, the economic downturn has narrowed that window of opportunity, since employers can readily find highly qualified and skilled workers to fill entry-level positions. Five years ago, our study found that firms would readily hire workers without college degrees because, as one firm told us, they were so desperate for people that "if you could spell the word Java, you were hired." Now they only hire people who have true Java experience or a computer-related master's degree with strong course work in Java. Applying to jobs now, Gail has noticed that "you need to know how to do everything now." Adds Paul, "It seems like I'm able to keep working but it seems like there are no permanent jobs out there. They're cherry picking is what is seems it is. They want you to do everything in your graphics job—web, print, sales, admin, everything." In addition, where opportunities exist for those without college degrees, wages and benefits are falling. Because of this competition, social networks become even more important to get the foot in the door in IT.

Soft Skills

Asked what are the most important skills they look for in an entry-level employee, almost all the companies we interviewed mentioned soft skills first or both technical and soft skills equally. About one-third of the companies added that experience was the most important way to ascertain an applicant's skill levels, both technical and soft. The companies placing soft skills first came from many different sectors, including IT services, but not hardware or software firms; these pure IT companies were more likely to value technical and soft skills equally. Because the non-IT firms

that emphasize soft skills are also more likely to hire through schools, training programs that can offer a good soft skills curriculum will have an advantage.

Five years ago, firms told us that communication skills were the most important, followed by motivation (essentially meaning personality), and then intellectual curiosity. Although companies are still emphasizing the same characteristics, this time we heard the most concern about personality and fit with the company. In particular, financial and business services companies, as well as temporary agencies, spoke about the importance of attitude and ability to work with others. Some look for compatibility: "I would rather hire someone with a great personality—someone I get along with—over a C++ nerd any day." Other companies emphasize the importance of presentation: "It is not exactly what you know; it's how you impress people....It's not what you say; it's how you say it." For some, this skill may come from a training program, but for others, they come earlier: "It's those skills that you learned from kindergarten to sixth grade. If you don't have them yet, then you will have a hard time in the work world." In fact, the successful graduates of programs without soft skills components all seem to have the right type of personality. For instance, José says he didn't miss soft skills training at Alexandria because "I already had those skills. I'm a very confident person, and I don't let a lot bother me."

Communication skills, as well as customer service, remain a strong concern. Tech support workers, in particular, need strong communication skills because, as one firm told us, "[In IT] you are dealing with people that are already frustrated and upset." It is also a matter of business value. As an IT service company told us, "It's how you communicate to the end user what you did and how you did it." Gail, a BAVC graduate, clearly understands: "I like to work with clients. The intonation is subtle, and you need to be face-to-face for a couple hours to pick up what they really want."

Another company described their customer service workforce as a machine, emphasizing the need for consistency in communication. If communication is the company's bottom line, it is likely to avoid offshore outsourcing or hiring workers with heavy accents (although the rise of on-line support helps eliminate this problem). Some argue that communication skills can't be taught, that working in help desk support requires innate patience, as well as humility. Yet one former welfare recipient from Training, Inc. claims that she learned her phone help desk techniques from raising her five children: "I have the same technique for dealing with people—I put them on hold for a minute and they always calm down."

Companies continue to look for self-starters with a high level of enthusiasm for learning, the "sponges" who love to solve problems, who will read a book to figure out what to do. Said a manager at a financial services firm, "I look for someone is who is hungry—hungry to do the work. It's so great to see when the lights come on during the training process—not someone who just wants to fill the chair." The key for these firms is worker creativity, or the ability to take a risk and think outside the box. Some described this as leadership, a concept that comprises not only creativity but also the ability to multi-task, "to walk and chew gum at the same time." IT departments want workers to think as both computer and business analysts: "It's not hardware, it's not software; it's orgware."

Technical Skills

The few firms that emphasized the importance of technical skills were very small, with only a few entry-level positions. This does not mean that technical skills are unimportant, but rather that beyond a certain basic level of technical proficiency, entry-level IT workers are expected to learn on the job. Skill sets change so quickly that depth of knowledge loses its value. As BAVC graduate Jo says, she no longer had to worry about her skills: "It was new for everyone, so it leveled the playing field."

For entry-level work in computer repair, help desk, networking, or web design, the essential technical skills can easily be obtained in a short-term training program. No more than an 8th grade level of math is required, and only rarely do workers have any college-level coursework in computer science. In fact, performance in math seems to be a poor predictor of success in getting an entry-level IT job. Asked what their worst class in high school was, half of the sample (mostly women) said math; just one-quarter of the sample claimed math as their best class.

What matters most is the ability for mechanical problem-solving. As George, a Per Scholas graduate, says:

> "You know the guy in the housing projects, the one totally covered with oil, who's under people's cars all day long? You bring your car to him because he's just as good—better—than the professional mechanic with a shop. I'm that guy with computers. I can fix the hell out of shit."

With that confidence, successful graduates like Carmen can make up for dropping out of high school in 10th grade to have children: "So I was the type of person that when something messed up like my phone or my radio, I would open it up and look and see if anything was wrong, anything was loose. And when I see that paper say computer repair and I

love computers, and I said 'I think I could do this, I would be good at it,' and I gave it a shot. It worked out."

Like Carmen, John, from Street Tech, dropped out of high school and has failed to get his GED. But his company values his work so much that they will help: "I have 5th grade math. My bosses are going to help me figure it out. Getting the diploma makes me feel like I have something."

Short-term technical training is not enough for everybody, as the discouraged and unlucky point out. Says Sarah, "I learned a tremendous amount at BAVC. It just wasn't enough once I started working." Likewise, Meredith says, "Training, Inc. doesn't prepare you for a career in technology, just a job. I'd like to know what education it would take to get into a technology career. That's not what they do."

The College Degree

Five years ago, only half of all firms told us that they require their entry-level IT workers to have a college degree, although most expressed a strong preference. This time around, just over one-third described the college degree as necessary. The firms requiring a degree were generally large institutional or IT sector employers located in the Bay Area. More likely not to require a degree were firms in central city areas with concentrations of entry-level jobs and relationships with training providers.

Employers who avoid workers with degrees cited several reasons: the inability to deal with real world technical problems; the signal the degree sends about willingness to work at the entry-level; and the relative importance of work experience.

Most prominent is employer concern about the attitude of college graduates. They "aren't willing to get their hands dirty," but they still need to be trained for the job—and they often want too much money. Working with users is difficult: "You can't blow up or speak over the top of the head with technical gobbley-gook. I need you to be able to talk with everyone." College doesn't give its graduates these soft skills, which are the one necessary ingredient for an entry-level technician. As an IT manager at a financial company said, "I can take the security guard down here and train him to be a technician" if he has a good attitude.

The degree may also send the wrong signal to some firms. One manufacturer/retailer told us that if a worker takes the time to go to college, it is a "red flag." Do they really want to be working in computer support? Others complained about the problems of insubordination:

"Those with a college degree are more of a management headache than not."

Some firms place such an emphasis on experience that, as a manager at a temporary agency told us, "I almost forget to look at their resume to see if they graduated from college." Temporary agencies are particularly likely to overlook the degree because very rarely does the employer require degrees for contract workers. Even for companies that value the degree, if the applicant has the right kind of experience, the type of degree doesn't matter. For instance, IT companies often value the experience at large IT firms like Cisco, HP, or IBM because of the amount of on-the-job training these companies do. In these cases, it doesn't matter whether the degree is a computer science (CS) degree from UC Berkeley or an information systems degree from the ITT Technical Institute. A CS degree can mask a job applicant's lack of qualifications, as in this story that José from Alexandria tells:

> "We just recently hired and fired a computer science major. He was a nice guy and all, but the Director of Operations there, she doesn't understand the fact that if you're a computer science major, you don't really know Windows operating systems all too well. You don't necessarily know that. You just know program code."

For companies emphasizing the degree, it signals that the applicant understands the big picture and has the drive to succeed. The IT department that wants its workers to be fluent in "orgware" argues that "It's the individuals that are coming out of CS, math, and physics that are able to rise above and analyze on a more holistic level." The ability to think about the big picture comes not only from technical knowledge but also the very process of getting a degree, the experience of using computers, dealing with complexity, multi-tasking, conducting research, asking questions. One institutional employer gave the example of a guy without a college education who kept trying to buy a new server every time they had a major new application. He was making the decision based on his knowledge, not the big picture; it was the safe—if inefficient—approach because, by using separate servers, unexpected snags would not occur.

A college education also signals motivation and ambition. As an IT firm told us, "Life is not easy, work is not easy, and they're not going to know that if they didn't go through some tough schooling." The companies that believe in hiring college grads referred repeatedly to their work ethic, their "voracious appetite for knowledge," their "can-do attitude," and their honesty when they can't solve a problem.

For some companies, the college degree is mandated by civil service or union requirements or is simply a matter of tradition. But for others, the decision whether or not to pursue college graduates is a personal judgment call. Recent experience with hiring workers without degrees has shown managers that the degree is no longer necessary. For instance, one manufacturer/retailer conducts systematic evaluations of its employee career paths and performance, and has discovered that some of their most competent and ambitious employees lacked the degree. Interestingly, the IT managers who feel the degree is not important tend not to have degrees themselves. While earlier generations of IT managers came from CS programs, the younger managers are less likely to hold technology-related degrees, and this in turn is reshaping the educational characteristics of the labor force.

Ultimately, most IT workers will attend some college. Our web-based survey of IT workers showed that by mid-career, most will have acquired several years of college education (Table 4.9). However, only in computer programming and database administrator occupations do the majority of workers have a degree in IT.

Of the nonprofit training program sample, about one-third want to go on to obtain a degree. These graduates are most likely to come from Alexandria, Training, Inc., and Street Tech. These three programs are all connected with a community college, directly in the case of the former two and indirectly for Street Tech, which offers the chance to take its classes for college credit. This suggests that the relationship between training programs and community colleges helps graduates think in terms of matriculating and thus become more upwardly mobile.

The program graduates who want a degree see it as critical to advancement. As Charlene from Alexandria says:

Table 4.9. Educational Attainment and Technology Degrees by Occupation

OCCUPATION	AVERAGE YEARS OF COLLEGE	% WITH IT-RELATED DEGREE
Help desk/technician	4.6	36.7%
Networking/systems	4.0	42.3%
Programming/DBA	5.2	78.3%
Web-related	4.3	42.1%
Senior or managerial	5.1	44.4%

> "I know at some point, I will have to go back to get that—at least a 4-year degree. Because it is much harder, because I have friends who have taken a lot of courses. They've gone the course route as opposed to the computer science route. One gentleman is a network person, and he makes good money with EDS, but he will plateau soon because, after a while, without the certification or the diploma, you won't go any further. Your salary will stagnate. Then people won't want to hire you because you have too much experience. DC is very much a college-or-paper town; they look for that—really...Some places you can go, and it's just experience and you wow them with your knowledge and, you know, you drop acronyms left, right and center, and that's it—they say, 'Okay, you're hired!' Other places, they really want to see structure within your resume, that you did your time in school—not just the basics—so they don't have to do a lot of training you."

For José, it's a matter of pride. "I don't want be the minority and felt sorry for...I don't want to be the one they had to hire because of equal opportunity...To me, that's BS. I want to be hired because I'm qualified." For Paul, it's survival: "If I could make $40,000 a year, it would be a godsend. The thing of it is, I've got 6 years of experience and web experience. The only thing holding me back is a B.A. They want that paper. You need a B.A. to get even an admin job these days." For Raul, it's part of networking:

> "So it's all who you know and, to get in, if they don't see college, at least a bachelor's degree—I'm working toward my associate's now, 60 credits in computer science. If I can accomplish that, this year to next year, then I figure in a good three years I'll be here—a bachelor's degree—so I can accomplish what I want. Degree and certifications to back up what I know. Then I can see myself moving on."

Not all graduates are as ambitious. Over 40 percent have no intention of pursuing a degree, although they might take more classes. For many of these, it is not for lack of interest, but the constraints of job and family. Sam from Byte Back expresses regret: "My biggest mistake in life was not finishing college—I wish my parents had been more strict and made me stay there—but I just can't do it now."[121] Many of these graduates turn to short-term certification programs instead.

Certifications

IT certifications have grown increasingly common. Over 300 certifications are now offered, many workers have multiple credentials, and almost one million U.S. workers, or about twenty percent of the IT workforce, hold certifications (Adelman, 2000).[122] Similarly, twenty percent of respondents to the web-based survey of IT workers hold at least one certification, as well as twenty percent of the nonprofit training program sample (mostly the A+ certification in computer repair). Yet certifications are by no means common in the IT labor market; in our database of job openings from Monster.com in 2002 and 2003, we found that less than 10 percent of employers were requiring certifications.

Certifications range from the vendor-specific credentials offered by large companies like Microsoft and Cisco (e.g., the Microsoft Certified Systems Engineer or Cisco Certified Network Associate), to the vendor-neutral certifications offered by companies such as CompTIA (e.g., A+, Network) (Table 4.10).

Employer views on IT certifications (such as the A+ and networking certifications from CompTia, Novell, and Cisco) are mixed, with about half in favor and half strongly opposed to them. In general, firms located in the central city, with concentrations of entry-level jobs, and in sectors such as business or IT services, view IT certifications as useful.

Table 4.10. Common IT Certifications

CERTIFICATION	SPONSORING ORGANIZATION
A+, Network+, i-Net+	CompTIA
MOUS, MCSA, MCSE and MCDBA	Microsoft
Java Certification Bundle	Sideris Consulting Group
CWNA, CWSP, CWNI, and CWNE	Planet3 Wireless
CCNA, CCIE, CCNP	Cisco
CIW Master Designer Certification	The Career Center
SSCP, CISSP	International Information Systems Security Certification Consortium
RHCE	Red Hat
CAN, CNE, Master CNE, CDE	Novell
ODA, ODO, OAD, OCSD	Oracle

IT certifications may signal ambition, give workers marketability, and make sense organizationally. According to employers, IT job applicants who complete a certification program typically have more of a sense of urgency than the college graduates and, thus, are hungrier for the work. In particular, employers see the A+ as providing important foundational training, a platform that allows workers to grow in different directions. Some large outsourcers also use certifications as a way of structuring their contracts, since it makes it possible to do warranty work for manufacturers.

On the negative side, companies argue that the certification may signal lack of ambition, a "technician for life" role. A company that helps its workers get certifications even told us that the certification can be dangerous, as it gives workers a false sense of security that they can market their skills. But the main complaint companies have with the certification process is that it produces "paper-certified" workers who have little idea how to perform the tasks. As one IT company said, "Our experience has been that certification isn't enough on its own. It tells you that they can do the job, but it doesn't really tell you how good they are at it."

Some training programs put a lot of pressure on students to get certified. One private training school told us that "if you're not certified by Microsoft or Oracle or Cisco, then your chances for getting a job are slim to none"—despite the fact that very few jobs ask explicitly for certifications. Many students also believe that certifications are important. As George, who has mapped out the series of certifications he wants to get, says, "With the CCNA, then you've really made it."

Clearly, certification helps students—even those like Chuck, who has a college degree—get the foot in the door:

> "Yes, it did help because, when they hired me, they wanted somebody that knew something about laptops and desktops and equipment, so they saw the A+ on my resume and that's what prompted HR to call me, to see if I would be able to do what they wanted."

But Cynthia is probably right that "you don't need it once you get your foot in the door." Focusing on acquiring certifications may actually be a futile distraction for less-educated students who will need a degree to make any substantial progress in the IT workforce. As discussed further in the next section, few of the students are as savvy as Diane, a grad from Alexandria: "You never know when that [certification] trend is going to end, so I have to be prepared for the future because...if somebody is looking for

someone to promote, then of course, they're going to want somebody with a degree." Michelle from Alexandria adds:

> "That's why it makes me sad that people are working so hard on certification when they should really just get an entry level position. They say you can get your MCSE in 6 months and say the average salary is $65,000. They take advantage of people. Come to Washington sometime and ride around in cabs and ask the cab drivers what country they are from and what they did before they did before they got a job and they all have a MCSE."

Conclusion

In the tight labor market created by the dot-com frenzy, employers relaxed their hiring requirements for entry-level IT jobs. With the increase in customer interaction and project teamwork that has occurred in the new economy, employers emphasize soft skills more than college credentials and certifications. Even when firms prefer the college degree, it is often because it proxies for personality characteristics such as motivation and intellectual curiosity.

In the current, softer labor market, companies are tempted to take advantage of dislocated advanced-level IT workers who are overqualified for entry-level positions. In both the San Francisco and New York labor markets, underemployed systems analysts and network engineers will take help desk positions at a pay cut. But companies debate the advantages of hiring the overqualified. Many firms across different sectors told us that they try not to hire overqualified workers because of the potential problem with turnover.

However, a few companies raised counterarguments. In anticipation of future skill needs, one IT firm looks for workers with broad skill sets to save training costs: "We can buy it cheaper than we can build it." Another exception is companies located in labor markets with a captive workforce; for instance in Sacramento workers are likely to stay, because of low housing costs. Finally, there are the companies that emphasize experience over technical or soft skills; for these firms the computer support is critical to survival, and new employees need to be responsive immediately.

The downturn has meant increased competition for IT jobs, which has renewed the emphasis on formal credentials. It is still possible to get an entry-level job with good soft skills and basic technical skills, but because of the competition with college-educated jobseekers, training program graduates will increasingly need to rely on networks to get the

foot in the door. Moreover, in this climate, advancement becomes more difficult without a college degree, as explored further in the next section.

Advancing in IT: Career Ladders and Training

> "I'm a first generation woman of color, and I'm in technology! But I haven't made a lot of progress like you're supposed to. I don't have a house, a family, or a full-time job. We're indoctrinated in these stages of life, and I feel like I'm behind and can't catch up....You know what my job goal is? I want to go to the doctor and the dentist. I want new glasses and a pap smear."
> —*Teresa, BAVC graduate*

Career progression in IT is rarely a simple linear movement from technical support to management. Most companies offer limited opportunities for advancement within IT, so career progression most typically occurs not through career ladders but lattices, in which workers advance through moving laterally to other divisions within and outside IT. As a recent U.S. Department of Commerce report notes,

> "Rather than moving step by step up a career ladder, IT workers often manage a portfolio of skills ("the skill set")...Individual technical skills in the portfolio may increase or decrease in value, depending on the skill currency or size of demand in the market. There is no common path to building the skill portfolio. In addition, frequent changes in technology and difficulties in forecasting future skill needs mean that IT workers are often left with little guidance on what training to acquire for long-term success in the IT field."[123]

For women and minorities, both of which are overrepresented in this sample of disadvantaged workers, this lack of clarity about advancement is compounded by the "glass ceiling" in IT—i.e., the barriers to advancement which have caused these groups to be underrepresented in management.[124] These factors have led firms to become more proactive about defining potential career paths. In turn, this has helped some graduates of nonprofit training programs move up. Yet, others have not; altogether, only half of the sample has succeeded in moving up within IT thus far, whether because of lack of demand, the difficulty in navigating the educational system while working, or because they are content simply to have crossed the Divide into a livable wage job.

Career Ladders

Asked about advancement, almost all of the firms interviewed claimed that there are opportunities to grow within the firm (findings similar to our study five years ago). The few exceptions were small firms and small IT divisions in the institutional sector. The following describes company efforts at career development, typical career ladders, and strategies for advancement. Yet, it is worth noting that career ladders internal to the firm are not necessarily the best path for advancement. This study and others show that changing jobs and industries helps increase upward mobility.[125]

Most of the larger companies with mature HR departments conduct career development of some kind. This varies from the uniform career paths at large IT service firms ("We need one model of people for one model of services") to the more flexible, jointly negotiated plans found at mature firms in other sectors. For many companies, career development makes sense from a managerial standpoint, since it helps both to conduct strategic planning and to reduce turnover: "From a management perspective, you need to create jobs to keep people excited and growing." On the other hand, supervisors spoke to us of a disincentive to do career development—after providing extensive on-the-job training in IT, employees often move on to other firms.

Asked to describe typical career ladders, firms typically mentioned advancement within a track. Starting from tech support or customer service, workers may move either into support coordinator positions or into desktop, applications, or web support. From there, if they acquire further outside training, they may move into network administration, systems analyst, or other infrastructure positions. Large, centralized firms also suggest moves (with further training) into programming, database administration, applications development, or engineering. As one financial firm said, "The help desk has been a feeder for other groups."

But many companies caution that the rapid advancement of the dot-com period is over. "People come in and expect to advance in two years, but the progression isn't as quick right now." Particularly for workers without a college education, career ladders take time to construct. As an IT firm told us, "The college-educated employees tend to have a little better understanding of what it takes to move up."

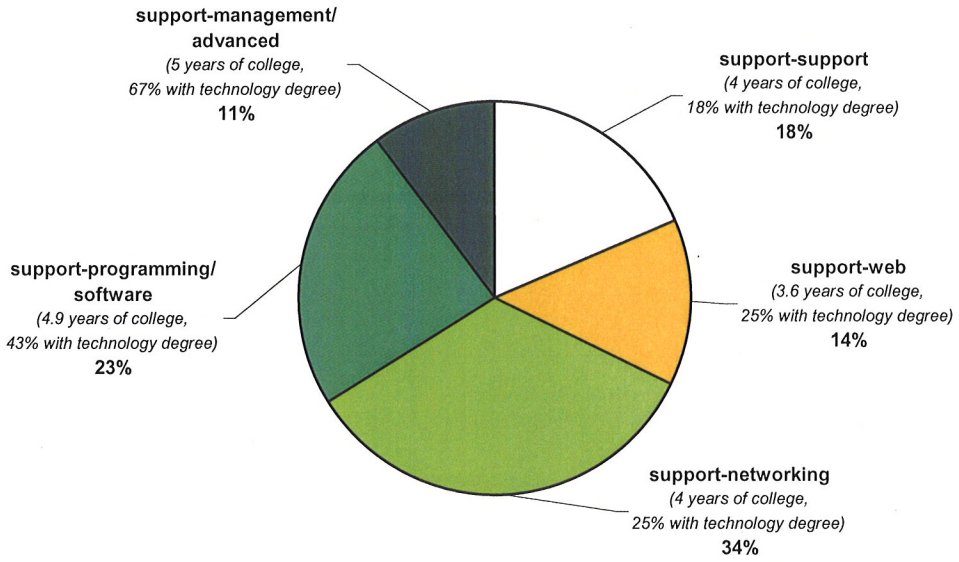
Data from the web-based survey of IT workers suggests that most technical support workers do move up into other areas. Asked what their next job will be, just 13 percent of support or help desk workers say they will remain in support. Indeed, looking at the career trajectories of the workers who started in technical support, just 18 percent have remained

there over the course of their IT careers; the largest share of workers has moved into networking, while others with more college and technical (computer-related) degrees have moved into programming or management (Figure 4.3). Most of these workers are self-taught in addition to college-educated. The main difference between those who remain in support and those who move into programming is where they first obtained IT training. Half of those who remain in support started in technical school, while half of the workers who advance were first exposed to IT in high school.

In contrast, workers in web-related occupations almost all plan to continue working in web design or applications. Figure 4.4 shows the career trajectories of web-related workers. Only a few (less than 30 percent) move out of web-related work into other IT-related fields; these lateral movers are also more likely to hold computer-related degrees.

