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Capability-sensitive principles for assistive technology to support young graduates with disabilities in Bangladesh and Kenya into employment

Lisa-Dionne Morris[1] | Ola Abu Alghaib[2] | James Northridge[3]

[1]School of Mechanical Engineering, University of Leeds, Leeds, UK

[2]Leonard Cheshire Disability, London, UK

[3]School of Education, University College Cork, Cork, Ireland

Correspondence
Lisa-Dionne Morris, School of Mechanical Engineering, University of Leeds, Leeds, UK.
Email: l.d.morris@leeds.ac.uk

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Abstract

Owing to increased inclusion of young people with disabilities into the private sector in Bangladesh and Kenya, there is an urgent need to find alternative ways to support young graduates with a disability in the workplace with assistive technology solutions. The aim of the paper is to identify barriers for private workplace sectors to use assistive technology to support young graduates seeking, maintaining and retaining employment. This qualitative study adopted the research onion design of Saunders et al. Data were collected using interviews and focus group discussions and analysed using thematic analysis. The findings reveal that barriers are linked to seven key person-centred capability themes: the dream, external factors, internal factors, assistive technology vision, strategic design priorities and gaps and assistive actions.

KEYWORDS
assistive technology, Bangladesh, design, disabilities, employment, graduates, Kenya

1 | INTRODUCTION

The implications of labour markets of young disabled populations, conditions for recruitment and job retention in Bangladesh and Kenya are of concern among private sector employers and young disabled graduates. Government

policy on employment opportunities, in both countries, for disabled people is increasingly aimed at promoting a prolongation of employment rights to young disable graduates. Kenya and Bangladesh may not be viewed as unusual cases. Disability, health and poverty in low-and-middle-income countries (LMICs) such as Kenya and Bangladesh are known to be linked in a causal and consequential relationship (Banks et al., 2017; Banks & Polack., 2014; Mitra et al., 2013; Walt et al., 2008; World Bank, 2017). Government efforts to develop and maintain policies levelled at targeting the employment of young disabled workers in Kenya (Wickenden et al., 2020) and especially in Bangladesh (Government of Bangladesh, 2006, 2011, 2013) have in the past not extended into the private sector workforce and have not been directed to the use of assistive technology solutions.

1.1 | Research questions

The primary research question is:

What are the barriers for private workplace sectors to use assistive technology to support young graduates with disabilities, with higher education competency levels seek, maintain and retain employment in the private workplace sectors in Bangladesh and Kenya?

Six sub-questions are as follows:

1. How do employers and the business community relate to graduate disability inclusive employment agendas in Bangladesh and Kenya?
2. What are the unique factors that shape inclusive employment in Bangladesh and Kenya?
3. What can we learn from people with disabilities' experiences of work to inform more inclusive workplaces in Bangladesh and Kenya?
4. What are the possibilities and constraints of models or schemes in relation to disability inclusive employment in Bangladesh and Kenya?
5. How can new technologies impact on people with disabilities' work opportunities, negatively and/or positively?
6. How do culture, beliefs, traditions and assumptions influence progress in moving to a more inclusive employment landscape in specific contexts?

1.2 | Aim

The aim of the paper is to identify barriers for private workplace sectors to use assistive technology to support young graduates with higher education competency levels seek, maintain and retain employment in private workplace sectors. The paper presents an advanced assessment of graduates with disabilities with higher education competency levels and assistive technology design interventions using novel scalable capability-centred performance criteria.

2 | LITERATURE

2.1 | Increased inclusion of young people with disabilities into the private sector in Bangladesh and Kenya

Research into socio-economic disadvantage, which compares those young disabled graduates to their able-bodied counterparts, shows that young disabled graduates and their households suffer multi-dimensional inequalities and internal and external factors prohibiting equal employment opportunities (Mizunoya & Mitra, 2013). High levels of exclusion of young people with a disability from the labour force is a dominant driver of multi-dimensional poverty

(World Health Organisation & World Bank, 2011) and explains persistent hardship for households with disabled members. In considering such issues, this paper builds on previous studies that have exposed work placed lack in adjustments, poor workforce planning for an increasing disabled workforce and disabled population demographic change and brings new insights on the ways in which employers intentionally and unintentionally exacerbate poverty and insecurity of young graduates with a disability, forcing them to engage in self-employment, working in informal, low earnings and less stable employment (Mactaggart et al., 2018; Morgon-Banks & Polack, 2014a/b).

2.2 | Alternative ways to support young graduates with a disability

What explains the utilisation of one co-creation-based service innovation model to support the change strategy over another is of particular interest to this study. The present study was distinct from many that have considered the place of young graduates with a disability in the labour market, in that it aimed to explain that including young graduates with a disability into the labour force has many costs, both to their individual family and society (Hussain, 2008). However, excluding young graduates with a disability into the labour force to wider society has also a cost. Understanding the circumstances under which young graduates with a disability can utilise assistive technology for employment can provide useful insights into the place of graduates with a disability in private workplace sector employment, particularly as the economies shift from informal to formal employment for young disabled people. Many organisations in Bangladesh and Kenya already have the beneficial impact of including people with a disability, in particular those young graduates with a disability that have and can demonstrate higher education competencies (Wickenden et al., 2020).

2.3 | The workplace for graduates with disabilities using assistive technology solutions

Reviews of the research into Bangladesh and Kenya and employer policy towards young disabled graduates and workforce inclusion present a mixed picture. Studies such as Amin and Rahman (2019) have observed that early employment strategy and intervention can resolve barriers such as a lack of appropriate policy, discrimination amongst employers, inaccessible work environments, transport to work, lack of reasonable accommodation and lack of appropriate education and training. There is limited research that links all these factors together to provide sustainable assistive technology solutions for graduates with a disability seeking private workplace sector employment opportunities in Kenya and Bangladesh (Groce et al., 2011; Jahan et al., 2020). The disability and labour force context of Kenya is shown in Figure 1. Figure 2 shows the Bangladesh context (Bangladesh Population, 2019; Disability Data Portal, 2019).

There is convincing evidence that increased levels of people with a disability to gain employment are in the use of the integration of assistive technology in the workplace. Additionally, increasing attention has been paid to extra costs of disability provision, for instance, assistive devices, personal assistance and workplace accommodations, which without them may hinder participation in the workplace and form in work barriers because of insufficient resources or a lack of disability workforce capacity. An ongoing overall weak orientation towards graduates with disabilities capability levels has been evidenced. A point in the economic cycle, which is of particular significance, is employers paying out-of-pocket expenses for assistive technology solutions they believe will support young graduates with a disability in independent working (Harniss et al., 2015; Jahan et al., 2020; Wickenden et al., 2020).

2.4 | Existing assistive technology and products

One of the factors enabling integration of gradates with disabilities into the workplace is advancements in mainstream and assistive technology and increasing awareness about how these can be leveraged to enable graduates with disabilities to participate in private sector waged employment. Technology continues to play a crucial role in this

