

Drivers of Employment for Individuals with Down Syndrome: An Exploration through the Social Ecological Model

Md Mizanur Rahman¹, Abg Safuan Adenan¹, Sharifa Ezat Wan Puteh², Razitasham Safii¹, Rosalia Saimon¹, Chen Yoke Yong¹, Ting Chuong Hock¹

¹Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

²Faculty of Medicine, Universiti Kebangsaan Malaysia, 43600, Bangi, Selangor, Malaysia

*Corresponding Author: Md Mizanur Rahman, Emails: rmmizanur@unimas.my; aniquim@hotmail.com

Abstract

Background: The social integration of individuals with disabilities represents one of the most pressing challenges in contemporary social policy. Globally, people with disabilities experience disproportionately high unemployment rates. However, socioeconomic research focusing specifically on individuals with Down syndrome remains limited. There is little empirical evidence regarding their employment-related challenges, and the underlying causes of their low employment rates are not yet well understood. This study investigated the factors that facilitate employment among individuals with Down syndrome in Malaysia, drawing upon multiple social-ecological contexts.

Methods: Guided by a social constructivist paradigm, this study adopted an exploratory qualitative design. Semi-structured online interviews were conducted with 45 participants, including six individuals with Down syndrome, ten family members, six employers or coworkers, twenty-two community members, and one policymaker. Data were analyzed using Braun and Clarke's reflexive thematic analysis approach, supported by ATLAS.ti software, to generate overarching themes and subthemes.

Results: The analysis produced a thematic map highlighting the key facilitators of employment. The identified themes included: supportive environment, (2) conducive workplace, (3) individual strengths, (4) inclusive community, and (5) family support.

Conclusion: Securing employment for individuals with Down syndrome is a complex, multidimensional issue that requires collaborative efforts across societal levels, particularly from employers and policymakers. It should not be viewed as the sole responsibility of the individual. The findings of this study may inform the development of more inclusive employment policies and practices by governmental bodies, non-governmental organizations, and private sector employers.

Keywords: Down syndrome, Employment, Facilitators, Opportunity, Qualitative research

Citation: Rahman MM, Adenan AS, Puteh SEW, Safii R, Saimon R, Yong CY, et al. Drivers of employment for individuals with down syndrome: an exploration through the social ecological model. *J Qual Res Health Sci*. 2025;14:1292. doi:10.34172/jqr.1292

Received: July 25, 2024, **Accepted:** November 12, 2025, **ePublished:** December 21, 2025

Introduction

The World Bank (1) estimates that approximately 15% of the global population, accounting for around one billion individuals, live with some form of disability. This figure is equivalent to the combined populations of the United States, Brazil, Indonesia, and Pakistan (2). In Malaysia, the number of registered persons with disabilities increased by 60.9% between 2015 and 2020, reaching a total of 588,378 individuals (3). Nevertheless, this figure likely underrepresents the actual number, as registration is voluntary and specific registries for conditions such as Down syndrome are lacking. Employment plays a pivotal role in human life, contributing to one's social status, interpersonal relationships, and sense of identity (4). For individuals with disabilities, meaningful work can provide not only financial independence but also opportunities for social inclusion and community

participation (5). However, these individuals continue to encounter substantial barriers to employment, leading to disproportionately high unemployment rates and increased economic vulnerability (6,7). Despite their capabilities and potential contributions, people with disabilities often face discrimination and misconceptions regarding their competence in the workplace (8). This persistent global disparity has prompted the implementation of inclusive labor market policies aimed at enhancing employment opportunities for persons with disabilities (9). Nonetheless, the employment experiences of individuals with Down syndrome remain notably underexplored, particularly within the Malaysian context. Therefore, it is essential to examine the specific barriers and facilitators that influence the workforce participation and independence of individuals with Down syndrome.

Down syndrome, also known as trisomy 21, is the



most common chromosomal disorder and the leading identifiable cause of intellectual disability worldwide. It is also prevalent in Malaysia (10). Advances in medical care have substantially improved the life expectancy of individuals with Down syndrome (11,12), highlighting the growing importance of addressing their employment opportunities and overall socioeconomic well-being. The clinical manifestations of the syndrome are highly diverse, encompassing congenital anomalies, an increased risk of comorbid health conditions, and considerable variation in cognitive functioning (13–15). Although individuals with Down syndrome may experience difficulties with adaptive behavior and executive functioning, they often demonstrate relative strengths in social interaction and emotional engagement (16,17). This variability in functional abilities and asynchronous skill development can significantly influence their employability and workplace integration (18). Consequently, it is essential to investigate the socioeconomic challenges of individuals with Down syndrome as a distinct group, taking into account the heterogeneity of their abilities and needs.

The Social Ecological Model (SEM), developed by Urie Bronfenbrenner, provides a comprehensive framework for examining how personal and environmental factors interact to shape individual behavior (19–21). This theory was originally formulated to explain the dynamic interplay between individuals and their surrounding environments in influencing behavioral outcomes (21). Bronfenbrenner conceptualized this interaction through a series of nested circles, placing the individual at the center and surrounding them with multiple, interrelated systems (20). The model comprises five hierarchical levels: individual, interpersonal, organizational, community, and policy or enabling environment. These levels are assumed to exert synergistic and mutually reinforcing effects on behavior (22). The SEM captures the complex web of interactions between individuals and their environments, all situated within broader sociocultural contexts (21–23). This framework is particularly suitable for the present study, as employment acquisition and retention among individuals with Down syndrome involve multifaceted interactions between personal characteristics and social contexts ([Supplementary Figure 1](#)). Beyond explaining behavioral development, the SEM also serves as a valuable tool for identifying behavioral and organizational leverage points that can inform targeted interventions and policy formulation (21–22, 24).

