DEVELOPMENT OF INCLUSION, ENABLEMENT, AVAILABILITY, ACCESSIBILITY & UTILISATION FRAMEWORK FOR PWD IN RESEARCH AND INNOVATION GHANA

PARADIGM ASSESSMENT AND BLUEPRINT FINAL REPORT

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LIST OF ABBREVIATIONS

ABBREVIATION	FULL MEANING
ADIRA	Advancing Disability Inclusive Research in Africa Network
CAPI	Computerized Assisted Personal Interviews
DARE	Disability Advocacy Research in Europe
DIDD	Disability-Inclusive Design Department
MoGCSP	Ministry of Gender Children and Social Protection
NCPD	National Council on Persons with Disabilities
OPWD	Organization of Persons with Disabilities
PWDs	Persons with Disabilities
RIAF	Research and Innovative Advisory Forum
UNCRPD	Convention on the Rights of Persons with Disabilities

1.0 INTRODUCTION

1.1. Overview of Persons with Disabilities

Persons with disabilities constitute about 15% of the world's population, with about 80 per cent of them living in countries of the global south, including Ghana (World Health Organization, 2011). Although the 2021 Ghana Population and Housing Census reports that persons with disabilities in Ghana constitute about 8% (2,098,138) of the country's population of 30,832,019 (Ghana Statistical Service, 2021), other reports show otherwise. The 2012 Human Rights Watch report indicates that over five million persons with disabilities live in Ghana. The five million figure corroborates with the World Health Organization's estimates that disability affects 15% -20% of every country's population (World Health Organization, 2018). Having five million persons with disabilities is a substantially high number that should be factored into any country's development agenda.



The inclusion and effective participation of persons with disabilities in mainstream Ghanaian society continues to be challenging, especially due to negative perceptions and attitudes directed towards them (Kassah, 2008; Mills, 2018; Naami, 2015). Persons with disabilities also encounter several other barriers including inaccessible physical structures, transportation, communication and information, and healthcare, as well as inadequate social security benefits and lack of assistive devices (Badu, Agyei-Baffour & Peprah, 2016; Braun & Naami, 2019; Naami, 2019; Tijm, Cornielje, & Edusei, 2011). For women and girls with disabilities, gender and disability interact to create multiple challenges and vulnerabilities that adversely affect their lives (Kassah, 2008; Mitra, 2006; Naami, 2015; WHO, 2011).

Innovative products and services could address the numerous needs of persons with various forms of disabilities, but how do current research and innovations include the needs of these socially and economically disadvantaged people?

1.2 Inclusive Research

Walmsley (2001) was the first to use the phrase "inclusive research" to refer to research in which people with disabilities participate in more capacities than simply as subjects or participants. According to Walmsley and Johnson (2003), inclusive research encompasses research approaches that have previously been categorized as "participatory" or "emancipatory." This overarching definition makes room for a variety of ways and modes of participation by individuals with disabilities (Blunt et al., 2012).



The paradigmatic shift that inclusive research is aiming for is a drift away from discriminatory practices which emphasize the voice of researchers who do not have disabilities toward people with disabilities, recognizing them as authorities on the experiences and challenges associated with living with disabilities (Walmsley, 2001; Walmsley & Johnson, 2003). In inclusive research, people with disabilities are recognized as co-researchers and they contribute to whatever degree they can (Williams, Ponting, Ford & Rudge, 2009). Research that takes an inclusive approach acknowledges that the extent to which individuals with disabilities can participate in research activities that need a high level of abstract reasoning is not limited by their impairments (Walmsley, 2004). Inclusive research therefore establishes a respectful relationship with persons with disabilities and considers their perspectives (McLaughlin, 2010; Walmsley & Johnson, 2003).

1.3 Inclusive Innovations

The term "innovation" refers to the development of novel processes, products, and services. The innovative products and services identified in the study are either significantly better versions of existing products and services or completely new products and services that are available on the market and help consumers solve their problems in new and exciting ways (Schillo & Robins, 2017). These innovative products and services are distinguished by enhancements to their design, appearance, efficiency, usability, and improved user experience.



