Implications of the Information Technology Revolution for People with Disabilities from a Labour Market and Training Perspective

Susanne M. Bruyère

and

S. Antonio Ruiz-Quintanilla

Cornell University

With

Martha Bonney
Syracuse University

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Introduction

Importance of the issue

People with disabilities represent approximately one sixth of the working age population globally, yet people continue to be significantly un- and under-employed compared to their nondisabled peers. This means that, to date, people with disabilities globally realise significantly less opportunity for the decent work that provides the resultant income needed to live a healthful and economically productive life. In addition, it means that many countries across the world are missing the opportunity to tap this largely untapped source of labour to strengthen their own economies as well as the well-being of their individual citizens who are persons with disabilities.

The rapid growth of information and communication technologies, called the Information Technology (IT) Revolution, and the new industries rapidly being created by these changes, may offer new opportunities for employment for people with disabilities. New jobs are being created continually by these growing industries that may perhaps offer a potential to benefit existing disadvantaged groups, such as those developing countries, people with disabilities, and women. Opportunities to access training and work at a distance may mean access to employment not previously available to many.

There may, however, also be attendant pitfalls to these workplace and labour force changes. Industries are moving quickly to try to take advantage of this revolution to increase their own business advantage, often rapidly changing job requirements and skill sets needed. This often means that those without the skill sets, or means to easily and quickly acquire them, are increasingly marginalised from labour force participation.

Populations already struggling for decent work opportunities, like people with disabilities, women, and those in developing countries, may be only further distanced from the opportunities that these changes might afford.

In addition, the new information and communication technologies not only influence business but also other aspects of society like communication and commerce. To be able to fully participate in society as a whole, people with disabilities, women, and those in developing nations must be equipped with the skills and abilities to increasingly access these new and emerging technologies, thereby enabling them to be not only economically productive, but also fully participating members of their own countries and the global society, in the ways which the new technologies are now requiring.

Overview of what is covered here

Starting with a brief discussion of the current incidence and employment rates of people with disabilities in different countries and the impact of disability on employment rates, this paper focuses on the integration of persons with different types of disabilities in the information technology (IT) labour market. Selected obstacles to labour force participation as well as potential opportunities for the various groups of persons with disabilities are identified and discussed. The paper also showcases selected existing successful strategies globally for the training and placement of persons with disabilities into the IT labour market.

Recent IT developments are identified and scrutinized for their potentially harmful or beneficial effects on access to the IT labour market for persons with disabilities. The opportunities created by new job creation, new forms of training, teleworking, and the role of assistive technologies in facilitating workplace accommodations are briefly described. The focus is on new options for the design and implementation of computer-related assistive technologies in the workplace, and the impact of teleworking and the World Wide Web on employability and work-related training of persons with disabilities.

The paper closes with a brief discussion of the roles that government agencies, business firms, labour unions, non-governmental organisations and education can play to help people with disabilities join the IT revolution and share its benefits.

Current Status of Persons with Disabilities in Employment and the IT Labour Market

Global incidence of persons with disabilities

Official tabulations of persons with disabilities, expressed as percentages of total populations, vary from less than one percent in countries like Brunai Darussalam, Kuwait, Qatar, Bulgaria, Thailand, Peru, Sri Lanka, and Jordan to more than 15 percent in Norway, Australia, Finland, Austria, and Hungary (United Nations Development Program 1999, taken from most recent data available, 1985-1992). These figures are influenced by the different approaches used to define and statistically calculate disabilities in different countries.

More detailed estimates are available for the United States. Approximately 20 percent of the population have a disability and 10 percent have a severe disability (Survey for Income and Program Participation (SIPP; 1994-1995 data). Disabilities rates vary by gender and race. Women have higher severe disability rates compared to men (9.0 percent versus 7.2 percent). Disabilities occur more frequently among black and Native American persons compared to all other groups. Among black women, 14.3 percent have a severe disability, compared to 9 percent for white, non-Hispanic women and 8.7 percent for the general population (Seelman 1999). The lowest rates of disabilities are found among Asian and Pacific Islanders (3.4 percent severe disabilities, 2.3 percent non-severe disabilities) (*ibid.*).