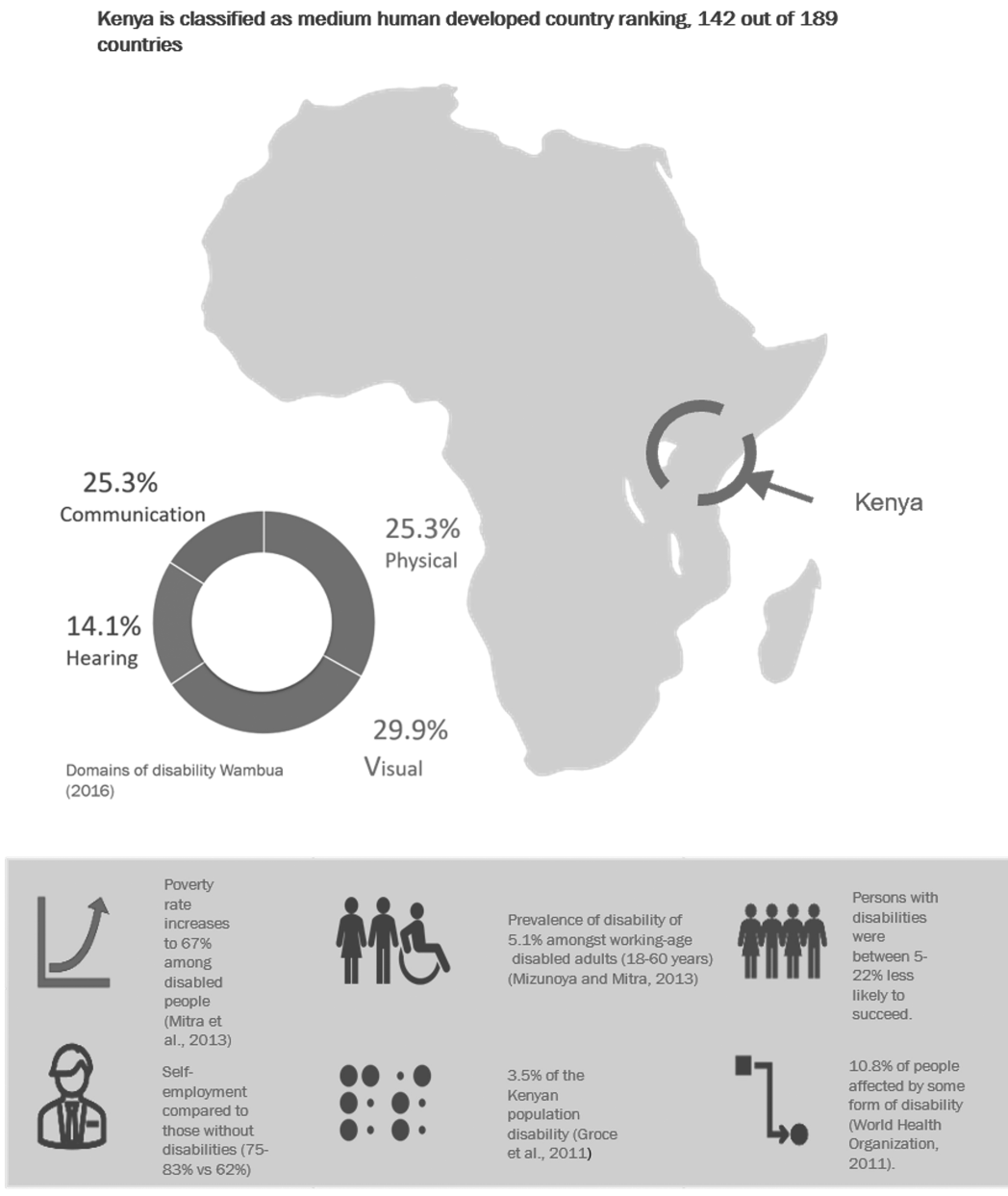

FIGURE 1 Kenya disability facts

regard to the extent that the boundary between both mainstream and assistive technology is often blurred. Mainstream technology is often used by people with disabilities in the workplace. For example, iDevices (iPod Touch/iPhone and iPad) serve as a useful platform to create personalised supports for people with intellectual disabilities and autism, thereby serving as AT in the workplace (Kagohara et al., 2013; McNaughton & Light, 2013). In addition to existing technology, emerging cutting-edge technology such as virtual reality (Smith et al., 2014) and robotics (Kumazaki et al., 2017) has proved beneficial in training people with disabilities for job interviews.

The past, current, ongoing and subsequent steps leading up to this paper have been the development of the detailed assistive technology strategy, which reflects the needs and aspirations of people with disabilities into private workplace sector waged employment, for example, making the workplace fit workers with disabilities, rather than

FIGURE 2 Bangladesh disability facts (Limited Published Academic Papers of Disability)

making the workers with disabilities to fit in the workplace. Technology-based solutions can be enabling for people with disabilities. In Kenya and Bangladesh, obtaining affordable and effective technology-based solutions to meet their needs can be difficult for people with disabilities, but almost impossible for higher education students and graduate job seekers with disabilities. Technology-based solutions can enable people with disabilities to access job opportunities for waged employment (Ciccarelli & Hodges, 2016). Furthermore, these solutions can function effectively and productively in the workplace. In this way, technology has the potential to enhance independence. Nevertheless, people with disabilities face limitations and barriers to participating with technology in the workforce. External factors, the work environment, public transport, building infrastructure and the facilities within the workplace can all form significant barriers, which can be related to low numbers of people with disabilities in employment.

2.5 | Assistive technologies are often too complex to use or unsuitable

Many support services for people with disabilities have transitioned to digital online platforms (McPherson, 2014). In the era of the digital and data economy, fourth-generation technology-based solutions include digital and software services, online artificial intelligence and robotics. In Kenya and Bangladesh, people with disabilities have increased access to information communication technology, smartphones and smart devices. In Dhaka and Nairobi, people with disabilities have access to strong and continuous telecommunication coverage including access to 5G. This is particularly significant when considering the support mechanisms required for changes in society in regard to work, such as flexible, changing patterns and remote working. Accessing online digital services and software through current forms of user interface designs has become an additional barrier those people with disabilities face. This is particularly noticeable, when online services do not adhere to any principles of inclusion. Once employed, digital services, devices and software used in the workplace can be inaccessible or difficult to use without adequate training. This has become a factor of potential significance for graduates with disabilities wanting to enter the private sector workforce.

2.6 | Assistive technology and service interventions based on users' capabilities

Further findings and analysis of proposed assistive technology and service interventions based on users' capabilities are found in the papers of Jahan and Holloway (2020), Morris et al. (2019) and Austin et al. (2019) and Consortium of partners led by Leonard Cheshire Disability (2020a, 2020b, 2020c, 2020d). Leonard Cheshire Disability led this phase of the research study. Leonard Cheshire Disability (2018) and Morris et al. (2019) highlighted five aspects of private sector employment that influence young graduate disabled peoples' interactions with work environments in Bangladesh and Kenya and so their ability to use assistive technology effectively to complete everyday work tasks including (1) technostress in the workplace for young disabled people; (2) assistive technology technostress experienced by young disabled graduates; (3) low capability levels of the person with a disability to access technology; (4) limited assistive technology solutions within the workplace; (5) and the work environment itself.

Furthermore, the study highlighted assistive technology solution design and development research gaps in two areas: young disabled people's well-being and a lack of digital service design to meet young disabled peoples' needs. Limited use of capability-sensitive design methods was also factor that influenced the effective use of such assistive technology, for example, limited transformative service research.

Given the aims of the study, to support improved assistive technology solutions, service design and innovation, and so independent working of young disabled graduates, it was important to measure the efficacy of young disabled graduates' interactions in ways that allowed the identification of key relationships between beneficiaries, employment and assistive technology features, which determine effective assistive technology use to be established. Studies identified the need to recognise further intervention data to strengthen young graduate disability employment use of assistive technology use for job seeking and retention.

3 | METHODOLOGY

3.1 | Research design

The research onion design of Saunders et al. (2009) was adopted. The research philosophy selected was is interpretivism, as the purpose of this research was to 'create new, richer understandings and interpretations' (Saunders et al., 2019, p. 149) of barriers for private workplace sectors to assist young graduates in Kenya and Bangladesh with seeking, maintaining and retaining employment. The inductive research approach, which is aligned to interpretivism, was employed because the researcher used inductive reasoning to reach conclusions/outcomes. The qualitative

methodological choice was 'multi-method qualitative' to align with the survey strategy, which comprised both interviews and focus group discussions (Saunders et al., 2019).

3.2 | Data collection

3.2.1 | Target population

The target population for this research included young disabled graduates from any discipline seeking employment with competencies in higher education, living in Bangladesh and Kenya. Whilst graduate programmes generally expect applicants to have a degree at 2:1 or higher, some private sector employers may be more flexible; therefore, the qualification of master's degree attainment was part of the criteria. Participants must be over the age of 25 years at the time of their involvement in the study. They had to have resided in Bangladesh or Kenya continuously for the past 3 years and be of Bangladesh or Kenya citizenship or heritage. Participants must declare an interest and an intent to work or maintain employment in the private sector so that this can be reviewed to make sure there is no conflict of interest with private or public sector employment.