Given the difficulty of advancing within a track, firms also look for alternative ways to create career lattices. But because the skill sets vary so widely between IT subfields such as hardware and web design, shifts into a different division altogether, such as business (deployment) or accounting, may be more likely. This typically occurs once entry-level employees have advanced several levels within their own track and can bring their technical expertise to the new area.

Figure 4.3. Career Trajectories and Educational Attainment of Workers Starting in Help Desk/Support Occupations

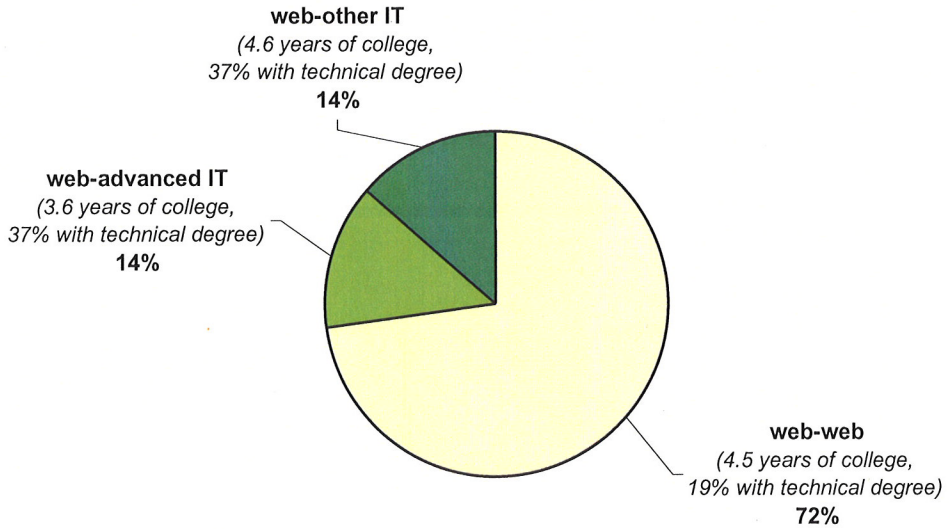


Proximity is key to developing career ladders or lattices within firms. Both the decentralization and outsourcing of different IT divisions have made internal advancement more difficult, and in some cases, impossible. For instance, many firms separate IT support functions geographically from IT development, making it difficult for employees to develop the networks and expertise to advance internally. With high turnover in technical support, some large firms are exploring ways to develop internal career paths to slow attrition. In general, however, IT career lattices are increasingly casualties of geography.

While outsourcing IT tasks may make advancement opportunities inaccessible for some, firms argue that when outsourcers hire their employees, it provides new opportunities to promote these workers. As a financial firm told us, "There's not much promotability in a workforce with 800 IT employees." In contrast, outsourcers like IBM and HP have about 100,000 IT jobs, so they can actually do career development.

But when firms use offshore outsourcing, these opportunities for advancement are eliminated. For instance, one IT company grew most of its own talent internally, from its Level 1 and Level 2 support. But since moving these support functions to the Philippines, it has had to recruit externally at the more advanced levels. Apart from the difficulty of

Figure 4.4. Career Trajectories and Educational Attainment of Workers Starting in Web-Related Occupations



inculcating these new employees in the company culture, the major impact of this division of labor is to make the job duties of senior-level employees more comprehensive (i.e., job enlarging). With no entry-level employees to problem-solve simple help desk problems, programmers and developers must take on these additional duties. This, in turn, leads to cost inefficiencies.

Thus, for reasons of cost and corporate culture, many firms are interested in recreating the internal career ladders lost in the reorganization of the IT sector. But are IT workers, particularly those from disadvantaged backgrounds, able to take advantage of this opportunity? As the data on wage progression shows, the sample respondents on average made substantial wage gains (about $3 per hour) between the first and last interviews. Altogether, 31 of the 64 respondents (48 percent) we were able to follow up with in 2004 had advanced in their careers, as measured by substantial wage increases, usually with new job duties.

Yet, advancement (as measured by wage progress) differs across groups, with some stagnating after graduating from the program. For instance, while whites on average gained over $5 per hour between the first and last interviews, African Americans increased their earnings by just $0.21. Women gained twice as much as men, on average, and workers with an associate's degree saw wage declines while those with a high school diploma gained over $4 per hour. And even if half of the sample is upwardly mobile, only a quarter have a realistic strategy for moving up even further. In their exit interviews, many seemed to be reaching a "glass ceiling," unable to figure out how to advance. As described next, some plan to advance using training they obtain on-the-job and others through education—but many are failing to move up at all.

Advancing Through Experience and On-the-Job Training

Many believe advancement will be possible within the same company. As Cheryl says, "There's so much opportunity for growth, it's unbelievable...All of the technicians that I met when I first started were there 10 or 15 years. The lowest was five years. So they hold onto people." Two years later, her perspective was unchanged: "I'm staying as long as they keep me. It's hard for me to believe. It's not a choice for me. It's a once in a lifetime opportunity."

In fact, one-fifth of the sample actually took a pay cut to enter IT because of their belief in the potential for advancement in IT careers. Like Per Scholas graduate Ruben, these workers map out a cautious strategy to move between firms:

> "I want to have at least two years' experience before I start doing anything because every time I looked at a job on the internet...they want one to two years' experience or better. I'm in no rush. I want to get my skills up better and get better and better and better. ...It pays to sometimes wait and, like what happened to one of my co-workers—he started at the top, he graduated in my class, started working for Lucent Technologies making $85,000 a year...Now he's not working...So I'd rather start down and work my way up instead of be at the top and then come down...Because you see yourself progressing."

For many, the career goal—and the rationale for entering IT—is to own their own business, and the way to achieve this is through self-training. Although just a handful have actually become independent contractors (mostly web design graduates from BAVC), many perceive IT as the opportunity to work on their own. For instance, BAVC graduate Rafael has grown his own web design business to a sustainable level. He preserves his independence: "If they come to me, then they're mine. But if I go to them, then I'm theirs." Growing the business entails constantly learning new skills in web design and programming, but Rafael learns from manuals and hands-on experimentation, not classes.

Advancing Through Education and Training

Companies described three paths to advancement: certifications and training, college education, and soft skills. For most, college education is the surest route.

Large companies with formal career ladders often promote workers based on a new certification earned through training, often provided by the company. While work experience is the key to proving their value to the company, the certification shows the motivation to move up. One IT company has developed a system for on-the-job training based on temporary absence from the company. When staff go on leave or are moved to cover special projects, the position is opened up to the staff below that level, to give them new experience and skills.

Most of the companies we spoke with offer some form of training. As opposed to our study four years ago, when most only offered in-house training, most firms now rely on external vendors for training in addition to on-the-job training. The change may be due in part to the slower pace of business generally; now companies can spare employees for a few days of outside training. In general, smaller firms rely on external vendors, while IT firms do training internally. Cynthia, from Training, Inc. has followed this path. Her employer, a large insurance company, has

supported her A+ certification and MCSE class at local training schools through New Jersey incumbent worker training funds.

Although employees may advance into supervisory positions based upon on-the-job training, they typically need some college education to move into either management or other IT divisions. Going back to college shows an interest in moving beyond narrow problem-solving, an interest that entry-level technicians or web developers are not able to demonstrate.

However, it takes tremendous initiative for workers to complete a degree while working full-time. A small proportion (about 10 percent) of the training program graduates in the sample are attempting it; most are working towards degrees in IT or computer science. Many more aspire to go to college but seem unable to manage it. Factors that seem critical to inducing program graduates to go back for the degree are the accumulation of some previous college credit (e.g., through training programs that offer credit, like Street Tech); financial support (especially from large employers like Cheryl's who help pay for schooling); and consistent mentoring, as in Shandon's case:

> "While I was at Chevron, this black dude said I needed to get a degree. He was preaching at me so hard to go, I was like, 'Man!' People had said that to me before, like my parents and the folks at _____ [a mentoring program], but you need to know it inside yourself. It's not going to come just from people pushing you. It has to be at the right time."

But many, like Danita, seem unable to keep up, despite the desire to advance. The routine nature of some entry-level IT jobs makes it difficult to acquire new skills. "For the past two years, I've been dormant and behind in my studies. I need to get on my toes to get out of here. I need to get into a job where I can learn where I work."

Failing to Move Up

Fully one-half of the sample of training program graduates (all of those with no success in IT and many of those with low success as well) are not planning to move up within IT. One-third of these never made it into IT and have given up; one-third are victims of the downturn, now trying to move out of IT; and the rest are either content with their current job or unable to move up because of lack of higher education.

Many of those that have failed to move up were the "unlucky" ones caught in the dot-com craze and subsequent crash. BAVC graduate Jay dropped out of a college biochemistry program to learn web design because "people in dot-coms were wiping their butts with money." Three

years later, he is out of a job. BAVC graduate Maggie turned down a job paying $55,000 for one paying $45,000 with prospects for advancement, only to get caught in a wave of downsizing; she went back to her career as an art teacher.

Likewise, Kenyon, who was working as a $47,000/year computer technician when we met in 2002, had a clear roadmap for advancement: cleaning up his credit, getting money in the bank, training in UNIX and Oracle ("so I can move to $80,000 quickly"), and eventually getting a degree and moving into management or another field, like real estate. But his company, a large New Jersey manufacturer, laid him off shortly thereafter, and when we spoke in 2004 he had been unemployed for a year and was retraining in HVAC at an expensive private trade school.

At the time of his initial interview, George had plans to expand his consulting business while working full-time at a computer retailer. Asked what his long-term job goal is, he said:

> "I have my own consulting business. I have a big house, I'm relaxing, I have a million dollar business, I'm a multimillionaire. My wife, I tell her we're going to have a seven-bedroom house, and she says, how am I going to clean it?"

But shortly after our first interview, George lost his job, and he has yet to return to IT. He is one of the "discouraged."

Others (generally the "complacent" type) simply lack ambition. Finding a stable and challenging job is enough for those like BAVC graduate Philip: "I want to work for a place that is established and has a creative outlet. I'm not so much concerned if it has a job ladder." For José, out of Alexandria, advancement is a long-term goal. Asked if he can advance in his company, he says:

> "Yeah, but I don't want to. I want the least amount of stress, so that I can still study and put all my effort toward certifications. I'm not looking for advancement. I'm just looking to get my probationary period over with. And then when I'm with another company that I truly like, then I will look toward the realms of advancement. But for right now, it's not a key issue."

For some of the less-educated workers in the sample, the problem is not lack of ambition but the lack of educational credentials, especially the high school diploma. Chia, recently laid off from his job as a network administrator at a bank (due to outsourcing), may have to take an entry-level position in tech support because he lacks any college. With no high school diploma, he had networked into his job through Street Tech; he

obtained his GED while working full-time but was unable to continue college coursework. He doesn't really want a tech support job, but "it's probably what I'm qualified for." In response to a question about whether he would look for a new IT job, John, also from Street Tech, says "No, because I don't have a high school diploma and I forgot my A+ certification because we don't use it here so I'd be kinda scared to try a new tech position."

Conclusion: Career Ladders in IT

Teresa from BAVC now works full-time as a web designer, so she finally got her pap smear. Reminded of her comment almost three years earlier, she says, "That's still my job goal! I'm in pursuit of teeth cleaning." Her job pays $35,000, with little or no opportunity to move up for someone with no college degree—and no dental benefits.

Ideally, a study of career ladders in IT would follow workers for at least a decade. This study was only able to track students for three to four years after their graduation from a short-term training program, finding that half had advanced. The question remains whether they will be able to continue their upward mobility. In part, it depends on the ability of employers to provide opportunities. But since real mobility comes from changing jobs and industries, it will ultimately depend on the ability to obtain a degree, whether a high school diploma or a four-year bachelor's degree in computer science. Without it, people like Teresa who live in expensive high-tech regions are entrenched among the working poor. As discussed further in Chapter 5, there are few resources for such workers to continue their education.

Workplace Culture and Diversity

One key factor affecting the ability of disadvantaged workers to enter and advance in IT is workplace culture and diversity. This study's employer interviews suggested that workplace culture—in particular, the formality of the work environment—is related to diversity in the workforce. The more formal firms are more likely to have guidelines in place regulating the recruitment of a diverse workforce and advancement of employees. Although workers at informal firms may in fact be more tolerant of diversity, in practice they may operate more like old boys' networks. About half of the companies described their culture as formal. In general, the more formal firms are large business, financial, or IT service firms hiring many entry-level workers and located in the central city. Informal firms are often younger IT software or hardware (so-called pure IT) companies.

The more formal companies stress either the nature of IT or the company's identity as the key reason to maintain a culture of formality. For IT support divisions, responsibility, punctuality, and professionalism are critical—and are often monitored through customer satisfaction surveys. If diversity is important to the company, it may also be important to develop a formal business culture to avoid conflict between different groups. One manufacturer/retailer argues also that their profits are driven by their company values, such as integrity and empathy, and in order to maintain their values, they need to develop a diverse workforce and inculcate them with these values. To do this, the company culture must be formalized; their values are described on their website and communicated in the recruitment process.

At present, the companies that characterize themselves as more informal tend to be small government agencies, manufacturers/retailers, or small IT companies, located in the Bay Area. At one company, the corporate culture actually has a name, "The Grooves," with the idea that company success depends on the empowerment of individual employees. Several IT managers characterized their own division as an island of informality in a more formal corporate culture. Sometimes this is made possible by separate locations for corporate and support divisions. For instance, one company has strict rules about dress, body piercing and tattoos, "so if corporate is coming to visit, the guy with tattoos wears long sleeves." In other cases, the informality results from the lack of diversity in terms of gender and race/ethnicity: "It's like a fraternity here."

Diversity

Our 1999 study found that while diversity was important to some firms, most IT divisions were actually quite homogeneous, dominated by white males. The lack of diversity seemed to result in part from the hiring through networks that was prevalent during the boom. In contrast, more firms characterized their workforce as diverse at this point; over half indicated that they were concerned about company diversity. However, a careful look at the attitudes and language about diversity suggests that it remains a complicated issue.

During the peak, several companies made strong arguments to us about how workforce diversity made it easier for them to access new markets. In the more recent set of interviews, companies were more concerned with diversity in terms of strengthening the organization and representing the communities they serve; in particular, firms located in central city areas were more intent on diversifying. Companies like this saw IT as an opportunity to bring diversity into the organization: "In IT

we have one of the more diverse departments in the corporation. In technology, common terms are used, no matter what language you speak." Another type of firm concerned with diversity is the large, mature IT service firm. These companies are looking for new strategies to maintain diversity in the face of global locations, mergers and acquisitions, and outsourcing/contracting relationships.

However, the current emphasis on cost containment has made diversity a secondary concern for many. As an institutional employer told us, "I'm pretty blind to diversity. I'm more concerned with skills and performance. That's the only thing that matters to me." One manufacturer/retailer told us bluntly, "We don't have much color here." A company that five years ago told us, "We target a diverse worker pool because we target diverse markets," this time said, "Nothing is conscious or intentional. We don't have any quotas. It's hiring the best person for the job with the right skill set." Although it is unknown whether the company has actually changed its policies, clearly the attitude toward diversity has shifted.

Outsourcers face particular difficulty in trying to develop and maintain a company culture. Several companies mentioned the difficulty of keeping a consistent culture across different U.S. regions and, increasingly, global locations. Moreover, many employees of outsourcing firms are embedded in their clients' environments and experience difficulty integrating the two company cultures. Similarly, location can shape company diversity; having multiple locations makes it more difficult to maintain a company policy on diversity.

The use of temporary agencies presents another challenge to maintaining a diverse workforce in IT. Although some companies are committed to diversity, most are not, and temp agencies follow their clients' lead: "Because of who we are, we have to toe whatever line the company wants." Almost all of the recruiters we spoke with do some screening for the employers, based on their awareness of employer preferences in terms of candidate characteristics, particularly race: "There is an unspoken racial profiling that goes on." However, preferences remain unspoken because of the liability issues. If a company makes a specific request, the recruiter will respond, "I didn't hear that, okay?" They can only screen based on a "BFOQ," or bonafide occupational qualification.

Most of the time, recruiters focus on finding the right match for a company in terms of fit with the corporate culture: "Like I always say, you don't want to place Jerry Garcia at Wells Fargo." But as recruiters told us, sometimes they define fit based on group membership, without really

thinking consciously about it. (As one described it, "John, no; Tom, no; Maureen, yes.") As one temp agency reluctantly told us, "The more you, as an interviewee, reflect the personality of the interviewer, the higher your chances of getting the position. I suppose that could, in some people, translate into cultural or racial issues." As the use of temporary agencies grows, this "racial profiling" presents a challenge for diversity in the IT workforce.

Asked about diversity, companies revealed a variety of ways of thinking about it. The more mature companies that had thought about diversity defined it broadly as race/ethnicity, gender, age, education, disability, lifestyle, region, sexual orientation, and income. Some chose to emphasize race/ethnicity, but then ducked the issue of representation in favor of communication issues associated with immigrants. Others were more comfortable discussing diversity in terms of the company's division of labor between women and men. The following looks in more detail at issues of race, ethnicity, and gender in IT.

Race/ethnicity and immigration in IT.

Several firms described their workforce diversity in terms of different ethnic groups, without seeming to realize that some groups were not represented, particularly African Americans. For instance, according to one IT company, "What we have in IT feels like a good representation of women, Hispanics, Asians and Indians." We heard similarly from an institutional sector employer, which has formal diversity goals: "I always look at who is the most qualified candidate, whether they are Caucasian or Asian."

Companies spoke highly of their immigrant employees, except for the issue of language, which is so critical when performing customer support over the phone. Hiring workers from India and China has helped companies feel like their workforce is diverse and given them new respect for non-American workers. One financial services employer who hires many Indians on H-1B visas argued that the Indian workers value their jobs more and don't "cause trouble" compared to their American counterparts, who cost more, are less productive, and have an attitude of entitlement.

In the sample of training program graduates, few have experienced outright racial discrimination in the workplace. However, Alexandria "poster child" Marcus, who comes from a working-class African American background, does feel condescension from co-workers:

> "People walk by and say 'Good job.' But what it is, is not a good job, but a shock that I'm doing well. And they

> don't understand that I have dealt with that mentality since I was 10 or 11. I realize that at first they didn't think I could do it. All of them didn't think I could do it...Now they can't live without me, but it doesn't matter—it's business and they're using it."

But for some, the most difficult hurdles come from within. Asked if he felt like he fit in at work, Shandon from Street Tech says,

> "Let me tell you the truth. It just felt weird. People accepted me, but as far as me accepting myself there. That was the thing. I wasn't used to it. You have to fake it until you make it. People have this categorical system in their minds, like you're working this job, so you should act in a certain way. And naturally as human beings we want to perfect ourselves. I didn't feel like I could do it."

Likewise, Maria, a Latina from Alexandria, was very worried that people at her government agency would stereotype her: "You come to the committee and all you see is white people. You think, is my accent going to stereotype me as stupid or dumb?" She gained respect over time, but at one point she "thought I wasn't going to make it."

Women in IT.

Emerging from our interviews was a clear sense of a division of labor between men and women within IT. Several companies described concentrations of women in customer service, web development, and business analyst positions and a lack of women in the areas of networking and engineering. Some companies even seem uncomfortable with women working in hardware. As Michelle from Alexandria says:

> "I can't tell you how much it drove me crazy when I first got hired there, that nobody would let me carry a computer. All these men—and the attorneys – oh, my God—if you crawled under their desk to fix a cable or something, it would just panic them. They wouldn't know what to do. There's this woman crawling around on their floor. And they would say, 'No, let me call Jeff, let me call Jeff, Jeff can do that.'...I've definitely had to train people to accept me in a role that would allow me to do things like move hardware, move computers, move heavy equipment. But I've definitely broken that barrier."

The most salient trend among many different companies is to place women in management positions, a surprising finding given the lack of women in IT management.[126] For instance, a manager at one large IT company told us that only six percent of her support staff are women,

while 62 percent of the managers are. Women end up in management because of their strong communication skills, their ability to manage conflict, and the way they handle feedback from their supervisors. One financial company even told us that women are simply more marketable than men: "The most attractive candidate for any upper-level IT job will be a 45-year-old woman with the technical background and the business/communication skills."

Of course, there are exceptions. One HR director at an institutional employer told the story of a woman who wore pants all the time and wasn't getting promoted: "You can't tell her that it's because of how she dresses, or she'll realize that the system is unfair and take action. But that's really the problem. It's hard not to be able to tell someone." With the supervisory levels still dominated by white men in their 40s, hiring still occurs by the logic of the old boys' network; there is a preference for hiring men in their own image (but younger) and attractive women.

Yet while companies clearly desire more women in management, they often experience difficulty in recruiting enough women. "I've tried to hire women, but if they are sharp, they're gone," according to an institutional employer. Several told us that women simply did not see the career track, either because of family responsibilities or a perception based on previous battles in the IT culture that it would be very difficult to advance further. Connie, a Per Scholas graduate who is now a systems administrator, confirms this: "If you want to move to higher levels as a female [in the tech field], you have to be willing to devote much of your time because every few months there's something new that you have to learn to stay on top of it. Am I going to devote that kind of time to a job? No. You want to have time for the other parts of life, like a family—the quality of life things."

Part of the problem seems to be company expectations of women who advance. For instance, Chandra wants to advance into a more technical and creative role, but she feels like her bosses want to "turn me into an admin person." Likewise, BAVC graduate Lola wanted to move into Oracle, but her boss said, "I don't really see Oracle on your career track."

The advent of the web and the downskilling of IT occupations are changing the relationship between women and technology, both gendering IT work and empowering women. Web design has attracted women into the profession and, in turn, feminized the work approach. According to BAVC graduate Marianne, "The hardest part of my job is psychological, coaxing the customer to make a decision while making them feel like they

made the decision themselves." As many of the female BAVC grads work for themselves, they speak glowingly of their new autonomy: "Having 150 dumb clients is better than one dumb boss." Likewise, as technical support becomes a low-skill occupation, more working poor women and their families can be expected to cross the Digital Divide. As former welfare client and Per Scholas graduate Tamara says, "Now my kids say, 'I want to be a computer tech like Mommy.' It is hard to get to used the computer in our house—my teenage son will say, 'Wait a minute, I'm downloading something.'"

Conclusion

Although the IT workforce remains homogeneous—white and male—in many companies, there are suggestions that the IT workplace is becoming less exclusive. First, the increase of immigrant minorities in the workforce has brought diversity. Second, despite the scarcity of women and minorities in college computer science programs, the rise of entry-level IT jobs has created new entry points for these underrepresented groups. The presence of a more diverse workforce may be slowly changing some attitudes. For instance, although women continue to be underrepresented in management, there is a growing perception that women are particularly effective managers. This, in turn, should help more disadvantaged or underrepresented workers join the IT workforce.

Conclusion

Street Tech Poem: Digital Monster
Brandon Moore[127]

Towering, menacing above me
Speaking, crying, whispering for me to come inside
and see
There was a door in the middle of 23rd
Yes a big big door in the middle of the street standing erect
The monster calling me hither pushing urging commanding
me to open its wooden frame
So I arose standing in front —No choice—
I opened the door
Slowly with fear in my heart looking down as if shy
then I lifting my eyes upward—I saw—I saw—
A new world!!!
Yea man I saw a new world!! One foot forward and
the door shut, locking itself, I cried for help but all
I saw was computers on
the shelf!