The National Science Foundation (1998, p.114) lists three major limitations of statistics on people with disabilities. First, and importantly, surveys lack standardization in the definitions of disabilities used. Operational definitions used by different survey

institutions vary widely in their inclusion of physical and mental conditions, which makes comparisons difficult. Second, most institutional records do not contain information on persons with disabilities. Third, most statistics are not based on objective data but on self-reports, which may be skewed by the respondent's self-image and unwillingness to disclose disability- related information.

Global employment status of people with disabilities

Employment status of persons with disabilities is greatly affected by educational achievement, gender, and race. Woman and minorities with disabilities are most likely to be unemployed or underemployed, and they are also least likely to have an advanced education. (*ibid.*).

In the United States the employment rate for people with non-severe disabilities is 76.9 percent employment and 26.1 percent among those with severe disabilities compared to 82.1 percent among the 21- to 64 year-old population without disabilities (McNeil 1997). The National Health Interview Survey gives a labor force participation rate of 51.8 percent for people with limitations versus 83 percent for people without limitations (NCHS, date not known - full citation being sought).

Employment rates vary also according to disability. Among 21- to 64-year-olds with disabilities, 64.4 percent of those with hearing difficulties are employed. Employment rates for persons with visual and mental disabilities are 43.7 and 41.3 percent, and only 33.5 percent of people who have difficulty walking are employed (U.S. Census Bureau 1997).

Among persons with functional limitations, 32.2 percent are employed. The lowest rates of employment are found for those with mobility-related impairments. "People unable to walk three city blocks have 22.5 percent employment. Employment for people unable to climb stairs is 25.5 percent; for those unable to lift or carry 10 pounds, 27 percent; for people with visual impairments (unable to see words or letters), 30.8 percent and for

those unable to hear conversations, 59.7 percent" (Stoddard, Jans, Ripple, and Kraus 1998). The extremely low rate of labor force participation for people with a work disability holds true for both men and women (32.3 percent and 28.5 percent respectively). (The term “work disability,” as used here, means a disability that specifically impairs the person's ability to perform work-related tasks, as opposed to more general skills like reading and walking.) These percentages have stayed more or less the same between 1983 and 1994 (*ibid.*).

The effect of education on labour force participation is more pronounced among persons with disabilities than those without disabilities. Labour force participation rates increase from 16 percent for those with less than 12 years of education to 27.3 percent for those with 12 years of education, to 40.9 percent for those with 13-15 years of education, to 50.6 percent for those with more than 16 years of education. For the different age groups, labour participation rates among persons with disabilities range from the high thirties among 16- to 34-year-olds down to 18.6 percent for the those aged 55 to 64 years (*ibid.*)

Generally it can be said that the labour force participation rate of young persons with disabilities is about 20 percent points lower than that of their nondisabled peers (Trupin et al. 1997).

Impact of disability on income

Persons with disabilities also tend to have lower incomes (Seelman 1999). The more severe the disability, the lower the earnings. Research about the relationship between poverty and disability shows that persons with disabilities around the world are more likely than the rest of the population to live in poverty. "It is a two-way relationship—disability adds to the risk of poverty, and conditions of poverty increase the risk of disability" (Elwan 1999). This finding is important in the context of this report, because of the well-known relationship between poverty and economic background on the one hand and educational level aspired and achieved on the other. Thus, in addition to the difficulties and barriers that people with disabilities have to overcome because societal institutions are not prepared to for people with disabling conditions, they also have a

disadvantage rooted in their relatively lower economic well-being. Furthermore, the incidence of disability is higher among older people for whom education, retraining, and labour market entry or re-entry are more difficult to achieve.