This study employed the Social Ecological Model (SEM) to examine the complex interactions between individuals with Down syndrome and their surrounding social environments within the context of employment. The primary objective was to explore the factors that facilitate employment among individuals with Down syndrome, as viewed from multiple perspectives—namely, those of the individuals themselves, their families, communities,

organizations, and policymakers. Accordingly, this study sought to address the following questions:

1. What employment opportunities are available for individuals with Down syndrome?
2. What factors promote or support their employment?

Methods

Study Design

This study adopted a social constructivist paradigm, which posits that reality is socially constructed, context-dependent, and dynamic (25). Given the diverse and multifaceted nature of individual experiences, semi-structured interviews were employed to collect rich, in-depth qualitative data (26). The meanings that participants ascribed to employment-related issues among individuals with Down syndrome were central to the inquiry. Data were analyzed using reflexive thematic analysis, chosen for its ability to capture patterns within the data while allowing interpretive flexibility (27–30). This analytical approach aligns with the Social Ecological Model (SEM) by accommodating the complex interplay of social interactions and contextual influences within broader environmental systems.

Participants and Data Collection

This study employed purposive sampling to recruit individuals with relevant experience in working with, employing, or caring for people with Down syndrome (31–32). Collaboration was established with non-governmental organisations (NGOs) and the Department of Social Welfare in Sarawak to facilitate participant recruitment. In addition, snowball sampling was used to reach individuals with Down syndrome who were not currently employed. Family members were also included to ensure comprehensive representation. Participants were contacted via telephone and were provided with information sheets and consent forms before the interviews ([Table 1](#)). The data were collected from June to December 2021 through online semi-structured interviews, a format necessitated by COVID-19 restrictions. The interviews were conducted in both English and Bahasa Malaysia and covered topics including participants' sociodemographic profiles, factors enhancing employment opportunities, and perceptions of employment among individuals with Down syndrome. A total of 45 participants were interviewed, comprising individuals with Down syndrome, family members, employers, co-workers, community members, and one policymaker ([Table 2](#)).

For the participants with Down syndrome, proxies or support persons were present during the interviews to facilitate communication and ensure participant comfort (33). The interviews were conducted by the first author, a medical doctor with experience working with individuals with Down syndrome, and supported by the second author, an expert in public health and social medicine.

Table 1. The inclusion and exclusion criteria for participant selection

Participant level	Description	Inclusion criteria	Exclusion criteria
Individual	The person with Down syndrome	An adult person with Down syndrome	- Unable to give consent - Unable to understand the construct of the questions asked - Unable to converse in Bahasa Malaysia or English
Family	Parents/caregivers/siblings	Has been taking care of PDS over a significant period of time	
Organization	Employer/Co-workers/ Job coaches	Has experience in hiring, working, or training PDS, either in open or sheltered employment	
Community	NGOs/ community members with PDS as part of their community/ special education teachers	Has significant experience in dealing with PDS as part of their community/ work, other than being a co-worker or employee	
State/Policy level	Member of parliament, High officials of the Ministry in the relevant sectors, Members of state/national representative groups for PWD/PDS	- Has been involved in policymaking for people with DS - Has experience in dealing with/representing people with DS or their respective organisations	

NGO, non-governmental organisation; PDS, person with Down syndrome; PWD, person with disabilities

Table 2. Participants' sociodemographic profile according to group (N=45)

Category (n)	Age group (n)	Gender (n)	Occupation (n)	Education level (n)
Individual (6)	18 – 29 (6)	Male (1) Female (5)	Unemployed (2) Private sector (4)	Secondary school (4) Certificate (2)
Family members (10)	18 – 29 (4)	Male (3) Female (7)	Homemaker (5)	Secondary school (6) Tertiary education (4)
	30 – 39 (1)		University student (2)	
	50 – 59 (1)		Pensioner (1)	
	60 – 69 (3)		Private sector (1)	
	≥70 (1)		Civil servant (1)	
Employer (3) Co-worker (3)	18 – 29 (1) 30 – 39 (1) 40 – 49 (1) 50 – 59 (2) 60 – 69 (1)	Male (1) Female (5)	Business owner (2) NGO (3) Private sector (1)	Secondary school (1) Tertiary education (5)
Community (22)	18 – 29 (17)	Male (11)	University student (6)	Secondary school (1)
	30 – 39 (5)	Female (11)	Self-employed (1) Private sector (9) Civil servant (6)	Tertiary education (21)
Policymaking (1)	18 – 29 (1)	Female (1)	NGO (1)	Tertiary education (1)

NGO, Non-governmental organisation

Each interview lasted from 30 to 90 minutes.