3.2.2 | Sampling

For this qualitative study, a combination of convenience and volunteering sampling was used to select the participants. The sample size in Bangladesh included low numbers of women. Not many women were willing or available in Bangladesh.

3.2.3 | Data collection techniques

Field research was conducted in the form of focus group discussions with key stakeholders (young disabled graduates) and focus group discussions with representative organisations of employers wanting to employ young disabled people in both countries. Field research was conducted in the form of interviews with disabled people's organisations (DPOs). Whilst the field research in both countries was conducted under the same framework and research management, it was conducted by different consortium of partner researchers. To structure this research study, lines of analysis were developed in collaboration with local partnerships with organisations and DPOs in Kenya and Bangladesh and Leonard Cheshire. The focus groups and interviews were directed to discuss the experience, interactions and perceptions of young disabled graduates' employment and assistive technology solutions.

As each study participant arrived, the researcher gave her/him a research pack and explained the purpose of the research and the research process. Participants had no familiarisation time with the researchers. Participants talked aloud as they interacted with the instruments in Figures 3 and then participated in two tasks outlined in Morris (2011) and Morris and Connolly (2010), but adapted for this study. The participants were audio-recorded and an English and native-speaking repertoire transcribed the audio recordings. Names of the participants were anonymised.

3.2.4 | Research instruments

The research used one instrument, Young Disabled Graduates In-Country Persona(s), which has been labelled (Figure 3). Persona was created in UK workshops using primary and secondary in country field study data. The

FIGURE 3 Examples of personas used in the study: a person with a disability (hearing impairment) and a person with a disability (vision impairment)

Person, Environment, Occupation and Performance (PEOP) model (Smith & Hudson, 2012) and the Expandable Activity of Theory model (Engeström, 2001; Engeström & Kerosuo, 2007) were used to develop persona(s) and are reported on in another paper.

3.3 | Data analysis

The data were analysed using thematic analysis, which is defined as a method that identifies, analyses and reports themes or patterns found in data (Clarke et al., 2016). The steps followed during thematic analysis are:

1. Become familiar with the data (transcribe, read, re-read)
2. Create initial codes (systematically identify words/phrases across the full data set)

3. Search for/identify themes (arrange codes into potential themes)
4. Review the themes (create a thematic 'map' of the themes)
5. Name and define the themes (ongoing, refining the specifics of each theme)
6. Present the themes (relate the analysis back to the research questions and literature; deliver a scholarly report of the analysis) (Clarke et al., 2016, p.35).

4 | ANALYSIS AND FINDINGS

Table 1 provides a summary of the study participants. The consortium formed local partnerships with organisations and DPOs (see Table 2). These in-country stakeholder and beneficiary steering groups helped to shape the assistive technology products, systems and services developed under the guidance of the innovation to inclusion i2i programme in Bangladesh and Kenya. In Kenya, for instance, NCPWD, LC, FKE, APDK, CBM and ANDY were significantly involved in providing insights. In Bangladesh, for instance, BBDN members were significantly involved in supporting surveying distribution.

One major motivator in improving the situation is a more person-centred approach treating graduates with disabilities as equal partners in identifying assistive design solutions. Graduates with disabilities dream big and realise that they have the potential to influence assistive technology use to break the barriers as indicated, specifically, co-creation, customised, synchronized and empowering actions linked to the findings of areas of key employment activities for assistive technology support including identification of potential graduates with disability employers, assessment of graduates with disabilities, skills development, for example, digital literacy, job matching and supporting private workplace sectors with assistive technology solutions. These strategic priorities are ranked high for assistive technology strategic goals and objectives.

The judgement of a graduate with a disability with the authority to set strategic direction for assistive technology use was proposed. The study found that key assistive technology drivers mapped on to sub-research questions, objectives and themes, which are areas of key employment activities for assistive technology support shown in Table 3. Findings reveal that these are stumbling blocks to graduates with disabilities seeking, gaining and succeeding. It also makes the decision to persist in employment difficult.

High-level micro findings from graduates, employers and experts reveal that there is a perception and evidence that companies are failing to provide graduates with disabilities employment opportunities and associated workplace assistive technology support. Graduates and experts argue private sector employers should be sensitised to what people with disabilities can achieve in a workplace and what assistive technologies are available, matching people with disability skills, competences and attributes to job opportunities.

Firstly, the graduates' aspirations to aspire in the workplace and improve the work situation were highlighted in country findings. The condition indicated significant knowledge gaps about people with disabilities in country regions' experiences and challenges with technology, whilst focusing on points and areas of lack, deficit and deficiency. For example, in Bangladesh, standard employment people with disabilities policy and assistive technology legislation regulation environment, on what basis technology strategy provision is derived, is missing.

Secondly, in Kenya, in-house access effective technology skills training, transferable skills training and development, people with disabilities technology and digital literacy upskilling, people peer-to-peer work communication solutions, teamwork best practice skills, standard people with disabilities health and safety policy, effective inclusive data and information communication access were absent in private workplace sectors.

Thirdly, a translation assistive technology push rather than pull was identified by employers. Graduates with disabilities aspirational working needs, discovered through identifying graduate capabilities (skills, abilities and attributes), derived through transformation research and change methods was revealed as lacking. Experts in Kenya and Bangladesh extended a wish for all relevant stakeholders' views, employers, universities, pedagogy expertise and graduate views to be integrated during the assistive technology integration and implementation phase.

TABLE 1 Bangladesh and Kenya participants' characteristics

Characteristics of participants in Bangladesh	
FGDs in Bangladesh people with disabilities	2 × *FGD* with 10 participants in each (total 20)
Duration	4-h session
FGD's gender split	Males (90%) and female (10%)
Participants	Masters' graduates aged 24–29 years old, not in education, employment and training
FGDs with employers[a]	1 × *FGD* with 10 participants
Duration	4 h
Gender split	Males (80%) and female (20%)
Expert interviewees	5 (director and managers of in-country NGOs and DOPs supporting pan-disabilities)
Duration	1 1/2 h (each)
Gender split	Male
Characteristics of participants in Kenya	
FGD's in Kenya people with disabilities	1 × group 8 participants
Duration	4-h session
FGD's gender split	Males (60%) and female (40%)
Participants	Masters' graduates aged 24–29 years old, not in education, employment and training
FGD's with employers[b]	1 × *FGD* with 10 participants
Duration	4 h
Gender split	Males (80%) and female (20%)
Expert interviewees	3 (director, HR manager and in-country NGOs supporting pan-disabilities)
Duration	1 1/2 h (each)
Gender split	Male

[a]*Private sector employers in Bangladesh included: ready-made garments; automobile; agribusiness; pharmaceuticals; retail; textiles; finance; manufacturing; information and communications technology*.
[b]*Private sector employers in Kenya included: manufacturing; infrastructure; information and communications technology; TV board casting, hotel and hospitality*.

Whilst most individuals highlighted various areas of barriers and concerns, participants in Kenya were able to highlight and articulate how and why archetypal characters (personas) that are meant to represent a group of end users, young disabled graduates, were important in expressing the needs, values and aspirations of graduates with a disability. As a result, of in-depth discussions, participants shared common goals, attitudes, behaviours and interactions with employers, by developing empathy and understanding of the business and beneficiary context.

It was made clear that the effects of disability differed in the workplace for the experiences of able-bodied individuals, and the phrase 'People with Special Workplace Intentions' was coined, and the term 'Graduate Adaptive Upskills' was given to the requirements of young disabled graduates to be able to function like a person without a disability in the workplace. Tables 4 and 5 illustrate the differences between Kenya and Bangladesh in terms of young graduates with disabilities, attitudes towards engagement with assistive technology and the private sector organisations and the challenges this presents for tackling inequality.

Tables 4 and 5 reveal two critical aspects for improvements to work-system design, information communication technology-based training and development and establishing graduates with disabilities requirements. Participants often expressed the opinion that they often lacked understandings of how to use specific assistive technology-based solutions, products, systems and services. Where this was the case, the fact was raised that work-based practice policy and assistive technology policy were often created and implemented without the input of end users who experience all forms of human disability and discrimination.