Little information is available about the *global* employment status of people with disabilities, across various disabling conditions. One source is the Disability Statistics Compendium from the United Nations (UN 1999), which lists employment characteristics by type of impairment or disability for selected countries. Comparisons among countries are difficult because classifications of disabilities are only partially standardized using the International Classification of Impairments, Disabilities, and Handicaps (ICIDH) codes developed by the World Health Organization (WHO) to classify various aspects of health. For example *mentally ill* in Hong Kong may not mean the same as *mentally disabled* in Egypt or *mental impairment* in the Philippines. This is probably also the case for categories like *unable to work*. Similar difficulties exist when using labels for economic activities. In the category *blind*, for example, about 26 percent of Egyptian men and 22 percent of women are described as unable to work, while for Bahrain the listed figures are 66 percent for men and 67 percent for women. Therefore, it is difficult to interpret numbers across countries, and one has to rely on anecdotal sources.

Some anecdotal documentation exists for the category of persons with *blindness*. In the past, most European and North American people with visual impairments only had access to a limited number of traditional employment areas. Early in the twentieth century, blind persons were trained to weave baskets, make brooms, or tune pianos. Attempts to train blind people as assembly workers in the 1920s in Germany met with limited success. Starting in the 1950s new job opportunities emerged: blind persons were trained to become telephone switchboard operators, dictaphone transcribers, and physiotherapists (mostly limited to massage and therapeutic baths). In the 1970s and 1980s more blind people in France were employed as switchboard operators than in any other job in that country (Scadden 1992).

Recently these occupations are threatened by new developments in telecommunication and computer technology. Switchboard operators are obsolete and speech recognition programs eliminate the need to use a dictaphone. In response to the new requirements of the job market, vocational training for blind people in countries like Austria, Germany, and Denmark now include learning how to use computer-based office equipment (Scadden 1992). Braille displays as well as speech are used as assisting technologies.

The representation of people with disabilities in the IT labour market compared to other jobs

Most people with disabilities in the United States who have a job are employed in administrative and executive positions, or as machine operators, food preparation workers, or service and sales workers. Only a few persons with disabilities are active in professions or occupations that require advanced degrees. While more than six percent of United States workers with disabilities work either in administrative positions, as machine operators or in service or retail jobs, only 0.8 percent are in such IT labor market positions as mathematics or computer scientists, 0.7 percent are computer equipment operators, 0.3 percent are natural scientists and 0.2 percent are computer programmers (McNeil 1993).

What is not known is how many of these workers were disabled because of an event that occurred later in life. To develop projections based on these numbers, it would be important to understand what percentage of workers with disabilities in the IT labor force were already trained and had some work experience before their disability occurred, and what percentage had a disability at the time they attended school or received job training.

Krueger and his colleagues did one of the few scientific studies estimating the employment and earning decline as a consequence of a disabling condition (Krueger et al. 1995; Kruse et al. 1996). Comparing the employment experience of a sample of individuals with spinal cord injuries to those of former co-workers without such injuries, they found a steep decline in employment, hours worked, and weekly earnings (Krueger

et al. 1995). Krueger and his colleagues were also interested in opportunities for persons with spinal cord injuries created by computer technologies. As they expected, having computer skills greatly expanded and improved employment opportunities for people with disabilities arising out of spinal cord injuries. Having computer skills is associated with higher weekly and quarterly earnings for individuals with spinal cord injuries (Krueger et al. 1995; Kruse et al. 1996).

Opportunities for People with Disabilities in the IT Labour Market Revolution

Opportunities presented by new job creation

Information services and information technology products have become fundamental to the overall growth and development of the economies in the United States and many other economies around the world. Virtually every sector—manufacturing, transportation, energy and utilities, retail and wholesale trade, finance, and government—uses information technology and information service in its operations. Information services represent one of the fastest growing sections of the U.S. economy. The information technology workforce has seen rapid growth of employment. Demand for highly skilled IT workers is greater than for all other occupations and this is expected to continue (Meares and Sargent 1999). From 1985 to 1996, employment in the IT segment in the United States more than doubled from less than 500,000 workers to over one million workers. By 2006, the U.S. Bureau of Labor Statistics projects that the demand for workers in the computer programming services industry will double again to two million (Wolfe 1999). In addition, demand for information technology-related workers in non-information technology industries is predicted to grow to 5.6 million by 2006 (*ibid.*).