Data Analysis and Trustworthiness

Reflexive Thematic Analysis (RTA) was employed for data analysis, following Braun and Clarke's six-stage framework (27). All interview recordings were carefully reviewed, transcribed verbatim, and translated from Bahasa Malaysia into English when necessary to minimize data loss (34). The reviewed transcripts were analyzed using *ATLAS.ti* software (Version 9). To ensure methodological rigour, Braun and Clarke's 15-point checklist for high-quality RTA practice was adhered to throughout the process (30). A comprehensive set of validation strategies was implemented to enhance the trustworthiness and analytical depth of the study. Data source triangulation was used to capture multiple perspectives, involving independent coding by the two principal investigators, followed by collaborative discussions to deepen engagement with the data. Member checking was conducted with participants to validate the interpretations, and detailed, "thick" descriptions of the research process were provided to support transferability. Throughout the analysis, the research team maintained a reflexive stance, continuously examining assumptions,

positionality, and potential biases. This multifaceted approach to triangulation and reflexivity strengthened the overall rigour and credibility of the findings, allowing for a richer and more nuanced understanding of the phenomenon under investigation (35). Reflexive journaling was also maintained throughout the study to document researchers' insights and reflections, ensuring transparency in how interpretive decisions were shaped—consistent with the social constructivist approach to data interpretation.

Ethical Considerations

The study was conducted in accordance with established ethical standards. Participants were provided with the informed consent form and participant information sheet via email, and verbal consent was obtained before the commencement of the interviews. Confidentiality was strictly maintained, and the rights of all participants were fully respected throughout the research process.

Results

The analysis identified five major themes representing perceived drivers of employment for individuals with Down syndrome. The themes and their corresponding

subthemes are presented in Table 3. The five primary themes included: (1) supportive environment, (2) conducive workplace, (3) individual strengths, (4) inclusive community, and (5) family support. Each theme encompasses multiple subthemes, which are elaborated in the results (Supplementary Table 1). The findings are presented according to the hierarchy of code frequency and relative importance.

Theme 1: Supportive environment

A supportive environment is essential for fostering positive employment attitudes and enhancing opportunities for individuals with Down syndrome. This theme encompasses the broader ecosystem of regulations, policies, and programs that facilitate workforce participation. Two subthemes emerged under this theme: (1) promoting integration into the workforce and (2) inclusive policies and regulations.

Subtheme 1: Promoting integration into the workforce

Sheltered workshops and job coaches were identified as critical facilitators of employment for individuals with Down syndrome. These initiatives provide essential training and create safe, supervised environments that support skill development. As one employer noted,

"We need to set up more places like that... we provide the training. They are very happy..." (Employer, 07).

Sheltered workshops also support the transition of individuals into the open labor market. Job coaches, meanwhile, serve as communicative bridges, facilitating workplace integration and helping employers optimize operations. Equally important, community acceptance was perceived as a key factor enhancing employment opportunities. A community member remarked,

"If an employer... hires individuals with Down syndrome, society will see it as one good value. It will lead others to do the same" (Community, 34).

Thus, employing individuals with Down syndrome has the potential to transform societal perceptions, fostering greater inclusivity and encouraging wider participation in

the workforce.

Subtheme 2: Inclusive policies and regulations

Effective policies are essential to safeguard the employment rights of individuals with Down syndrome. Proposed measures include the introduction of employment quotas in the private sector, provision of incentives for employers, and mandatory awareness training for both employers and co-workers. As one employer stated,

"Companies, especially large multinational ones, should make a quota for disabled individuals, so that they can have equal opportunity to be employed" (Employer, 03).

Enforcement of the existing 1% employment quota in the public sector was also highlighted as a strategy to enhance visibility and foster confidence in hiring individuals with Down syndrome. Financial incentives, such as tax breaks and grants, were perceived as additional motivators for employers. Furthermore, awareness and educational programs for employers and co-workers were deemed beneficial. As one community participant suggested,

"They need to attend the program, so they can improve their knowledge regarding PWD first" (Community, 16).

It was also recommended that standard operating procedures be developed to streamline the recruitment and management of employees with disabilities. Cross-sector collaboration could further enhance policy inclusivity and provide a platform for shared learning. As another participant noted,

"They can learn and try to see from which aspect they need to improve. Is it their management or their safety?" (Community, 34).

Theme 2: Conducive workplace

Workplace settings play a critical role in shaping individuals' employment experiences. The theme of an inclusive workplace emerged from participants' responses as a key factor enhancing the employability of individuals with Down syndrome. Two subthemes were identified under this theme: (1) supportive colleagues and employers, and (2) employers' incentives.

Subtheme 1: Supportive colleagues and employers

Support from co-workers and employers plays a pivotal role in enhancing both the work performance and employment opportunities of individuals with Down syndrome. Such support creates an environment in which these individuals can perform tasks effectively and develop their skills. As one job coach noted,

"People with Down Syndrome have a better performance as they have co-workers' support and understanding" (Job coach, 09).

