ASSESSING THE ROLES OF EMERGING TECHNOLOGIES ON DISABILITY INCLUSIVITY IN THE CONSTRUCTION INDUSTRY

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The construction industry is witnessing a transformative shift with the advent of emerging technologies (ETs), profoundly impacting disability inclusivity. This research assesses the roles technologies have in enhancing inclusivity for individuals with disabilities within the industry. The analysis explores the effects of ETs on disability inclusivity in the construction industry. Based on quantitative research method, purposive and convenience sampling techniques 190 valid responses were collected, and a one-sample t-test was conducted. The findings indicated that reducing physical strain and fatigue, participating remotely in project management and decision-making and reducing the need for manual labour were the most ranked roles of ETs on disability inclusivity in the construction industry. The study offers critical insights for policymakers and industry stakeholders to realise the full potential of ETs in promoting disability inclusivity.

Keywords: emerging technologies; disability inclusivity; construction

INTRODUCTION

According to the World Health Organisation (WHO) (2011), about 15% of the world's population lives with some form of disability. In January 2025, this had increased to 16% - approximately 1.3 billion people as reported by WHO. That is for every six people you find in the world; you will find a person who is disabled. Some of the reasons behind the rising number are ageing of the population and the rapid spread of non-communicable or chronic diseases as well as the improvement in the methodologies used to measure disability (Sable *et al.,* 2019). The inclusion of this population in the social-labour environment has been discussed and encouraged in many countries through various laws, for example from quotas set for the employment of people with disabilities. For instance, Article 27 of the UN Convention for the Rights of Persons with Disabilities obligates member states to promote employment for people with disabilities, often through legislative measures like quotas. The EU Directive 2000/78/EC supports positive actions to prevent disadvantages linked to

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disability. China has established a formal quota system over the past three decades, though implementation inconsistencies remain (Liao, 2020).

However, persons with disabilities experience an Internet of Things (IoT) of barriers to inclusion which makes them live in deplorable conditions as a result of their physio-biological and psychosocial incapacitations of which the construction industry is not an exception (Bailey *et al.,* 2022; McKinney and Swartz, 2021). The construction industry has traditionally been characterised by physically demanding tasks, hazardous environments, and limited accessibility, making it challenging for individuals with disabilities to participate fully in the workforce. Despite global efforts to promote disability inclusivity through policies and regulations, the industry continues to face barriers in creating an equitable work environment for persons with disabilities. However, the construction industry worldwide is facing significant challenges due to a lack of skilled labour, which impacts productivity and project timelines. This issue is prevalent across various regions, affecting both developed and developing countries (Manoharan *et al.,* 2023). Given these labour shortages, there is a growing need to explore alternative workforce solutions, including the inclusion of individuals with disabilities, who remain an underutilised segment of the labor market. ETs have the potential to bridge this gap by enabling PWDs to perform construction tasks in addressing labour shortages and inclusivity concerns. Workers with disabilities typically work in offices rather than construction sites, in most construction companies (Guimarães *et al.,* 2018). The advent of ETs presents new opportunities to enhance accessibility, safety, and productivity for individuals with disabilities in construction. The integration of ETs in the workplace has the potential to significantly enhance the inclusion of individuals with disabilities (Jetha *et al.,* 2023). This involves not only providing assistive technologies but also transforming work environments to be more inclusive and accessible. ETs have been described as facilitators for social inclusion because it allows for the delivery of real-time services that can enable individuals to learn, work, travel, socialise, shop, and interact with the community without being subject to physical barriers (Manzoor and Vimarlund, 2018).

While these technologies have been widely recognised for improving efficiency and innovation in construction processes, their roles in fostering disability inclusivity remain underexplored. There is limited empirical evidence on how ETs can mitigate workplace challenges for persons with disability workers in the construction industry. This research aims to identify the roles of emerging technologies on disability inclusivity in the construction industry.