Many researchers see great opportunities for people with disabilities in the IT labour market revolution. People with disabilities appear to perform at levels comparable to their

nondisabled peers in the fields of science, engineering, and technology, and they hold comparable positions and earn the same median income (Seelman 1999). The conclusion is that the presence of a disability does not interfere with the earnings potential of an individual once he or she has access to a good education and professional opportunities (National Science Foundation 1998). The remaining major barriers seem to be identifying job opportunities and encouraging employers to make the workplace accessible (Seelman1999).

The experiences of mid-career technical workers tell a different story. These workers seem to have difficulties finding employment in the midst of a tight labour market. The barriers that mid-career technical workers face in the IT labour market are mostly attitudinal. They include the fear of younger managers to hire older, more experienced employees, and assumptions that mid -career workers with families may be unwilling to work long hours, expect higher salaries, do not posses the current up-to-date skills and knowledge, and might cost the company more in insurance premiums (Meares and Sargent 1999).

In 1998 the U.S. Congress passed the American Competitiveness and Workforce Improvement Act and commissioned the National Academy of Sciences to assess the status of older workers in the IT field, including a consideration of the existence and extent of age discrimination in the IT workplace. One of the companies discussed in these findings is Dupont. The company conducted surveys in 1958, 1973, 1981 and again in 1990 to prove that employees with disabilities are equal to the task (compared to other DuPont employees in job performance, attendance and safety).[1] Their findings showed that their workers with disabilities performed competitively with others without disabilities in their workforce in terms of days on the job and other indicators of productivity.

Opportunities presented by new forms of training

There are select examples globally of governmental, private sector, and non-governmental (NGO) efforts to training and place persons with disabilities into IT jobs.

An example of an organization that has as its specific focus to advance the employment opportunities for people with disabilities using information technologies is the U.S.-based company, National Telecommuting Institute, Inc. (NTI)[2]. NTI specializes in home-based telecommuting employment training and job placement for individuals with disabilities. A unique educational institution, NTI assists individuals to develop the skills needed to become competitive in a virtual workforce.

NTI began as the job placement division of "Helping Hands," A non-profit organization established in 1982. The division was reorganized and incorporated under the name National Telecommuting Institute in 1995. In 1997 NTI became the first virtual school ever accepted for candidacy accreditation status by the New England Association of Schools and Colleges. The Institute's training and placement services are funded by participating state vocational rehabilitation agencies, and by private foundation and federal grants.

NTI provides distance training designed to lead to home-based employment. Courses are delivered by NTI to students in their homes, using multimedia web-based training methods. Audio and video files, text-based information and on-line quizzes are used to present material and monitor the students' progress. Electronic web boards and e-mail provide the opportunity for students and instructors to communicate one-on-one and within their assigned groups. This provides a virtual classroom leading to a virtual workplace, where training, testing, and the work itself can all take place without requiring students to physically travel to a centralized training facility or a distant employment setting. This technology also enables the potential employee to access job listings from employers who might have their corporate headquarters thousands of miles away from their telecommuting employees.

NTI's most popular area of study is the training provided for telephone-based customer service work. This course is taught using a highly interactive hands-on approach, where students partner with one another while role-playing customer and agency telephone interactions. They learn to handle telephone inquiries for companies by whom they will

later be employed, like the American Automobile Association (AAA), Alamo Automobile Rental, the Home Shopping Network, and others. Students can log into the company's intranet training site and practice entering order information or accessing a customer's account. When telephone role sessions are combined with order entry practice sessions, the resulting simulations are as close to reality as possible outside of an actual call center. After passing a one-on-one role-play final exam with an instructor, students transition directly into taking live calls for participating employers.