Supportive employers are equally important, as they encourage individuals with Down syndrome to reach their full potential and foster positive workplace attitudes. In parallel, supportive colleagues provide assistance as

Table 3. Themes and subthemes generated as perceived drivers of employment for individuals with Down syndrome

Themes	Subthemes
1. Supportive environment	1. Promoting integration into the workforce 2. Inclusive policies and regulations
2. Conducive Workplace	1. Supportive colleagues and employers 2. Employers' incentives
3. Individual strengths	1. Qualification and training 2. Individual characteristics
4. Inclusive community	1. Inclusive community
5. Family support	1. Continuous motivation 2. Providing resources

needed, contributing to a conducive environment for growth. As an individual with Down syndrome explained, *"They [my colleagues] support me"* (Individual with Down syndrome, 39).

This supportive workplace atmosphere not only enhances the employment experience for individuals with Down syndrome but also reassures parents, thereby strengthening their endorsement of their children's participation in the workforce. One employer commented, *"So that's why in [workplace name] this group of parents feel that the environment is safe for them (individuals with Down syndrome)..."* (Employer, 15).

Subtheme 2: Employers' incentives

Employment incentives for employers also serve as a significant driver for the hiring of individuals with Down syndrome. Financial benefits, such as tax reliefs or grants under corporate social responsibility (CSR) initiatives, can encourage employers:

"... if we employ somebody with Down syndrome, do we get extra perks from the government?..." (Employer, 07)

"Tax exemption, yeah... Able to get more support. Especially financial..." (Job coach, 11).

Moreover, an enhanced corporate image attracts more business opportunities, benefiting employers:

"If anything, you'll get more customers and more clients because you're tapping into the PWD community" (Policymaker, 06).

Theme 3: Individual strengths

The strengths of individuals with Down syndrome may enhance their employment and retention. Such individuals can be empowered through (1) qualification and training and (2) paying attention to their individual characteristics.

Subtheme 1: Qualification and training

Training and qualifications emerged as the primary drivers of employment and retention for individuals with Down syndrome, as consistently highlighted across all participant groups. Employers' confidence in hiring these individuals is often contingent upon prior training and demonstrated task competence. As one employer explained,

"As for the credentials, I mean, I didn't go through and check, but the aunt said that he went to the special needs school and was trained to do simple tasks for daily living. So, I do trust that he went to school" (Employer, 03).

Formal assessment and certification programs in Malaysian special needs schools were perceived as providing credibility, while vocational certificates facilitate participation in the open labor market. Moreover, formal training was considered to expand the scope of employment opportunities, enabling individuals

with Down syndrome to undertake more complex responsibilities beyond routine or repetitive tasks.

Subtheme 2: Individual characteristics

The individual characteristics of people with Down syndrome can significantly influence their employment prospects. They are generally perceived as friendly and hardworking, with a notable ability to engage warmly with others, including customers. As one mother observed,

"They actually love to interact with adults their age, you know?" (Mother, 20).

Similarly, a community member remarked,

"And then, as a cashier, they actually like talking to people. They like to interact with people" (Community, 30).

Individuals with Down syndrome are also viewed as dedicated and focused, often demonstrating commitment to completing tasks. As another community member stated,

"Probably, I would think that people with Down Syndrome are actually quite dedicated to their work or their task. As long as they can, you know, finish the work given. Yeah. I think they are quite dedicated" (Community, 33).

Theme 4: Inclusive community

Community acceptance plays a crucial role in facilitating the integration of individuals with Down syndrome into the workforce. Employment not only enhances their societal inclusion but can also influence broader public perceptions. As one community member noted,

"They indirectly will change the stigma of our public society... But if the employer is willing to take a risk or wholeheartedly hire individuals with Down syndrome, society will look at it as one solution or one good value..." (Community, 34).

By employing individuals with Down syndrome, organizations can set a precedent that encourages others to follow suit, thereby promoting a more inclusive and accepting society.

Theme 5: Family support

In addition to individual strengths, ongoing family support plays a vital role in helping individuals with Down syndrome secure and maintain employment. This theme highlights how family involvement can facilitate both employment opportunities and greater independence. Two subthemes were identified under this theme: (1) continuous motivation and (2) providing resources.

Subtheme 1: Continuous motivation

Persistent motivation and support are critical in facilitating employment for individuals with Down syndrome. Parents, in particular, play a key role in encouraging their children's workforce participation as a step toward greater

independence. As one mother explained,

"I think most parents with a Down Syndrome child will really give them a chance to work... let them explore... let them do what they want to do. So, they can be themselves..." (Mother, 08).

Parental encouragement also boosts confidence and eases workplace adaptation. As one individual with Down syndrome stated,

"My mother... always [reminds me] to work at my pace" (Individual with Down syndrome, 11).

Subtheme 2: Providing resources

Parental support further encompasses the provision of essential resources to facilitate the employment of individuals with Down syndrome. Parents play a pivotal role in assisting their children with enrolment in job training programs, thereby equipping them with skills that enhance employability. As one job coach noted,

"The parents call the [training agency name] to look for help" (Job coach, 09).

In addition, parents often provide direct training at home, which further develops their children's skills and improves their employment prospects. As one mother described,

"So now I'm teaching him to work with Word and, what do they call it, the other one (Excel)?" (Mother, 20).