LITERATURE REVIEW

Disability

Defining disability is complicated as it is complex, dynamic, multidimensional and contested (WHO and World Bank, 2011). It is an evolving concept that results from the interaction between persons with impairments and attitudinal and environmental barriers that may hinder their full and effective participation in society on an equal basis with others (UNCRPD, 2019). Disability is a multifaceted and dynamic concept that can be understood through various lenses, each contributing to a more holistic understanding of its meaning and implications. From medical, social, biopsychosocial, legal, cultural, human rights, economic, identity, functional, and critical perspectives, disability can be described as a natural part of human diversity that arises from the interaction between an individual's physical, sensory, cognitive, or mental health impairments and the societal, environmental, and attitudinal barriers that restrict their full participation in life (WHO, 2001). It encompasses both the intrinsic limitations of impairment (as highlighted by the medical model (WHO, 1980)) and the external obstacles created by inaccessible environments, discriminatory practices, and cultural norms (Shakespeare, 2006). Disability is not merely a personal or medical issue, but a social construct shaped by historical, cultural, and political contexts, as well as a lived experience that intersects with other aspects of identity such as race, gender, class, and sexuality (Goodley, 2011).

Emerging Technology (ET)

ETs are those technologies that are in the infancy stages of creation and implementation and can transform industries and society**.** ETs are typically characte**rise**d by radical novelty, fast growth, high uncertainty, coherence, and big impact (Rotolo ***et** al.,* 2015)**.** Unlike established technologies, ETs are in the development stages, and their full implications, both positive and negative are not yet determined**.** According to Halaweh (2013) ETs are characterised by high uncertainty, network effects, unseen social and ethical implications, cost, unobvious impacts, limited availability, and limited research.

Role of Emerging Technologies on Disability Inclusivity in the Construction Industry

Technologies are essential for strengthening construction ventures, yet still, the point of embracing technology in the construction sector has been low compared to other industries (Bashir and Kivrak, 2020). ETs have to be proven helpful in the Construction industry due to their varied benefits to project stakeholders, such as enhanced visualisation, better data sharing, reduction in building waste, increased productivity, sustainable performance and safety improvement. (Manzoor *et al.,* 2021). ETs can contribute significantly to disability inclusivity in the construction industry through enhanced accessibility, safety, and productivity for individuals with disabilities. One of the significant contributions of these technologies is that they assist in enhancing physical capabilities and reduce strain. Exoskeletons and wearable technologies, for instance, assist construction workers with mobility disabilities by minim*ising* physical exertion and fatigue, enabling their inclusion in physically demanding activities (Rahman *et al.,* 2023). This is particularly helpful in an industry where manual labour is common and can serve as a point of exclusion. The integration of assistive and individual*ise*d tools facilitated through augmented reality (AR) and virtual reality (VR), has also assisted in introducing greater inclusivity. These technologies allow individuals with disabilities to interact with virtual construction environments, improving their ability to understand designs and perform tasks efficiently (Almeida *et al.,* 2021). The Walkin VR application, for example, provides virtual movement and rotation functions for individuals with mobility impairments, enabling their ability to engage with construction processes (Lagos Rodríguez *et al.,* 2022).

Besides, ETs have improved communication and coordination in construction projects. AI-driven communication systems and AR support collaboration by providing real-time visual presentations and interactive systems that help workers with disabilities communicate effectively with other workers (Almeida *et al.,* 2021). This ensures that persons living with disabilities are effectively integrated into construction teams rather than being marginalised by communication barriers. With technologies like IoT and AI, individuals with disabilities can participate in project management and supervision without being physically present at the site (Louis and Dunston, 2018). Using AI-powered project monitoring and cloud-hosted collaboration tools, disabled construction professionals can effectively contribute to decision-making, overcoming physical accessibility limitations (Almufareh *et al.,* 2024). These among other effects are summarised in Table 1.

