



International Journal of Engineering, Business and Enterprise Applications (IJEBA)

www.iasir.net

Mechanisms Currently in Place to Increase the Ability of Physically Disabled Population to Work in Industry

Abeykoon¹, K.M.W., Nanayakkara², L.D.J.F. and Punchihewa³, H.K.G.

¹PhD Scholar, Department of Mechanical Engineering, University of Moratuwa, SRI LANKA,

²Senior Lecturer, Department of Industrial Management, University of Kelaniya, SRI LANKA,

³Senior Lecturer, Department of Mechanical Engineering, University of Moratuwa, SRI LANKA,

Abstract: About one billion of the world population have some form of disability and governments spend huge amounts of money to provide welfare and accessibility facilities, and protect their rights to make them inclusive. The aim of this review is to find out mechanisms and practices currently in place to increase the ability of physically disabled people to work in industry with a view to improve their employability. The literature revealed that people with disabilities (PWDs) are willing to work if they are provided with necessary job support. However, key barriers to employing PWDs are; employers not having an understanding about how to identify and select PWDs for available vacancies, inability to determine their work capacity, lack of performance measurement strategies and on-the-job support for PWDs. Employers need to provide amenities such as accessible pathways, auxiliary devices and safe and comfortable sanitary facilities if needed, but they are unable to predict the successes and failures of the outcomes of recruiting PWDs to their organisations. This paper explores aspects of managing PWDs at work and proposes further research needed to categorise work-related needs of PWDs based on their physical capabilities and limitations to help design work tasks that could be carried out by them.

Keywords: employment, work place, capabilities and limitations, physical, persons with disabilities.

I. Introduction

Over a billion people or about 15% of the world's population have some form of disability [1]. In many countries systematic data on employment of people with disabilities (PWDs) is not available and, in low and middle-income countries, the availability of data continues to be limited [1]. However, it is estimated that in many countries there is a significant proportion of working age population of PWD ([2]-[3]) and a very high unemployment rate that ranges from 13% in the UK to 80% in many emerging countries [2].

PWDs generally have poorer health, lower education achievements, fewer economic opportunities and higher rates of poverty than people without disabilities [1]. Thus, governments spend huge amounts of money on PWDs to ensure that they have similar living standards as normal persons [4]. Social benefits, policy making and legislations, providing safer access-ways and sanitary facilities, organising job fairs, medical clinics and maintaining hospital wards, providing facilities for sports and recreational activities, making assistive and auxiliary devices and paying compensation to upgrade living conditions of the PWDs are significant cost centres for governments and disability care organisations ([4],[5],[6],[7]-[8]).

PWDs earn significantly less than normal workers even though they need to spend more than normal people for facilities such as transport, assistive devices and medical check-ups, accidental injuries in reality [9]. As a solution, [10] focuses on employing qualified PWDs and it states that under-usage of their potential not only wastes human resources, but also causes a heavy burden on the society. In addition, [11] goes beyond the general idea that disability constitutes a social, societal and political issue and identifies significant scientific stakes for research. It proposes the use of engineering sciences to provide solutions to workplace requirements of PWDs.

Reference [10] cited from a research states that two-thirds of the PWDs desire to work if appropriate job opportunities are available. Later, [12] has concluded that one third of PWDs would like to work. Reference [10] further argues that assigning qualified PWDs to do a specific job or making reasonable accommodations for disabled employees is not only ethical, but also necessary to reduce the social and economic burden. These findings signify the need to make the PWDs more employable.

II. Aim and Objectives

Further research is imperative to increase the possibility for PWDs to be employed and raise awareness of potential employers of PWDs. As such, a literature review was conducted to identify mechanisms and practices currently in place to increase the ability of physically disabled population to work in industry. The review focused on identifying reasons for unemployment and underemployment, exploring disability models, reviewing employment models used to increase employability of PWDs, and evaluating currently available methods, work practices and work measurement-related issues to help improve employability of PWDs.

III. Methodology

The review was carried out using PWDs, disability models, employment for PWDs, rehabilitation, workplace, work practices for PWDs as keywords. Both online and printed sources of information were searched. 48 publications that included journal and conference papers, reports, databases and books were accessed through a title-based search. The abstracts of these publications were then read and 25 publications were selected to be read fully. Only papers published in English were included.

IV. Findings and Discussion

A. Reasons for Unemployment and Under-employment of PWDs

There are two categories of disability, which can originate from a congenital cause or by reason of accident or disease ([7],[13]-[14]). No matter what the etiology of the disability, employers expect the PWDs to adjust themselves to workplace environments. Several studies ([3],[4],[7],[10]-[15]) reveal that poor standards of living are prevalent among PWDs and identify that the reason for low rates of employment among these PWDs as institutional discrimination in employment. Reference [16] states that the workplace discrimination is due to the physical and mental limitations of employees with disabilities where colleagues and supervisors assume that the work performance of PWDs are affected by their disabilities.