Discussion

The analysis of the data revealed a clear hierarchy of themes across the various stakeholder groups. A supportive environment emerged as the most critical factor, emphasizing the importance of creating an inclusive and accommodating context for individuals with Down syndrome. Closely related is the promotion of workforce integration, highlighting the necessity of active initiatives to include these individuals in employment opportunities. The theme of a conducive workplace also emerged prominently, indicating that specific conditions, organizational culture, and supportive practices within work settings are pivotal. Employer incentives and inclusive policies were similarly emphasised, suggesting that both practical support and formal regulatory frameworks are essential. Individual strengths and the notion of an inclusive community were also key themes, reflecting the importance of personal capabilities and broader societal acceptance. Although mentioned less frequently, factors such as personal characteristics, family support, and continuous motivation were recognized as significant contributors to successful employment outcomes.

A supportive and inclusive workplace enhances the employment experience and retention of individuals with disabilities, including those with Down syndrome (36). Such environments contribute to the development of skills, increase confidence, and improve job retention,

producing mutual benefits for both employees and employers (6, 13, 37). Employer incentives, including tax breaks and financial benefits, further facilitate employment opportunities for individuals with disabilities (38). Societal acceptance of individuals with Down syndrome is also critical in expanding employment opportunities and can be shaped by awareness, exposure, and cultural factors (39–41). In addition, enabling environments, inclusive policies, and government support are key elements in promoting workforce participation among people with disabilities (42–43). Nonetheless, effective implementation requires coordinated action and collaboration among government bodies, organizations, and communities to strengthen policies and safeguard the rights of individuals with disabilities (44).

A conducive workplace is essential for enhancing the employment experiences of individuals with Down syndrome, as support from co-workers and employers significantly improves work performance and opportunities. Hagner et al. (45) highlight the positive effects of workplace support on employees with disabilities, noting that understanding colleagues not only enhances work experiences but also reassures families regarding safety and inclusivity. Supportive employers are similarly crucial, as they facilitate skill development, unlock employee potential, and promote a positive workplace culture. Financial incentives, such as tax relief and corporate social responsibility initiatives, further motivate employers to establish inclusive work environments (18), while also enhancing corporate image and business prospects. In Malaysia, although government policies encourage inclusive employment, challenges persist in effectively incentivizing supportive workplace practices, highlighting the need for ongoing advocacy and policy development to ensure accessibility for individuals with disabilities (46).

Employers are more inclined to hire individuals with Down syndrome who possess the necessary qualifications, training, and desirable personal characteristics (42, 47). This preference reflects the desire for employees who can competently perform required tasks while contributing to a culture of acceptance within the workplace. Furthermore, formal certification and training increase employers' confidence in hiring and retaining individuals with disabilities (48). Despite these qualifications, individuals with Down syndrome often encounter challenges in securing employment due to persistent negative perceptions and stigma from employers (6, 36). Addressing this issue requires not only improving awareness and attitudes toward individuals with Down syndrome but also developing their human capital (36). However, enhancing human capital alone is insufficient; interventions must also consider the broader social-ecological context to be effective.

Community inclusion emerged as a critical factor

for integrating individuals with Down syndrome into the workforce. Acceptance by the community not only enhances employment opportunities but also positively influences social perceptions. As one community member observed, employers who hire individuals with Down syndrome can challenge existing stigma and promote inclusivity, encouraging others to follow suit. This finding aligns with research indicating that employment can significantly improve public perceptions of people with disabilities (18). Although government policies in Malaysia aim to foster inclusive practices, prevailing social attitudes continue to pose challenges. Stigma and misconceptions surrounding Down syndrome persist, underscoring the need for ongoing advocacy and awareness initiatives (49). The reciprocal relationship between employment and community acceptance suggests that increased visibility of individuals with Down syndrome in the workforce may, in turn, enhance broader societal acceptance.

The family plays a central role in supporting individuals with Down syndrome, both in the workforce and in daily life. Parental support and advocacy are critical for facilitating a successful transition into employment. Families often continue providing guidance after individuals with Down syndrome graduate, and their involvement in supporting employment opportunities can contribute to improved quality of life for their children (13, 50). However, many parents adopt an authoritative approach to parenting young adults with Down syndrome, making decisions without consultation or discussion (51). This dynamic presents a challenge in balancing the individuals' need for family support with their desire for independence. Overall, fostering positive attitudes toward individuals with Down syndrome, combined with support from both the social-ecological context and the family, can enhance employment outcomes and promote a higher quality of life (51).

Conclusion

Fostering a supportive and inclusive environment is essential for enhancing the employment experiences of individuals with Down syndrome. This entails cultivating a supportive workplace culture, promoting integration into the workforce, and implementing employer incentives alongside inclusive policies. Such measures not only improve employee retention and satisfaction but also help challenge social stigma and misconceptions. Community acceptance plays a critical role by expanding employment opportunities and positively shaping social perceptions, while family support is equally vital in facilitating successful transitions into the workforce. Despite these valuable insights, the study acknowledges certain limitations, including potential biases and limited representation due to disparities in technology access and unmeasured cognitive levels. Overall, the findings underscore the need for a holistic approach to improving

employment opportunities for individuals with Down syndrome, emphasizing the interconnected influence of individual, family, workplace, community, and policy factors in creating a more inclusive workforce.

Acknowledgements

Our heartfelt gratitude goes to the participants who courageously took part in this study amid the challenges posed by the COVID-19 pandemic. Moreover, Universiti Malaysia Sarawak earns our deep gratitude for their invaluable support of this research project.