> I saw new age soldiers computers on their backs
> linked to satellites rotating the heavens
> 1's and 0's everything either on or off backward or forward
> hard or soft but I remained strong—in this binary world—
> the monster had pushed me forward into a new world I
> knew nothing about, separated, yes divided from the rest as
> they ran forward, I tried to start a stride but my feet were
> stuck—yes due to lack of knowledge of this world I
> couldn't move, backpedaling on cords and strings tripping
> on power supplies and outlets which hung from the dark
> sky like a dream, I was dying like the others their bodies
> canceling like word perfect windows I pushed myself to my
> feet and beheld a fountain from behind, drinking, I drank,
> as a camel in the desert, drinking, I drank of knowledge and
> grew strong enough to run—yes strong enough to run.

Brandon's tribute shows how programs like Street Tech can "switch on" their graduates. Crossing the Divide is not just about access to new networks and skills, although these factors are critical. It is about seeing the new world of technology and becoming "strong enough to run." In their exit interviews three or four years after they finished the program, graduates were most likely to mention exposure to technology—an area they would never have felt comfortable in prior to the program—and new confidence as the biggest impacts of the programs on their lives.

Learning about computers is a giant step towards upward mobility. As Jamain explains, "It's been very, very beneficial to realize how important computers are in our society. That's why I got back in school." Although many of the training program graduates had used computers in high school, most were too intimidated to consider a career path as an IT maintainer, creator, or even user. As Marcus, the $85,000/year systems administrator from Alexandria, says:

> "I had tried everything else. I was a certified nursing
> assistant, did construction, worked at Foot Locker, did
> sales, tried to sell alarm systems, tried to be a
> teller...Computers was the only thing that I never tried.
> Glory be.... The computer training I got, it got me in the
> door and allowed me to see that, with training, I can do
> more. I saw the opportunities and saw the minimal
> requirements for opportunities."

The major incentive to enter these training programs is that they are free. That attracts low-wage workers who cannot see a viable way to exit poverty, like Raul, a Colombian immigrant:

> "Of course, first of all, it was a free program, and it just
> happened, they just came at the right moment because I

> was living on minimum wage. I didn't think that computers were necessary. I didn't choose it because I wanted to be a computer person. It didn't cross your mind that I could do that. But then everything took place. It's a very good way to make a living. I do think that I am lucky."

Because it is free, it also draws students who are comfortable with technology but intimidated by college-level coursework, like Cheryl: "It [Street Tech] reinforced my direction...I always wanted an IT degree but I couldn't afford it...I had the opportunity to get it for free at Street Tech. It's unbelievable."

The training programs give their graduates the confidence they need to enter technology. Most importantly, the programs are hands-on and results-oriented in a way that many community college and trade school courses are not. Graduates particularly benefit from programs like Byte Back, where students intern for a year at community technology centers around Washington, DC. Thus, Andrew from Byte Back credits this approach for helping him get the foot in the door: "With the hands-on experience, I was able to land my first job as a PC support."

But the mentoring and peer support these programs provide are also important. For Street Tech graduate Rod, the confidence of the program staff in him was what made the difference:

> "I got out of the California Department of Corrections in January, 2001. I was looking for a new direction. My life of crime didn't pay off. I trained a bit and got up to a computer program in Solano. I got out and was told that I would never find a job. I almost went [fell] for it. Someone told me about Street Tech and I applied. I drug my feet because you think folks will say no. But Coretta, Paul and Jesse [program staff] told me that if I hit the ground running, I would do well."

Confidence comes not just from support but also from working on interpersonal skills while at the program. Even Patrick, who didn't make it in IT, describes how critical the soft skills were for him: "Just being able to communicate with people about how to understand something—to ask, relate. I got more out of the life skills more than anything else."

As this chapter showed, the intensive involvement of the nonprofit training programs, particularly their ability to prepare their students for the corporate world and place their graduates through contacts, puts many disadvantaged workers on the road towards livable wages and upward mobility. The increased diversity in the IT workplace has also helped nontraditional workers feel more welcome.

Of all the programs, the one public program, Alexandria Workforce Development Center at the Northern Virginia Community College, was arguably most successful. Only 13 percent of its graduates experienced low success (i.e., dropped out of IT). Yet, like most community colleges, Alexandria has a different target population of students who generally have more education and confidence to start with. This raises a key question: whom do these programs benefit most?

Upward Mobility for Whom?

> "[My training] took the stigma out of college. I thought that only rich kids went to college. That's for rich parents and rich kids. I put some effort in and I got something out." —*Marcus, Alexandria graduate*

This chapter showed that most training program graduates do well in IT, contradicting the prophecies that those with little education will be "switched-off." Just over one-fourth of the sample didn't succeed at all, either losing their first job or never even getting the foot in the door. The others are evenly split between those who have held onto their jobs and perhaps improved their wages but are unable or uninterested in moving up further, and those who have added new responsibilities in IT jobs and made substantial wage progress, typically because of new education. Given this mobility, it is not surprising that three-quarters of the sample said that the program made a difference in their lives.

But the programs don't work as well for some. For Gene, who has a college degree: "It [Street Tech] worked for a little while but it didn't last." He would probably have benefited more from work experience and advanced IT training. In part, training doesn't last because technology changes so quickly. Says Jamain, "I learned a little bit of everything [at Byte Back] and I'm starting to lose it a little now. It's hard to keep up with technology." Wanda, also from Street Tech, regrets that she took time out of college to join the program, "now that I'm 24 and see other people my age graduating with their B.A.s..." Asked if the program made a difference in his life, Jabari from Per Scholas says, "No, because it's about the same field that I was in. I have two-year degree in electronics. I was building them and now I just service them. I'm falling into the same thing."

The graduates who are disappointed in the programs are either unsuccessful (the "discouraged" or the "unlucky") or the "creamers," those who were relatively overqualified for the program and thus couldn't take advantage of what it offered. This suggests first that the programs need to screen more effectively, and secondly, that they should try to

provide training only for the most needy students—i.e., those without a college degree.

Although those who came to the training program with a college degree did slightly better than those without, there was still remarkable success—69 percent—among those with low educational attainment. These graduates were indeed more likely to move down than up between the initial and exit interviews, but a remarkable share, almost 40 percent, were highly successful in IT. They are the "poster children" of IT training, able to benefit from the second-chance employment and training system where they had failed in the public educational system. The more educated graduates of programs like BAVC will undoubtedly go further, quicker, in IT, but they could have drawn upon other resources. Ruben, the former chef at Per Scholas, or Rod, straight out of prison into Street Tech, could not.

Next Steps for the Second-Chance Employment and Training System

Most of the training programs have mastered placement for their graduates, but few seem to help graduates with upward mobility over the long term. For many from disadvantaged backgrounds, the programs seem to be a necessary first step into IT, but not sufficient for upward mobility. Although many have achieved upward mobility, it is becoming more challenging since the downturn.

The graduates who are able to move up tend to think of the training program as part of the larger educational process, not a one-time event. Take Connie, who has advanced in her job while going to college part-time: "So, yes, Per Scholas is great, but people shouldn't think that Per Scholas is their entire work goal. It's only one part." Or Raul, who also went on to college: "Actually, I see Per Scholas as a stepping-stone. It wasn't like you were gonna go to Per Scholas and everything was gonna fall in your lap."

To help graduates move up after their first job, providers will need to integrate their short-term training program into a larger educational system. One way is to build closer links to colleges—e.g., as Street Tech has through articulation agreements with Contra Costa College. Even counseling about how to manage college would benefit many. Dafina, from Byte Back, also stresses the importance of offering more advanced courses for graduates and using alumni as mentors in order to keep the worlds of training and employment connected. Most of the other programs actually do this, but resources are too scarce to accommodate more than a small number of graduates.

There is far more demand than the handful of programs like Training, Inc. and BAVC can possibly meet. To have a real impact on upward mobility for disadvantaged jobseekers in high-tech regions, the number of these programs will need to grow significantly. Marcus says, "I don't want to be a special case. I don't want to be the success story. I want to be one of many. More people should take advantage of training." But WIA makes it more, not less, difficult for successful nonprofits to find funding. The next chapter looks in more detail at policy implications for the study.

CHAPTER 5
Conclusion and Policy Implications

Conclusion

This study examines the potential for disadvantaged individuals in high-tech regions to cross the Digital Divide into jobs in the knowledge economy. Despite growing bifurcation and inequality, many of the "switched-off" are able to access jobs and achieve upward mobility, in part, through nonprofit job training programs that help them network into jobs. The emergence of entry-level IT jobs has made this transition possible, and despite recent job losses, the growth of entry-level occupations will likely continue, particularly in high-tech regions with smaller metros and a scarcity of entry-level occupations.

Labor market intermediaries, particularly training providers, play an important role for jobseekers who end up in the second-chance employment and training system. Although this study focused on training for IT occupations, its findings are likely generalizable to others as well. Training providers can be effective if they are responsive to the regional economy and train in technical and soft skills that are applicable across a variety of job environments. Crossing the Divide is about access to new networks and skills, but most importantly, gaining confidence in using technology and interacting in corporate settings. The majority of training program graduates remain in IT four years later, with substantial wage progress. For many, particularly those able to obtain a college degree, a clear career trajectory lies ahead. Because they are in technology occupations, upward mobility may be feasible, particularly if they move between industries.

Unfortunately, these training programs emerged in spite of, not because of, the Workforce Investment Act. Although government funding (such as the H-1B program) supports such programs in some states, these nonprofits rarely qualify for WIA training monies. For instance, Per Scholas—the nonprofit that trained Ruben, the former fast-food chef who introduced Chapter 1—is in New York, which provides training for a smaller share of its WIA participants than almost any other state. Such innovation and responsiveness to labor market opportunity is left to foundations to fund.

Key to provider effectiveness is responsiveness to employer demand, particularly relationships with employers and ability to train in soft skills. However, WIA does not necessarily reward the most effective programs. Because of its emphasis on "customer choice," it funds training

in occupations that may not be in demand in the regional economy (as shown in Chapter 3). Its requirements make participation onerous for both public and nonprofit providers, which is unfortunate because nonprofit providers not only play a critical facilitator role in helping jobseekers transition to work, but also may have stronger relationships to employers, particularly local firms. Finally, it incentivizes programs to cream, or select the least disadvantaged candidates for programs, despite the fact that the hard-to-serve benefit most from short-term training programs. The following looks at the implications for policy in more detail, relying largely on interviews with workforce development officials in the San Francisco Bay Area and New York metropolitan region.

Policy Implications

These findings have policy implications for the second-chance employment and training system. Perhaps most importantly, IT job training does help most participants find jobs and is particularly effective for more disadvantaged participants. But WIA does not dedicate services to low-income adults in the way that previous job training programs did: while 90 percent of adults receiving training under JTPA had to meet an income eligibility test, WIA gives states discretion in whom to serve.[128] Thus, the ease of obtaining training under WIA varies by state, since WIA offers states considerable flexibility in implementation. From 2000 to 2002, 83 percent of WIA participants in New Jersey received vouchers for training, compared to 51 percent in Connecticut, 26 percent in California and just 11 percent in New York State.[129] In other words, a disadvantaged adult living on the New Jersey side of the Lincoln Tunnel is seven or eight times more likely to get training than one on the New York City side!

Although the implementation of WIA makes it more difficult for the system to serve the most disadvantaged, there are ways that the system could support the types of nonprofit training providers shown to work so well in this study. In addition, the system's lack of responsiveness to employer demand suggests the need for intermediaries that can link economic and workforce development more effectively. There are experiments emerging across the country to do just this.

Serving the Disadvantaged Under WIA

The key changes under WIA are the one-stop system, the use of vouchers for training, and the performance standards for job placement and other indicators. One-stop centers simplify access to a variety of services by consolidating 17 programs under one roof (either through on-site co-location or electronic referral). The vouchers (individual training

accounts) allow participants to choose the appropriate training program for themselves (the "customer choice" model). While under JTPA there were contracts with a small number of providers, WIA certifies a large pool of training providers as eligible to participate in the system, thus inducing competition among providers for students. If these providers do not meet the performance targets, they will be dropped from the list of eligible providers.

This new emphasis on universal service, flexibility, and accountability has changed the landscape of job training dramatically for both jobseekers and providers. Because resources are devoted to a variety of jobseekers, far fewer adults are being trained, with a total decline of as much as two-thirds.[130] Moreover, these changes decrease the likelihood that the hard-to-serve will get training. Although Congress is likely to revise and reauthorize WIA in 2005, it is unlikely to address these problems, which are examined in more detail next.

The one-stop model.

With its shift in focus to employment services for all jobseekers, WIA privileges universal access to job search assistance over the traditional mission of job training programs—skills upgrading for the disadvantaged. To create the one-stop system, local workforce investment areas had to shift resources out of training and into resources that can be used by most, such as computers for job search. Few anticipated the logistical problems associated with creating one-stops. According to a New York area WIB, "It has been very difficult getting all the services in one place; often there are real estate problems, parking problems."

The one-stops are required to offer three tiers of service: core (basic services such as job search assistance); intensive (staff-intensive services such as assessment and case management); and training for eligible individuals. Offering core services absorbs much of the budget at one-stops, leaving little money for training. To become eligible for training, jobseekers must fail to get a job through core and intensive services. But getting a training voucher is also a subjective process; one-stops differ considerably in who they select for training.[131] For instance, a Bay Area one-stop has its counselors use five criteria to determine who will get training: where the jobseeker lives, whether s/he needs and wants to work, whether s/he can benefit from training, whether s/he has demonstrated follow-through, and whether s/he is likely to end up employed through their mutual efforts. A New York area one-stop gives out vouchers on a first-come, first-serve basis. Another New York area

one-stop has a checklist to determine how transferable their skills and work experience will be to the training and then a new job.

Typically, the result is "creaming," or selecting those with greatest prospects for success rather than most pressing need. With performance measures that emphasize successful placement, retention, and credentialing, one-stops are under pressure to select the clients most likely to succeed for scarce job training vouchers, who often come from relatively privileged backgrounds. Overall, over 60 percent of voucher recipients in the regions studied were low-income, but selection varies by state, from a low of 60 percent low-income recipients in New York to a high of 95 percent in Connecticut.

However, some WIBs and one-stop operators argue in favor of the shift to universal (or core) services. Creating an agency that provides employment services for different groups of jobseekers removes the stigma for disadvantaged groups of depending on government social services. The system creates new efficiencies in service delivery. As a New York City one-stop pointed out, "Before we used to train them all. But a simple referral may be all they need." In defense of creaming, a Bay Area workforce development official says, "A lot of people lack basic skills—soft skills. There are a lot of people with learning disorders and other things out there. Until those things are resolved, a lot of training will be lost on them."

Under the proposed WIA reauthorization, it seems even more unlikely that the hard-to-serve will get training, since some versions of the bill prioritize training for the unemployed rather than low-income jobseekers.[132] As discussed next, the use of vouchers also complicates training the hard-to-serve because it makes it more difficult for providers targeting the disadvantaged to continue training.

Voucher system and provider participation.

Probably the biggest change that WIA has brought is a new landscape of providers participating in job training for the disadvantaged. Before, under JTPA, the Private Industry Council gave out contracts to providers to train in selected occupations. This created an inefficient situation both by committing government to fund a large number of slots in each classroom and by pressuring administrators to keep funding the same places, regardless of performance.

Now, the voucher system under WIA creates a new set of issues. As noted in Chapter 3, the playing field is not level, with participation particularly onerous for public and nonprofit providers. The shift to a customer-based voucher system from the contract system under JTPA has hit nonprofits particularly hard. With just one or two WIA clients in each

class and few resources to redesign curricula to compete for enough non-disadvantaged students to fill the classroom, the small providers can no longer offer the programs, even if they are effective at training. As SER-Jobs for Progress points out, this is ironic because JTPA and private foundations have typically held nonprofit community-based organizations to a placement standard of 85 percent or higher, while placement through the community college system is notoriously low.[133] Although it is difficult to analyze CBO participation systematically, WIBs and one-stops in Connecticut, New York, and the Bay Area reported in interviews that many CBOs that used to participate in JTPA have gone out of business.[134]

Under the voucher system, clients remain free to choose any WIA-eligible provider as long as it meets performance standards. As a result, WIA students are dispersed among many different programs. Moreover, many states have reduced voucher money. For instance, New York has decreased funding from $4,000 per voucher to $2,600. For the more intensive programs, it will simply become impossible to participate in WIA. For most of the nonprofit IT training programs described in this study, costs run from $5,000 to $10,000.

Other problems hindering the participation of nonprofits are eligibility rules and the paperwork burden. To become eligible for WIA funding, training providers in most states must be accredited under the Higher Education Act or National Apprenticeship Act. Alternatively, providers who offer a training program that leads to a certificate, degree, license, or new competency may apply for eligibility under procedures established by each state. These rules have meant that many private and public providers are automatically eligible for WIA, while many nonprofits have had to reapply to offer training programs that government had previously funded under JTPA.

Although large providers have little problem dealing with WIA-related red tape, requirements such as the need to resubmit course offerings each year for approval burden short-staffed nonprofits.[135] Making it even more difficult to find resources to comply are regulations for nonprofits: CBOs are not allowed to keep extra revenue from training, while private and public providers are.[136] Likewise, nonprofits lack the staff resources to manage the new paperwork.

Clearly, not all nonprofits deserve to be funded. As a New York metropolitan WIB pointed out, "A lot of that job training money [under CETA and JTPA] was wasted. If we cut billions, it's because that money was just being thrown away." Several WIB officials suggested that competition has raised the bar and the nonprofits need to restructure themselves, to diversify their services. Yet, this study shows that CBOs

play an important role in the transition to work for the disadvantaged. As one New York area WIB official argued, "The CBOs provide more options for those with the greatest barriers. The problem is sorting out the good ones from the bad."

Participating in WIA is also difficult for community colleges. Most onerous are the performance standards requiring that they show outcomes for all of the students in a class, even if just one is attending through WIA. The structure of the community college system also presents obstacles to participation. Course offerings change from semester to semester; the semester schedule restricts when courses can be offered; and colleges are unable to add courses quickly. In Connecticut, New York, and New Jersey, community colleges have made special arrangements with the state in order to participate in the system. But in California, the community colleges have essentially been shut out.

Thus, rules for provider eligibility make it more difficult for the providers that are most effective in serving the disadvantaged to participate. Just as the one-stop system encourages creaming, the regulation of participation results in funding for the organizations that need it least, rather than those with more pressing needs—and arguably, more effectiveness.

Performance measures and incentives.

The purpose of WIA is "to increase the employment, retention, and earnings of participants, and increase occupational skill attainment by participants, and, as a result, improve the quality of the workforce, reduce welfare dependency, and enhance the productivity and competitiveness of the Nation."[137] Thus there are multiple goals with the long-term end of facilitating both economic development (i.e., improving the capacity of workers to participate in the economy and thus their self-sufficiency) and growth.

To achieve those goals, workforce development systems are to meet the objectives of placement and retention in jobs and increases in earnings and skills (measured by new credentials). These (along with customer satisfaction measures for businesses and clients) are the WIA performance measures. Except for the satisfaction measures, the performance measures evaluate outcomes, or the benefits to clients from participation in the program, rather than goals, or the extent to which the system is creating economic development and growth (which would be very difficult to measure).[138]

Ultimately, the effectiveness of the performance measures depends on how well they measure outcomes, address overall goals, and are

enforced. But as Chapter 4 showed, outcomes are multiple and complex and depend largely on the starting level of the participant. Moreover, the measures are ineffective at assessing overall system performance. Although core services constitute the bulk of workforce development activities, the WIA standards measure outcomes only for intensive and training services instead of the whole system. The customer satisfaction measures fail at the most basic task, evaluating whether the system is helping to address labor market failure, since they only ask businesses and clients who come in the door to evaluate their services.

Providers must meet performance standards or else face removal from the eligible provider list. As it turns out, performance standards have proven not very difficult to meet and sanctions are not as effective as anticipated, in part, because removal from the list is not the threat it was supposed to be. The next section focuses on these shortcomings as well as the ways that the performance measures, particularly placement, force creaming.

Measuring placement. Perhaps the biggest problem with measuring placement is the difficulty in determining the role of the training program in making the placement occur. For instance, the placement rate may include graduates who are placed in jobs that don't use new skills from the program or who are returning to jobs held prior to the training program. There are three basic flaws with the system: unclear definitions of a placement, unclear responsibility for placement, and weak compliance monitoring. These flaws again add up to a tendency to cream in selecting trainees for the programs.

Most states have adopted the definition of placement (a.k.a. "entered employment") from the Carl D. Perkins Vocational and Technical Education Act of 1998: the percentage of program completers who are placed in further education, employment, or the military within the six months following program completion. But both interviews with WIB officials and the provider survey indicate that many providers are not aware of this definition. Over two-thirds of the providers surveyed do not count continuing education or training as a placement; many require the graduate to find the job in three months or less; and some only count full-time work in a job related to the skills obtained. Some are lax about how they define placement. For instance many, particularly in the Bay Area (where enforcement is poor), only include people actively searching for jobs in their placement statistics, thereby inflating their results substantially. Because the placement statistic does not take into account how long the job lasts, many count jobs lasting 30 days or even just one day as a placement.

The confusion is due in part to lack of clarity on the part of policymakers, but also to the fragmented structure of funding. Different funders, including labor, education and economic development agencies as well as private foundations, apply different definitions for placement. Typically, foundation standards are higher than the government's, so the nonprofits who rely on foundation funding have developed far more sophisticated tracking systems than the private providers have. For instance, the survey showed that nonprofits tend to be particularly strict about not counting forms of employment such as internships, self-employment, and contract employment as a placement.

Likewise, many WIA-eligible training providers have never participated in the workforce development system before and lack both the understanding and capacity to meet its requirements. Many providers complain about WIA placement requirements, claiming, "We're not in the placement business." [139] To avoid worrying about placement, providers select students carefully.

Providers don't have to do placement well partly because compliance monitoring is often ineffective. In general, the one-stops are responsible for reporting on the measures to the WIB. One-stops either gather the information through the Unemployment Insurance (UI) system or through the providers themselves (in states like California that have not yet implemented automated tracking). Whichever method is used, there is considerable leeway in how providers and one-stops define performance. For instance, the UI system can report a new place of employment, but not at a high enough level of detail to know whether the new job is related to the job training obtained or is a temporary placement. Even if it reports the same place of work, providers can claim that the job duties changed due to the program. Because it does not track self-employment, the UI system falls particularly short in tracking the many IT jobs that are contract positions.

But results may be even more suspect when reported by the provider. As one Bay Area one-stop told us, "Schools place people in internships for 90 days and call it a placement. In actuality, they have very low placement rates. The state is supposed to monitor this, but they don't have anybody in place, so it falls on us, the counties." The providers themselves use a variety of methods for tracking students, but most rely on student reporting; only a few report requiring employer verification of employment.