A global employer, Manpower, Inc. is also moving toward the opportunity for web-based training for its workers, as well as increasingly placing workers in IT jobs. Manpower plans to make training available to its employees through an Internet site called the Global Learning Center (GLC). This site will offer more than 300 TechTrack courses and in the future will offer the full range of Manpower's training programs. This will provide Manpower employees with free, instant access to training, through computers in Manpower offices or in their own homes (Blanck 1998).

The Training and Development Centers of the Bavarian Employers' Association (bfz gGmbH), founded in 1983, is evolving to respond to changing labour market needs for qualified workers in Germany.[3] Partnered with businesses to determine precise training needs and supported by government agencies, the Bavarian Employers' Association is responding to labour market needs in the field of information and telecommunications technology. Available training courses include skill training for four IT professions: informatics (computer science) specialist in the field of system integration, informatics specialist in the field of applications development, IT systems clerk, and informatics clerk. As of the end of 1998, 611 participants were taking part in part-time and 61 in full-time retraining to become office communication clerks[4]. The Bavarian Employers' Association believes that such training will enable persons with disabilities, particularly in rural or economically weak areas, to work for a business firm some distance away without leaving their own homes.

Since 1987 the Redemptorist Vocational School for the Disabled in Thailand offers courses in computer science and electronic repair to physically handicapped students. [5] Graduating students are trained to find employment as web developers, network administrators, system developers, computer graphic designers, key operators, technicians, computer repair experts, or related occupations. All but one of the teachers have a disability. The school's web site (www.rvsd.ac.th/jobs) offers career-related information to help students find employment, posting vacancies and allowing online applications.

Opportunities presented by assistive technology in the workplace, facilitating accommodations

Katharine Seelman, author of a U.S. Department of Education paper on "Persons with Disabilities in Science, Engineering, and Technology," sees the impact of technology on the lives of persons with disabilities as "profound" (Seelman 1999). She quotes IBM's Mar Pat Radabaught, who stated in her testimony to the U.S. Congress in 1988 that while for people without disabilities technology makes things easier, for persons with disabilities technology makes things possible. "Technology can overcome barriers of distance, technology can foster communication, and technology can modify the environment to eliminate or mitigate the effects of physical disability" (*ibid.*). Innovation in science and technology can help to enable people with disabilities to live independent lives and reduce dependence on services and special assistance.

Stephen Kaye, author of another U.S. Department of Education paper on "Computer and Internet Use among People with Disabilities," argues that people with disabilities are probably the single segment of society with the most to gain from the new technologies of the electronic age. Yet while 51.7 percent of people in the United States aged 15 and above own a computer and 31.1 percent have Internet access at home, while the rates for

people with work disabilities are much lower: 23.9 percent and 11.4 percent respectively (Kaye 2000).

The transformation of the Internet from a text-based medium to a robust multi-media environment has created a crisis—a growing digital divide in access for people with disabilities. Previously, people with visual impairments were able to read Web pages with the help of audible screen readers. Today, graphical web pages are a barrier if they do not incorporate accessible web design. As Cynthia Waddell points out, the barrier created by inaccessible web pages is not limited to people with visual and mobility disabilities, but applies also to persons with learning or cognitive disabilities (Waddell 1999). Online forms for registration, banking, or shopping transactions cannot be accessed by many people with disabilities. Similar, persons with hearing impairments cannot access audio or video streaming contents because they are not captioned.