Authors' Contribution

Conceptualization: Md Mizanur Rahman, Abg Safuan Adenan, Sharifa Ezat Wan Puteh.

Data curation: Abg Safuan Adenan.

Formal analysis: Abg Safuan Adenan, Md Mizanur Rahman.

Funding acquisition: Md Mizanur Rahman.

Investigation: Abg Safuan Adenan.

Methodology: Md Mizanur Rahman, Abg Safuan Adenan, .

Project administration: Md Mizanur Rahman, Abg Safuan Adenan.

Resources: Md Mizanur Rahman.

Software: Abg Safuan Adenan.

Supervision: Md Mizanur Rahman, Razitasham Safii.

Validation: Rosalia Saimon, Chen Yoke Yong, Ting Chuong Hock, Razitasham Safii.

Visualization: Abg Safuan Adenan.

Writing – original draft: Abg Safuan Adenan, Md Mizanur Rahman.

Writing – review & editing: Razitasham Safii, Sharifa Ezat Wan Puteh, Rosalia Saimon.

Competing Interests

The authors have no competing interests to declare.

Ethical Approval

The protocol for this study was approved by the ethical committee of Universiti Malaysia Sarawak with the ethics reference number FME/21/12.

Funding

This research project was financed by the Ministry of Higher Education, Malaysia, through Universiti Malaysia Sarawak (Ref #: FRGS/1/2020/SS0/UNIMAS/01/2).

Supplementary Files

Supplementary file 1 contains Figure S1 and Table S1.

References

1. The World Bank. Disability Inclusion. The World Bank; 2011. Available from: <https://www.worldbank.org/ext/en/topic/social-development/disability-inclusion>. Accessed August 3, 2026
2. United Nations. World Population Prospects. United Nations, DESA, Population Division; 2019. Available from: <https://www.un.org/development/desa/pd/news/world-population-prospects-2019-0>. Accessed August 3, 2026
3. Ministry of Human Resource M. Statistik Pekerjaan & Perburuhan. Malaysia: Kementerian Sumber Manusia Malaysia; 2021. Report No.: Siri 27, Bil. 1
4. Billett S, Choy S, Salling Olesen H. Policies and Practices for Sustaining Employability Through Worklife Learning. In: Billett S, Salling Olesen H, Fillettaz L, editors. Sustaining Employability Through Work-life Learning: Practices and Policies. Singapore: Springer Nature Singapore; 2023. p. 23-52. doi:10.1007/978-981-99-3959-6_2
5. Araten-Bergman T, Stein MA. Employment, social capital,