Table 1: Role of emerging technologies on disability inclusivity in the construction industry

SN	Role Emerging Technologies on Disability Inclusion	References
1.	Improving muscular fitness, cardiorespiratory fitness, balance, and speed and agility in individuals with intellectual disabilities e.g., VR-based exercise can	Li *et al.,* (2023)
2.	Developing customised assistive tools for the disabled (e.g., AR)	Almedia *et al.,* (2021)
3.	Helping in remote monitoring and oversight without being physically present.	Halder *et al.,* (2023)
4.	Providing support systems for day-to-day activities (e.g., Internet of Things (IoT))	Heyn, (2020)
5.	Providing assistance and security for visually impaired persons (e.g., IoT)	Haouel *et al.,* (2016)
6.	Enhancing effective communication between employees especially PWDs	Almeida *et al.,* (2021)
7.	Reducing physical strain and fatigue	Rahman *et al.,* (2023)
8.	Assisting in remote site inspection (e.g., VR)	Zhou *et al.* (2017)
9.	Enhancing safety for workers (e.g., Wearable technology)	Dobrucali *et al.,* (2024)
10.	Delivering real-time alerts for emergencies.	Cheung *et al.,* (2018);
11.	Reducing physical strain and fatigue	Almufareh *et al.,* (2024); Rahman *et al. (*2023)
12.	Participating remotely in Project Management and Decision-Making	Almufareh *et al. (*2024); Shaw and Vinsen, (2023)
13.	Providing greater independence in navigation and mobility	Almufareh *et al.,* (2024)
14.	Providing ergonomic adjustments.	Rahman *et al.,* (2023)

Source: Authors' construct (2024)

METHOD

This study adopted a quantitative research method to assess the role of emerging technologies on disability inclusivity in the construction industry. Quantitative research allows for systematic investigation of relationships between variables, ensuring objectivity and replicability (Creswell, 2017). Contextually, this study primarily focused on physical and sensory disabilities, as these are most relevant to participation and safety in a construction environment (Owusu *et al.,* 2024).

Primary data was collected using a closed-ended questionnaire, which was divided into two sections that are demographic information of respondents and the roles of ETs on disability inclusivity. The questionnaire utilised a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) to measure respondents' perceptions and experiences. Purposive and convenience sampling techniques were used ensure that individuals with relevant experience in construction technology and disability inclusion participated in the study. Although the study did not explicitly target individuals with disabilities, the insights reflect the perspectives of those involved in implementing or observing inclusive practices. The combination of purposive and convenience methods ensured that the study focused on informed respondents while maintaining a practical approach to data collection. Prior to the administration of the questionnaire, content validity was done, by incorporating expert opinions from researchers and professionals in the construction and academia through a pilot survey involving 15 respondents, whose feedback helped refine the questionnaire for clarity and effectiveness. Ethical approval for the study was sought to ensure adherence to research ethics. The study complied with ethical guidelines for research involving human subjects, ensuring voluntary participation and data protection. Following this, a total of 215 questionnaires were distributed to professionals in Ghanaian construction industry. Out of these, 190 completed responses were retrieved, yielding an 88.4% response rate, which is considered adequate. The Statistical Package for the Social Sciences (SPSS) software version 23.0 was used for data processing and analysis. Descriptive statistics were employed to summarise the demographic profile of respondents. One-sample t-test was conducted to determine the significance of the mean scores relative to a test value of 3.5 (Mireku *et al.,* 2025), providing insights into the perceived importance of the variables. A one-sample t-test was appropriate to determine whether the sample means for each variable differed significantly from the neutral test value of 3.5, which served as the benchmark for evaluating perceived effectiveness of the roles.

DATA ANALYSIS

Prior to the main analysis, to ensure reliability of the data set, the Cronbach's Alpha test was conducted, which yielded a value 0.959 which is above 0.7 as generally considered acceptable for reliability (Tavakol and Dennick, 2011).

The respondents represented various professions within the construction industry. Quantity surveyors comprised the largest group, accounting for 27.4% (52 respondents), followed by construction managers at 26.3% (50 respondents). Project managers represented 15.8% (30 respondents), while architects accounted for 13.7% (26 respondents). Civil engineers made up 10.5% (20 respondents), and geomatic engineers represented 6.3% (12 respondents). The educational background of respondents indicates a high level of academic qualification, which contributes to informed perspectives on the research topic. Most respondents held a first degree (49.5%, 94 respondents), followed by those with a master's degree (38.9%, 74 respondents). A smaller proportion had a PhD (4.2%, 8 respondents), while 7.4% (14 respondents) possessed a diploma or technician qualification. These figures highlight that most participants had advanced academic qualifications, ensuring their ability to comprehend and provide insightful responses to the questionnaire. The study also captured the work experience of respondents, as this factor influences their familiarity with ETs and their application in construction. The largest group had up to 5 years of experience (37.9%, 72 respondents), followed by those with 6 to 10 years (27.9%, 53 respondents). Additionally, 25.8% (49 respondents) had 11 to 15 years of experience, while 8.4% (16 respondents) had been in the industry for more than 16 years. These statistics indicate that the sample included both early-career professionals and seasoned experts, ensuring a balanced range of perspectives in evaluating the effects of ETs on disability inclusivity.