The recent frustrating experience of a municipal government worker in San Jose, California, resulted in a list of suggested ways to make web sites and linked documents more accessible to visually impaired government workers and citizens. A visually impaired City Commissioner complained that she was unable to access City Council documents as part of her work in advising the City Council because the documents were posted in an in accessible portable document format (PDF). As a result, the City of San Jose established the following minimum accessible web standard for use across its various municipal responsibilities:

- Provide an access instruction page for visitors
- Provide support for text browsers
- Attach descriptive "Alt" tags to graphic images for screen readers to read aloud
- Hyperlink photographs with descriptive text
- Caption all audio and video clips by using "CC" hyperlinks
- Provide an alternative mechanism for on-line forms
- Avoid access barriers such as posting documents in PDF, table, newspaper or frame format. If posting in PDF, the HTML text or ASCII file should also be posted.

Knowbility is a Texas-based organization with the central aim of raising awareness and rallying communities around the powerful idea of IT inclusion (http://www.knowbility.org). They inform people with disabilities about careers in the IT sector, and help them gain the training they need. They lobby within the IT community to establish scholarships and educational support for youth and adults with disabilities. Knowbility cooperates with employers to help them understand how to recruit and employ people with disabilities. Finally they have developed an "accessible web page design curriculum" for the Information Technology Association (ITTA) and offer training courses for web designers.

Assistive technologies for working and teleworking have improved significantly in recent years, too, thanks to IT developments and innovations. Computerized equipment and software have become more affordable, portable, and widely distributed. Computer input devices have grown from the traditional keyboard (regular or Braille) to computer mouses, track balls, light pens, touch sensitive screens, computerized voice recognition systems, scanning devices, and equipment to track eye movements. On the output side there are high-resolution screens, terminals with synthetic voices, and synthetic speech speakers next to traditional printers and Braille printers.

Distance learning can be is another helpful tool for teaching people with disabilities. The advantages are similar those of teleworking. Distance learning offers improved accessibility, the option to participate from a familiar and assisting (home) environment and the opportunity to learn at one’s own pace. But the opportunity to participate in distance learning could be endangered if the access problems of some persons with disabilities are neglected when designing distance learning programs and materials (Waddell 1999). Another barrier remains the costs of the equipment and connection, and a lack of awareness of potential benefits (Kaye 2000).

Opportunities for teleworking

Teleworking can be defined as working at a location separate from the site of the employer. Employer, employees, and customers interact by means of telecommunication equipment including PCs, phones, and fast data transmission lines.

Teleworking in one's home eliminates the problem of getting to work for workers with mobility impairments.

> Working at home enables a person to operate in a physical environment which is more tailored to their specific needs, for example, blind people know the layout of their home and can control their environment. Similarly, the layout of shelves, filing cabinets, stationary supplies, etc. can be arranged to suit a particular disability- for example, low shelving for those who use wheelchairs (Welham 1997).

Finally, teleworking from home allows flexibility for those who need frequent breaks. Teleworking, which gives the worker more control over how and when to do the work, should result in higher productivity because it allows the individual worker to determine the best way to do the task given his or her individual restrictions.

As mentioned above, some basic teleworking equipment is needed. Given the short lifespan of the hardware and software products and the need for additional assistive devices, costs for an teleworking station can easily add up, and workers with disabilities have to rely on the employer to bear those costs. Yet compared to workers without disabilities, the percentage of workers with disabilities doing paid home-based work in the United States showed a higher increase (from 9.2 percent to 15.1 percent) between 1991 and 1997 (Kruse and Hyland 1998).

Home base work is better paid. Kruse and Hyland found that employees with and without disabilities who do home-based work have average higher pay compared to their on-site counterparts (*ibid.*). Furthermore, those who use computers in their home-based work gain another 12 percent in their hourly pay rate. This is the same percentage by which

salaries of people with disabilities on average lag behind the salaries of those without disabilities.