- and community participation among Israelis with disabilities. *Work* 2014;48(3):381–90. doi:[10.3233/wor-131779](https://doi.org/10.3233/wor-131779)
6. Ang MCH. The challenges and benefits of employing persons with disabilities: the Japanese multinational corporations' perspective. *International Journal of Innovation, Management and Technology*. 2017;8(5):359–66. doi:[10.18178/ijimt.2017.8.5.754](https://doi.org/10.18178/ijimt.2017.8.5.754)
 7. Curnock E, Leyland AH, Popham F. The impact on health of employment and welfare transitions for those receiving out-of-work disability benefits in the UK. *Soc Sci Med* 2016;162:1–10. doi:[10.1016/j.socscimed.2016.05.042](https://doi.org/10.1016/j.socscimed.2016.05.042)
 8. Narayanan S. A Study on the Challenges Faced by Disabled People at Workplace in Malaysia. *International Journal for Studies on Children, Women, Elderly And Disabled* 2018;5:85–92
 9. Hashim HNM, Mahmood A. Law, morality, justice, freedom and equality: the underlying concepts. Shah Alam: Mc-Graw Hill (M); 2009 2009.
 10. Weijerman ME, de Winter JP. Clinical practice. The care of children with Down syndrome. *Eur J Pediatr* 2010;169(12):1445–52. doi:[10.1007/s00431-010-1253-0](https://doi.org/10.1007/s00431-010-1253-0)
 11. Presson AP, Partyka G, Jensen KM, Devine OJ, Rasmussen SA, McCabe LL, et al. Current estimate of Down Syndrome population prevalence in the United States. *J Pediatr* 2013;163(4):1163–8. doi:[10.1016/j.jpeds.2013.06.013](https://doi.org/10.1016/j.jpeds.2013.06.013)
 12. Englund A, Jonsson B, Zander CS, Gustafsson J, Annerén G. Changes in mortality and causes of death in the Swedish Down syndrome population. *Am J Med Genet A* 2013;161a(4):642–9. doi:[10.1002/ajmg.a.35706](https://doi.org/10.1002/ajmg.a.35706)
 13. Foley KR, Jacoby P, Einfeld S, Girdler S, Bourke J, Riches V, et al. Day occupation is associated with psychopathology for adolescents and young adults with Down syndrome. *BMC Psychiatry* 2014;14:266. doi:[10.1186/s12888-014-0266-z](https://doi.org/10.1186/s12888-014-0266-z)
 14. Muhammad Ismail HI, Mohd Ibrahim H, Ng HP, Thomas T, editors. *Pediatrics Protocol for Malaysian Hospitals*. 4th ed. Malaysia: Ministry of Health, Malaysia; 2019
 15. Pikora TJ, Bourke J, Bathgate K, Foley KR, Lennox N, Leonard H. Health conditions and their impact among adolescents and young adults with Down syndrome. *PLoS One* 2014;9(5):e96868. doi:[10.1371/journal.pone.0096868](https://doi.org/10.1371/journal.pone.0096868)
 16. Channell MM, Mattie LJ, Hamilton DR, Capone GT, Mahone EM, Sherman SL, et al. Capturing cognitive and behavioral variability among individuals with Down syndrome: a latent profile analysis. *J Neurodev Disord* 2021;13(1):16. doi:[10.1186/s11689-021-09365-2](https://doi.org/10.1186/s11689-021-09365-2)
 17. Tomaszewski B, Fidler D, Talapatra D, Riley K. Adaptive behaviour, executive function and employment in adults with Down syndrome. *J Intellect Disabil Res* 2018;62(1):41–52. doi:[10.1111/jir.12450](https://doi.org/10.1111/jir.12450)
 18. Kumin L, Schoenbrodt L. Employment in Adults with Down Syndrome in the United States: Results from a National Survey. *J Appl Res Intellect Disabil* 2016;29(4):330–45. doi:[10.1111/jar.12182](https://doi.org/10.1111/jar.12182)
 19. Bronfenbrenner U. Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology*. 1986;22(6):723–42. <https://doi.org/10.1037/0012-1649.22.6.723>
 20. Bronfenbrenner U. Ecological systems theory. In: Vasta R, editor. *Six theories of child development: Revised formulations and current issues*: Jessica Kingsley Publishers; 1992. p. 187–249
 21. Kilanowski JFPRACF. Breadth of the Socio-Ecological Model. *J Agromedicine* 2017;22(4):295–7. doi:[10.1080/1059924x.2017.1358971](https://doi.org/10.1080/1059924x.2017.1358971)
 22. Golden SD, Earp JA. Social ecological approaches to individuals and their contexts: twenty years of health education & behavior health promotion interventions. *Health Educ Behav* 2012;39(3):364–72. doi:[10.1177/1090198111418634](https://doi.org/10.1177/1090198111418634)
 23. Lindsay S, McDougall C, Menna-Dack D, Sanford R, Adams T. An ecological approach to understanding barriers to employment for youth with disabilities compared to their typically developing peers: views of youth, employers, and job counselors. *Disabil Rehabil* 2015;37(8):701–11. doi:[10.3109/09638288.2014.939775](https://doi.org/10.3109/09638288.2014.939775)
 24. The Social-Ecological Model: A Framework for Prevention." Violence Prevention, Centers for Disease Control and Prevention, 2021, Available from: <https://dc.gov/violenceprevention/about/social-ecologicalmodel.html>. Accessed August 3, 2026.
 25. Cohen D, Crabtree B. Qualitative Research Guidelines Project. 2006. Available from: https://imrdschool.wordpress.com/wp-content/uploads/2017/07/qualitativeresearchguidelinesproject_interviews.pdf. Accessed August 3, 2026.
 26. Green J, Thorogood N. Qualitative methods for health research. 4th ed. Los Angeles: SAGE Publications; 2018 2018. 420 p
 27. Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology* 2006;3(2):77–101. doi:[10.1191/1478088706qp063oa](https://doi.org/10.1191/1478088706qp063oa)
 28. Braun V, Clarke V. One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology* 2021;18(3):328–52. doi:[10.1080/14780887.2020.1769238](https://doi.org/10.1080/14780887.2020.1769238)
 29. Braun V, Clarke V. To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qualitative Research in Sport, Exercise and Health* 2021;13(2):201–16. doi:[10.1080/2159676X.2019.1704846](https://doi.org/10.1080/2159676X.2019.1704846)
 30. Braun V, Clarke V, Weate P. Using thematic analysis in sport and exercise research. In: Smith B, Sparkes AC, editors. *Routledge handbook of qualitative research in sport and exercise*. London Routledge; 2016. p. 191–205
 31. Patton MQ. Qualitative research & evaluation methods: integrating theory and practice. 4 ed. Thousand Oaks, California: SAGE Publications; 2014 2014. p. 806
 32. Creswell JW, Plano Clark VL. Designing and conducting mixed methods research. 2nd ed. Los Angeles: SAGE Publications; 2011. p. 457
 33. Dodds S, Hess AC. Adapting research methodology during COVID-19: lessons for transformative service research. *Journal of Service Management* 2020;32(2):203–17. doi:[10.1108/JOSM-05-2020-0153](https://doi.org/10.1108/JOSM-05-2020-0153)
 34. Edwardraj S, Mumtaj K, Prasad JH, Kuruvilla A, Jacob KS. Perceptions about intellectual disability: a qualitative study from Vellore, South India. *J Intellect Disabil Res* 2010;54(8):736–48. doi:[10.1111/j.1365-2788.2010.01301.x](https://doi.org/10.1111/j.1365-2788.2010.01301.x)
 35. D'Souza A, Fabricius A, Amodio V, Colquhoun H, Lewko J, Haag HL, et al. Men's gendered experiences of rehabilitation and recovery following traumatic brain injury: A reflexive thematic analysis. *Neuropsychol Rehabil* 2022;32(3):337–58. doi:[10.1080/09602011.2020.1822882](https://doi.org/10.1080/09602011.2020.1822882)
 36. Khayatzaadeh-Mahani A, Wittevrongel K, Nicholas DB, Zwicker JD. Prioritizing barriers and solutions to improve employment for persons with developmental disabilities. *Disabil Rehabil* 2020;42(19):2696–706. doi:[10.1080/09638288.2019.1570356](https://doi.org/10.1080/09638288.2019.1570356)
 37. Barbosa T, Lima ILB, Alves GÂ DS, Delgado IC. Contributions of speech-language therapy to the integration of individuals with Down syndrome in the workplace. *Codas* 2018;30(1):e20160144. doi:[10.1590/2317-1782/20172016144](https://doi.org/10.1590/2317-1782/20172016144)