Given these problems with defining and monitoring placement, it is not surprising that WIB officials in both the New York region and San Francisco Bay Area suggested that the placement measures do not reflect

the reality on the ground. Yet somehow, whether due to faulty reporting, confused definitions, creaming, or program effectiveness, most have actually met their performance targets. The inflexibility of performance targets, which are negotiated with the state WIB and national Department of Labor, should have become an issue in slow economic times, when the targets are impossibly high.[140] For instance, in California, negotiated performance levels for the state are 68 percent for placement, 76 percent for retention, $3,600 in wage progression, and 50 percent attainment of a credential. Yet most states have met high targets, even in times of recession because, according to a New York area WIB official, "They're managing the front door." The system seems to encourage mediocrity: as another New York area WIB official said, "I'm tired of systems where floors become ceilings, where people say, 'We hit the floor; didn't we do a great job?'"

Other performance measures. The retention and wage progression measures also are problematic. Overall, 63 percent of WIA-eligible training providers monitor retention. Nonprofit providers, as well as providers located in New York, are significantly more likely to track graduates than public or Bay Area providers. Again, this difference probably occurs because nonprofits must follow the more stringent requirements of other funders and because WIA implementation has generally been more lax in California than in the New York region. Although some WIBs incentivize retention by withholding 25 percent of the voucher payment until a 90-day or six-month retention deadline has passed, many providers simply refuse to monitor retention because it is not cost effective. As a New York area WIB that pays 25 percent upon retention explains, its providers charge so much that "they can avoid tracking their graduates, forego the 25 percent, and still make 40 percent profit."

The wage progression measure is ineffective for more disadvantaged program graduates because it encourages providers to place graduates in the jobs that pay the most rather than those that fit best. As one nonprofit provider warned, this is a "situation set up for failure" because the job will not "realistically" fit the student's skills and the student may quit or get fired. Some providers succumb to pressures to place graduates in high-paying temporary jobs instead of intern positions with the possibility for advancement.

Like the placement measure, the need to meet wage progression standards induces one-stops to select trainees carefully. For instance, the wage progression measure will be more favorable for a long-term unemployed worker who gets a minimum wage job than a dislocated IT

worker who must be retrained as an HVAC installer. So this creates a disincentive to send high-end workers for training, in favor of training for a job that is much lower in wage and quality.

Conclusion. Under JTPA, the government had the ability to influence the quality of programs through negotiations with providers. Now, using the more "objective" performance standards, it is more difficult to force a program to change. Providers regularly manipulate performance measures and few have been sanctioned. As a New York area official told us, "We've lost leverage with the voucher system. We can't tell them to change the program if it doesn't work. Being able to withhold money used to be our only source of leverage."

But most importantly, the pressure for high placement rates means that providers will select trainees carefully, typically choosing those with more skills to start with and perhaps other resources to draw upon. Under JTPA, there was an incentive to serve the disadvantaged: the more difficult the clientele served, the lower the targets became. Now, since the performance measures don't take into account the starting skill level of clientele, providers see little reason to target the disadvantaged.

Alternative ways of measuring success.

> I have learned that success is to be measured not so much by the position that one has reached in life as by the obstacles which he has had to overcome while trying to succeed. —*Booker T. Washington*
>
> "Isn't training an outcome?" —*New York workforce intermediary*

The WIA performance measures focus on outcomes related to training: skills obtained (credentials), placement, wage gains, and retention. However, training program participants experience a variety of outcomes that help them progress toward self-sufficiency. Performance measures, and program evaluations generally, can gauge these different forms of learning and other reactions in addition to changes in skills and economic performance.[141]

The key question in evaluation should be whether programs help jobseekers find jobs. Chapter 4 showed a variety of ways programs assist graduates to enter the workforce. Most important, according to the successful program graduates, was not the technical skill but the self-confidence that comes from being exposed to technology in a hands-on learning environment. Simply finishing a training program can be a significant confidence boost to a high school dropout. Also key are

networking skills: new connections to the corporate world, a new community of peers and mentors, even a new language in which to communicate about technology.

Training programs often plant a seed in their graduates that leads to outcomes down the road. For instance, one private training provider told us of a woman who could not find a job after the program, but ended up volunteering at her church using her new computer and software applications skills. She was later hired into a bonafide tech position. This progress toward self-sufficiency not only creates economic development, but is measurable, leading some to call for such new performance measures.[142]

How might an evaluation take a graduate's progression from confidence to employment into account? Currently, WIA sets numerical outcome targets (e.g., placement rates). To measure how they are helping graduates progress towards these targets, programs might establish outcome indicators that reflect the observable and measurable milestones toward an outcome target.[143]

For instance, milestones for the job placement target could include the number of job applications submitted and interviews attended, as well as indicators of increased self-confidence. Such indicators might include using new skills (e.g., tinkering with the computer at home), obtaining more education, removing barriers in other areas (e.g., getting out of debt), taking on new responsibilities, or even making new network contacts. All can be measured, although it would probably be necessary to utilize qualitative methodology to understand how the participants grow and change in response to program inputs, given the context of their lives.[144] Of course, some outcomes—such as the emotional transformation many program personnel have seen in their graduates—will remain too intangible to measure. But focusing on measurable progress toward self-sufficiency would help eliminate one of WIA's biggest shortcomings, the tendency to cream.

In the administration's proposed reauthorization of WIA, the number of performance measures has been reduced (from 17 to 8), with a new efficiency measure (total expenditures divided by total number of individuals served) replacing customer satisfaction and credentialing. Not only does this remedy fail to address the problems with creaming and the placement measure, it privileges low-cost strategies above system effectiveness.[145]

Given the ongoing problems using WIA funds to serve disadvantaged jobseekers, difficulties lie ahead for regions with concentrations of poverty and inequality. Yet if WIA could at least help

solve labor market failures by responding to employer demand, maybe it could at least meet its goal of enhancing productivity and competitiveness. Next we look at the extent to which WIA has helped to create a demand-driven system, as was envisioned.

Linking Workforce Development to the Regional Economy

> "For the one-stops, employers are an after-thought. I call it the duck-and-cover approach. The approach is to send someone out to a job and hope it works. If not, you give up on that employer (partly out of shame). I was a job developer once. You are thinking of the job seeker and that is it." —*Bay Area WIB official*

Chapter 3 showed the discrepancy between occupation of training and job demand in New York and San Francisco. Jobseekers are choosing training in occupations (e.g., clerical work) for which there is little or no demand for labor. The workforce development system under WIA is still a supply-driven system. Training and placement services cater more to the wishes of jobseekers than to the needs of employers. To make workforce development work for economic development, the system should link training programs more effectively to the regional economy by using data and resources more strategically. This would mean the abolition of customer choice in favor of more guidance. Another important step is to use the WIB or alternative labor market intermediaries more effectively to build connections and partner with employers.

The idea behind the customer choice model was that one-stops would provide full information about training and labor market demand, enabling jobseekers to make informed choices. Under this model, a jobseeker who possesses a training voucher may choose among training providers. Most one-stops do require clients with vouchers to visit three schools and do labor market research on job openings before selecting a training program. But access to information is not equal. Many large providers can afford to advertise heavily and also may showcase their programs in brochures displayed at the one-stops. In practice, "reverse referral," in which providers send prospective students to the one-stop to obtain a voucher, is also common.[146]

One-stops actually do try to influence the type of training obtained, typically through lists of occupations in demand. The problems with this approach are twofold. First, these lists, provided by the state employment security departments, are rapidly out of date and may in any case reflect forecasting assumptions more than actual projections. Second, while the

lists assess labor market demand, they do not look at supply, so they fail to provide an accurate sense of openings available.

For instance, one New York area one-stop director told a story about trying to discourage a bus driver who wanted training as a printer: "We had to persuade him that he wouldn't get to use his experience, he wouldn't be able to compete with the guys with printing experience, and it wasn't a growing sector." That one-stop would look more favorably upon a jobseeker with computer experience who wanted a Cisco certification. Yet, at the time, the regional job market was deluged with unemployed Cisco-certified IT workers, and labor market demand depends on the supply of jobseekers.

Thus in practice, many guide customer choice—and not in a way that responds to the regional labor market.[147] Customer choice is not the "vision for a matrix of information, customer-informed choice" intended, as one of its designers told us. How might it become more responsive to employer demand?

Some argue for working within the existing framework of WIBs and one-stops. As a New York business leader on the state WIB points out, their mission is economic development, "delivering resources to opportunities." As policy bodies, WIBs can identify economic strategies and design a comprehensive system of service delivery. The challenge is to make the system flexible and responsive enough to identify the opportunities.

But some question whether the WIB can ever overcome its institutional limitations effectively enough to begin to connect workforce and economic development. WIBs are simply not effective intermediaries for reasons of history, culture, staffing, and their role as public institutions.[148] One telling example comes from the employers interviewed for this study. Of the 49 companies interviewed, just a third had even heard of the programs at the state and local labor agencies and the one-stops, and among those companies, reactions were uniformly negative. Even an employer on the New York WIB told us, "I wouldn't call the one-stop! It has a long ways to go. But I'm encouraged."

There are also few incentives to connect workforce and economic development because of the scale of the Local Workforce Investments Areas. Although some LWIAs are identified with cities, most are organized around counties or groups of counties.[149] Yet there are few, if any, mechanisms at the county level for economic development. Thus, only the WIBs that coincide with municipalities are properly incentivized to link workforce and economic development. Further, although labor markets are regional, low-wage labor markets are more likely to be

local.[150] Labor market intermediaries function locally. Chapter 3 shows how training providers, particularly the nonprofits, develop the strongest connections with employers in the immediate area. Most importantly, businesses tend to have both a stake and a personal interest in their own communities.

Given these shortcomings, it is not surprising that other workforce intermediaries are emerging across the country in a variety of institutional forms, led by different combinations of businesses, community colleges, CBOs, unions, and government agencies—many working closely with local WIBs.[151] In general, these intermediaries have had much greater success at innovating than stand-alone WIBs have; they build partnerships from the ground up that leverage resources from a variety of sources.[152] As a New York area WIB official stated simply, "Intermediaries have no baggage."

Although there has been little systematic evaluation of these efforts, there is some suggestion of what works. Several studies of sector initiatives (collaborative workforce development efforts to both improve firm productivity and benefit low-wage workers in a single industry) have indicated that they are effective; well-documented successes include the Wisconsin Regional Training Partnership, Project Quest, WIRE-Net and others.[153] A recent study of six workforce development collaborations in California also shows how cross-sectoral intermediaries (business, education, and government) are able to mobilize resources effectively.[154]

Many other initiatives focus on creating career ladders into livable wage jobs in sectors such as health care, biotechnology, and IT.[155] The idea of these career ladder initiatives is to outline the skill sets that lead to a progression of occupations and thereby solve two labor market failures: the problem for employers of recruiting and retaining qualified workers, and the difficulty for workers of gaining more responsibility and wages within a given sector. However, there are serious concerns about the feasibility of these programs, as they would have limited effects on upward mobility and could also have a downward effect on wages as firms substitute less educated workers for their traditional workforce recruited through first-chance system.[156] Moreover, only certain types of firms experience these failures, in particular, sectors with large, stable firms. Thus, these initiatives are most likely to be successful when targeting these sectors and also when there is a supportive corporate culture, assistance from the public sector, and pressure from unions.[157]

Despite these problems, by encouraging collaboration, career ladder initiatives present an opportunity to begin to integrate the second-chance employment and training system better into the first-chance system

of four-year universities. As Chapter 4 showed, the biggest obstacle to advancement for nonprofit IT training program graduates is the lack of college education. Some are unable to advance at all because they lack basic education, which suggests the need for better access to remedial education for adults. Recent studies by the Workforce Strategy Center and Jobs for the Future outline successful strategies for improving access to remedial education and building career pathways using the community college system.[158] One particularly promising model for IT is the Watsonville Digital Bridge Academy at Cabrillo College, which prepares low income at-risk young adults with the soft skills, technical skills, support services, and work experience they need to successfully enter and complete Cabrillo College's regular IT program and enter the workforce as high-wage knowledge workers.[159]

It will likely take intermediaries from both within and outside the workforce development system to reform it—to create what workforce development expert Robert Giloth calls a "performance regime" rather than an "employment regime."[160] An employment regime is a set of workforce organizations more focused on institutional survival than reform, while a performance regime is a network of stakeholders in the workforce development system who can innovate more freely, given the task of jointly negotiating problem definitions, goals, strategies, and performance criteria against which to hold workforce investments accountable. These types of interactions—the "array of brokering, convening, and planning functions that involve a range of stakeholders in the region and industry"—are critical to making programs more effective.[161] If the reauthorization of WIA is not able to create the conditions for such involvement, then it will be important to foster parallel organizations that can.

Conclusion

With the help of training provider intermediaries, high-tech regions offer opportunity for disadvantaged jobseekers to enter and advance in the IT workforce. But the devolution of workforce development policy under WIA has created a highly differentiated landscape of opportunity across and within regions. While most agree that the system has eliminated the favoritism and waste under JTPA, the benefits are not reaching the hard-to serve as effectively as before.

Critics might wonder why we should channel resources to the disadvantaged—don't high-technology regions require a highly educated, fully prepared workforce in order to compete? But arguably, with over 50,000 low-skill IT job openings every year amidst intense global wage

competition, firms will need to look beyond four-year colleges for their IT workforce. Moreover, IT training programs provide the largest benefit for society by helping the disadvantaged reach self-sufficiency; others have access to other resources to enter the first-chance educational system.

Because of the new coordination among the 17 different employment and training programs, as well as the focus on joint public-private governance on the WIBs, WIA provides an opportunity to bring more partners to the table. To help more disadvantaged workers enter and advance in the workforce, it will be critical to ensure that CBOs remain in the workforce development system. Ultimately, the partnerships may make it possible to integrate the second-chance system more effectively with two- and four-year colleges. Without the foot-in-the-door provided by CBOs and the opportunity to move up through college education, people like Ruben, the former chef, won't ever get that second chance.

APPENDIX A
Methodology and Data

Web-Based Survey of Jobseekers

A web-based survey provided an overview of the job search process. The survey sample was drawn from a strategic sample of approximately 4,000 jobseekers with current resumes posted on the web; excluding inaccurate e-mail addresses, the net response rate was approximately 15 percent (298 jobseekers, mostly concentrated in the four regions). To be included, the resume had to mention keywords associated with entry-level IT occupations, such as technician, help desk, or web design, as well as one of the regions under study. An e-mail solicited participation in the survey; respondents received a ten-dollar gift certificate for participating.

The sampling method introduced a potential nonresponse bias: although most recent graduates of training or educational programs are familiar with web posting, older or less educated IT workers are not. In addition, it is possible that among those refusing to participate were the most busy or affluent jobseekers. Thus, the survey results are most readily generalizable to the universe of active jobseekers who are familiar with web-based job search methods.

The web-based survey, conducted in 2002, asked respondents to provide information about their first job in IT and up to eight subsequent IT jobs, including the job description, period of employment, and job search method. The survey also obtained information on educational attainment, including IT training, and other demographic characteristics. Chapters 2 and 4 discuss the findings of the survey in more detail.

Training Provider Survey

To look at the role of training providers in providing soft skills and job placement, I conducted a mail survey to which 171 training providers responded in spring 2003. The sample was the universe of 800 WIA-eligible training providers providing IT training in the four regions under study. Respondents received three invitations to participate in the survey: a full survey mailing by post, a follow-up postcard, and a second survey mailing (by e-mail where addresses were available). As an incentive to participate, respondents were sent a free copy of *Bouncing Back: Jobs, Skills and the Continuing Demand for IT Workers* by the Information Technology Association of America. The net response rate (excluding providers who had moved or gone out of business) was 24 percent.

Based on communication with selected nonrespondents, the pool of providers who refused to participate in the survey included those which were too busy to participate (either because of high demand or minimal staffing); were not complying with WIA regulations and thus reluctant to respond; and/or did not conduct placement internally. In addition to these selection biases, some sample biases occur, looking at three key parameters (provider type, region, and location). The sample slightly underrepresents private providers (oversampling the nonprofit and public sectors); it underrepresents providers in New York; and it underrepresents providers located in the city (as opposed to the suburbs). Thus, prior to analysis, the sample was weighted to reflect the universe of providers in terms of type, region, and location. However, some selection bias remains; responses are most generalizable to the universe of providers who are compliant with WIA and are not short-staffed.

The survey included 37 questions on five topics related to job placement: assistance provided to jobseekers, connections to employers, institutional capacity to do placement, effectiveness, and compliance with WIA. The survey also obtained background information on curriculum and size and verified the provider's identity. Chapters 3 and 5 incorporate the results of this training providers survey.

Interviews

Training Program Graduates

In-depth, semi-structured interviews with 112 nonprofit and public training program graduates explored the job search and career advancement processes in detail for disadvantaged jobseekers transitioning into IT. Respondents were sampled from six different training programs that offer a 3–4 month training course in computer hardware, elementary networking, or web design: Training, Inc. in Newark, New Jersey; Per Scholas in Bronx, New York; Northern Virginia Community College in Alexandria, Virginia (the sole public provider in the study); Byte Back in Washington, DC; Street Tech in San Pablo, California; and the Bay Area Video Coalition in San Francisco, California.

Each program provided a random sample of 50 graduates, and approximately 25–50% agreed to participate. Based upon interviews with program personnel, there is little or no nonrespondent bias in the sample. If the respondent samples exclude any type of student, it may be either the most successful graduates, who didn't have time to participate, or the least successful, who self-selected themselves out because of very negative feelings about their training experiences.

Initial in-person interviews, conducted in 2001 and 2002, asked about their background in computers, their educational history, their job and job search history, their career goals and plans, and their experiences on the job. These interviews eliminated approximately 20 graduates from the sample due to failure to complete the program or extensive postsecondary education in IT; in addition, all graduates from one program were eliminated as it became clear that the program was unsuccessful. Approximately 80% of the sample also participated in follow-up surveys conducted by e-mail and phone; by the end of the study, we were still in touch with 69% (64). These follow-ups checked on their career and educational trajectories since the initial interview. Chapter 4 describes results from these interviews in more detail.

Employers

In-depth, in-person interviews with 49 employers examined the trends in entry-level IT hiring and firm location, the connections of employers to training providers, and the current skill requirements for entry-level IT jobs. The sample of private and public sector employers was strategic, in order to represent the variety of economic sectors that employ entry-level IT workers, including IT and IT services, finance and insurance, manufacturing and retail, business and communications, temporary agencies, and the institutional sector (government, education, and health). In large companies, we typically interviewed the head of the IT division and the human resources manager; in smaller companies, we interviewed the CEO. The sample included a mix of city and suburban employers, mostly from the Bay Area but with a special sub-sample of eight New York employers to explore regional differences. Results are compared with interviews conducted with 29 San Francisco-based IT employers in 1998 to ascertain entry-level hiring patterns at the peak of the economic cycle (Saxenian et al., 1999). The analysis of the employer interviews is in Chapters 2, 3, and 4.

Training Providers

To provide more insight into the networks and placement techniques of training providers, in-depth, semi-structured interviews were conducted with 30 training providers, including the six from which I sampled graduates. These exploratory interviews, with a cross-section of public, private, and nonprofit training providers in the New York and San Francisco Bay Area regions, provided information on how providers provide placement assistance, who attends their programs, how well they connect with local employers, how effective they are, and how they comply with WIA. The training provider survey (above) built upon the

information yielded by the training providers in these interviews. Chapter 3 builds upon these interviews as well as the survey.

Other Key Informants

Finally, the study included interviews with 21 key informants in the workforce development system, including thirteen officials from workforce investment boards and one-stops in California, Connecticut, New York, and New Jersey, and eight informants who either work closely with the WIBs or in IT training. These interviews provided background on WIA implementation in the different regions, the participation of employers, training providers, and jobseekers in the workforce development system, and the links generally between economic development and workforce development. Chapter 5 draws upon these interview findings.

Secondary Source Data

This study also relies on multiple secondary data sources. For mapped data on entry-level IT employment, I draw from the 1998 Bureau of Labor Statistics staffing patterns matrix and 2001 Dun & Bradstreet Marketplace. Monster.com provided data on IT job openings in 2002–2003. Data on migration and career ladders comes from the Public Use Microdata Sample from the 2000 Decennial Census. I use data from the 1997 Economic Census to calculate productivity. Hoover's and Mergent Online provided background data on the employers interviewed. Data on Individual Training Account Vouchers come from the one-stops and the Workforce Investment Act Standardized Record Data (WIASRD).

Protocol for Web-Based Survey of IT Jobseekers

IT Education Survey

We would like to invite you to be in a research study of the information technology workforce. We ask that you read this information before completing the short survey. This study is being conducted by Professor Karen Chapple at the University of California, Berkeley, Department of City and Regional Planning.

If you agree to be in this study, we would ask you to answer the following survey, which asks about your educational background and the jobs you have held in information technology. The survey will take approximately 10 minutes to complete. You may choose not to answer any questions should you wish.

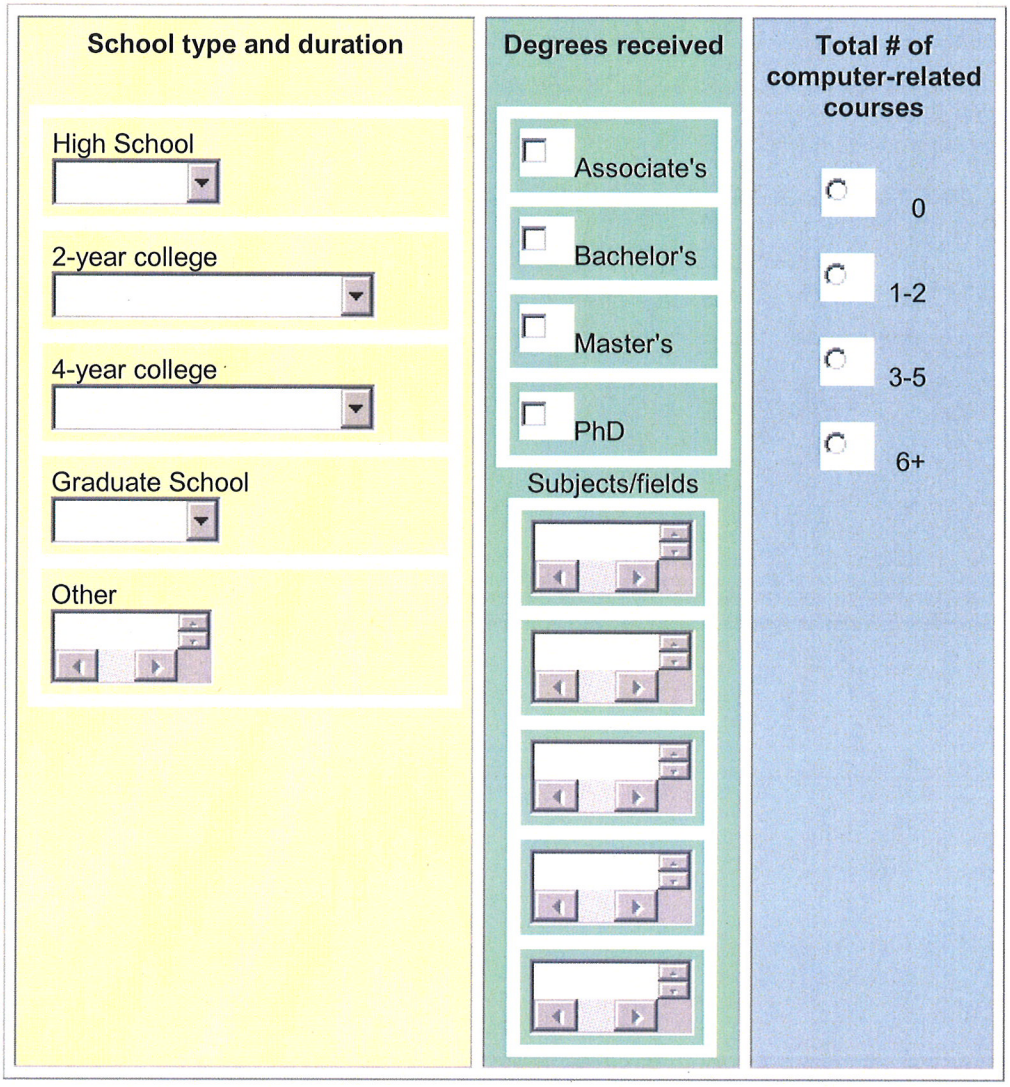
This study has no known risks or benefits to you for participating. We hope that the research will benefit society by showing how different institutions are helping graduates find jobs in information technology.