To examine the statistical significance of these effects, a one-sample t-test was conducted, comparing the mean difference for each variable against a test value of 3.5 (neutral midpoint). Using a 95% confidence level, Table 2 presents the results, showing that all effects were statistically significant ($p < 0.05$), indicating a strong positive impact of ETs on disability inclusivity. The mean score ranking method was used to assess the perceived role of ETs on disability inclusivity in the construction industry. Table 2 presents the 14 response variables, ranked from highest to lowest based on their mean scores. All the variables were above the tested mean of 3.5 and all were also significant.

DISCUSSION

With a mean score of 4.22, the highest-ranked benefit of ETs is their ability to reduce physical strain and fatigue for workers with disabilities. Automation and robotics, for instance, perform physically demanding tasks, reducing the need for manual labor. Exoskeletons and wearable technology provide physical support, enhancing workers' strength and endurance. This technological assistance allows workers with disabilities to perform tasks that would otherwise be physically challenging. This agrees with Rahman *et al.* (2023) when they highlighted that exoskeletons and robotics significantly reduce physical strain and injury risks, thereby promoting a more inclusive workplace for individuals with physical limitations.

Table 2: Mean Score and One-sample t-test of Identified Effects

SN	Roles	Mean	SD	t	Sig. (1-tailed)	Rank
1.	Reducing physical strain and fatigue	4.22	0.830	11.358	< .001	1st
2.	Participating remotely in Project Management and Decision-Making	4.22	0.875	11.890	< .001	2nd
3.	Minimising the need for manual labour, which is beneficial for workers with physical disabilities	4.18	0.862	10.936	< .001	3rd
4.	Helping in remote monitoring and oversight without being physically present	4.17	0.808	11.498	< .001	4th
5.	Delivering real-time alerts for emergencies	4.17	0.846	10.977	< .001	5th
6.	Providing greater independence in navigation and mobility	4.16	0.833	10.882	< .001	6th
7.	Enhancing Collaborative Work Environments for Persons with Disabilities	4.13	0.854	10.199	< .001	7th
8.	Assisting in remote site inspection	4.11	0.857	9.824	< .001	8th
9.	Providing of assistance and security for visually impaired persons (e.g., IoT systems)	4.09	0.855	9.584	< .001	9th
10.	Enhancing safety for workers	4.09	0.889	9.137	< .001	10th
11.	Providing support systems for day-to-day activities (e.g., Internet of Things)	4.08	0.790	10.108	< .001	11th
12.	Providing customised assistive tools for the disabled (e.g., AR)	4.03	0.806	8.998	< .001	12th
13.	Providing ergonomic adjustments	4.02	0.914	7.857	< .001	13th
14.	Improving muscular fitness, cardiorespiratory fitness, balance, and speed and agility in individuals with intellectual disabilities.	3.89	0.786	6.833	< .001	14th

Source: Field Survey (2024)