38. Mik-Meyer N. Othering, ableism and disability: A discursive analysis of co-workers' construction of colleagues with visible impairments. *Human Relations* 2016;69(6):1341–63. doi:[10.1177/0018726715618454](https://doi.org/10.1177/0018726715618454)
39. Baidi N, Ilias A. The Acceptability Towards PWDs At Workplace - Perceptions and Awareness. *International Journal for Studies on Children, Women, Elderly And Disabled*. 2019;6(Jan.):9-18.
40. Grześkowiak A, Załuska U, Kozyra C, Kwiatkowska-Ciotucha D. Perception and Acceptance of People with Disabilities by Employers and Co-Workers. *Int J Environ Res Public Health* 2021;18(10). doi:[10.3390/ijerph18105278](https://doi.org/10.3390/ijerph18105278)
41. Soffer M. Culture, causal attributions to visual impairments, and stigma: A mediation model. *Disabil Health J* 2019;12(3):437–42. doi:[10.1016/j.dhjo.2019.01.006](https://doi.org/10.1016/j.dhjo.2019.01.006)
42. Omar MK, Mat Ali NS, Mohd Puad MH, Yaakub M, Zakaria A. Enabling Employment for People with Disability (PWD): Readiness, Commitment, and Disposition of Malaysian Employers. *International Journal of Entrepreneurship and Management Practices*. 2021;4(15):01-22. doi:[10.35631/ijemp.415001](https://doi.org/10.35631/ijemp.415001)
43. Tahir Z, Thambapillay S, Mohd Yusoff JZ, Abdul Rahman AS. Undang-Undang Berkenaan Orang Kurang Upaya: Satu Analisis Perkembangan Perundangan di Malaysia. *The Malaysian Journal of Social Administration*. 2020;14(1):96-114.
44. Abdul Wahab H, Ayub ZA, Arshad R. Employment for People with Disability: Some Findings on the Policy and Implementation. *International Review of Management and Marketing*. 2016;6(S8):327-32.
45. Hagner D, Dague B, Phillips K. Including Employees With Disabilities in Workplace Cultures: Strategies and Barriers. *Rehabilitation Counseling Bulletin* 2015;58(4):195–202. doi:[10.1177/0034355214544750](https://doi.org/10.1177/0034355214544750)
46. Ziyuan X. Ensuring Equal Work Rights for Employees With Disabilities: A Case Study of Dismissal of an Employee With Down's Syndrome by Company Y. *Social Security and Administration Management*. 2023;4(8):105-10. doi:[10.23977/socsam.2023.040814](https://doi.org/10.23977/socsam.2023.040814)
47. Manaf ARA, Othman SZ, Saad ZM, Jamaluddin Z, Noor AAM. Employability of Persons with Disabilities: Job Coaches' Perspectives. *International Journal of Academic Research in Business and Social Sciences*. 2018;8(6):254-69. doi:[10.6007/IJARBS/v8-i6/4202](https://doi.org/10.6007/IJARBS/v8-i6/4202)
48. Rimmerman A, Araten-Bergman T, Hernandez B, Chen B. Israeli employers' hiring intentions for recruiting employees with disabilities: how do they compare with US employers? *J Soc Work Disabil Rehabil* 2013;12(3):176–93. doi:[10.1080/1536710x.2013.810097](https://doi.org/10.1080/1536710x.2013.810097)
49. Griffith GM, Totsika V, Nash S, Hastings RP. 'I just don't fit anywhere': support experiences and future support needs of individuals with Asperger syndrome in middle adulthood. *Autism* 2012;16(5):532–46. doi:[10.1177/1362361311405223](https://doi.org/10.1177/1362361311405223)
50. Dyke P, Bourke J, Llewellyn G, Leonard H. The experiences of mothers of young adults with an intellectual disability transitioning from secondary school to adult life. *J Intellect Dev Disabil* 2013;38(2):149–62. doi:[10.3109/13668250.2013.789099](https://doi.org/10.3109/13668250.2013.789099)
51. Scott M, Foley KR, Bourke J, Leonard H, Girdler S. "I have a good life": the meaning of well-being from the perspective of young adults with Down syndrome. *Disabil Rehabil* 2014;36(15):1290–8. doi:[10.3109/09638288.2013.854843](https://doi.org/10.3109/09638288.2013.854843)