The records of this study will be kept private. We will not use your e-mail address for any purpose other than sending you the $10 gift certificate. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject.

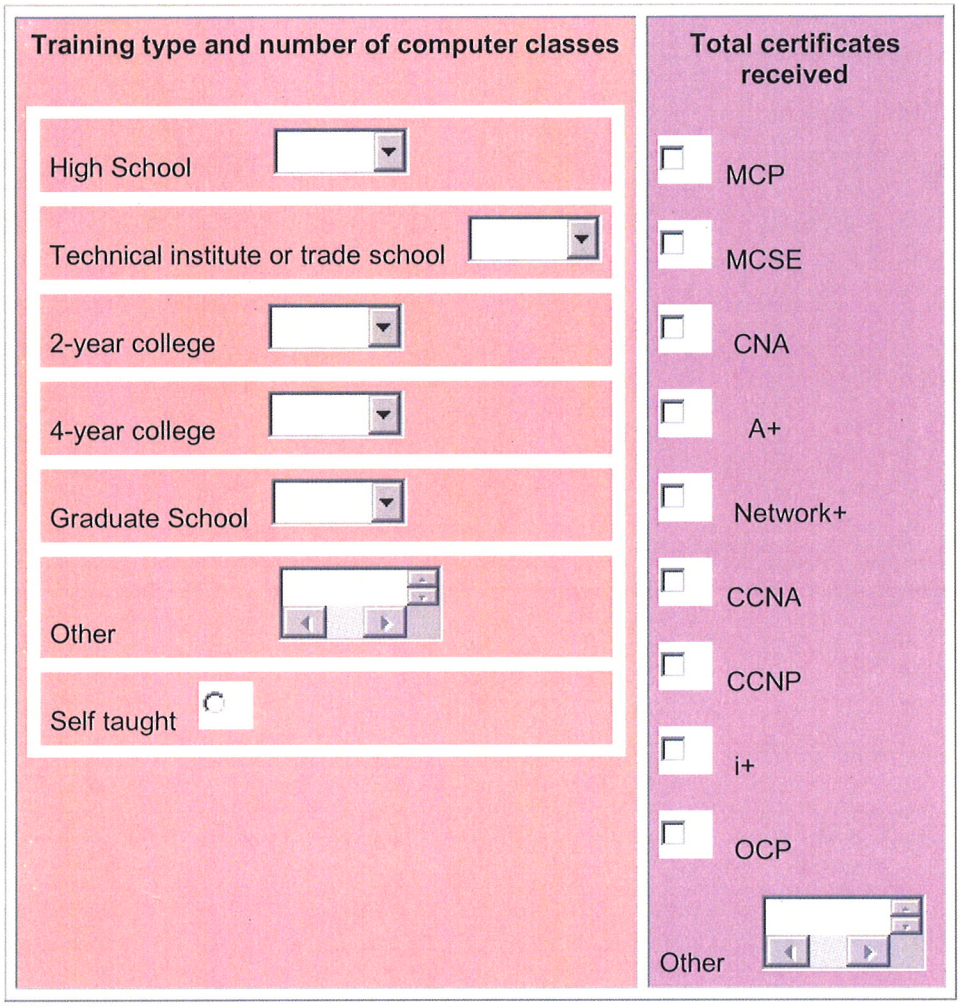
Your decision whether or not to participate will not affect your current or future relations with the Department of City and Regional Planning or any other department or service of the University of California, Berkeley. If you have questions, you may contact Professor Chapple at (510) 642-1868 or chapple@uclink.berkeley.edu.

Thanks for joining this UC Berkeley survey! Please answer the following questions.

1. Please tell us which of the following types of schools you have attended:

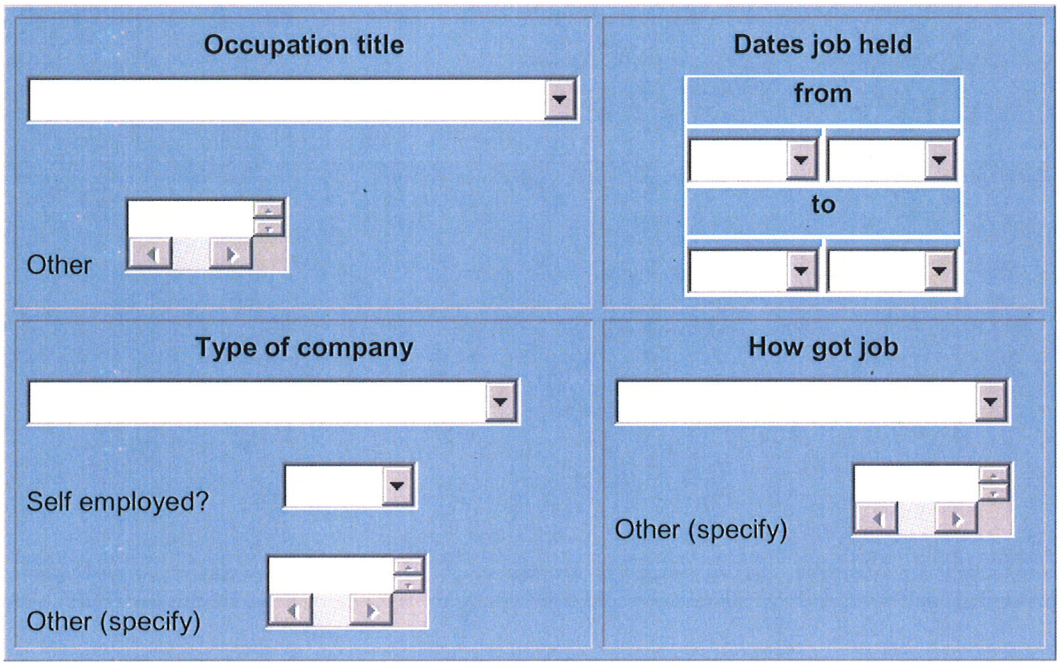


2. Please tell us which of the following types of computer-related training programs you have attended:



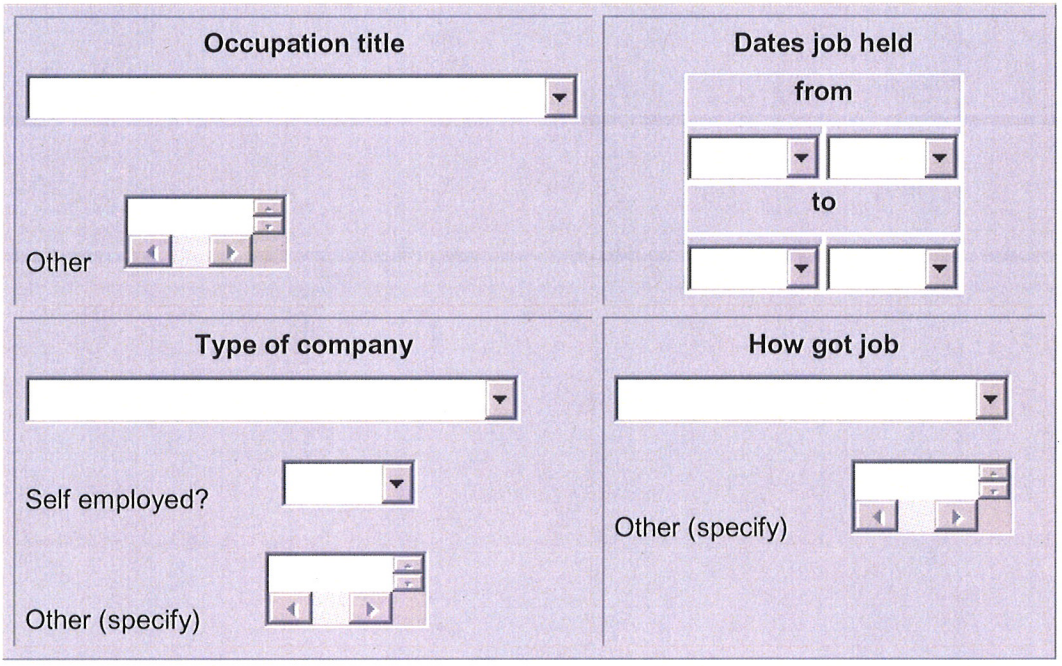
3. Please list the first job you held in information technology or computer-related occupations:

First job

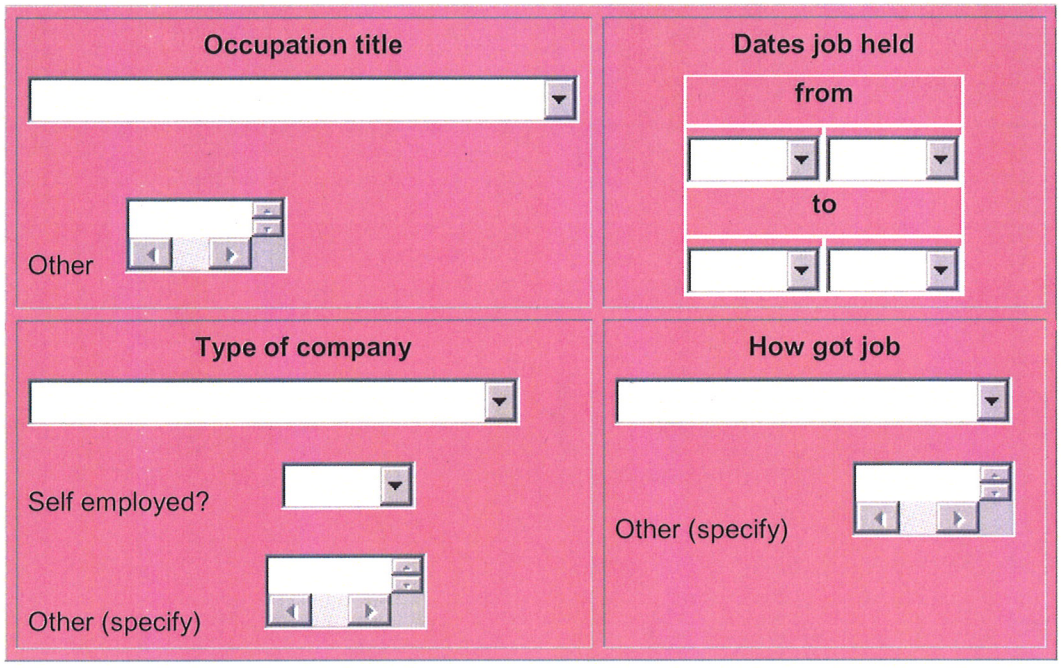


4. Please list the most recent jobs you have held in information technology or computer-related occupations (8 jobs or less). Start with the most recent first:

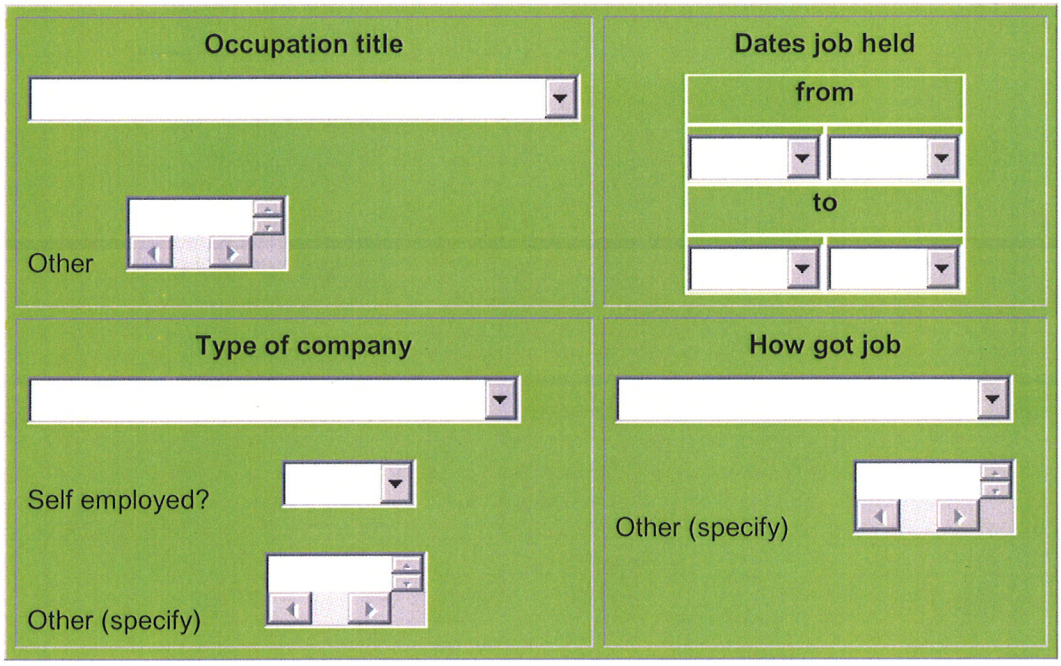
Job #1



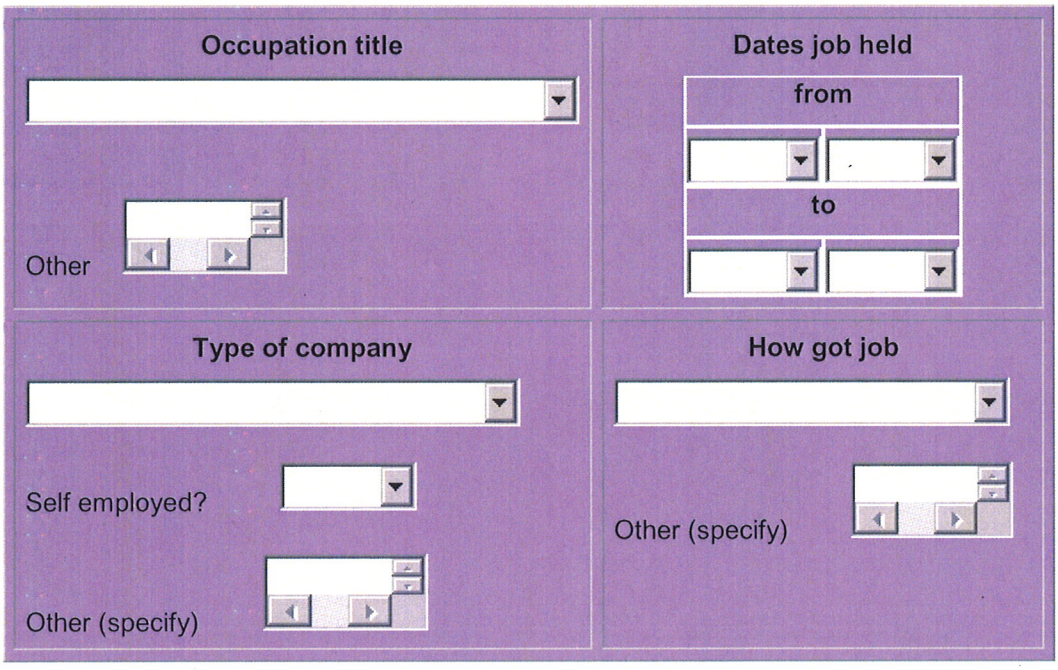
Job #2


Occupation title
Other
Dates job held
from
to
Type of company
Self employed?
Other (specify)
How got job
Other (specify)

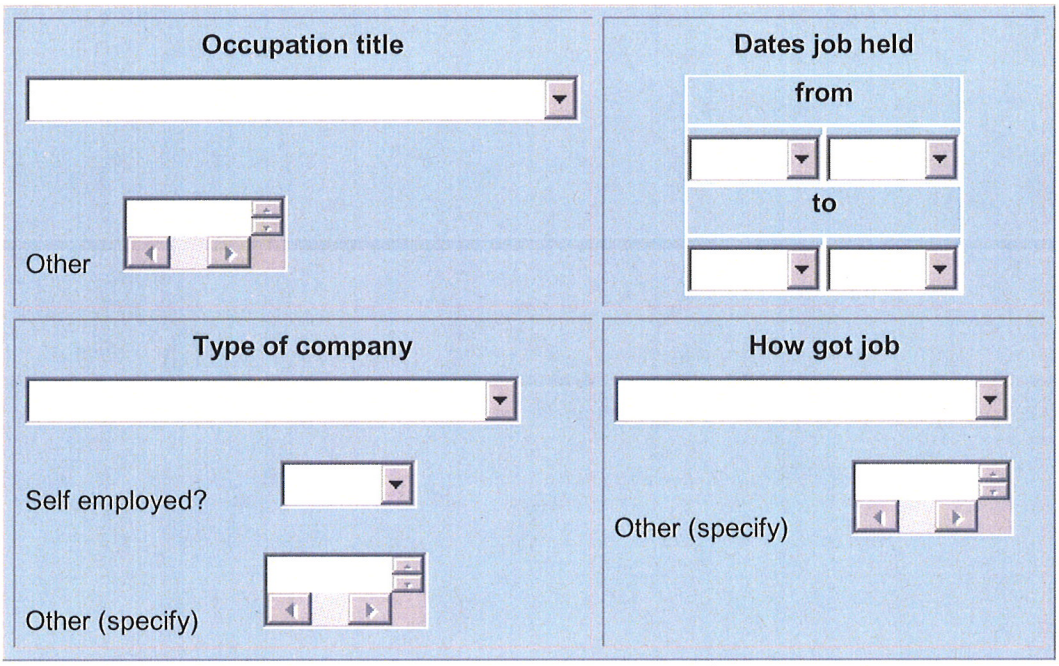
Job #3


Occupation title
Other
Dates job held
from
to
Type of company
Self employed?
Other (specify)
How got job
Other (specify)

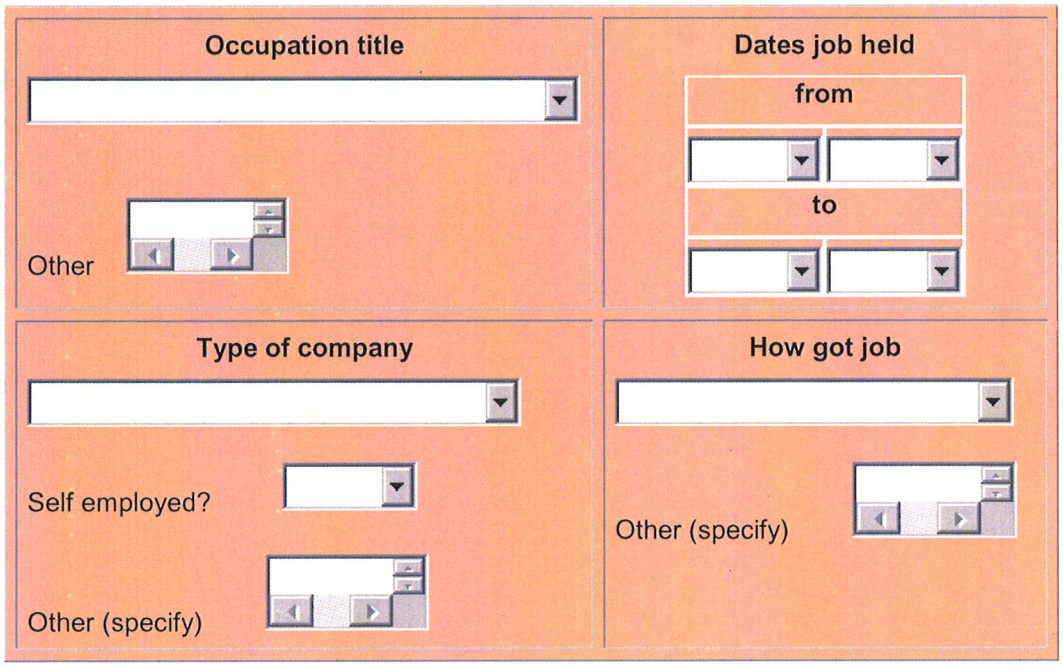
Job #4


Occupation title
Other
Dates job held
from
to
Type of company
Self employed?
Other (specify)
How got job
Other (specify)

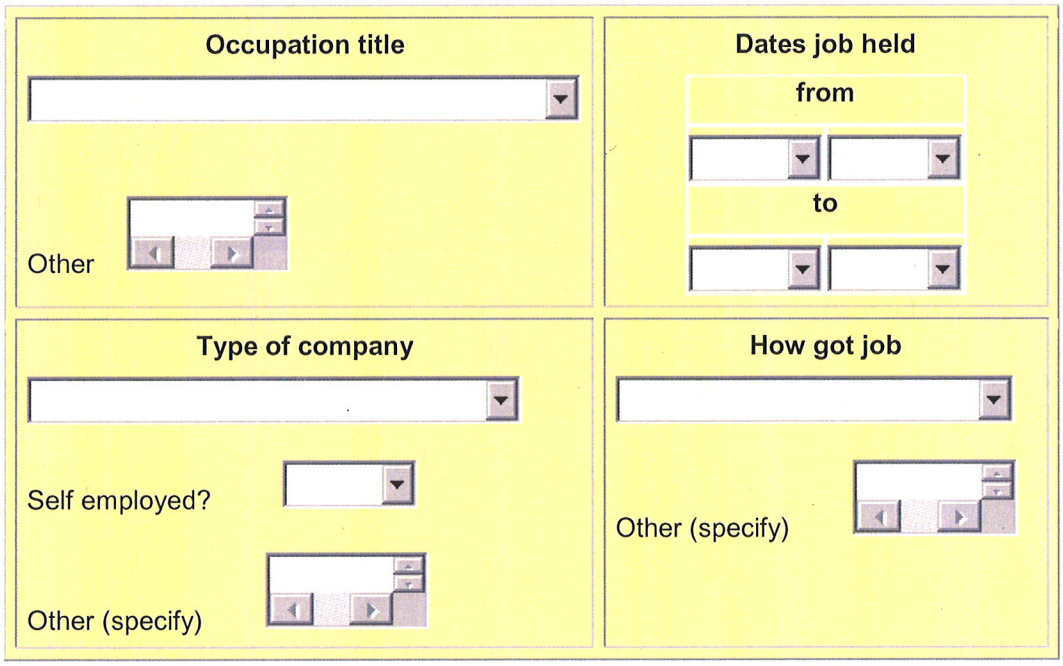
Job #5


Occupation title
Other
Dates job held
from
to
Type of company
Self employed?
Other (specify)
How got job
Other (specify)

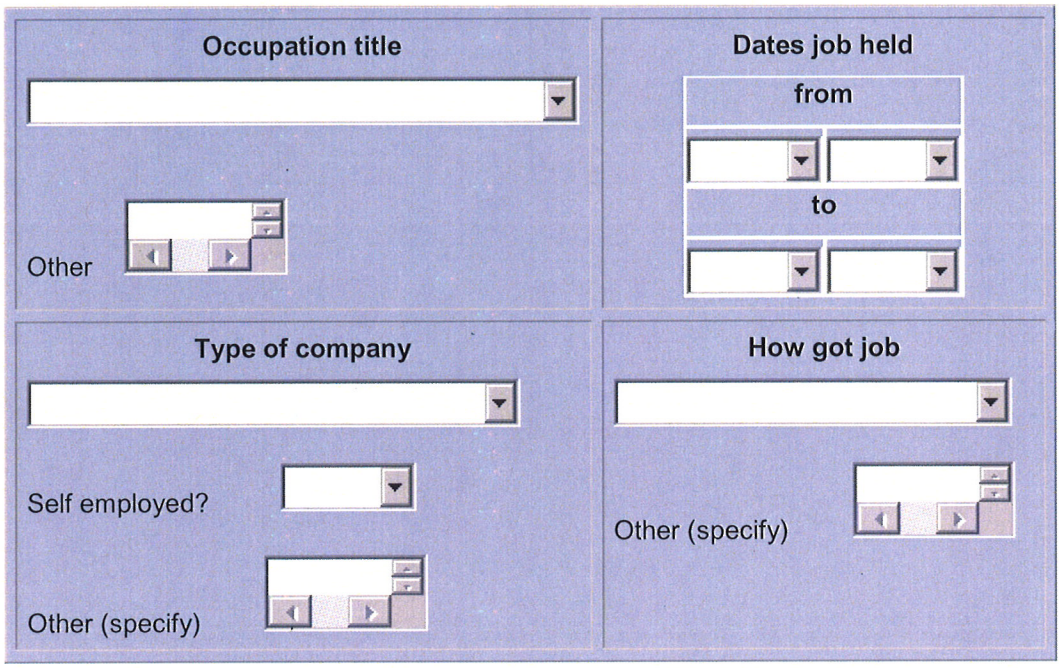
Job #6


Occupation title
Other
Dates job held
from
to
Type of company
Self employed?
Other (specify)
How got job
Other (specify)

Job #7


Occupation title
Other
Dates job held
from
to
Type of company
Self employed?
Other (specify)
How got job
Other (specify)

Job #8



5. Please list the next job you would like in information technology or a computer-related occupation:

Occupation title

Other (specify)

6. Now we'd like some background information.

Thanks for participating in the survey!