Inclusive innovation seeks to provide sustainable solutions to the many disadvantaged people who would otherwise be excluded from access to innovations because of their physical, mental, social, economic, or environmental context. Assistive technology and devices, financial innovations, technology at the workplace, healthcare and promotion innovations, and agricultural innovations are a few examples of innovations. Inclusive innovations, therefore, could be a conduit to creating commercial viability and sustainable social and economic development as well as autonomy.



1.4 Gaps, Study Objectives and Research Questions

Ghana's government promulgated the Persons with Disability Act, Act 715, signed and ratified the Convention on the Rights of Persons with Disabilities (UNCRPD) in 2007 and 2012 respectively. Nevertheless, there is evidence that persons with disabilities continue to encounter barriers to participation and inclusion in all spheres of life due to stigma and discrimination, built environment, transportation, and information inaccessibility. However, little is known about what disability-inclusive research and innovations exist in the ecosystem in Ghana and how relevant they are to promoting disability inclusion and social-economic sustainable development. This study sought to identify disability-inclusive research and innovations that exist in Ghana, best practice models for disability-inclusive research and innovations implemented elsewhere that could be replicated in Ghana, as well as recommendations to promote collaborations among government, university and research institutions, industry, and organisations of persons with disabilities. The following research questions guided the study:

Figure 1: Research Questions



1.5 Importance of Inclusion Technology

The importance of inclusive innovations and research cannot be overemphasised as the world is becoming more technological. A lot of services and information are in the digital space and many products are technologically inspired. Employment opportunities are also being created in the digital space.

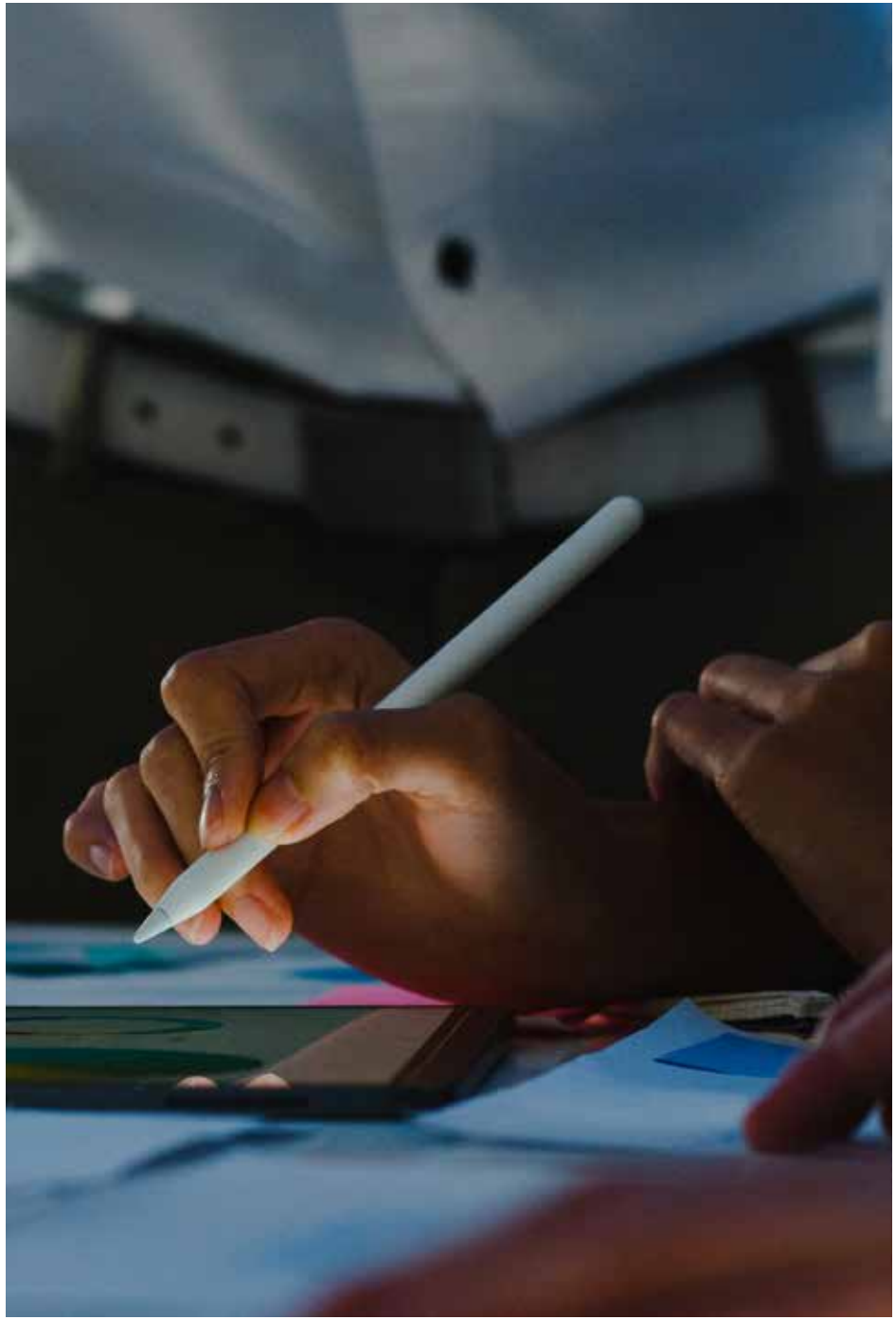
The technological ecosystem could improve the lives of persons with disabilities, increase products and services that could make their lives more comfortable, and opportunities to work remotely. The technological ecosystem could make persons with disabilities more productive and harness their ability to contribute meaningfully to national development. Working remotely could reduce the cost of travel (given that many public transportation systems are not accessible in Ghana, which sometimes necessitates the use of hired transport services that could be more expensive) as well as the issues relating to inaccessible physical and the built environment.