VR and AR tools provide immersive experiences that allow workers to visualise and interact with construction sites remotely. These technologies ensure that individuals with mobility challenges can actively participate in project reviews, site inspections, and decision-making processes. According to Almufareh *et al.* (2024), and Shaw and Vinsen (2023), the use of VR/AR in construction enhances remote collaboration and allows for greater inclusivity in project management. The adoption of automation and advanced machinery significantly reduces the need for human intervention in repetitive and physically demanding tasks. This shift increases efficiency and creates a safer and more inclusive work environment for individuals with disabilities. This agrees with Almufareh *et al.* (2024) and Rahman *et al.* (2023), who highlight that automated material handling and robotic assistance minimise the reliance on manual labor, thereby enhancing accessibility for disabled workers in construction. Technologies such as drones, IoT sensors, and AI-driven monitoring platforms allow for real-time oversight of construction sites. According to Halder *et al. (*2023), remote monitoring enables individuals with mobility impairments to participate actively in site management and supervision, eliminating the need for physical presence. According to the respondents, digital collaboration tools, such as Building Information Modeling (BIM) and project management software, enable seamless communication and coordination among team members. This inclusivity ensures that workers with disabilities can actively participate in team activities and contribute effectively to the project. According to Oke *et al. (*2021), the use of digital tools in construction enhances team collaboration and streamlines workflow processes, making the industry more inclusive for individuals with disabilities.

The ability of ETs to deliver real-time alerts for emergencies was ranked fifth. IoT-connected wearable devices can detect hazards such as gas leaks, structural failures, or fires and instantly notify workers. Cheung *et al. (*2018) emphasize that these alert systems improve safety measures for all employees, particularly those with auditory or visual impairments. Technologies like exoskeletons, robots, and AI-powered mobility aids enable individuals with physical disabilities to navigate construction sites more independently. Almufareh *et al. (*2024) highlight that these advancements not only enhance the independence of disabled workers but also integrate them into the workforce, promoting a more inclusive and diverse work environment. AR and AI-driven communication tools improve workplace interactions by providing real-time visual aids, speech recognition, and adaptive interfaces. Almeida *et al. (*2021) confirm that these technologies help individuals with disabilities, particularly those with speech or hearing impairments, to communicate effectively with colleagues. VR and simulation-based training provide immersive learning experiences, allowing individuals with disabilities to acquire construction-related skills in a controlled and risk-free environment. In agreement with existing studies, Zhou *et al. (*2017) highlight that VR enhances site inspections by improving the interpretation of results and increasing accessibility to critical areas.

In the views of the respondents, ETs can enhance safety for people living with disability in the construction industry. Wearable devices, such as smart helmets and vests, provide real-time monitoring of workers' vital signs and environmental conditions, ensuring a safer workplace. Studies confirm that wearable technology significantly improves safety measures in high-risk environments, particularly for workers with disabilities (Dobrucali *et al.,* 2024; Rahman *et al.,* 2023).

CONCLUSIONS

The findings indicate that ETs play a significant role in promoting disability inclusivity in the construction industry. From enhancing teamwork and reducing physical strain to enabling remote participation and improving safety, these technologies help integrate individuals with disabilities into the workforce. The statistical significance of all effects supports the need for construction firms to prioritise technological adoption to create a more inclusive industry. Future research could explore implementation challenges and strategies to optimise the use of ETs for disability inclusivity.

This study has some limitations that should be acknowledged. First, the research relied on self-reported data, which may introduce response bias. Second, the study focused on a specific geographic region herein Ghana, limiting the generalisability of findings to other construction industries worldwide. To enhance disability inclusivity in construction, it is recommended that industry stakeholders invest in advanced technological solutions, including AI-driven safety systems, AR/VR-based training, and wearable assistive devices. Policymakers should develop regulations that promote the adoption of these technologies while ensuring accessibility and affordability. The study adopted a univariate analysis due to the specific objective of assessing the role of technologies relative to a baseline. Future research may employ multivariate techniques to explore inter-variable relationships and causality.

REFERENCES

Almeida, I C R, Ribeiro, J and Moreira, A (2021) Assistive technologies for children with cognitive and/or motor disabilities: interviews as a means to diagnose the training needs of informal caregivers, *Disability and Rehabilitation: Assistive Technology*, **16**(3), 340-349.

Almufareh, M.F, Kausar, S, Humayun, M and Tehsin, S (2024) A conceptual model for inclusive technology: Advancing disability inclusion through artificial intelligence, *Journal of Disability Research*, **3**(1), 20230060.

Americans with Disabilities Act of 1990, as amended by the ADA Amendments Act of 2008.