We will e-mail you a $10 Amazon.com gift certificate for participating. Or, if you wish, you can choose to skip the $10. That will help us make the survey better because more people can participate. What would you like to do?

Skip the $10 certificate Send me the $10 certificate

Your email 

Submit | Reset

Protocol for Training Provider Survey (Alameda County sample)

The questions in this survey should be answered by the person most familiar with job placement in your organization. All responses will be kept confidential; individual institutions will not be identified in any published reports.

Job Placement Services:

1. What kind of assistance does your organization provide to the graduate in making contact with potential employers? (Check ALL that apply.)
   - ____ a. List job openings via e-mail listserves
   - ____ b. List job openings on bulletin board/job posting binder
   - ____ c. Provide computers for job search
   - ____ d. Provide space for phoning, faxing, etc.
   - ____ e. Conduct job fairs
   - ____ f. Contact employers you don't know ("cold-calling")
   - ____ g. Contact employers you know
   - ____ h. Provide references
   - ____ i. Other, specify:
     _____
   - ____ j. None of the above

2. When are any of these job placement services available to students? (Check ALL that apply.)
   - ____ a. During training
   - ____ b. At time of graduation only
   - ____ c. For up to 6 months after graduation
   - ____ d. For 6–12 months after graduation
   - ____ e. For more than one year after graduation

3. Where do you get the information on those job openings? (Check ALL that apply.)
   - _____ a. Employers contact us
   - _____ b. We contact employers
   - _____ c. Web job search engines (e.g., monster.com, hotjobs.com)
   - _____ d. Other web postings
   - _____ e. Newspaper advertisements
   - _____ f. Program alumni
   - _____ g. Other, specify:_____

4. Do you provide any of the following types of placement and soft skills training? (Check ALL that apply.)
   _____ a. Resume writing
   _____ b. Cover letter writing
   _____ c. Interviewing skills
   _____ d. Personal presentation skills
   _____ e. Videotaping of practice interviews
   _____ f. Motivational counseling
   _____ g. Other, specify:_____
   _____ h. None of the above

5. Who works on placement at your organization? (Check ALL that apply.)
   _____ a. Job developer/placement officer
   _____ b. Instructor
   _____ c. Program director
   _____ d. Other, specify: _____

6. How many staff hours PER WEEK, on average, do you spend on placement? Please estimate the total for ALL staff.
   _____ a. 0–5 _____ d. 21–40 _____ g. 81 or more
   _____ b. 6–10 _____ e. 41–60
   _____ c. 11–20 _____ f. 61–80

Contact and Relationship with Area Employers:

7. How large is your contact list of area employers?
   _____ a. 0–5 _____b. 6–20 _____c. 21–50 _____d. 50+
   _____ e. not applicable

8. Please list the five employers with whom you have placed the most people, the approximate number of placements, and the city where they are located.

Employer	# of placements	City
A:		
B:		
C:		
D:		
E:		

9. Of these five employers, which two offer the highest-paying jobs to your graduates (right after graduation)?

Employer 1: _____

Employer 2: _____

10. Of these five employers, which two offer the best advancement possibilities within the company for your graduates?

Employer 1: _____

Employer 2: _____

11. Are there firms you haven't placed with but would like to establish a relationship with? ___ a. yes ___ b. no ___ c. don't know

If yes, please list three employers your institution wishes to target:

Employer	City
A:	
B:	
C:	

12. How do you establish and maintain contact with area employers? (Please check ALL that apply.)

_____ a. Your institution initiates/maintains direct contact
_____ b. The employer contacts/recruits from your institution
_____ c. Your board of directors/business advisory council
_____ d. Trade/business fairs or networking events
_____ e. Trade associations
_____ f. Through your local Workforce Investment Board
_____ g. Through other city government services
_____ h. Through other government (state, federal) services
_____ i. Don't know
_____ j. Other, specify:_____

13. Below is a list of employers who have recently been recruiting for IT workers in your region. For each employer, check if (A) you recognize the name, (B) you know somebody at the company, (C) you have tried to place a graduate at the company, and (D) you have successfully placed a graduate at the company. Please check ALL that apply.

Employer	(A) Recognize Emp. name	(B) Know person at company	(C) Tried to place at company	(D) Placed someone at company
Atlantis Partners	____	____	____	____
Analysts International Corp.	____	____	____	____
Crescent Global Services	____	____	____	____
California Air National Guard	____	____	____	____
NetNational Inc.	____	____	____	____
ADP	____	____	____	____
Directfit (Staffing Firm)	____	____	____	____
GOOGLEGEAR	____	____	____	____
Dantz Development Corp.	____	____	____	____
Drummer Personnel(Staffing Firm)	____	____	____	____
InterVideo	____	____	____	____
Mervyn's	____	____	____	____
The Boylston Group	____	____	____	____
Aquent	____	____	____	____
Act 1 Technical	____	____	____	____
Keane, Inc.	____	____	____	____
Spherion	____	____	____	____
Kelly IT Resources	____	____	____	____
CFH Enterprises, Inc.	____	____	____	____
EDP Contract Services	____	____	____	____
IBM Corporation	____	____	____	____
A-R-C (Alternative Resources)	____	____	____	____
MacArthur Associates	____	____	____	____
Informatica Corporation	____	____	____	____
Naval Reserve	____	____	____	____
Robert Half Technology(Staffing Firm)	____	____	____	____
Resources Connection	____	____	____	____

Internal Contacts and Partnering

14. Do you have employer representation within your organization (e.g., member of board of directors)?

_____ a. yes _____ b. no _____ c. don't know

15. Do you ever seek employer assistance in curriculum development?
_____ a. yes _____ b. no _____ c. don't know

If yes, specify employers and type of assistance:
_____
_____
_____

16. Do you ever seek employer assistance in grant writing (for instance, for letters of support)?
_____ a. yes _____ b. no _____ c. don't know

17. Do you ever partner with employers in training? (For example, on-the-job or incumbent worker training.)
_____ a. yes _____ b. no _____ c. don't know

If yes, specify:_____

18. Do any employers do guest speaking in classes?
_____ a. yes _____ b. no _____ c. don't know

19. Do you have a mentorship program?
_____ a. yes _____ b. no _____ c. don't know

20. Does your mentorship program involve employers, alumni, or both?
_____ a. employers _____ b. alumni _____ c. both

21. What is the professional background of the majority of your instructors?
____ a. IT ____ b. education ____ c. social services ____ d. other
____ e. don't know

22. Do your instructors tend to hold second jobs?
_____ a. yes _____ b. no _____ c. don't know

If yes, are they with IT employers?
_____ a. yes _____ b. no _____ c. don't know

Placement Rates and Tracking:

23. Approximately, what is your current (2002) placement rate for graduates?
____ a. 25% ____ b. 33% ____ c. 50% ____ d. 66% ____ e. 75%+
____ f. Don't know

24. Approximately, what was your placement rate between 2000 and 2001 for graduates?
____ a. 25% ____ b. 33% ____ c. 50% ____ d. 66% ____ e. 75%+
____ f. Don't know

25. Which of the following counts as a placement for your organization? (Check ALL that apply.)
_____ a. New job working with information technology
_____ b. Any kind of new job working in information technology firm
_____ c. Any kind of new job
_____ d. Continuing on for more education or training
_____ e. Internship working with information technology
_____ f. Self-employment in information technology
_____ g. Contract employment

26. How do you calculate placement?
_____
_____
_____

27. Do you monitor the retention and advancement of your graduates?
_____ a. yes _____ b. no _____ c. don't know

If yes, for how long?
_____ a. 6 months _____ b. 1 year _____c. 2 years ____d. 3+years
_____ e. don't know

28. How often do you report your placement rates to the government?
_____ a. Monthly
_____ b. Quarterly
_____ c. Semi-annually
_____ d. Annually
_____ e. Never

29. How often do you report your retention rates to the government?
_____ a. Monthly
_____ b. Quarterly
_____ c. Semi-annually
_____ d. Annually
_____ e. Never

30. How much of your government funding do you receive at intake?
_____ a. 25% _____ b. 50% _____ c. 75% _____ d. 100%
_____ e. don't know

31. How much of your government funding do you receive at graduation?
_____ a. 25% _____ b. 50% _____ c. 75% _____ d. 100%
_____ e. don't know

32. How much of your government funding do you receive at placement?
_____ a. 25% _____ b. 50% _____ c. 75% _____ d. 100%
_____ e. don't know

33. How much of your government funding do you receive at 90-day retention?
_____ a. 25% _____ b. 50% _____ c. 75% _____ d. 100%
_____ e. don't know

34. How much of your government funding do you receive at 3-month retention?
_____ a. 25% _____ b. 50% _____ c. 75% _____ d. 100%
_____ e. don't know

35. How much of your government funding do you receive at 6-month retention?
_____ a. 25% _____ b. 50% _____ c. 75% _____ d. 100%
_____ e. don't know

Conclusion

36. Please list the top three important factors that make placement work well for an organization like yours.

_____
_____
_____
_____
_____

37. What could the government do to help improve placement?

_____
_____
_____
_____
_____

Respondent Information:

36. Your name:_____

37. Your title:_____

38. Name of institution:_____

39. Address of institution (street, city, and state):

_____
_____

40. Institution status (check one):____ a. for-profit ____ b. non-profit

41. Please provide the number of graduates from your program in each of the past 3 years: _____ 2002 _____ 2001 _____ 2000

42. Course offerings (check all that apply):

_____ a. Basic web design (HTML)
_____ b. Computer repair/A+ preparation
_____ c. Cisco-related
_____ d. Microsoft Office
_____ e. Windows NT/2000/XP/MCSE preparation
_____ f. Advanced web design (XML, Java)
_____ g. Database management
_____ h. Novell
_____ i. UNIX
_____ j. Oracle
_____ k. Computer graphics (e.g., Photoshop)
_____ l. Other, specify:_____

Protocol for Initial Training Program Graduate Interviews

A. Introduction

1. How did you decide to go into computers? And how did you decide which program to go to?

2. Did you know anybody, a friend or acquaintance, who was working in IT before you got interested in IT jobs? Did this person(s) influence your decision to enter the IT field?

B. Educational history

3. Let's talk about your experience at school first. What were your best classes in high school? Were there any classes where you were helping the other students? What were your worst classes?

4. In addition to your computer training at school, has your employer ever provided any training for you (on-the-job, through an outside vendor, or through other institutions)?

5. Think about what you do at your job—for instance, the projects you have worked on in the last couple of weeks. Describe three things you worked on. What were the technical skills that you used? What were the interpersonal or communication skills that you used? Where did you learn those skills?

C. Job history

6. Of the computer jobs you listed, how did you get each one?

7. Did any of the educational institutions you attended help you to get a job in computers? What about any other institutions or agencies? Are there any particular individuals who helped you to get started in a job in computers?

8. Was it hard to get into your first computer job? Did you apply to many places? (Ask about subsequent computer jobs if applicable.)

9. Was the commute to work a consideration in your job search? How far would you commute for a job? (prompts with specific places)

D. Job goals

10. Where and at what job do you see yourself working in one year? Five years? Will you need any more education or training to get to that job in one year or five years?

11. Do you feel like it would be difficult to advance in your company? In the industry?

E. Workplace culture

12. How does your work environment differ from other jobs you have held? Are you more or less comfortable? Do you feel like you "fit in"?

13. Does your job require you to work in teams a lot? Do you enjoy that or not?

14. In your job, how much freedom do you have to make decisions without reporting to a supervisor? What about freedom to figure out what to do next?

15. Does your job require you to help other people (e.g., customers, co-workers)? Do you enjoy that or not?

16. Have you had to deal with conflict on the job? With teams or customers?

17. How well do you get along with your supervisor? How comfortable are you when you need to ask for flexibility about problems, such as the need to tend to a sick child at home?

18. Do you feel a lot of pressure to meet deadlines at your job?

19. Do you socialize with your colleagues during work? After work?

20. How many hours do you work in a typical week? Is there pressure to work overtime hours? Are you comfortable working overtime? Is flex-time available at your workplace?

21. Have you experienced any kind of discrimination at this job? What about other jobs you have held?

F. Conclusion

22. How has your life changed since you graduated from your computer training program?

Protocol for Follow-up Training Program Graduate Interviews

Hi,

I'm calling about the study of <program name>. A couple of years ago you met with Professor Karen Chapple at UC Berkeley. She was working with <program person> at <program name> on a study of graduates to see how they did in the workforce.

This is a follow-up to see how you're doing now. It'll take about 10 minutes.

1. Are you still working at the same place? Yes _____ No _____

    a. If yes, are you still working in _____ or are you doing different work now? Please explain (is that a promotion?).

    b. If no, do you have a new job? Yes _____ No _____

        i. If yes, what is your new job title?

        ii. What is your new company called?

        iii. Where is it (city)?

        iv. How did you find the job?

2. Have you taken or started any new classes in the last year? If yes, what kind?

3. Have you gotten any certifications in the last year? If yes, what kind?

4. What is your job goal for the next couple of years?

5. Have you applied for any jobs in the last year? If so, where did you hear about the job? Where was it located? What happened?

6. Our records show that you earned about ___ when you were starting out. What is your salary or hourly wage now?

7. Looking back at your time at _____, did it change the direction of your life in any way?

Protocol for Employer Interviews

Company Information

1. How long have you been with the company? What is your role here?
2. How many IT employees does your firm have? How many of those are entry-level? Where are they located?
3. What is the overall structure of your company (branch types and locations)? Where do you do which kind of work? What are the factors that lead you to locate different types of work in different places?
4. What types of IT work do you outsource? Are your contractors on-site or off-site?
5. What guides your decision to use contractors or hire permanent employees? Do you have plans to outsource more or less in the future?

Hiring

6. How do you recruit your entry-level workers? Describe the procedures you used to recruit your last few help desk support workers, web developers, and network technicians.
7. What are the minimum qualifications in terms of skills, education, knowledge, and experience that you require for an entry-level position in this field? How important is a college degree for your entry-level workers?
8. What are the most important characteristics that you look for when hiring an employee? For the last 3 entry-level people you've hired, what were the characteristics that got them the job? (Prompt – both hard and soft skills)
9. How do you determine in the hiring process whether the worker has these specific characteristics?

Skills

10. Are you satisfied with the quality and skills of your entry-level hires? What do you feel is lacking?
11. If you need one of your entry-level workers to obtain more training, where do you conduct the training (in-house, external vendor, external institution)?

Advancement

12. Do you try to provide growth opportunities within the firm, or is it necessary for your entry-level IT workers to look elsewhere when they move up?
13. What is the typical career ladder for a help desk support worker, a web developer, or a network technician at this company? (please give examples)
14. Thinking about one or two of your entry-level workers who have advanced within the company, is advancement more contingent upon acquiring new hard skills, the level of soft skills, or other factors? Where do they get these skills?
15. Do you have any problems with employee turnover? Why or why not?

Workplace culture and advancement

16. What is the corporate culture like? What are the expectations? Are there times at which your IT workers don't behave professionally? How?
17. Do employees from diverse ethnic/cultural/economic backgrounds have any difficulty "fitting in" with the corporate culture?

Relationship-building

18. What is your relationship with the local WIB? The One-Stop? Other government agencies? Business groups (i.e. Chamber of Commerce)? If involved, what keeps you involved?
19. Have you heard of any of the following IT training providers? Have you hired anybody who graduated from one or similar IT training programs?
    a. (list of providers here)
20. What are the strengths and weaknesses of different types of providers (public, private, nonprofit)?

Interview Protocol for Outsourcers (IT Service Firms)

Company Information

1. How long have you been with the company? What is your role here?
2. How do you see short-term economic factors—i.e., slow economic growth—and long-term economic factors—i.e., the high-skilled labor shortages some are anticipating with the retirement of Baby Boom workers—affecting your company?
3. What is the overall structure of your company (branch types and locations) in the US and the Bay Area/Northern California in particular?
4. Where do you do which kind of work? Are there clear divisions between where the *creative* work takes place and where the *routine* work takes place? (What are your core competencies?)
5. Describe the occupations found in your different locations, particularly at the entry-level.
6. What are the factors that lead you to locate different types of work in different places? What is centralized and what is decentralized (e.g., support)?
7. Do you anticipate any changes?
8. What is the overall structure of your company (branch types and locations) overseas, particularly in India and China?
9. What type of work do you perform offshore? (e.g., routine vs. creative)
10. Describe the occupations found in locations like India, particularly at the entry-level. Also, do you have to have extra managers for offshore work?
11. What are the factors that lead you to locate different types of work in different places? (e.g., one company told us 30% cost reduction was enough)
12. Have you experienced any problems with offshoring arrangements to date? (e.g. infrastructure, inefficiency)
13. What types of companies do you perform outsourced work for?
14. Is your role as a service provider to other firms increasing?
15. Where is it increasing? (In the US, in the Bay Area, offshore?
16. What types of IT work do **you** outsource? (also, business processes)
17. Are your contractors on-site or off-site?

18. What guides your decision to use contractors or hire permanent employees? Do you have plans to outsource more or less in the future?
19. Is turnover an issue?

Hiring

20. How do you recruit your entry-level workers? Describe the procedures you used to recruit your last few help desk support workers, web developers, and network technicians.
21. What are the minimum qualifications in terms of skills, education, knowledge, and experience that you require for an entry-level position in this field? How important is a college degree for your entry-level workers?
22. What are the most important characteristics that you look for when hiring an employee? For the last 3 entry-level people you've hired, what were the characteristics that got them the job? (Prompt – both hard and soft skills)

Advancement

23. One of the arguments that we hear about outsourcing is that it creates a career ladder (for IT workers coming from small firms). Is this true? Do you try to provide growth opportunities within the firm, or is it necessary for your entry-level IT workers to look elsewhere when they move up?
24. What is the typical career ladder for a help desk support worker, a web developer, or a network technician at this company? (please give examples) What about your offshore workforce, for instance in India?
25. As you shift jobs offshore, how do you anticipate that career ladders for your US workers will be affected?
26. Do you have any problems with employee turnover (both US and offshore)? If so, why?

Workplace culture and advancement

27. What is the corporate culture like? What are the expectations? Are there times at which your IT workers don't behave professionally? How?
28. Does your organizational structure (i.e. as a global firm) make it difficult to develop a "company culture"? If so, has that presented any difficulties for you?

29. Do employees from diverse ethnic/cultural/economic backgrounds have any difficulty "fitting in" with the corporate culture?

Relationship-building

30. What is your relationship with the local WIB? The One-Stop? Other government agencies? Business groups (i.e. Chamber of Commerce)? If involved, what keeps you involved?

31. Have you heard of any of the following IT training providers? Have you hired anybody who graduated from one or similar IT training programs?

32. What are the strengths and weaknesses of different types of providers (public, private, nonprofit)?

List of firms interviewed (all in the SF Bay Area except where noted)

Accenture
Act1 Technical
Adecco-Sacramento
Adecco-San Francisco
AN West Engineers
Apple
Applied Biosystems
AT&T Broadband/Comcast
Autodesk
BART
BEA Systems
Bechtel
C3I (New York City)
CBX Technologies
Contra Costa County IT Department
Chevron Texaco
City of Walnut Creek
Clorox
Dreyer's
Gap
Hall Kinion
Hewlett Packard
Horizon (New Jersey)
IBM (New York)
IBM (San Francisco)
Levi's
Macromedia
Manpower
Mechanics Bank
National Semiconductor
NorVergence (New Jersey)
People Soft
PMI
Pomerantz Staffing (New Jersey)
Prime Time Personnel (New Jersey)
Providian
Sacramento County IT Department
Siemens
Stanford University
Sun
Techunet (New York City)
Time Warner Cable (New York City)
UC Berkeley
UCSF Medical Center
Volt
Wells Fargo
Western States Bancard
Williams-Sonoma
Wind River Systems

APPENDIX B
Offshore Outsourcing: Trends and Limits

Trends in Offshoring: Which Work to Send Abroad?

The current wave of services offshoring focuses on two related areas: IT services and business processes (BP). Where the two overlap is in entry-level IT work, particularly customer service. Businesses may classify their technical help desk support as either a business process or IT services. Large outsourcers experience economies of scale in offering both—for instance, Accenture's IT solutions delivery centers offer both in the same location in India.