Technology has come to stay and changes frequently, which also affects the way we do things. Hence, the need to make the technology ecosystem inclusive, allowing access for persons with disabilities to enjoy the benefits like everyone and empowering persons with disabilities to use new technology as well as skill sets to actively participate in this space. It is also noteworthy that persons with disabilities can enrich the innovation processes by bringing in new ideas about what could best address their issues. Ghana as a country that is driving the agenda of innovations and digitisation must make conscious efforts to include persons with disabilities. Leaving out persons with disabilities could worsen their plight.

Further, inclusive innovation has great market potential. Persons with disabilities are not a homogenous group. There is diversity in disability and each of the different categories of disability and their unique needs. There is therefore the need to develop various products and services that could address these needs.

2.0 METHODOLOGY

The study utilised a mixed-methods design, using both qualitative and quantitative approaches. The qualitative exploratory descriptive research design was used since very little is known about the subject under investigation (Singleton & Straits, 2010). The quantitative method consisted of a cross-sectional survey and document review. The cross-sectional survey was used because data was collected at one point in time (Creswell, 2014).



Simple random sampling, which is randomly selecting a subset of a population where each member has an equal chance of being selected for participation, was used for the study (Creswell, 2014; Singleton & Straits, 2010). Participants were randomly selected from a list that Heritos Lab Ltd gave to the research team. The list consisted of government, academic and research institutions and industry, but the research team added a few organisations of persons with disabilities because the list did not include them. The research team reached out to over 60 organisations but only 30 responded. Two factors could have accounted for the low response rate: (1) some of the organisations stated that they were not aware of Heritos Lab, while others did not consider themselves to be stakeholders of Heritos Lab explaining that they participated in their activities just once, (2) the time allotted for data collection was also a challenge. The research team was given only 2 weeks for data collection and analysis from a population that the team was not familiar with.

For participation in the qualitative approach, we purposively sampled ten representatives from the academic and research institutions, industry, and organisations of persons with disabilities as well as researchers with disabilities. This sample was based on saturation. Again, we drew the sample from the list of organisations that Heritors Labs Ltd gave to the team. Since the list did not include organisations of persons with disabilities, the research team relied on their contacts.