Researchers also have identified many other reasons for low rates of employment among PWDs that relate to employers and workplaces. For instance, [2] identifies attitudes and prejudices of non-disabled people, especially of job providers, as reasons for low rates of employment. A publication of another author cited in [10] identifies a mismatch of capabilities and limitations of PWDs with the available job opportunities as a key barrier for employment. Reference [12] identifies long term sickness and not having relevant skills, education, training or experience as key problems for unemployment and under-employment. Reference [17] states that, PWDs do not have adequate knowledge of products, processes or systems to enable them to be accommodated in the workforce, especially in the manufacturing sector.

With respect to low rates of employment among PWDs due to unsuitable workplaces, researchers have identified accessibility in the physical environment as a key issue ([2],[10],[11],[17]-[18]). Labour market policies and labour structure and work organisations have also been identified as barriers present at workplaces [2].

Reference [4] identifies physical and/or psychological consequences of impairment as the reason for disabled individuals being unable to maintain a reasonable living standard by their own efforts. Reference [14] justifies this argument by stating that people in wheelchairs are perceived to be too dependent and thus, were unproductive and lacked efficiency. Reference [18] cited by a report has a contrasting view with regard to difficulties in accessing a place in a wheelchair. The author argues that the reason for this dependency and lack of efficiency is environmental barriers for individuals with physical and/or psychological impairment.

B. Disability Models

Reference [19] citing from a research signifies the requirement of a multi-disciplinary model that integrates theory and research on social cognition in the areas of social psychology, sociology and rehabilitation psychology into a framework that will help to understand how persons with disabilities are perceived and treated at work. In the literature there are four different models to understand disability, namely, medical model ([15],[19],[20]-[21]), social model [15], stigma model [15] and embodied model [15].

In the medical model, disability is defined as a problem that is suffered by an individual, which is caused genetically or by environmental incidents such as illness, accidents, war and pollution that require medical treatment ([19]-[21]). The medical model proposes two essential strategies, namely, prevention and cure of causes of disability. More specifically, this model is concerned about detection, avoidance, elimination and categorisation of impairment of PWDs and how these PWDs can be helped and rehabilitated through medical and psychological treatment.

In the social model, disability is defined as social oppression caused by social and material barriers in the environment [15]. It assumes that, disability is socially constructed, and PWDs are subjected to relations of power in social, institutional and material environments and disability can be resolved by removing barriers in the social and material environment.

Disability is defined in the stigma model, which was cited in [15], as social stigma and restrictions suffered by individuals with physical and mental impairments because they fail to meet the norms of society. However, research based on stigma model tends to work with abstract and disembodied models that focus on the traits and characteristics of the PWDs and pass the responsibility to PWDs.

Embodied model is defined as social and bodily problems suffered by people with physical and mental impairment [15]. This model emphasises bodily differences of disabilities and impairments and draws attention to the bodily differences of PWDs and to their different experiences, problems and needs. It further investigates how different people with different or similar disabilities and impairments are affected by these and how they experience attempts by organisations to accommodate these PWDs and impairments.

Disability models look at disability in different perspectives. According to [15], even though disability is defined in terms of the medical model, the perceptions, attitudes and biases related to PWDs in the workplace is more related to the stigma model. This work ascertains that issues of embodiment tend to be reduced to issues of medical impairment and perception of physical appearance, and the social model is powerful in understanding the PWDs and disabling aspects of social and material practices. Both disability and impairment are socially constructed, but at the same time, not all the bodily problems and experiences that affect PWDs are socially constructed. Embodied model highlights disabled people as active subjects and represent their social and material surroundings. This makes it possible for research to investigate how disabled employees and job seekers perform work and structure their social and material surroundings in the workplace. Reference [15] too concludes that an embodied approach may help to deal with a wider range of disability aspects than those admitted by the medical, stigma and social models of disability.

C. Employment Models

There are four main categories of employment for PWDs, which have been stated in the literature; namely, subsidised, sheltered, designated and supported ([4]-[22]). Sheltered employment is related to people with relatively severe disabilities [22]. These occupations are offered in protected environments at state-owned workshops or certain segments of ordinary companies. This model of employment is criticised for low efficiency [22]. Reference [2] further elaborate on principal obstacles experienced by the PWDs when looking for employment in sheltered work centres: accessibility issues in the physical environment, labour market policies, attitudes and prejudices of non-disabled people, especially the job providers, labour structure and work organisation. Furthermore, they propose 'universal design' concepts seeking a systemic change in the workplace environment to promote complete integration of PWDs to the work. This will eliminate the need to redesign work environments for specific worker disabilities focussing on accessibility after PWDs are employed.