TABLE 2 Local partnerships with organisations and DPOs in Kenya and Bangladesh

ANDY	Action Network for the Disabled
APDK	Association for the Physically Disabled of Kenya
BBDN	Bangladesh Business and Disability Network
BBS	Bangladesh Bureau of Statistics
B-SEP	Bangladesh Skills for Employment and Productivity
CRPD	Convention on the Rights of Persons with Disabilities
CBM	Christian Disability charity
DoSS	Department of Social Services (Bangladesh)
DFID	Department for International Development (UK)
FKE	Federation of Kenyan Employers
ILO	International Labour Organization
KNAD	Kenya National Association of the Deaf
KNBS	Kenya National Bureau of Statistics
KNCHR	Kenya National Commission on Human Rights
KUB	Kenya Union for the Blind
LC	Leonard Cheshire
LFTW	Light for the World
NCPWD	National Council of Persons with Disabilities
MoSW	Ministry of Social Welfare (Bangladesh)
ML&SP	Ministry of Labour and Social Protection
NGO	Non-governmental organisation
TVET	Technical and Vocational Education and Training
UDPK	United Disabled Persons of Kenya
VSO	Voluntary Services Overseas

The next part of this paper discusses findings from Bangladesh. In Dhaka, the technology readiness levels needed for graduates with a disability to be able to access the job vacancies in Bangladesh were the emphasis of the focus group discussions. This study revealed, from the perspective of beneficiaries and employers, that the data for young disabled graduates were inconsistent and do not represent the high technology levels, technology concepts, requirements and observed and demonstrated capabilities of young disabled graduates with higher education competency levels in Bangladesh.

The inconsistencies reveal that many policies and processes involved in employment were a focal point for many of the continuous debates that took place with employers. Evaluating the graduate disabled individuals' performance, employers identified that employers were interested in the prospect of employing graduates with a disability. Individuals with direct experiences of working with graduates with a disability discussed and identified distinctive and common aspects of the experiences of their organisations.

The most important barriers and influences merged with Kenya findings reveal the interplay between a lack of a policy and inconsistency in the approaches to identifying competing alternatives for assistive technology solutions. A lack of understanding of the important criteria beneficiaries used to assess technology and assistive technology solutions was identified as the main cause for concern. Where this is the case, it might be suggested that these present opportunities for assistive technology solutions and digital service innovations proposed by participants shown in Table 6.

TABLE 3 Key assistive technology drivers mapped on to sub-research question, objectives and themes

SRQ	Objectives	Themes	Findings
SRQ1: How do employers and the business community relate to graduate disability inclusive employment agendas in Bangladesh and Kenya?	**Objective 1:** To identify how the employers and the business community relate to graduate disability inclusive employment agendas in Bangladesh and Kenya	**Theme 3:** Young disabled graduates' internal environments: strengths and weaknesses	**Findings 1:** Lack of long-term commitment to graduates with a disability and a precautionary approach to human resource investment and the quality of employment opportunities for young disabled graduates **Findings 2:** The employability skills space for young disabled graduates is a formal process and is not intended to assist young disabled graduates to reach deserved goals or encourage use of assistive technology solutions to facilitate positions of high-level employment
SRQ2: What are the unique factors that shape inclusive employment in Bangladesh and Kenya?	**Objective 2:** To identify what are unique factor that shape inclusive employment in Bangladesh and Kenya	**Theme 2:** Young disabled graduates' internal environments: strengths and weaknesses	**Findings 3:** Understanding specific resource limitations and challenges when developing assistive technology products, systems and services for Kenya emerged as a critical factor **Findings 4:** Disabled graduates in Kenya boost their chances of success when they find ways to get first-hand exposure to technology used in the workplace **Findings 5:** It helps if they receive guidance from people, societies, institutes and partners when it comes to navigating the complicated process of obtaining digital skills required to access employment
SRQ3: What can we learn from people with disabilities' experiences of work to	**Objective 3:** To identify what we can learn from people with disabilities' experiences of work to	**Theme 1:** The dream **Theme 4:** Aligning external opportunities and internal strengths	**Findings 6:** A database made by employees showing job roles by critical skills and

(Continues)

TABLE 3 (Continued)

SRQ	Objectives	Themes	Findings
inform more inclusive workplaces in Bangladesh and Kenya?	inform more inclusive workplaces in Bangladesh and Kenya		knowledge stored by human resources for reference **Findings 7:** There should be different kinds of assistive technology to support adaptive skills **Findings 8:** The inconsistencies in existing job portals specifically established for people with a disability, and existing and emerging job-matching websites could be made more accessible such that graduates with a range of disabilities might benefit from them **Findings 9:** Employers do not dedicate time to thinking about identifying the ways, in which to assess the skills, advance work-based practice and match job skills, capabilities and attitudes to working roles
SRQ4: What are the possibilities and constraints of models or schemes in relation to disability inclusive employment in Bangladesh and Kenya?	**Objective 5:** To identify what are the possibilities and constraints of models or schemes in relation to disability inclusive employment in Bangladesh and Kenya	**Theme 6:** Strategic priorities and gaps for assistive technology use	**Findings 10:** Technology level should be established first to increase access for young graduates with a disability in two key areas digital independence and digital skills/literacy **Findings 11:** Significant knowledge gaps. These were particularly concerned with in country regional challenges
SRQ5: How can new technologies impact on people with disabilities' work opportunities, negatively and or positively?	**Objective 6:** To identify how new technologies impact on people with disabilities' work opportunities, negatively and/or positively	**Theme 5:** The assistive technology vision	**Findings 12:** Technologies can be leveraged to reach out to young disabled graduates and employers about employment opportunities
SRQ6: How do culture, beliefs, traditions, and	**Objective 7:** To identify how culture, beliefs,	**Theme 7:** Actions to help graduates with a	**Findings 13:** Experts felt that there was a need for

TABLE 3 (Continued)

SRQ	Objectives	Themes	Findings
assumptions influence progress in moving to a more inclusive employment landscape in specific contexts?	traditions, and assumptions influence progress in moving to a more inclusive employment landscape in specific contexts	disability to get there, and its dynamics such as the support from the community and, the support from peers within private workplace sectors	the experience to be safeguarded. The experience both online and within the private sector organisations. **Findings 14:** A broader sensitization and information campaign was considered essential for graduates with a disability to help them to make informed decisions about employment options and skills development **Findings 15:** It was suggested that the campaign must address the unfounded rumours that graduates with a disability are unable and incapable of working in the private sector

TABLE 4 Bangladesh barriers and proposed solutions by graduates with disabilities

➢ **Information communication technology and online digital challenges. This is mostly due to English language barriers and numerous sign language interpretation media. The current situation in Dhaka**
➢ Not all mainstream technology can be easily translated to support graduates with a disability, for example, sign language. Hence, technology is a challenge for deaf people
➢ There is a lack of trainers to help graduates with a disability use technology in institutions and workplaces

In terms of importance, participants showed a willingness to attempt to resolve assistive technology service design and innovation issues. This was done by referring to persona(s) (see Figure 3), the key assistive technology drivers shown in Figure 4, mapped on to areas of key employment activities for assistive technology support.

Based on the analysis, using these tools indicates that service design efforts could become more holistically focused on context- and capability-driven data. The perception is that the private sector organisations, governments and policymakers are failing to provide young graduates with disabilities with context- and capability-driven information to make good employment and assistive technology solution support decisions. More consistent information graduates with a disability can be used to access information about the applicability of assistive technology to roles and duties of specific jobs are identified. Assistive technology solution information that mirrors the habitual behaviours of the activities of working, living and best practice is recognised as preferable to graduates with a disability.

Table 6 expands the dialogue and shows objects of attention and other similar focus of participants. In this circumstance, three key components were identified: accessible functioning of graduates with a disability in the workplace and considering graduates with a disability needs and aspirations.