Despite this positive effect of computer work, people with disabilities are less likely to become employees who use computers in their home-based work and more likely to be self-employed. One explanation for this finding is that employees with disabilities are as reluctant as other employees to engage in home-based work out of concern that it increases social isolation and decreases promotion opportunities. Another explanation is that employers hesitate to offer adequate opportunities for home-based work to people with disabilities. In summary, teleworking and home-based work using computers offer special advantages to people with disabilities, but it appears that employers and employees are not yet taking full advantage of this opportunity. On the other hand, teleworking, which does not require that employers and employers be in the same geographic location, opens up a global labor market resulting in worldwide competition for teleworking jobs (Janssen 1986).

M.J. Willard,[6] Executive Director of National Telecommuting Institute, says that she increasingly is concerned about the trend to move teleworking jobs to other countries, thereby perhaps minimising opportunities in home countries for persons with disabilities. She urges those organisations designing and implementing teleworking opportunities for persons with disabilities to perhaps move toward exploration and procurement of governmental contracts for employment. Her rationale -- these contract and employment opportunities are less likely to be vulnerable to the chase for cheaper labour sources in teleworking which might be found in other countries.

Challenges for People with Disabilities in the IT Labor Market

Challenges presented by loss of lower skilled jobs and creation of new jobs

The major impact of the IT revolution on work requirements could be summarised as increased importance of cognitive skills, and greater flexibility in time and location of

work. These technology-related changes tend to eliminate the more tedious and repetitive jobs, which are the very positions in which a higher share of persons with disabilities have been employed (Hunt and Berkowitz 1992). J.F. Moses concludes that "the shift from physical to cognitive requirements appears to be a plus for intelligent and emotionally (socially) mature people with physical impairments, but it implies that those with cognitive or developmental deficits may be excluded from the new work-place" (Moses 1988)

Replacing human manipulation by machine power and changing from manufacturing to a service economy does improve the employability of people with mobility impairments. The underlying assumption is that they can acquire the necessary skills and that they will then be treated in a fair and non-discriminatory manner in the labor market (Hunt and Berkowitz 1992). But trends like the increased recruiting of teleworkers from the international market and the substitution of electronic files for paper files and archives seem to lessen the job possibilities of people with disabilities.

In many countries, a large portion of the employment opportunities for persons with disabilities can still be found in governmental agencies and institutions. These organization generally are more closely monitored for compliance with laws and regulations that open their jobs to people with disabilities. Increased teleworking and removing geographic barriers, in combination with greater enforcement of equal opportunity for job applicants with disabilities, should benefit disabled persons. An offsetting trend, however, is the increased outsourcing of work tasks, including those formerly done by government workers with disabilities, to private organizations, where equal opportunity compliance is not as closely monitored.

Challenges presented by rapidly changing skill set needs and continual learning required to keep pace with IT labor market needs

Persons with or without disabilities vary widely in their characteristics, their strengths and weaknesses. All workers in a changing labor market require continuous retraining to adapt their skills to new products or services as well as new technologies. Therefore, the challenge is to design the work, training and learning materials in a way that reaches all workers, including those with disabilities.

Challenges presented by changes in the workplace culture and human resource management, such as emphasis on a facile labour force and use of the World Wide Web for primary communication

Most of the challenges created by moving to web communication and other new communication technologies can be overcome by sensitive training and design. Policymakers need to ensure that persons with disabilities are given equal access to training that enables them to use the new media, including the Web. Business firms need to design their Web pages and Intranets so that all information is accessible to all people. Once these conditions are met, most remaining reasons for exclusion will prove to be attitudinal and prejudicial.

Summary and Conclusions

Estimates in the industrialized nations generally assume that 20 percent of the population have a disability. Statistics for developing countries are generally lower and less reliable, depending on the definitions used and disabilities included. Few statistical sources are available and most are restricted to a few countries or of low quality, using non-comparable definitions or categorization systems. Generally, no reliable global information exists on labour force participation rates of people with different disabling conditions.

Unemployment is generally higher among people with disabilities. Earnings are generally lower, with greatest unemployment among those with mobility-related impairments.

There is a strong correlation between the severity of the disability and the level of earnings.