Babić, D, Bertić, Ž, Križanec, N and Babić, L (2020) Detecting functional disabilities in elderly persons with cardiovascular diseases using the self-reporting method, *Hrvatska Revija Za Rehabilitacijska Istraživanja*, **56**(2), 169-180.

Babon-Ayeng, P, Oduro-Ofori, E, Owusu-Manu, D G, Edwards, D J, Kissi, E and Kukah, A S K (2022) Socio-political factors underlying the adoption of green bond financing of infrastructure projects: The case of Ghana, *Journal of Capital Markets Studies*, **6**(3), 304-319.

Bailey, S, Carnemolla, P, Loosemore, M, Darcy, S and Sankaran, S (2022) A critical scoping review of disability employment research in the construction industry: Driving social innovation through more inclusive pathways to employment opportunity, *Buildings*, **12**(12), 2196.

Bashir, A and Kivrak, S (2020 Investigating engineer's actual usage intention to apply construction technologies in emerging countries, *Journal of Measurements in Engineering*, **8**(3), 80-89.

Cheung, W F, Lin, T H and Lin, Y C (2018) A real-time construction safety monitoring system for hazardous gas integrating wireless sensor network and building information modelling technologies, *Sensors*, **18**(2), 436.

Creswell, J W and Creswell, J. D (2017) *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*, London: Sage publications.

Dobrucali, E, Demirkesen, S, Sadikoglu, E, Zhang, C and Damci, A (2024) Investigating the impact of emerging technologies on construction safety performance, *Engineering, Construction and Architectural Management*, **31**(3), 1322-1347.

Goedert, J D and Rokooei, S (2016) Project-based construction education with simulations in a gaming environment, *International Journal of Construction Education and Research*, **12**(3), 208-223.

Goodley, D (2016) *Disability Studies: An Interdisciplinary Introduction*, London: Sage.

Guimarães, B, Barkokébas Junior, B and Martins, L (2018) Absenteeism of people with disabilities in the construction industry in Brazil, *Work*, **60**(3), 411-419.

Halaweh, M (2013) Emerging technology: What is it, *Journal of Technology Management and Innovation*, **8**(3), 108-115.

Halder, S, Afsari, K, Serdakowski, J, DeVito, S, Ensafi, M and Thabet, W (2022) Real-time and remote construction progress monitoring with a quadruped robot using augmented reality, *Buildings*, **12**(11), p.2027.

Haouel, J, Ghorbel, H and Bargaoui, H (2016) Towards an IoT architecture for persons with disabilities and applications, *In*: *International Conference on Iot Technologies for Healthcare*, Cham: Springer International Publishing, 159-161

Heyn, P (2020) Workplace adaptive technologies for working adults with cognitive and physical disabilities, *Innovation in Aging*, **4**(1), 861.

Jetha, A, Shamaee, A, Tompa, E, Smith, P, Bültmann, U, Bonaccio, S, Tucker, L B, Norman, C, Banks, C G and Gignac, M A (2023) The future of work in shaping the employment inclusion of young adults with disabilities: A qualitative study, *Equality, Diversity and Inclusion*, **42**(9), 75-91.

Lagos Rodríguez, M, García, Á G, Loureiro, J P and García, T P (2022) Personalised virtual reality environments for intervention with people with disability, *Electronics*, **11**(10), 1586.

Li, X, Huang, J, Kong, Z, Sun, F, Sit, C H and Li, C (2023) Effects of virtual reality-based exercise on physical fitness in people with intellectual disability: A systematic review of randomised controlled trials. *Games for Health Journal*, **12**(2), 89-99.

Liao, J (2020) The quota system for employment of people with disabilities in China: Policy, practice, barriers and ways forward, *Disability and Society*, **36**(2), 326-331. .

Louis, J and Dunston, P S (2018) Integrating IoT into operational workflows for real-time and automated decision-making in repetitive construction operations, *Automation in Construction*, **94**, 317-327.

Manoharan, K, Dissanayake, P, Pathirana, C, Deegahawature, D and Silva, R (2023) Assessment of critical factors influencing the performance of labour in Sri Lankan construction industry, *International Journal of Construction Management*, **23**(1), 144-155.