TABLE 5 Kenya barriers and proposed solutions by graduates with disabilities

➢ There are limited people with disabilities workplace assessment (Recommendation to ensure that technology provided matches skills, knowledge and attributes)
➢ There is limited focus on environmental limitations, for instance, if the whole workplace is not working for graduates with a disability, they will experience ineffective functionality
➢ Assessment of the wider workplace environment (workplace analysis) is required (Recommendation to ensure accurate assessment and the assurance of provision for graduates with a disability)
➢ The idea of skills, competencies and attributes database for jobs for graduates with a disability was mooted. The database might match graduates with a disability, skills, knowledge, competencies and attributes (hard and soft) to job opportunities
➢ Different kinds of mainstream technology-based solutions should be used to advertise jobs to graduates with a disability because people with different disabilities need to access information in different ways
➢ Special work training and assistive technology skills training should be required to enable graduates with a disability to be assimilated with and integrated into private workplace sectors
➢ Graduates with a disability knowledge, skills and attributes acquired should be an essential part of any digital or assistive technology-based solution
➢ Sensitisation should be carried out among graduates with a disability to create awareness on graduates with a disability experience and use of employment mainstream technology-based solutions
➢ Where appropriate, pre-disability skills, competences and attributes should be identified to establish graduates with a disability benchmark to acknowledge acquired job skills and attainment levels, if it is an acquired disability
➢ Graduates with a disability face ineffective data and information accessibility for online job adverts and application systems
➢ A key point was the use of technology for graduates with a disability in workplace emergencies such as a fire. (Recommendation to ensure graduates with a disability are given alternative and dedicated technology systems as part of Health & Safety policy that alert them in case of health and safety issues and dangers)

Contribution analysis methods formed the basis of the inquiry approach to support the development of appropriate and manageable recommendations that could be fully implemented and be relevant for use in the innovation and inclusion i2i programme development in Bangladesh and Kenya.

The findings of this study resulted in six themes, namely, (1) the dream; young disabled graduates' external environment: job market, collaborators, opportunities and challenges; (2) young disabled graduates' internal environments: strengths and weaknesses; (3) aligning external opportunities and internal strengths; (4) the assistive technology vision; (5) strategic priorities and gaps for assistive technology use; and (6) actions to help them to get there and its dynamics such as the support from the community and the support from peers within private workplace sectors. These themes and the evidence for them are presented in terms of assistive technology key drivers in Figure 4.

5 | DISCUSSION

The discussion to be presented here consists of the presentation of the exploratory study concerning young disabled graduates' workforce experience and the cumulative effects of different workplace drivers, including culture and assistive technology compensation factors. Comparative data on private sector organisations responses and expert responses used to provide an analysis of the characteristics of the private workplace sector labour supply assistive technology strategy being employed by private sector companies in Bangladesh and Kenya are also discussed. As noted above, the efficacy of the persona research instruments shown in Figures 3 was assessed by applying it to an

TABLE 6 Kenya and Bangladesh barriers

Barriers	Solutions
Communication	AI, machine language, sign language to speech converter
Limited internal and external assessment and identification of disabilities workplace needs	Google Glass can integrate such a solution
Lack of family support, accessible and affordable transportation	Public awareness, acceptance to remove stigma Campaign, advocacy efforts through social media, TV etc. Radio is very strong in rural areas; it can be utilized for i2i campaigns
Employers lack awareness and information on gradates with a disabilities-related skills level. Employees are reluctant to hire people with disabilities. Graduates with a disability lack marketable skills and positive work environments, job security and safety	Public not private transport programmes required Employees can use ride sharing app. Employers can arrange the pickup and drop-off
Connecting people with disabilities to work opportunities and work experience	Job sites/app/portal that can take voice commands for ordering transport
Often graduates with a disability find it difficult to express thoughts and emotions in a way that is comprehensible to others in a team	Access to job listings and transportation to interviews. This must continue upon hiring Access to continued affordable inclusive training based on disability needs; integrating customized assistive technology if requested Social acceptance in the workplace Customized assistive technology devices (if required)
Negative attitudes from other staff or employers	To bridge the gap. People with disabilities need business practice skills through case studies in which people with disabilities share employment experience
Limited strategic expression of company's disability rights and protections	Support from government, NGOs, DPOs and others for offline training. This might include virtual work environments
The People with Disabilities Act has been promulgated at in country level, but not enforced with the five industry sectors	Translates neural and neurochemical excitement to linguistic forms and displays on monitors Transform visual memory, visual processing decisions into inclusive linguistic forms
Accessibility, mobility: no ramps, no braille. Building code requires ramps at all government buildings, however, they are absent	Raising awareness through training, conferences, workshops, seminars, lectures, rallies, etc.
Exclusion from fair private sector skills, abilities and attribute examinations. For instance, a person with a visual impairment can request a scribe, but they are seated next to others in the examination area. This is disruptive for all parties	Private sector needs to provide policy, strategy and opportunities for graduates with a disability Information on and equal access to scholarships and work opportunities that tap into global job markets
Lack of representation in government. Reserved seats for women, but not for people with a disability. No clear ministry accountability for disability rights. Workplace issues often placed under the Social Welfare Ministry Department.	Implementation of existing building standards Need enforcement of building code (City Accessibility Act) In Bangladesh, the government consulted BUET help accessible cities for all kinds of people with disabilities. Graduates with a disability want enforcement of this new code
Lack of job opportunities. No disability orientation among employers. They have limited knowledge of the competence graduates with a disability have. They consider graduates with a disability invalid	Government and private sector initiative for inclusive examination facilities. Accommodations for people with special needs at public and work entry examinations On interview graduates with a disability should be allowed additional time and breaks during examinations

(Continues)

TABLE 6 (Continued)

Barriers	Solutions
Employees think accommodations for graduates with a disability would cost more and be unfair	Public awareness, government initiatives and new laws
Lack of job opportunities. No disability orientation among employers. They have limited knowledge of the competence graduates with a disability have. They consider graduates with a disability invalid Employees think accommodations for graduates with a disability would cost more and be unfair	Add disability awareness to the training agenda for government employees These can be extended to the private sector Need friendly environment for different disabilities. Government is training IT skills under i2i project. Add how to accommodate graduates with a disability with a minimal or no cost, especially visually impaired people who are often left out of formal jobs Lack of knowledge of sign language. People cannot access online services since no one understands. BTV has already adapted sign language, but major offices need at least one sign language interpreter in the communications department. At least basic sign language should be used. No unified sign language, but Bangla Sign Language is under way. In Bangladesh, 7 February 2019 is Bangla Sign Language Day. Good sign language training provided by the National Deaf Organisation and the Society for Deaf and Sign Language (SDSL)

existing in-country context for assistive technology solutions used by young disabled graduates to seek, gain or retain private sector employment in Bangladesh and Kenya.

This paper has provided important new evidence concerning employers' attitudes and practises towards graduates with a disability in Bangladesh and Kenya. It has also placed graduates with a disability, as workers in the workplace, in the context of labour utilisation strategy at the heart of the problem situation. Critically, this provides an overview and analysis method for what it might be like on the ground for graduates with a disability in Kenya and Bangladesh. This study has found evidence to demonstrate the complexity of multiple cases and scenarios, technology levels, infrastructure and digital technology accessibility and technology requirements for graduates with a disability.

Our findings contrast favourably with assistive technology studies in the consortium group. Unlike other studies, this study can offer one dominating explanation. Provision should be primarily evaluated according to the extent of the access graduates with disabilities have to promote or achieve their functionings valued in the workplace. This might be indicated in a scenario of graduate with a disability (hearing impairment) plus employability knowledge, skills and attributes, plus assistive technology-based solutions, and funding. Another example, graduate with a disability (visual impairment), employability skills (only), plus public transport service support.

Each young graduate with a disability situation may be exacerbated by end user needs and requirements. Capability-sensitive design is an effective way of describing the complex relationships between employability, graduates with a disability, capacity building, technology, workplace practice, environmental, societal and cultural problems and issues faced by graduates with a disability. Each of the scenarios and examples presented in the end user journey can be used to provide knowledge and context and frame the insights into assistive technology-based solutions.