In subsidised employment, part of employers' wage cost is compensated by the government and the subsidy is typically phased out over time [22]. In designated employment PWDs depend on specific work tasks or jobs that they can perform without affecting work effectiveness or efficiency. Both subsidised and designated employment models only provide a partial solution to employment problems faced by the PWDs. Thus, there needs to be more comprehensive employment models that empower PWDs to seamlessly integrate to work environments.

Supported employment provides on-the-job support through personal job coaches for a limited duration ([22],[23]-[24]). Supported employment was developed in the United States at the beginning of the 1980s to provide practical, on-the-job training to people with intellectual disabilities based on their individual needs. The systematic instruction and support they received in the workplace enabled them to build their skills, enter the labour market and succeed at the job in open employment and to enable PWDs prepared to freely take up work.

Reference [23] explains that, supported employment has been developed enabling PWDs to obtain free choice of employment in favourable conditions of work. Focusing on abilities, but not disabilities, it is expected to receive equal pay for equal work and protection against unemployment. There is a possibility of providing support to the person, depending on individual needs and providing advice to employers. This model follows a number of clearly defined stages: getting to know the person; drawing up a vocational profile; job notions; job search; job analysis; job training and reduction in support. This is to ensure that the employer's perspective is considered fully and that the model is extended to cover progression issues.

D. Improving Employability of PWDs

Reference [18] identifies that focus received recently by the PWDs widely supported universal design concepts. Environmental accommodation and area of assistive technology have been suggested by [11] to boost disability research to improve employability. Different researchers suggest many other solutions in view of employing PWDs. For example [16] discusses redesigning workplaces and jobs as a solution where they expect employers to adapt these workplaces and jobs according to the requirements of disabled workers. They further explain that work-site modifications range from the simplest and least costly, e.g. changing hours, work procedures, work location or task assignments to the most expensive and most complex such as using advanced technology or rehabilitation engineering for sophisticated equipment or building adaptations. They advocate that jobs, which are adapted to meet the needs of PWDs through the application of ergonomic planning and design measures could also be carried out by a non-disabled employee.

Reference [2] takes a totally radical view regarding employment of PWDs. It explains that there are certain situations where PWDs are successfully integrated into the workforce with an initiative by managers. These managers assign tasks to workers by considering their capabilities and respecting the constraints of each individual. Reference [11] has identified research needs for PWDs and it has identified some imbalances in the research areas of engineering sciences such as information and communication sciences and technology or robotics. On the other hand, research and innovation has spent little in some domains of application [11]. Environmental dimension is an area that has not been sufficiently addressed, even though accessibility constitutes a major challenge in the issues related to the environment and sustainable development with respect to needs of PWDs.

Tasks performed by PWDs are not performed under normal conditions [20]. Reference [25] validates the statement made by [19] explaining the existing Pre-Determined Motion Time Systems (PMTS) do not generate work standards for PWDs. In order to accommodate PWDs in the workplace gainfully, employers must know how much work a disabled person can perform in a day, how much time would a disabled person take to complete the work cycle, how to determine the remuneration for a disabled and what impact would the integration of the disabled individual will have on the organisational productivity. The answers to all these questions require modifications to existing PMTS standards.

E. Legislature

References [4] and [7] recommend that the formation of anti-discrimination legislation is the key solution to overcome this problem of unemployment of PWDs. In order to promote organisational diversity and promote participation and integration of PWDs in working life, [15] explains how western employers and government authorities make increasing efforts. For instance, a state owned company in Sweden employed some 27,000 workers with disabilities in 1999 [22].

To overcome the problems due to institutional discrimination and to legally protect PWDs the Americans with Disability Act (ADA) was established in 1992. ADA has also formed some questions, which should not be asked from PWDs under ethical grounds. Reference [4] states that under the 1944 act, all employers with 20 or more employees have to employ 3% of their workforce from the disabled person's employment register. Although these circulars and policy directives are proposed, PWDs and potential employers must be able to use/follow legislature without difficulty.

V. Conclusion

PWDs live under relatively poor social conditions as a result of low economic value they naturally demonstrate at work. There is also institutional discrimination by comparing the PWDs with normal persons. There are several causes, which have led to this situation and some are controllable by the adoption of appropriate strategies. The problem is basically one of matching the individual capabilities to work requirements. Review suggests to manage PWDs at work and a more focused approach in relation to technological strategies is proposed as a basis for enhancing the performance of PWDs at work.