Computer-based assistive devices for people with disabilities can be produced at relatively low cost. This equipment, together with the higher demand for mental as compared to physical work, should—in theory— reduce barriers to participation in the labour market for people with disabilities. The time and geographical flexibility created by teleworking will increase both accessibility to and competition for IT jobs for some workers with disabilities.

Teleworking offers a great opportunity for people with disabilities to work from home, a place that is already optimally adjusted to their needs and abilities. Statistics about telework in general and among persons with disabilities are again incomplete, but they indicate that only a few companies are currently interested in developing telework opportunities and recruiting among those with disabilities. However, a shortage of highly skilled IT workers in some industrialized countries might lead business firms to overcome their prejudices and attitudinal barriers and encourage them to consider to hire people with disabilities if they have the required skills.

Education becomes essential, even more so than among people without disabilities. Again, statistics and studies about the inclusion of people with disabilities in education and training programs report lower participation rates, as a consequence of attitudinal barriers and accessibility problems. People with disabilities must have the opportunity to acquire the skills that are in high demand. People with disabilities, when compared to their peers, are less likely to have computer skills and less likely to use computers or the Internet, despite the advantages they provide. One cause might be lack of knowledge about these advantages as well as the start-up and operating costs of the equipment.

Educational institutions can assist by beginning to document the participation of students with disabilities in science, engineering, and technology (SET) courses, and identifying

and documenting special needs their unique needs and how to meet these needs for successful full participation in this learning process. Governmental bodies can assist by stimulating partnerships (training, internships, mentoring) between educational institutions and private sector employers, to fund the kind of education needed to appropriately equip young people with disabilities in the IT labour force.

Education and training via the Internet and distance learning programs offer easier access to skill development for people with disabilities, but only if they have the basic skills to use computer equipment. They need to know about vocational options and labor market demands. They need to be motivated, in part by the availability of jobs, to take part in educational efforts and finally they need to have the access to computers.

In summary, changes in IT have the potential to ease integration of people with disabilities into the labour market and society in general. Still, these same technical developments, by opening labour markets to global competition, might also endanger integration and lead to a new division of society. The direction of change is less a matter of technology and more a matter of sensitive policy decisions.

Policy makers need better information about the current status of people with different disabilities in different countries, in order to make the right decisions and develop better programs. More good research is needed to provide reliable and valid statistics upon which to base policies. Global information is lacking on major variables like education, training and labour market participation, and the economic situation for people with different disabilities. There are no global data available on different industries, occupational groups, or skill levels. Case studies could be developed to make successful practices widely available Up to now no systematic collection of successful and not successful cases of integration exists.

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Endnotes

[1] For further information, see the Dupont web site at (http://www.dupont.com/corp/people/disabled/partners.html).

[2] Further information about the National Telecommuting Institute, Inc. can be obtained from NTI at 1505 Commonwealth Avenue, Boston, Massachusetts 02135, Telephone 617-787-4426, fax 617-787-3806, text telephone 617-787-4160. NTI's executive director, M.J. Willard can be reached at e-mail jmwillard@nti.org.

[3] Further information about this training effort can be obtained from: Berufliche Fortbildungszentren der Bayerischen Wirtschaft (bfz) gGmbH; Herr Werner Lindig, Bereichsleitung, Schleizer Strasse 5-7, D - 95028 Hof; Phone: 0049- (0) 9281 /7177-0; Fax: 0049- (0) 9281 /3406
E-mail: lindig.werner bln.bfz.de; Internet: http://www.bfz.de.

[4] Vocational courses that prepare young adults for apprenticeships include IT Units tailored for the needs of that occupation.

[5] Mr. Suporntum Mongkolsawadi, *Principal*, Redemptorist Vocational School for the Disabled, Box 1, Pattaya City, Chonburi 20260; Tel (038) 716 247 – 9, Fax (38) 716 543; Email: suporntum@rvsd.ac.th

[6] Personal communication with M.J. Willard, June, 2000.