This section provides insights on how participants' experience and interactions highlight the importance of using the key drivers of assistive technology and key employment activities for assistive technology support. Table 4 presents findings concerning contextualise results of the analysis of the multi-modal interactions and activities involved in seeking employment in Kenya. The table puts the graduates with disabilities activity and employment

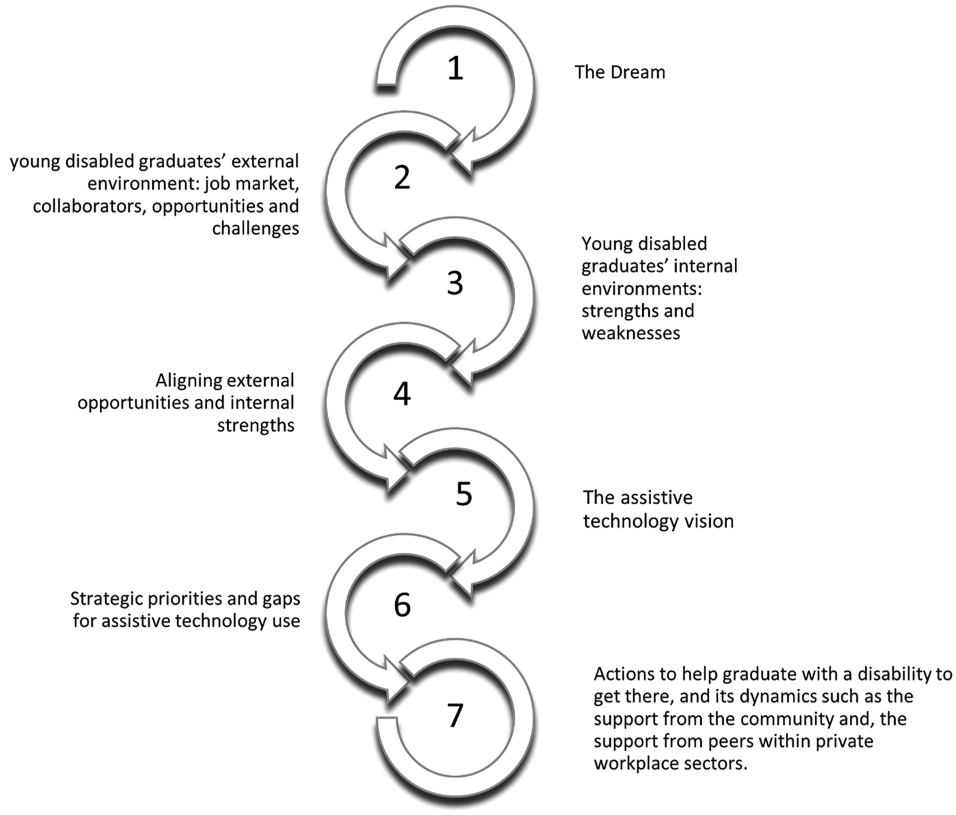

FIGURE 4 Assistive technology key drivers

opportunities under consideration into a wider product, service and systems design context. Tables 4 and 5 present findings considering responses to show the proximity between reality and dream when beneficiaries experience difficulties and interact with employment opportunities and the associated assistive technology solutions. In the present analysis, Table 4 shows that representation of the needs and requirements of Ruth Guchanji (Persona) were outlined in four key areas: the dream, external factors, internal factors and actions to help us get there.

A broader sensitisation and information campaign was considered essential for graduates with a disability to help them to make informed decisions about employment options and skills development. It was suggested that the campaign must address the unfounded rumours that graduates with a disability are unable and incapable of working in the private sector. In answer to the question 'What are the barriers for private workplace sectors to use assistive technology to support graduates with a disability, with higher education competency levels seek, maintain and retain employment in the private workplace sectors in Bangladesh and Kenya?', barriers and proposed solutions are presented in Table 6.

Based on the proposed solutions in Table 6 and key drivers of assistive technology in Figure 4, using this tool for assistive technology service design indicates that design efforts could become more holistically focused on context- and capability-driven data. The perception is that the private sector organisations, governments and policymakers are failing to provide young graduates with a disability with private workplace sector employment context- and capability-driven information to make good assistive technology solution decisions. More consistent information graduates with a disability can use to access information is identified. Information on assistive technology solutions that mirrors the habitual behaviours of the activities of working, living and best practice is recognised as preferable to graduates with a disability.

A Capability-Sensitive Assistive Technology (CSAT) Principles for Disabled Graduate Employment was developed in the research study. The CSAT Principles categorise seven principles including graduate(s) with disability requirements, capability support, assistance, information communication technology-based training and development, assistive technology-based solutions, intervention(s) and employment competency levels critical for assistive technology solution development and implementation. The competencies are related to address the ways assistive technology are often too complex to use by graduates with disabilities or unsuitable for task specific work. Expanding on gaps in the literature, using goal-orientated domains from the Activity Theory Model by Engeström (2001) and types of inclusive service design workflow identified by Hatakka and De' (2011), Fisk et al. (2018) and De la Harpe et al. (2013). A descriptive study framing young disabled peoples' experience and interaction points with assistive technology and the work environment was devised to show the details of capability hierarchy as a response to barriers. This is reported in another paper.

This study findings concur with those of Morash-Macneil et al. (2018) suggesting that indeed, there are limited information and data available on how potential young graduates with a disability are assessed on their skills in both the developed and the developing countries. It could be suggested that inclusive employment agendas or employees experiencing inclusive issues, challenges and problems with identifying graduates with disabilities might use (Identifor, 2020), which measures multiple intelligence, executive function and job interests through the app and computer games to relevant career. Accordingly, they could be used for disabled graduates seeking employment, particularly those with autism and intellectual disabilities as research studies such as Ciccarelli and Hodges (2016), Morash-Macneil et al. (2018) and Pouliot et al. (2017) show that digital assistants are particularly helpful for disabled graduates accessing work opportunities.

The research found that open-source technology might be better integrated in to work environments to help save costs, whereby a device or technology should be able to serve both a young graduate with a disability and a graduate without a disability, therefore making the workplace more inclusive (Borg & stergren, 2015). In the context of this study, the implementation phase should seek to distil some lessons learnt in Bangladesh into the Kenyan context.

Understanding specific resource limitations and challenges when developing assistive technology products, systems and services for Kenya emerged as a critical factor. For instance, McPherson (2014) argues that disabled graduates face 'unique challenges' when it comes to discovering opportunities for work and overcoming barriers. This study found that this was indeed the case to enter the Kenya job market. It appears that disabled graduates in Kenya boost their chances of success when they find ways to get first-hand exposure to technology used in the workplace. Leading towards Cobley's (2012) argument for inclusion rather than segregation in the Kenyan context.

The research found that in terms of employability and workplace practice, essentially positive feedback was received on the concept of young graduates with a disability social care innovation programme-based solution to support graduates with a disability into private workplace sector employment like the concepts proposed by Walsham et al. (2018), Banks and Polack (2014) and Banks et al. (2017), thus ensuring to a large extent the proximity of graduates with a disability to the digital economy.

6 | CONCLUSION

The results largely corroborate that earlier research in terms of a high inclination of graduates with a disability is still excluded from the labour economics. The first conclusion relates to the significance of the use of the personas in Bangladesh and Kenya. The recommendations suggest that a multipronged strategy at all levels is required. As shown in the results, support is required at government and local level for grassroots programmes for young disabled graduates, which in turn requires reciprocal accountability and responsibility of leadership in the private workplace sector to remove barriers.

We found that private sector human resources require a complete overhaul of the recruitment process and dedicated young disabled graduates' talent streams. In addition, private sector participants themselves suggest young disabled graduates' data collection, accountability and open availability of job opportunities, resources with the appropriate appraisal and coaching and mentoring of young disabled graduates are required. One way to improve access and acceptance of assistive technology in the private sector is to consider other stakeholders such as private sector able-bodied staff.