References

- [1] "World Report on Disability", Produced jointly by WHO and the World Bank, 2011.
- [2] C. Miralles, P. J. Garcia-Sabater, C. Andres, and M. Cardos, "Advantages of assembly lines in sheltered work centres for disabled", *International Journal of Production Economics*, vol. 110, 2007, pp 187-197.
- [3] M. K. Jones, "Disability and the labour market: a review of the empirical evidence". *Journal of Economic Studies*, vol. 35 (5), 2008, pp 405-424.
- [4] C. Barnes, "Disability and Employment". *Personnel Review*, vol. 21 (6), 1992, pp 55-73.
- [5] O. Plos, S. Buisine, A. Aoussat, F. Mantelet and C. Dumas, "A Universalist strategy for the design of Assistive Technology", *International Journal of Industrial Ergonomics*, vol. 42, 2012, pp 533-541.

- [6] C. Biihler, "Approach to the analysis of user requirements in assistive technology", *International Journal of Industrial Ergonomics*, vol. 17, 1996, pp 187-192.
- [7] B. Doyle, "Disabled workers, employment vulnerability and labour law", *Employee Relations*, vol. 9 (5), 1987, pp 20-29.
- [8] OECD, "Disability into Ability", OECD, Paris, 2003.
- [9] J. Lund and T. Bjerkedal, "Permanent impairments, disabilities and disability pensions related to accidents in Norway", *Accident Analysis and Prevention*, vol. 33, 2001, pp 19-30.
- [10] J. J. Chen and Z. He "Using analytic hierarchy process and fuzzy set theory to rate and rank the disability", *Fuzzy Sets and Systems*, vol. 88, 1997, pp 1-22.
- [11] J. Ravaud and V. Boissonnat, "Boosting disability research in the engineering sciences: The recommendations of the National Observatory for Training, Research and Innovation on Disability (ONFRIH)", *Annals of Physical and Rehabilitation Medicine*, vol.54, 2001, pp 16-24.
- [12] R. Newton, R. M. Ormerod and P. Thomas, "Disabled people's experiences in the workplace environment in England". *Equal Opportunities International*, vol. 26 (6), 2007, pp 610-623.
- [13] L. J. Bonnici, S. L. Maatta, and M. K. Wells, "US national accessibility survey: librarians serving patrons with disabilities", *New Library World*, vol. 110 (11), 2009, pp 512-528.
- [14] T.A. Pointer and B. H. Kleiner, "Developments Concerning Accommodation of Wheelchair Users within the Workplace in Accordance to the Americans with Disabilities Act". *Equal Opportunities International*, vol. 16 (6), 1997, pp 44-49.
- [15] T. Thanem, "Embodying disability in diversity management research", *Equal Opportunities International*, vol.27 (7), 2008, pp 581-594.
- [16] C. Chi, Y. Jang, T. Liu and J. Pan, "The development of a hierarchical coding scheme and data base of job accommodation for disabled workers", *International Journal of Industrial Ergonomics*, vol. 33, 2004, pp 429-447.
- [17] A. Girdhar, A. Mital, A. Kephart, and A. Young, "Design guidelines for Accommodating Amputees in the workplace". *Journal of occupational rehabilitation*, vol. 11(2), 2001, pp 99-118.
- [18] B. Kyei-Dompim, "Technical -Vocational Institute for the physically disabled institute; An examination of conflicting design requirements for people with mobility impairment", Unpublished Thesis submitted to Master of Architecture, the Department of Architecture, Kwame Nkrumah University of Science and Technology, 2010.
- [19] D. L. Stone, and A. Colella, "A Model of factors affecting the treatment of disabled individuals in organizations", *The Academy of Management Review*, vol. 21(2), 1996, pp 352-401.
- [20] A. Sairam, "Developing and verifying MTM modifiers for tasks performed by individuals with permanent partial disability of fingers", Unpublished Thesis submitted to M.Sc. in Industrial Engineering, University of Cincinnati, 2008.
- [21] M.D. Warren, "The Prevalence of Disability: Measuring and Estimating the Number and the Needs of Disabled People in the Community", *Public Health*, vol. 101, 1987, pp 333-341
- [22] P. Skedinger, and B. Widerstedt, "Cream skimming in employment programmed for the disabled? Evidence from Sweden", *International Journal of Manpower*, vol. 28(8), 2007, pp 694-714.
- [23] G. Ruggeri-Stevens and S. Goodwin, "learning to work" in small business". *Education+Training*, vol. 49 (8/9), 2007, pp 745-755.
- [24] M. Simpson, N. Taylor and J. Padmore, "Marketing in supported employment enterprises - Part I: Case studies", *Journal of Small Business and Enterprise Development*, vol. 8 (3), 2001, pp 233-244.
- [25] A. Subramanian and A. Mital, "A. Finger disabilities and Higher level tasks – developing and validating MTM multipliers", *International Journal of Industrial Engineering*, vol. 16 (4), 2009, pp 344-352.

Acknowledgment

University Grants Commission of Sri Lanka is acknowledged for funding this research.