Manzoor, B, Othman, I and Pomares, J C (2021) Digital technologies in the architecture, engineering and construction (AEC) industry—a bibliometric—qualitative literature review of research activities, *International Journal of Environmental Research and Public Health*, **18**(11), 6135.

McKinney, E L and Swartz, L (2021) Employment integration barriers: Experiences of people with disabilities, *International Journal of Human Resource Management*, **32**(10), 2298-2320.

Mireku, E K, Kissi, E, Abu, I M A, Acheampong, A and Armah, N K P (2024) Strategies for the development of mental toughness of construction professionals: The case of Ghana, *Journal of Engineering, Design and Technology* [ahead-of-print].

Nagi, S Z (1991) Disability concepts revisited: Implications for preventions, *In*: A M Pope and A R Tarlov (Eds) *Disability in America: Toward a National Agenda for Prevention*, 309-327.

OECD (2010) *Sickness, Disability and Work: Breaking the Barriers*.

Oke, A E, Kineber, A F, Elshaboury, N, Ekundayo, D and Bello, S A (2023) Exploring the benefits of virtual reality adoption for successful construction in a developing economy, *Buildings*, **13**(7), p.1665.

Owusu, C.D, Kissi, E, Abu, I.M, Owusu-Boadi, J and Badu, E (2024, October 8-11) Systematic review of the categorisation of people with disabilities in an employment: A case for construction site, *In*: *Proceedings of CIBW099W123 2024*, Knust, Kumasi, Ghana.

Rahman, M H, Ghasemi, A, Dai, F and Ryu, J (2023) Review of emerging technologies for reducing ergonomic hazards in construction workplaces, *Buildings*, **13**(12), 2967.

Rotolo, D, Hicks, D and Martin, B R (2015) What is an emerging technology? *Research Policy*, **44**(10), 1827-1843.

Roulstone, A (2016) *Disability and Technology: An Interdisciplinary and International Approach*, Cham: Springer.

Sable, C, Gourvès-Hayward, A, Ignac, L, Jurica, B, Zilak, M, Podobnik, V, Car, Z, Gace, I, Topolovac, I, Vdovic, H and Papp, I (2020) *Analysis of Emerging Technologies for Improving Social Inclusion of People with Disabilities*, INNOSID

Shakespeare, T (2008) Disability rights and wrongs, *Beyond Disciplines*, **4**(2), 45.

Shaw, N and Vinsen, K (2023) Improving the social inclusion of people with disabilities in the remote workplace: Digital assistive technologies, *In*: *Proceedings of the 2023 Australasian Computer Science Week*, 255-256.

Siddesh, G M, Manjunath, S and Srinivasa, K G (2016) Application for assisting mobility for the visually impaired using IoT infrastructure, *In*: *2016 International Conference on Computing, Communication and Automation (ICCCA)*, IEEE, 1244-1249

Tavakol, M (2017) The reliability of assessments: The Bayesian Cronbach's alpha, *Medical Teacher*, **39**(5), 561-561.

United Nations (2006) *Convention on the Rights of Persons with Disabilities (CRPD).*

World Health Organisation (WHO) (1980) *International Classification of Impairments, Disabilities and Handicaps (ICIDH).*

World Health Organisation (WHO) (2001) *International Classification of Functioning, Disability and Health (ICF).*

World Health Organisation (WHO) (2011) World Report on Disability 2011 Accessed from: https://www.who.int/teams/noncommunicable-diseases/sensory-functions-disability-and-rehabilitation/world-reportondisability#:~:text=About%2015%25%20of%20the%20world%7s%20population%20lives%20with,1970s%20and%20suggested%20a%20figure%20of%20around%2010%25 [Accessed 28 July 2025].

World Health Organisation (WHO) (2025) *Disability*, Accessed from: https://www.who.int/news-room/fact-sheets/detail/disability-and-health [Accessed 28 July 2025].

Zhou, Y, Luo, H and Yang, Y (2017) Implementation of augmented reality for segment displacement inspection during tunnelling construction, *Automation in Construction*, **82**, 112-121.