Specifically, the effects of more co-creation vision to social and cohesive working environments, technology and resource sharing and creating peer-to-peer support are required for young disabled graduates. As shown in the results, young disabled graduates were shown to be more engaged when the job and responsibilities were explained by staff and linked to capability levels and adaptative skills using assistive technology solutions. The results can perhaps, in combination with the visible effect of subjective disability, be interpreted as an expression of young disabled graduates' 'dreams'. On a personal level, young disabled graduates require more personalised, assistance, intervention, development training and support, assistive technology and technology solutions identified by themselves. It is also possible that this might facilitate a growth mindset and empower young disabled graduates to analyse their own skills gap. In future, young disabled graduates with young disabled graduates' peer-to-peer coaching and mentoring in-country programmes could be provided.

Finally, high level of technology engagement was found in Bangladesh. In Bangladesh, innovation hubs, SMEs and enterprise units are increasingly building new assistive technology solutions to strengthen capacity and assist young disabled graduates. This includes developing new products, establishing new markets and engaging with young disabled graduates as a core activity. Another implication is that technology-based solutions adapted and adopted, based on benefits for young disabled graduates such as capabilities, assistance, information communication technology-based training and development, assistive technology-based solutions, intervention and employment, are often the seven best ways to drive advances in service model design and innovation in assistive technology use, specifically in Kenya.

This is especially true when developing products, services and systems to be used by young graduates with a disability in the innovation and inclusion i2i programme in Bangladesh and Kenya. In Bangladesh, the digital economy and data economy have advanced rapidly within the last 5 years. According to the young graduates' perspective, there has been an increase of information communication technology enterprise, innovation hubs and SMEs supporting the development of digital technology-based solutions for young graduates with a disability. Overall, the study found a need to capitalise on a co-creation-based service innovation model to support the change, which needs to be met by employers in Bangladesh, with a view to piloting aspects of the implementation in Kenya.

The ways in which the innovation and inclusion i2i programme development process might be used to invite technology responses to address the major challenges experienced by graduates with a disability were expressed by young graduates with a disability themselves, private sector organisation employers and experts. However, further work will be required in the overall research study to understand organisational perspectives such as pressures, accountability, scrutiny, data collection and an overall rationale for understanding of the young disabled graduates' recruitment process for sustainable and dedicated change. The study found that the use of the CSAT Principles for Disabled Graduate Employment might successfully deliver for private sector organisations, permanent and productive gains and leveraged private sector investment in Bangladesh, Kenya and beyond. In Stages 4 and 5 of the innovation and inclusion i2i programme development, therefore, there might be evidence of beneficial effect for democracy as well as young disabled graduates' well-being and livelihoods.

This is rather more suggestive of a lack of long-term commitment to graduates with a disability and a precautionary approach to human resource investment and the quality of employment opportunities for young disabled graduates. Noticeable was the fact that overall, the employability skills space for young graduates with a disability is a formal process and is not intended to assist young graduates with a disability to reach deserved goals or encourage the use of new assistive technology solutions to facilitate positions of private sector employment.

Although websites that connect people with a disability to prospective employers exist in many countries including Bangladesh, this seems to run counter to the views of disabled graduates; a clear statement was that not all of them are accessible. Understanding specific resource limitations and challenges when developing assistive technology products, systems and services for Kenya emerged as a critical factor.

Given considerable increase in work aspirations among young graduates with a disability, it appears that the inconsistencies in existing job portals specifically established for people with a disability and existing and emerging job-matching websites could be made more accessible such that graduates with a range of disabilities might benefit from them. This approach is most likely to be implemented by private sector employers; here, the potential for graduates with a disability to be significantly advantaged is evident.

The research found that the employability skills space for graduates with a disability is a formal process and is not intended to assist graduates with a disability to reach deserved goals or encourage the use of new assistive technology solutions to facilitate positions of high-level employment.

The study found that graduates with a disability face typical and additional technology challenges in Dhaka. Two broad and related issues include ineffective data representation and information communication technology media. The research found significant knowledge gaps. These were particularly concerned with in country regional challenges. Given the extensive use of social media in this case, it could serve as a potential medium to reach out to potential job candidates with a disability.

It appears that disabled graduates in Kenya boost their chances of success when they find ways to get first-hand exposure to technology used in the workplace. It helps if they receive guidance from people, societies, institutes and partners when it comes to navigating the complicated process of obtaining digital skills required to access employment.

The study found that graduates with a disability face typical and additional technology challenges in Dhaka and Nairobi. Two broad and related issues include ineffective data representation and information communication technology media. The research found significant knowledge gaps. These were particularly concerned with in-country regional challenges. Experts felt that there was a need for the experience to be safeguarded—both online and within the private sector organisations.

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DATA AVAILABILITY STATEMENT

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ORCID

Lisa-Dionne Morris https://orcid.org/0000-0002-6348-7675

REFERENCES

Amin, S. B., & Rahman, S. (2019). The impact of skill development in Bangladesh energy sector. In S. B. Amin & S. Rahman (Eds.), *Energy resources in Bangladesh* (pp. 43–47). Springer. 10.1007/978-3-030-02919-7_8

Austin, V., Jahan, N., & Barbareschi, G. (January 2019). Innovating pathways to employment and inclusion. Internal & External DFID UK-Aid Connect Report.

Bangladesh Population. (2019). http://worldpopulationreview.com/countries/bangladeshpopulation

Banks, L. M., Kuper, H., & Polack, S. (2017). Poverty and disability in low-and middle-income countries: A systematic review. *PLoS ONE*, *12*(12), e0189996. https://doi.org/10.1371/journal.pone.0189996

Banks, L. M., & Polack, S. (2014). *The economic costs of exclusion and gains of inclusion of people with disabilities*. London: International Centre for Evidence in Disability.

Borg, J., & stergren, P-O. (2015). 'Users' perspectives on the provision of assistive technologies.

Ciccarelli, M., & Hodges, A. (2016). A personal digital assistant intervention reduced job coaching support hours without reducing work performance among workers with autism. *Australian Occupational Therapy Journal*, *63*(6), 441–442. https://doi.org/10.1111/1440-1630.12324

Clarke, V., Braun, V., & Weate, P. (2016). Using thematic analysis in sport and exercise research. In B. Smith & A. C. Sparkes (Eds.), *Routledge handbook of qualitative research in sport and exercise* (pp. 191–205). Taylor & Francis.

Cobley, D. S. (2012). Towards economic empowerment: Segregation versus inclusion in the Kenyan context. *Disability & Society*, *27*(3), 371–384. https://doi.org/10.1080/09687599.2012.654988

Consortium of partners led by Leonard Cheshire Disability, "Factors affecting access to waged employment amongst persons with disabilities in Nairobi, Kenya and Dhaka, Bangladesh", Internal & External DFID UK-Aid Connect Report A. (January 2020a).

Consortium of partners led by Leonard Cheshire Disability, "Innovation to inclusion understanding data systems for employment and social protection of persons with disabilities in Kenya and Bangladesh", Internal & External DFID UK-Aid Connect Report B. (January 2020b).

Consortium of partners led by Leonard Cheshire Disability, "Factors affecting access to waged employment amongst persons with disabilities in Nairobi, Kenya and Dhaka, Bangladesh", Internal & External DFID UK-Aid Connect Report C. (January 2020c).

Consortium of partners led by Leonard Cheshire Disability, "Innovation to inclusion understanding data systems for employment and social protection of persons with disabilities in Kenya and Bangladesh", Internal & External DFID UK-Aid Connect Report D. (January 2020d).

Consortium of partners led by Morris, LD for Leonard Cheshire Disability, "Assistive technology practices in Bangladesh", Internal & External DFID UK-Aid Connect Report A. (December 2018).

de la Harpe, R., Lotriet, H., Pottas, D., & Korpela, M. (2013). Socio-technical approach to community health: designing and developing a mobile care data application for home-based healthcare, in South Africa. *The Journal of Community Informatics*, *9*(2), 1–9. https://doi.org/10.15353/joci.v9i2.3175

Disability Data Portal. Bangladesh: Economic empowerment. 2018 [cited 2019 April 6]; Available from: https://www.disabilitydataportal.com/explorebycountry/country/empowerment/Bangladesh/

Engeström, Y. (2001). Expansive learning at work: toward an activity theoretical reconceptualisation. *Journal of Education and Work*, *14*(1), 133–156. https://doi.org/10.1080/13639080020028747

Engeström, Y., & Kerosuo, H. (2007). From workplace learning to inter-organizational learning and back: the contribution of activity theory. *Journal of Workplace Learning*, *19*, 336–342. https://doi.org/10.1108/13665620710777084

Fisk, R. P., Dean, A. M., Alkire (née Nasr), L., Joubert, A., Previte, J., Robertson, N., & Rosenbaum, M. S. (2018). Design for service inclusion: Creating inclusive service systems by 2050. *Journal of Service Management*, *29*(5), 834–858. https://doi.org/10.1108/JOSM-05-2018-0121

Government of Bangladesh. (2006). Bangladesh labour act 2006. Bangladesh.