As several firms told us, both IT services and BP have increasingly become commodities, particularly at the entry-level. According to one management consulting firm, "The more technology, the less communication is necessary between management and workers, which allows companies to skip steps." This commodification occurs for activities that can be subdivided into separate processes and scripted. By definition, the types of activities that can be thus commodified will require minimal social interaction, creativity, and tacit knowledge transfer—i.e., they will be what some call "rules-based" rather than "judgment-based" operations.[1] Thus, firms will not offshore entire administrative units like finance or human resources, but some less complex component such as payroll. The following briefly examines the types of IT services and business processes sent offshore, the types of companies engaging in offshoring, the organization of offshoring processes, and the location of offshoring.

In deciding what to offshore, companies look to shed any IT service that is not a core competency. For instance, some companies define as non-core their desktop and application support, supply chain management via SAP, and legacy programming (maintenance of older applications in Cobol, PL/1, Fortran, and other near-obsolete languages), which still provides the bulk of offshore revenues.

But as firms mature, their definition of non-core activities broadens. For instance, the largest software companies are performing less application development and instead moving toward packaged and customized applications, which can be non-core. Smaller companies focusing on niche applications need these larger companies to market and sell their products. Increasingly, firms consider non-legacy programming as readily offshorable, depending on the amount of work that is routine;

[1] Glater, New York Times, 1/3/04

one example is the Y2K preparation, which required extensive, but routine, coding. There is substantial debate over whether IT support is a core activity or not. For instance, large IT services companies like HP no longer see IT support as core (instead, its core competencies are now supply chain management and R&D). However, as discussed further below, after experimenting with offshore customer service, many companies have begun to redefine support as core.

Some companies even consider software development and engineering non-core as well. For instance, for HP, once its developers come up with a concept, some of the actual design work goes to China because "they can engineer it better there." For the most part, the creative work that is sent over depends on whether or not it needs to be documented; only the more structured, formal, documentable work can move offshore. But there are exceptions, as the growth of R&D offshore outsourcing testifies. For instance, the next Intel chip is being created in Bangalore, and third-party vendors such as Wipro are growing in R&D.[2] Although some herald the beginning of IT infrastructure and architecture offshoring, experts generally suggest that this area is not growing, unless offshore locations begin developing an advantage in on-demand utility management, the system where the service provider owns the whole IT infrastructure and individual companies can rent it as necessary.

Although offshorability of many IT functions is debatable, almost all business processes can relocate with minimal difficulty; common examples include customer service, telemarketing, help desk (particularly e-mail and web-based support), HR, insurance and mortgage processing, document management, accounting, tax preparation, sales, GIS services, medical transcription, legal and stock market research, and procurement and supply chain management. Increasingly, the market for business process outsourcing is growing fragmented as vendors specialize in individual business processes. Transaction processing (in data centers) remains more of a growth area than customer service, in part, because of problems with customer interaction that have been documented in well-publicized reversals—e.g., the lack of accountability of the customer service representatives trained only in "sponge listening" that resulted in Dell's bringing its business-to-business customer service back to the U.S.[3] However, much of customer service is routinized—for instance, one

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[2] This has led theorists such as Guhathakurta & Parthasarathy (2003) to argue that for the first time, IT innovation and intellectual property are originating from India. This has led technology sector leaders to warn that the U.S. is losing competitiveness in high-tech – calling for relaxation of immigration restrictions (e.g., Krim, 10/10/03).

[3] San Francisco Chronicle, 11/24/03.

insurance company told us that 80 percent of their Level 1 help desk is password reset, a function that could readily be separated and offshored.[4]

Where are the growth markets for offshore outsourcing? Documented shifts, as well as our interviews, suggest that certain industry and company types are more likely to participate in the trend. In our sample of a broad cross-section of companies, we found that it was overwhelmingly the IT and IT services companies that had plans to shift jobs offshore; only one business services and one institutional sector employer indicated plans to increase their offshore presence substantially. Of the companies we interviewed, it was only the very large companies based in the San Francisco area, most with substantial entry-level employment, that were actively planning the move.

Most aggressive users of IT, including these IT companies but also many financial services firms, have already committed to offshoring.[5] It is the non-leading edge firms and organizations, including government and manufacturers, that Gartner and IDC forecast will next become the fastest growing market segment. However, our interviews suggest considerable resistance to offshoring within these sectors (as described in the next section).

Offshore outsourcing relies on many different organizational forms, including multi-national corporations with offshore subsidiaries, multi-national outsourcers, Indian outsourcers and specialists, non-resident Indian firms, and Indian subsidiaries.[6] Many companies rely on multiple arrangements, using outsourcers for big contracts and specialists for smaller projects. As familiarity with offshore talent grows, the preference seems to be to go direct and avoid the extra costs imposed by large outsourcers; however, others are turning to the outsourcers as they realize the "hidden costs" of offshoring, in particular the expense and inflexibility of maintaining multiple locations.[7] In a climate of intense competition for contracts, the trend is toward mergers and consolidation of outsourcers.[8]

This, paradoxically, may have the effect of dispersing outsourced work around the globe, since the large outsourcers are developing "global

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[4] Help desk is typically divided into three levels: Level 1, phone support; Level 2, desktop support, which takes place at the workstation; and Level 3, breakfix (which may be at the workstation or a separate location.)

[5] Business Times, 5/7/03; Joint Venture: Silicon Valley, 2004. *The Future of Bay Area Jobs: The Impact of Offshoring and Other Key Trends.*

[6] Dossani and Kenney, 2003

[7] San Francisco Chronicle, 11/16/03

[8] Global News Wire, 2003

delivery systems" for "right-shoring" or "best-shoring." There is a right shore for each process; by spreading work across different locations, companies can reach an optimal balance of risk. Popular offshore and nearshore locations (in addition to India and China, which are most commonly cited) include Romania, Russia, Hungary, the Czech Republic, the Philippines, Grenada, Ireland, France, Spain, the Dominican Republic, Australia, New Zealand, Singapore, Thailand and Vietnam.[9] This "right-shoring" is driven by costs: in as little as a decade, the cost of employing top software engineers in India could be the same as in the U.S.[10] For instance, one software company told us that their Bangalore location was a three to five year plan, after which they will move to another, cheaper country. Others spoke of problems with offshoring that will limit their expansion offshore for the near future.

The Limits to Offshore Outsourcing

Our interviews revealed multiple concerns about offshoring jobs. Most often, companies voiced worries relating to their business model, including issues with quality, customer interaction, and security. Businesses are also apprehensive about labor problems such as rising turnover and costs, as well as the lack of high-level and managerial capacity. Logistical problems, such as poor infrastructure, bureaucracy, and problems with knowledge flow, also make companies reluctant to shift jobs offshore.

Business Model

Many companies fear that shifting jobs offshore will interfere with how they do business. Face-to-face contact is critical not only in stimulating creativity but also in preserving what companies call "tribal" knowledge (i.e., tacit knowledge) of the business. IT companies, in particular, "can't just compete on price." While outsourcers point to their standardized models such as the Carnegie Mellon M5 certification with pride, "Nobody's even heard of that here," the head of a major software association told us. In other words, much of what makes businesses, particularly software developers, successful can't be codified. Much of the standardized work has already shifted offshore. More than half of the companies we interviewed said they had already reached the limits of what offshoring could offer and had no plans to expand. For instance, one major manufacturer/retailer told us, "We've moved as much as we can to India. We won't be moving any more positions anytime soon. The main

[9] Wired, 6/6/03; Computer World, 9/17/03; interviews

[10] New York Times, 7/22/03

reason for moving these positions was for economic reasons. We can't outsource any more positions without affecting the quality of service."

For some firms, offshoring threatens their identity or way of doing business. Despite the issue of maintaining only core competencies within the company, firms see efficiency advantages to keeping functions in-house; as a large manufacturer/retailer told us, "Going overseas cuts costs, but doesn't decrease complexity." While non-IT companies are more likely to emphasize these efficiency rationales for keeping jobs here, IT companies point to their company identity. For instance, one large IT firm told us of "cultural hurdles" in both process—a tradition of informality in creating and approving specs that makes it difficult to transmit internationally—and content—a need to continually showcase their new products and absorb the technical advances to produce the next generation. An outsourcer would be unable to keep up with this company's pace of innovation. For this type of work, the homogeneity and standardization offered by outsourcers threatens the way they do business.

Part of the business identity is interaction with customers. Outsourcers told us of their clients' concern for maintaining a high level of communication with their customers, which makes them intolerant of offshore workers who haven't mastered the nuances of English. Several IT firms also reported that they had experimented with offshoring but had decided to return customer-critical processes to the U.S.

Although the media has featured horror stories of security risks posed by outsourcing (for instance, the well-publicized posting of medical records on the Internet by a disgruntled medical transcriptionist), only a few of the companies we interviewed, most from the institutional sector, mentioned security concerns. Customer privacy is only one issue; others mentioned the need for transparency in documentation for many businesses, such as law firms and companies conducting clinical trials.

Labor Issues

Another factor behind company resistance to offshoring is the quality of labor, particularly in high-skilled or managerial positions. Although companies aren't concerned about the quantity of college graduates available, there are problems with establishing an internal labor market to groom entry-level workers to rise within the firm.

High-skilled capacity is an issue in offshoring particularly because of the need for more managers. According to an IT firm, for every 10 people in the U.S. you need about one manager. But overseas, companies typically need one additional manager on top of that because of cultural differences, physical distance, and time zone issues. The shortage of

managerial talent is particularly acute in industries like finance and health care, which are looking to expand IT-enabled services and business processing abroad.[11] IT-enabled business services, including functions like finance, paying suppliers, payroll and benefits, require non-technical but specialized skills in business that are not yet common among offshore workers. At the same time, there is intense competition for workers with specialized skills; one outsourcer complained to us that it was hard to find Ph.D.s in India, even though they (supposedly) have 100,000 graduating each year.

Companies with very short tenures abroad have difficulty developing an internal labor market. Although the large outsourcers have standardized promotion and training procedures, companies seeking an independent presence in India have to deal with a new set of occupational titles and complicated labor laws that require wages to be posted, making it difficult to offer different wages to workers in the same position and thus reward effective workers. High employee turnover makes it difficult to create internal career ladders and developmental patterns. Turnover is particularly problematic—according to one source, up to 40% at some sites—in business process outsourcing, which is still in its infancy. Even IT firms outsourcing advanced processes complained about turnover, as other companies poach their workers creating an "inherent inefficiency."

Logistical Problems

Other problems companies have experienced in offshore outsourcing stem from poor infrastructure, excessive bureaucracy, or problems with managing business across different locations and time zones. Although the first two are surmountable, the spatial issues are not.

Based on U.S. urban standards, the infrastructure in India and China is very poor. Network outages can mean millions in lost business and, over time, decreases in consumer confidence. The consensus is that it will still be decades before these countries catch up. This limits both the type and quantity of work that can be sent abroad.

Companies see problems expanding offshore, particularly in India, because of bureaucracy in the courts and in labor regulations. For instance, firms complained not only about the wage posting requirement in India, but the mandate that companies provide employee housing. Another set of concerns is legal, particularly the risk of losing intellectual property if a dispute arises. Although corruption is an issue in both China

[11] Wired, 12/31/02; Dossani and Kenney, 2003

and India, companies seem to work with it. As one outsourcer explained, they hire third parties "to do the dirty work for them."

Most of the "hidden costs" of offshore outsourcing—costs that are not generally anticipated or readily quantified—stem from problems with knowledge flow. Many IT firms need to provide hardware to their employees, but remote management requires a lot of bandwidth and shipping hardware can be very expensive. Delays at customs add unpredictability to the process of transporting hardware. The need for communication within the company makes working across multiple locations and time zones awkward. Companies complained about the expense of flying workers from across the globe for a few meetings. While the 24/7 model works well for business process outsourcing, it fails when projects need to be coordinated between high-level workers in areas such as India and California; the time difference makes remote meetings difficult to schedule.

APPENDIX C

Training Provider Survey Results: Differences by Provider Type

1. What kind of assistance does your organization provide to the graduate in making contact with potential employers? (Check ALL that apply.)

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
listserves	11	65%	50	48%	21	54%	82	51%			
job-posting binders	12	71%	72	69%	36	90%	127	79%		*	**
computers for search	13	76%	79	76%	36	90%	128	80%			*
space provided	13	76%	65	63%	25	63%	103	64%			
job fairs	10	59%	48	46%	28	72%	86	54%			***
cold-calling	11	65%	57	55%	21	54%	89	56%			
employer contacts	13	76%	84	81%	28	70%	125	78%			
references	15	88%	75	72%	23	59%	113	71%		**	
none of the above	0	0%	6	6%	2	5%	8	5%			

2. When are any of these job placement services available to students?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
during training	16	94%	83	80%	34	87%	133	83%			
at graduation only	4	24%	38	37%	14	35%	56	35%			
<= 6 months after grad	4	24%	49	47%	16	40%	69	43%	*		
6-12 months after grad	6	35%	39	38%	17	43%	62	39%			
1+ year after grad	8	47%	57	55%	27	68%	92	58%			

3. Where do you get the information on those job openings? (Check ALL that apply.)

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
employers contact firm	16	94%	92	88%	36	90%	144	90%			
contact employers	14	82%	74	71%	27	68%	115	72%			
web search engines	15	88%	83	80%	28	70%	126	79%			
other web postings	11	65%	58	56%	22	56%	91	57%			
newspaper advertisements	16	94%	65	63%	27	68%	108	68%	**	**	
program alumni	9	53%	53	51%	17	43%	79	49%			

4. Do you provide any of the following types of placement and soft skills training? (Check ALL that apply.)

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
resume writing	16	94%	89	86%	36	90%	141	88%			
cover letter writing	16	94%	81	78%	36	90%	133	83%			*
interviewing skills	16	94%	83	80%	35	88%	134	84%			
personal presentation skills	15	88%	71	68%	25	63%	111	69%	*	*	
videotaping	10	59%	30	29%	13	33%	53	33%	**	*	
motivational counseling	15	88%	66	63%	23	58%	104	65%	**	**	
none of the above	0	0%	10	10%	1	3%	11	7%			

5. Who works on placement at your organization? (Check ALL that apply.)

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
job developer/ placement officer	13	76%	64	62%	26	65%	103	64%			
instructor	10	59%	41	39%	19	48%	70	44%			
program director	12	71%	69	66%	21	54%	102	64%			

6. How many staff hours PER WEEK, on average, do you spend on placement? Please estimate the total for ALL staff.

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
0 to 5	3	18%	18	17%	7	18%	28	18%			
6 to 10	1	6%	19	18%	7	18%	27	17%			
11 to 20	2	12%	13	13%	4	10%	19	12%			
21 to 40	1	6%	21	20%	7	18%	29	18%			
41 to 60	2	12%	15	14%	7	18%	24	15%			
61 to 80	2	12%	5	5%	0	0%	7	4%		**	
81 or more	4	24%	11	11%	5	13%	20	13%			

7. How large is your contact list of area employers?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
0 to 5	1	6%	5	5%	1	4%	7	4%			
6 to 20	2	12%	19	18%	0	0%	21	13%		**	***
21 to 50	3	18%	16	15%	2	8%	21	13%			
50 +	7	41%	33	32%	22	88%	62	39%		***	***

11. Are there firms you haven't placed with but would like to establish a relationship with?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
yes	10	59%	61	59%	24	62%	95	59%			
no	2	12%	7	7%	2	5%	11	7%			
don't know	2	12%	19	18%	4	10%	25	16%			

12. How do you establish and maintain contact with area employers? (Please check ALL that apply.)

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
initiates/ maintain contact	13	76%	83	80%	30	75%	126	79%			
employer recruits/contacts firm	12	71%	60	58%	31	78%	103	64%			**
board of directors/ bus. advisory	5	29%	28	27%	17	44%	50	31%			*
networking events	12	71%	61	59%	28	72%	101	63%			
trade associations	5	29%	27	26%	12	30%	44	28%			
workforce investment board	5	29%	39	38%	18	46%	62	39%			
other city gov. services	6	35%	18	17%	12	30%	36	23%	*		*
other state/federal services	4	24%	25	24%	9	23%	38	24%			
don't know	0	0%	4	4%	0	0%	4	3%			

13. Below is a list of employers who have recently been recruiting for IT workers in your region. For each employer, check if (A) you recognize the name, (B) you know somebody at the company, F(C) you have tried to place a graduate at the company, and (D) you have successfully placed a graduate at the company. Please check ALL that apply

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
recognize employer name											
0	2	12%	15	14%	2	5%	19	12%			
1-10	12	71%	57	55%	29	77%	98	61%			**
11+	2	12%	25	24%	7	18%	34	21%			
know person at company											
0	10	59%	52	50%	18	49%	80	50%			
1-10	8	47%	41	39%	19	51%	68	43%			
11+	0	0%	3	3%	0	0%	3	2%			
tried to place at company											
0	13	76%	61	59%	27	73%	101	63%			
1-10	5	29%	33	32%	10	27%	48	30%			
11+	0	0%	2	2%	0	0%	2	1%			
placed someone at company											
0	11	65%	56	54%	22	58%	89	56%			
1-10	7	41%	36	35%	16	42%	59	37%			
11+	0	0%	2	2%	0	0%	2	1%			

14. Do you have employer representation within your organization (e.g. member of board of directors)?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
yes	10	59%	44	42%	27	69%	81	51%			***
no	7	41%	48	46%	8	21%	63	39%			***
don't know	0	0%	9	9%	3	8%	12	8%			

15. Do you ever seek employer assistance in curriculum development?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
yes	10	59%	59	57%	30	75%	99	62%			**
no	7	41%	35	34%	5	13%	47	29%		**	**
don't know	0	0%	7	7%	4	10%	11	7%			

16. Do you ever seek employer assistance in grant writing (for instance, for letters of support)?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
yes	8	47%	21	20%	19	48%	48	30%	**		***
no	7	41%	74	71%	8	20%	89	56%	**	*	***
don't know	2	12%	6	6%	11	28%	19	12%			***

17. Do you ever partner with employers in training? (For example, on-the-job or incumbent worker training.)

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
yes	9	53%	49	47%	30	75%	88	55%			***
no	7	41%	43	41%	6	15%	56	35%		**	***
don't know	1	6%	8	8%	4	10%	13	8%			

18. Do any employers do guest speaking in classes?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
yes	12	71%	67	64%	32	82%	111	69%			**
no	5	29%	33	32%	3	8%	41	26%		**	***
don't know	0	0%	3	3%	2	5%	5	3%			

19. Do you have a mentorship program?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
yes	6	35%	29	28%	13	33%	48	30%			
no	9	53%	69	66%	21	54%	99	62%			
don't know	1	6%	3	3%	4	10%	8	5%			*

20. Does your mentorship program involve employers, alumni, or both?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
employers	0	0%	9	24%	5	42%	14	26%	**	***	**
alumni	1	20%	9	24%	2	17%	12	22%			
both	4	80%	19	51%	5	42%	28	52%	**	***	

21. What is the professional background of the majority of your instructors?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
IT	4	24%	42	40%	3	8%	49	31%			***
IT & education	1	6%	20	19%	5	13%	26	16%			
education	4	24%	13	13%	11	28%	28	18%			**
education & social services	1	6%	4	4%	6	15%	11	7%			**
social services	2	12%	1	1%	1	3%	4	3%	***		
IT & education & social services & other	2	12%	6	6%	2	5%	10	6%			
other	5	29%	13	13%	4	10%	22	14%	*	*	
don't know	0	0%	2	2%	6	15%	8	5%		*	***

22. Do your instructors tend to hold second jobs?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
yes	8	47%	48	46%	11	28%	67	42%			*
no	7	41%	43	41%	15	39%	65	41%			
don't know	1	6%	10	10%	11	28%	22	14%		*	***

If yes, are they with IT employers?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
yes	4	24%	39	38%	3	8%	46	29%		*	***
no	4	24%	9	9%	5	13%	18	11%	*		
don't know	1	6%	7	7%	18	45%	26	16%		***	***

23. Approximately, what is your current (2002) placement rate for graduates

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
25%	0	0%	1	1%	0	0%	1	1%			
33%	1	6%	5	5%	2	5%	8	5%			
50%	1	6%	6	6%	2	5%	9	6%			
66%	6	35%	18	17%	3	8%	27	17%	*	***	
75% +	5	29%	39	38%	8	20%	52	33%			**
don't know	3	18%	29	28%	19	48%	51	32%		**	**

24. Approximately, what was your placement rate between 2000 and 2001 for graduates?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
25%	0	0%	3	3%	1	3%	4	3%			
33%	0	0%	5	5%	3	8%	8	5%			
50%	3	18%	7	7%	3	8%	13	8%			
66%	3	18%	6	6%	2	5%	11	7%	*		
75% +	6	35%	46	44%	8	21%	60	38%			***
don't know	4	24%	30	29%	19	49%	53	33%		*	**

25. Which of the following counts as a placement for your organization?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
new job with IT	8	47%	71	68%	23	58%	102	64%	*		
new job in IT firm	9	53%	58	56%	21	53%	88	55%			
any new job	16	94%	45	43%	31	78%	92	58%	***		***
continuing education or training	5	29%	18	17%	12	30%	35	22%			
internship	4	24%	24	23%	11	28%	39	24%			*
self-employment	4	24%	49	47%	15	38%	68	43%	*		
contract employment	5	29%	51	49%	14	35%	70	44%			

27. Do you monitor the retention and advancement of your graduates?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
yes	14	82%	68	65%	19	48%	101	63%		**	*
no	3	18%	30	29%	16	40%	49	31%			
don't know	0	0%	2	2%	3	8%	5	3%			

If yes, for how long?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
6 months	3	18%	20	19%	6	15%	29	18%			
1 year	5	29%	29	28%	10	25%	44	28%			
2 years	2	12%	7	7%	2	5%	11	7%			
3 + years	2	12%	7	7%	1	3%	10	6%			
don't know	0	0%	3	3%	1	3%	4	3%			

28. How often do you report your placement rates to the government?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
monthly	6	35%	16	15%	6	16%	28	18%	**	*	
quarterly	5	29%	18	17%	3	8%	26	16%		**	
semi-annually	0	0%	7	7%	2	5%	9	6%			
annually	2	12%	32	31%	10	26%	44	28%			
never	4	24%	24	23%	12	31%	40	25%			

29. How often do you report your retention rates to the government?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
monthly	4	24%	10	10%	4	10%	18	11%	*		
quarterly	7	41%	12	12%	4	10%	23	14%	***	***	
semi-annually	0	0%	6	6%	1	3%	7	4%			
annually	1	6%	31	30%	7	18%	39	24%	**		
never	4	24%	35	34%	14	35%	53	33%			

30. How much of your government funding do you receive at intake?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
0%	2	12%	6	6%	1	3%	9	6%			
25%	5	29%	16	15%	0	0%	21	13%		***	***
50%	1	6%	15	14%	1	3%	17	11%			**
75%	0	0%	5	5%	3	8%	8	5%			
100%	0	0%	0	0%	4	10%	4	3%			***
don't know	5	29%	29	28%	19	49%	53	33%			**

31. How much of your government funding do you receive at graduation?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
0%	2	12%	2	2%	3	8%	7	4%	**		
25%	4	24%	11	11%	3	8%	18	11%		*	
50%	1	6%	13	13%	0	0%	14	9%			**
75%	0	0%	20	19%	2	5%	22	14%	**		**
100%	3	18%	7	7%	3	8%	13	8%			
don't know	4	24%	29	28%	19	48%	52	33%		*	**

32. How much of your government funding do you receive at placement?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
0%	0	0%	7	7%	3	7%	10	6%			
25%	3	18%	14	13%	1	2%	18	11%		**	*
50%	5	29%	6	6%	0	0%	11	7%	***	***	
75%	0	0%	7	7%	0	0%	7	4%			*
100%	2	12%	7	7%	1	2%	10	6%			
don't know	5	29%	30	29%	22	54%	57	36%		*	***

33. How much of your government funding do you receive at 90-day retention?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
0%	1	6%	7	7%	1	3%	9	6%			
25%	3	18%	10	10%	1	3%	14	9%		**	
50%	2	12%	0	0%	0	0%	2	1%	***	**	
75%	0	0%	3	3%	0	0%	3	2%			
100%	0	0%	3	3%	1	3%	4	3%			
don't know	5	29%	40	38%	22	55%	67	42%		*	*

35. How much of your government funding do you receive at 6-month retention?

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
0%	3	18%	7	7%	3	8%	13	8%			
25%	1	6%	6	6%	0	0%	7	4%			
50%	0	0%	0	0%	0	0%	0	0%			
75%	0	0%	2	2%	0	0%	2	1%			
100%	0	0%	3	3%	0	0%	3	2%			
don't know	7	41%	39	38%	22	55%	68	43%			*

42. Course offerings (check all that apply):

	I. Nonprofit		II. Private		III. Public		Total		Significance		
	Num	%	Num	%	Num	%	Num	%	I - II	I - III	II - III
basic web design	6	32%	68	63%	25	63%	54	32%	**	**	
computer repair	6	33%	59	55%	24	62%	89	54%		*	
cisco-related	3	16%	38	35%	22	55%	63	38%		***	**
microsoft office	17	90%	78	72%	35	88%	130	78%			*
window NT	4	21%	58	54%	26	65%	88	53%	**	***	
advanced web design	4	21%	48	45%	20	50%	72	43%	*	**	
database management	3	16%	63	58%	26	65%	92	55%	***	***	
novell	1	5%	14	13%	13	33%	28	17%		**	***
unix	1	6%	28	26%	14	35%	43	26%	*	**	
oracle	1	6%	33	31%	7	18%	41	25%	**		
computer graphics	4	21%	51	48%	24	60%	79	48%	**	***	

Notes

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[2] Castells, M. (1996). The rise of the network society. Blackwell Publishers, Malden, MA. Sassen, S. (1991). The global city: New York, London, Tokyo. Princeton, NJ: Princeton University Press.