Government of Bangladesh. (2011). National skill development policy. Bangladesh.

Government of Bangladesh. (2013). Rights and protection of persons with disabilities act 2013, in act no. 39 of 2013. Government of Bangladesh: Bangladesh.

Groce, N., Kembhavi, G., Wirz, S., Lang, R., Trani, J. F., & Kett, M. (2011). Poverty and disability–a critical review of the literature in low and middle-income countries. Leonard Cheshire Research Centre Working Paper Series, (16).

Harniss, M., Samant Raja, D., & Matter, R. (2015). Assistive technology access and service delivery in resource-limited environments: Introduction to a special issue of disability and rehabilitation: assistive technology. *Disability and Rehabilitation: Assistive*, *10*, 267–270.

Hatakka, M., & De', R. (2011). Development, capabilities and technology – An evaluative framework. Proceedings of Proceedings of the 11th International Conference on Social Implications of Computers in Developing Countries, Kathmandu, Nepal, May 2011.

Hussain, A. (2008). Report on women with disabilities in Bangladesh. Social assistance and rehabilitation for the physically vulnerable (SARPV): Dhaka.

Identifor. (2020). Identifor terms of service. Available at: https://www.identifor.com/about/identifor (Accessed: 11 May 2020).

Jahan, N., Barbareschi, G., Jan, C.A., Mutuku, C.M., Rahman, N., Austin, V., & Holloway, C. (2020). Inclusion and Independence: The impact of mobile technology on the Lives of persons with disabilities in Kenya and Bangladesh. In 2020 IEEE Global Humanitarian Technology Conference (GHTC) (pp. 1–8). IEEE.

Jahan, N., & Holloway, C. (2020). Barriers to access and retain formal employment for persons with disabilities in Bangladesh and Kenya. GDI Hub Working Paper Series Issue 01.

Kagohara, D., van der Meer, L., Ramdoss, S., O'Reilly, M. F., Lancioni, G., Davis, T., Rispoli, M., Lang, R., Marschik, P. B., Sutherland, D., Green, V. A., & Sigafoos, J. (2013). Using iPods and iPads in teaching programs for individuals with

developmental disabilities: A systematic review. *Research in Developmental Disabilities*, *34*, 147–156. https://doi.org/10.1016/j.ridd.2012.07.027

Kumazaki, H., Warren, Z., Corbett, B. A., Yoshikawa, Y., Matsumoto, Y., Higashida, H., Yuhi, T., Ikeda, T., Ishiguro, H., & Kikuchi, M. (2017). Android robot-mediated mock job interview sessions for young adults with autism spectrum disorder: A pilot study. *Frontiers in Psychiatry*, *8*, 169.

Mactaggart, I., Banks, L. M., Kuper, H., Murthy, G. V. S., Sagar, J., Oye, J., & Polack, S. (2018). Livelihood opportunities amongst adults with and without disabilities in Cameroon and India: A case control study. *PLoS ONE*, *13*(4), e0194105. https://doi.org/10.1371/journal.pone.0194105

McNaughton, D., & Light, J. (2013). The iPad and mobile technology revolution: Benefits and challenges for individuals with require augmentative and alternative communication. *Augmentative and Alternative Communication*, *29*, 107–116. https://doi.org/10.3109/07434618.2013.784930

McPherson, B. (2014). Hearing assistive technologies in developing countries: Background, achievements and challenges. *Disability and Rehabilitation: Assistive Technology*, *9*(5), 360–364. https://doi.org/10.3109/17483107.2014.907365

Mitra, S., Posarac, A., & Vick, B. (2013). Disability and poverty in developing countries: A multidimensional study. *World Development*, *41*, 1–18. https://doi.org/10.1016/j.worlddev.2012.05.024

Mizunoya, S., & Mitra, S. (2013). Is there a disability gap in employment rates in developing countries? *World Development*, *42*, 28–43. https://doi.org/10.1016/j.worlddev.2012.05.037

Morash-Macneil, V., Johnson, F., & Ryan, J. B. (2018). A systematic review of assistive technology for individuals with intellectual disability in the workplace. *Journal of Special Education Technology*, *33*(1), 15–26.

Morgon Banks, L., & Polack, S. (2014a). The economic costs of exclusion and gains of inclusion of people with disabilities. London: International Centre for Evidence in Disability.

Morgon Banks, L., & Polack, S. (2014b). The economic costs of exclusion and gains of inclusion of people with disabilities: Evidence from low- and middle-income countries. CBM, International Centre for Evidence in Disability, London School of Hygiene & Tropical Medicine.

Morris, L. D. (2011). Helping your lecturers creatively infuse ubiquitous computing technology into teaching. In T. T. Kidd & I. Chen (Eds.), *Ubiquitous learning: Strategies for pedagogy, course design and technology* (Vol. 2011) (pp. 207–226). IAP.

Morris, L. D., Abu Alghaib, O., & Northridge, J. (December 2019). "Kenya and Bangladesh assistive technology practices and employability", Internal & External DFID UK-Aid Connect Report.

Morris, L. D., & Connolly, A. (2010). Involving students in the development and evaluation of a ubiquitous learning application for a design practice setting. *Ubiquitous Learning: An International Journal*, *2*(4), 21–38. https://doi.org/10.18848/1835-9795/CGP/v02i04/40480

Pouliot, D. M., Müller, E., Frasché, N. F., Kern, A. S., & Resti, I. H. (2017). A tool for supporting communication in the workplace for individuals with intellectual disabilities and/or autism. *Career Development and Transition for Exceptional Individuals*, *40*(4), 244–249. https://doi.org/10.1177/2165143416683927

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students*. Pearson education.

Saunders, M. N., Lewis, P., & Thornhill, A. (2019). Research methods for business students ebook. *Learning*, *34*, 149.

Smith, D., & Hudson, S. (2012). Using the person–environment–occupational Performance conceptual model as an analyzing framework for health literacy. *Journal of Communication in Healthcare*, *5*(1), 11–13. https://doi.org/10.1179/1753807611Y.0000000021

Smith, M. J., Ginger, E. J., Wright, K., Wright, M. A., Taylor, J. L., Humm, L. B., Olsen, D. E., Bell, M. D., & Fleming, M. F. (2014). Virtual Reality Job Interview Training in Adults with Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders*, *44*(10), 2450–2463. https://doi.org/10.1007/s10803-014-2113-y

Walsham, M., Kuper, H., Banks, L. M., & Blanchet, K. (2018). *Social protection for disabled people in Africa and Asia: a review of programmes for low-and middle-income countries* (pp. 1–16). Oxford Development Studies.

Walt, G., Shiffman, J., Schneider, H., Murray, S. F., Brugha, R., & Gilson, L. (2008). 'Doing' health policy analysis: methodological and conceptual reflections and challenges. *Health Policy and Planning*, *23*(5), 308–317. https://doi.org/10.1093/heapol/czn024

Wickenden, M., Thompson, S., Mader, P., Brown, S., & Rohwerder, B. (2020). Accelerating Disability Inclusive Formal Employment in Bangladesh, Kenya, Nigeria, and Uganda: What are the Vital Ingredients?

World Bank. (2017). Country profile: PovcalNet: An online analysis tool for global poverty monitoring Bangladesh. http://iresearch.worldbank.org/PovcalNet/home.aspx

World Health Organisation and World Bank. (2011). *World Report on Disability*. Geneva: WHO.

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