[3] Giloth, R., ed. (2004). Workforce Intermediaries for the Twenty-first Century. Philadelphia, PA: Temple University Press, p. 13. Giloth defines this second-chance system as including GED, ESL, adult and vocational education, job training, and other programs targeted to special populations; he estimates that it serves 15–50 million people.

[4] Defined as the "skills, abilities, and traits that pertain to personality, attitude, and behavior rather than to formal or technical knowledge." Moss, P. I. and C. Tilly. (2001). Stories employers tell: Race, skill, and hiring in America. Russell Sage Foundation, New York. P. 44

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[13] Castells, 1997b: 21; Reich (op. cit.)

[14] Bernhardt et al. (op. cit.). McMurrer, Daniel and Isabel Sawhill.Getting Ahead – Economic and Social Mobility in America. 1998. Urban Institute Press.

[15] Andersson et al. 2003 (op. cit.).

[16] Technology-related work was defined based on a combination of one-digit occupation and one-digit industry. Thus, it consists of professionals and technicians in FIRE, business services, professional services, and manufacturing.

[17] Interestingly, these increases are similar to or greater than increases noted by another recent evaluation of sectoral initiatives (employer-based job training programs focused on specific industry sectors) (SEDLP Research Report No. 3: Gaining Ground: The Labor Market Progress of Participants of Sectoral Employment

Development Programs, by Lily Zandniapour and Maureen Conway, February 2002.)

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[20] Marano & Tarr, 2004 (op. cit.)

[21] Giloth, 2004 (Workforce Intermediaries, op.cit.)

[22] Giloth, 2004, Workforce Development Politics.

[23] Human capital : A theoretical and empirical analysis, with special reference to education / by Gary S. Becker. 2d ed. New York : National Bureau of Economic Research : distributed by Columbia University Press, 1975. Gordon, D., Edwards, R., & Reich, M. (1982). Segmented work, divided workers: The historical transformation of labor in the United States. Cambridge, England: Cambridge University Press.

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[25] Giloth, R., ed. (2004). Workforce Intermediaries for the Twenty-first Century. Philadelphia, PA: Temple University Press, p. 13. Giloth defines this second-chance system as including GED, ESL, adult and vocational education, job training, and other programs targeted to special populations; he estimates that it serves 15–50 million people.

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Wolman and A. Colamosca, The Judas Economy: The Triumph of Capital and the Betrayal of Work (Reading, MA: Addison-Wesley, 1997).

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[48] McCarthy et al., 2002, op.cit.; "U.S. IT Outsourcing Forecast and Analysis by Vertical Market, 2003–2007", IDC, October 22, 2003; Frances Karamouzis & Rita Terdiman, "Offshore Sourcing Goes Mainstream in 2003," Gartner Research, 13 November 2002. However, these firms have recently retracted these earlier estimates due to the slowing pace of offshore outsourcing (Wall Street Journal, "Behind Outsourcing Debate: Surprisingly Few Hard Numbers," Jon E. Hilsenrath, April 12, 2004, p. A1.)

[49] Jon E. Hilsenrath, 2004, op.cit.

[50] An example of survey research is a report from Gartner that describes the results of a survey held at the company's outsourcing conference: 42% of conference attendees indicated that they would be increasing "offshore people resources" by 21% or more next year. No mention is made of sampling bias in the respondent pool of the enterprise buyers and IT service providers who chose to attend the conference. Also worthy of note is that, of this group of companies interested enough in offshoring to attend, 58% are actually planning to increase their offshoring by 20% or less, and some not at all. Yet, Gartner's conclusion: "Bottom Line: New business demands and investments by enterprises and governments around the world will converge with new and established vendor models to cause the most significant human capital shift that has occurred in the history of the IT services industry." (F. Karamouzis, July 18, 2003, "The Impact on People When Going Offshore for IT Services" Gartner Research Tactical Guidelines, TG-20-4757, p.4).

[51] Another example from Gartner is the "80/80/80 Discuss/Analyze/Act prediction": "Through 2004, despite the potential human resource backlash, 80 percent of U.S. executive boardrooms will have discussed global delivery options (nearshore and offshore); of those, 80 percent will pursue an analysis of global delivery options (nearshore and offshore) and 80 percent of those enterprises using global delivery models will act by increasing their level of people resources (nearshore and offshore) by as much as 30 percent (0.8 probability)." (Frances Karamouzis, July 29, 2003, "A Look at India for Offshore Sourcing Options" Gartner Research Article Top View, AV-18-8057, p.1). In other words, half of U.S. firms will increase their offshore outsourcing by up to 30 percent. Is this half of all seven million U.S. firms, representing tens of millions of jobs? With no precise figures on how many jobs firms currently offshore, how much is a 30 percent increase? It is unclear; yet Gartner can actually assign a probability to it! Asked about it, a Gartner official explained that they are conducting an ongoing assessment of this prediction—but also said it is a key data point used by vendors as an input into their strategic planning assumptions.

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[53] Chapple & Zook, op. cit., 2002.

[54] Australian Financial Review, 8/5/03.

[55] Michaels, Max P. "Why Offshoring Is Good for America," Business Today, October 26, 2003, New York Times, 7/22/03, 12/22/03 (op. cit.).

[56] Kaihla, P., 2003, op. cit.; Carnevale, Anthony P. and Donna M. Desrochers. "The Political Economy of Labor Market Mediation in the United States" in Giloth (2004), Chapter 7, pp. 170–192; Mitra Toossi, "A Century of Change: The U.S. Labor Force, 1950–2050," Monthly Labor Review, May 2002, pp. 15–28.

[57] (Because data is missing for 20 of 338 metros, and jobs outside of metropolitan areas are excluded, the table shows a net loss of 107,000 jobs, despite the overall IT job gains of 314,000 from 1998 to 2003).

[58] Calculated based upon the coterminant ratio—the share of an occupation accounted for by a single industry. For each metro, the "percent of coterminant employment" is calculated as the coterminant ratio for an occupation multiplied by the number of workers in that occupation and divided by the total number of IT workers. For instance, 28% of computer software engineers are employed in computer software design, and the remainder are divided among hundreds of other industries; this means a coterminant ratio of 0.28. If there are 100 computer software engineers and 1,000 total IT workers, the percent of coterminant employment is 28 (0.28 x 100) divided by 1,000, or .028. Markusen, Ann and Schrock, Greg. 2001. Occupational Advantage: Detecting and Enhancing Occupational Mix in Regional Development. Unpublished paper. Project on Industrial and Regional Economics, University of Minnesota.

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[60] Bardhan & Kroll, 2003 (op.cit.)

[61] Appelbaum, E., A. D. Bernhardt, et al. (2003). Low-wage America: How employers are reshaping opportunity in the workplace. New York: Russell Sage. McCall, Leslie. (2001). Complex Inequality : Gender, race and class in the New Economy. New York: Routledge.

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[63] Giloth, 2004,(op.cit.).

[64] To become eligible for WIA funding, training providers in most states must be accredited, meet industry standards for certification, or simply provide a training program that leads to a certificate, degree, license, or new competency that is recognized by employers.

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[71] Bureau of Labor Statistics, Contingent and Alternative Employment Arrangements (Washington, D.C.: Bureau of Labor Statistics, 2001).

[72] Unfortunately, there were insufficient responses in the web-based survey from disadvantaged (low-income or minority) jobseekers to allow analysis.

[73] Pastor et al. 2004 (op. cit.)

[74] Laufer, Jessica K. and Winship, Sian, "Perception vs. Reality: Employer Attitudes and the Rebranding of Workforce Intermediaries, Chapter 9, pp. 216–240 in Giloth 2004.

[75] Grubb, 1995 (op.cit.). U.S. Department of Labor 1995 (op.cit.)

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[77] For a review of GAIN, see Riccio, D. Friedlander, and S. Freedman, GAIN: Benefits, costs, and three-year impacts of a welfare-to-work program (San Francisco: MDRC, 1994).

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[81] Giloth, 2004 (op. cit.).

[82] Giloth, Robert, editor. (2004.) Workforce Development Politics: Civic Capacity and Performance. Philadelphia: Temple University Press.

[83] Giloth, 2004 (Workforce Intermediaries).

[84] Marano, Cindy & Tarr, Kim, "The Workforce Intermediary: Profiling the Field of Practice and Its Challenges, Chapter 4, pp. 93–123 in Giloth, 2004.

[85] As one New York area workforce development official told us, "The private trade schools market themselves very aggressively. They portray their programs as if they are free. But it's $3000 WIA and maybe a $10–16,000 loan."

[86] Laufer & Winship (op. cit.)

[87] The requirement to track placement for all students in a class, regardless of whether they were funded under WIA, is very difficult for community colleges to comply with, given the broad array of students enrolled and the dearth of full career centers.

[88] This weight takes into account three factors: provider type (private, nonprofit, or public); provider region (San Francisco, New York, Chicago, or Washington, DC); and provider location (city or suburb, as determined by population density). The respondent sample was not weighted by size because approximately one-third of the respondents did not specify how many students they graduate.

[89] The Laufer & Winship study (op. cit. in Giloth, 2004) included employers in the New York and Chicago regions and targeted three specific industries: fabricated metals and industrial machinery manufacturing; health care and biomedical technology; and transportation, distribution, and logistics.

[90] Chapple, Karen. (2001). Time to work: Job search strategies and commute time for women on welfare in San Francisco." Journal of Urban Affairs 23(2):155–173.

[91] This includes all of the provider survey respondents for whom we could map and geocode the employers they had placed with.

[92] Just for example, one New York private provider interviewed during the peak of the recession told us that her graduates, from dislocated workers to ex-felons, were all getting jobs in programming right away, at $100,000 a year. Nearby, other programs with similar curricula told us of extreme difficulties in placement.

[93] Some states use unemployment insurance (UI) data to track placements. However, many have had difficulty coordinating databases and, in any case, numerous problems may arise: for instance, undercounting of placement may occur because of contract work or self-employment that is not recorded in UI data, and overcounting may occur as workers simply return to their old jobs or take temporary jobs.

California relies on local and state WIB staff to verify placements, but in practice due to staff shortages, few placements are verified.

[94] All names have been changed herein.

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[101] Hilary Silver and Regina Bures, "Dual Cities? Sectoral Shifts and Metropolitan Income Inequality, 1980–90" (Service Industries Journal v17, n1 (Jan 1997):69–90). ICF Kaiser International, Inc. Economic Strategy Group, May, 1998. America's Regions in the Global Economy: A New Framework for Metropolitan Economic Strategy. A Report Submitted To: Office of Policy Development and Research, United States Department of Housing and Urban Development.

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[104] Martin Carnoy, Manuel Castells, and Chris Benner, What is happening to the U.S. labor market? Part I: Review of the literature (Unpublished manuscript, Russell Sage Foundation, 1996); Osterman, 1999 (op. cit.)

[105] U.S. Bureau of Labor Statistics, 2001 (op. cit.)

[106] P. Gottshalk and R. Moffitt, "The growth of earnings instability in the United States labor market" (Washington, D.C.: Brookings Papers on Economic Activity, 1994 #2); McKinley Blackburn, David Bloom and Richard Freeman, "The declining economic position of less skilled American men," in Gary Burtless (ed.), A Future of Lousy Jobs? The Changing Structure of US Wages, (Washington, D.C.: Brookings, 1990); Silver & Bures, 1997 (op. cit.); McCall, 2001 (op. cit.); Bernhardt, Annette, Martina Morris, Mark Handcock, and Marc Scott, Divergent Paths, Russell Sage Publications, 2001.

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[108] Bernhardt et al., 2001 (op. cit.)

[109] Andersson, Fredrik, Harry Holzer,and Julia Lane. October 2003. "Worker Advancement in the Low-Wage Labor Market: The Importance of 'Good Jobs" (Urban Center Policy Brief). Washington, D.C.: Brookings.

[110] Appelbaum et al. (op. cit.)

[111] The SIPP panel is 115,996 individuals. Once non-working-age individuals and cases with missing data are excluded, the sample consists of 32,024 working-age individuals. This analysis examined mobility of those who worked at least 10 hours per week (520 hours per year) over the course of both years 1 and 4

[112] Andersson et al. 2003 (op. cit.) found this as well; however, they and others suggest that there may be age differences—i.e., while younger workers benefit from job mobility, older workers do not.

[113] Technology-related work was defined based on a combination of one-digit occupation and one-digit industry. Thus, it consists of professionals and technicians in FIRE, business services, professional services, and manufacturing.

[114] Although BAVC began training more disadvantaged groups a couple years ago, only a few of the study participants could be characterized as seriously disadvantaged—i.e., having no college education.

[115] In Byte Back's case, the sample included some students just finishing the program because of the difficulty of locating graduates. However, as it turned out, most of these students took an extra year to finish the program, not entering the workforce until 2003 (too late for this study).

[116] There were several reasons for disqualification. Several of the graduates from the Alexandria program had been in IT for years, with computer science degrees, and were simply brushing up on skills; because there were no real upward mobility issues for them, they were eliminated. Several of the Byte Back graduates interviewed never finished the program. Finally, a small program in Silicon Valley was initially included in the study but then eliminated because only a few of its graduates could be located.

[117] SEDLP Research Report No. 3: Gaining Ground: The Labor Market Progress of Participants of Sectoral Employment Development Programs, by Lily Zandniapour and Maureen Conway, February 2002.

[118] Granovetter, M. (1995). Getting a job: A study of contacts and careers (2nd ed.). Chicago: University of Chicago Press.

[119] Saxenian et al. 1999 (op. cit.).

[120] For the definitive study of the new emphasis on soft skills, see Moss & Tilly, 2001 (op. cit.)

[121] Two and a half years later, in his exit interview, Sam told us about trying to go back to school, this time to a private noncertified university: "The last time [I went to school], the school filed for bankruptcy and I lost $13K of my money. Now I study on my own."

[122] Adelman, C. (2000.) A parallel postsecondary universe: The certification system in information technology. Washington, DC: U.S. Department of Education Publications Center.

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[128] WIA requires that states prioritize services to low-income adults only if it finds that resources are limited.

[129] Calculated from WIA Standardized Record Data. This does not include those receiving employment services for the unemployed under the Wagner-Peyser Act. Including both ITA vouchers and the Wagner-Peyser training, almost half of all WIA participants nationally have received job training.

[130] Center for Law and Social Policy, "WIA Reauthorization Recommendations," July 2003, http://www.clasp.org/DMS/Documents/1057258510.44/WIA_Recomm.pdf. Further, a recent report by the Workforce Alliance found that the U.S. Department of Labor has decreased its budget for worker training by 29 percent between 1985 and 2003 (in real dollars), and training funds for disadvantaged adults have been cut roughly in half. ("Skilling the American workforce 'on the cheap': Ongoing shortfalls in federal funding for workforce development," Robin Spence and Brendan Kiel, September 2003.)

[131] This is suggested also by the Center for Law and Social Policy, 2003 (op. cit.).

[132] Bush proposal: Adult, dislocated, and employment services to be consolidated into one block grant, meaning that groups will compete for same funding. Bush would prioritize unemployed workers over low-income (currently priority is on individuals on public assistance if funds are limited). Bush proposals "seem to run counter to the expressed desire to assist such at-risk jobseekers" (Spence & Kiel, op.cit., 8).

[133] SER-Jobs for Progress National, Inc, "WIA reauthorization: The community-based perspective," James Parsons, April 2002, http://www.ser-national.org/Media/wia.pdf.

[134] The WIBs are not collecting data on this, which makes it difficult to substantiate.

[135] SER, 2002 (op. cit.).

[136] SER, 2002 (op. cit.).

[137] http://www.doleta.gov/usworkforce/wia/wialaw.txt, Section 106.

[138] McNamara, Carter. (1998.) Basic guide to program evaluation. [Available online http://www.mapnp.org/library/evaluatn/fnl_eval.htm].

[139] Some providers indeed are not responsible for placement because they have contracted with the local one-stop for its placement services. But in practice, this division of responsibility is proving problematic for three reasons. First, companies are more inclined to contact a specific training provider than the one-stop when looking for trained workers. Secondly, one-stop employment specialists are not trained to help jobseekers in specific fields, which may prove particularly problematic in a field like IT, in which employers are often looking for a specific set of characteristics. Finally, with the one-stop responsible for placement, the training provider cannot be sanctioned for providing poor training outcomes.

[140] United States General Accounting Office. "Workforce Investment Act: Improvements needed in performance measures to provide a more accurate picture of WIA's effectiveness." Report Number: GAO-02-275, February 2002; SER, 2002 (op. cit.)

[141] McNamara, 1998 (op. cit.)

[142] Comments on the Reauthorization of the Workforce Investment Act (2003), Jobs for the Future (Boston, MA). http://www.jff.org/jff/kc/library/0170?p_primarytopic=1009

[143] Kibel, Barry M. (1999.) Success stories as hard data: An introduction to results mapping. New York: Kluwer Academic/Plenum.

[144] Kibel, op. cit.

[145] Spence and Kiel, 2003 (op. cit.)

[146] As one public training provider in New York City explained, "The way it works is they come to us and get referred to the one-stop, which gets them the voucher. They have to go through a three-hour training at the one-stop, but other than that, it's pretty minimal."

[147] Even in New York City, where officials are adamant that they do not guide customers, a recent WIB study showed that the bulk of vouchers have gone to just three providers.

[148] Kazis, Richard. (2004.) "What do workforce intermediaries do?" In Giloth, Robert, 2004 (Workforce Intermediaries, op. cit.)

[149] For the most part, the LWIAs are equivalent to the "service delivery areas" under JTPA; although WIA attempted to consolidate many of the areas, large cities such as Oakland and Newark were allowed to grandfather in their city-based workforce areas.

[150] Studies such as Chapple (2001, op.cit.) and Hanson, S. and Pratt, G. (Gender, work, and space; New York: Routledge; 1995) demonstrate how labor markets work locally, particularly for disadvantaged women, minority, and low-income groups, in part because of social networks.

[151] Marano and Tarr, 2004 (op. cit.)

[152] Giloth, 2004 (Workforce Intermediaries, op.cit.)

[153] Zandniapour and Conway, 2002 (op. cit.). Gearing Up: An Interim Report on the Sectoral Employment Initiative by Mark Elliott, Anne Roder, Elisabeth King and Joseph Stillman September 2001, 32 pages. Parker, Eric and Joel Rogers. 1999. "Sectoral Training Initiatives in the U.S.: Building Blocks of a New Workforce Preparation System?" In Pepper D. Culpepper and David Finegold, eds., The

German System of Skill Provision in Comparative Perspective. Oxford, UK: Berghahn Books.

[154] Chapple, Karen. (2005.) Building institutions from the region up: Regional workforce development collaboratives in California. Working Paper 2005-01. Berkeley: Institute of Urban and Regional Development, University of California.

[155] Workforce Strategy Center. Co-Authors: Julian L. Alssid, David Gruber, Davis Jenkins, Christopher Mazzeo, Brandon Roberts, Regina Stanback-Stroud. Building a career pathways system: Promising practices in community college-centered workforce development. October 2002. http://www.workforcestrategy.org/.g. Fitzgerald, J., and Carlson, V. (2000). Ladders to a better life. *American Prospect*, 11 (15), 54–60. Prince, Heath and Mills, Jack. Career ladders: A guidebook for workforce intermediaries. Jobs for the Future. December 2003. www.jff.org

[156] Too Many Bad Jobs: An Analysis of the Prospects for Career Ladder Initiatives in the Service Economy. 2004. Pablo A. Mitnik, Matthew Zeidenberg Center on Wisconsin Strategy Department of Sociology, University of Wisconsin-Madison. Unpublished paper.

[157] Fitzgerald, Joan. (2004.) Pathways to good jobs: Can career ladders solve the low-wage problem? The American Prospect, Jan 2004 v15 i1 p57 (3). Appelbaum and Bernhardt Low-Wage America.

[158] Alssid et al., 2002 (op. cit.); http://www.jff.org/jff/kc/library/0242 Breaking Through: Helping Low-Skilled Adults Enter and Succeed in College and Careers, 2004, Jobs for the Future

[159] Chapple, Karen. 2005. Building institutions from the region up: Regional workforce development collaboratives in California. Working Paper 2005-01. Berkeley: Institute of Urban and Regional Development, University of California.

[160] Giloth, 2004 (Workforce Development Politics, op. cit.), p. 213.

[161] The Aspen Institute. "Industry-specific workforce development: Key research findings and implications for the Workforce Investment Act." Maureen Conway and Ida Rademacher. June 2003. http://www.aspenwsi.org/Publications/WIABrief.pdf, p.2.