Academic and research institutions were targeted because they engage in research, and their perspectives about disability-inclusive research and innovations are important to determine what support is needed to promote research and innovations that focus on persons with disabilities. The industry brought on board perspectives about the availability, types, nature, affordability, and accessibility of innovative systems and the gaps that should be addressed for disability inclusion to happen. Leaders of the organisations of persons with disabilities and researchers with disabilities helped with the understanding of what systems and best practices exist, the utilisation, affordability and accessibility of current innovative systems, as well as the gaps that should be addressed to promote disability-inclusion research and innovations.



One of the sources of the quantitative data was a 15-minute self-administered survey. The survey made use of Google Forms and was administered via email. (See Appendix 1 for the Survey Instrument). The source of the secondary data was existing policies, legislation, and regulations relating to disability-inclusive research and innovation in the ecosystem of Ghana and outside of the country. The purpose of the document review was to determine what disability-inclusive research, inclusive innovations and best practices exist in Ghana and globally that could be replicated in the ecosystem of Ghana to improve the lives of persons with disabilities (See the Analytical Tool in Appendix 2).

The qualitative exploratory descriptive research design explored disability-inclusive research and innovative systems (policies, programmes, approaches, procedures, and regulations) that exist in the Ghanaian ecosystem and abroad. We also explored what needs to be done to promote disability-inclusive research and innovations using an interview guide that was developed by the research team. In-depth individual interviews were used for the qualitative data collection. All qualitative interviews were conducted virtually via Zoom and Google Teams. Data was collected with the aid of an interview guide (See Appendix 3). The in-depth interviews lasted 30-45 minutes.



It is obvious from the above that diverse research techniques were used. The purpose of the diverse methodological approaches was to triangulate data and to strengthen the credibility and trustworthiness, as well as to ensure the rigour of the study (Creswell, 2014).

3.0 DATA ANALYSIS

The qualitative and quantitative data were analysed separately. The qualitative data was analysed manually using Braun and Clarke's (2006) thematic analysis framework. The six steps of analysis outlined in this framework are familiarisation with the data, generation of codes, searching for themes, sorting codes, forming patterns, and defining themes. According to this framework, familiarisation happens after the Zoom audio-recorded interviews were transcribed verbatim into text. The research team familiarized itself with the data by reading through the notes several times and generating a list of ideas. Initial codes were generated from the list of ideas. The researchers then searched for themes in the codes created. The codes were sorted into potential themes, which then were reviewed and refined to form coherent patterns. The researchers then defined and named the themes which were then translated into the report write-up (See Appendix).



The survey responses were analysed using both the survey tool on Google Forms and Excel and the secondary data was analysed using Excel. Descriptive tools from Excel and Google Forms were utilised to analyse the survey data. The secondary data also utilised descriptive tools from Excel for the purpose of analysis. The Excel and the descriptive tools were used to describe the demographics of the participants and their responses to the survey questions. The descriptive analysis resulted in the generation of statistical graphs, charts and tables highlighting socio-demographic findings from the quantitative data. Results from both the quantitative (survey and secondary data) and qualitative data analysis were compared and contrasted to give a better understanding of the topic under investigation.

1. Systems: We define systems as policies, programmes, approaches, procedures, and regulations.

2. Inclusion: Inclusion refers to creating the opportunity for people with disabilities to be included in everyday activities and encouraging them to have roles like their peers who do not have disabilities (Strnadová et al., 2022).

3. Persons with disabilities: Article 1 of the Convention on the Rights of Persons with Disabilities defines persons with disabilities as people who have had physical, mental, intellectual, or sensory impairments for a significant amount of time, which in conjunction with other obstacles may prevent them from participating fully and effectively in society on an equal basis with others.

4. Persons with Disabilities Act 715 defines persons with disabilities as “person with disability” means an individual with a physical, mental or sensory impairment including a visual, hearing or speech functional disability which gives rise to physical, cultural or social barriers that substantially limits one more of the major life activities of that individual…”

5. Organisations of persons with disabilities: These are organisations that speak for and champion the interests of persons with disabilities. A sizable proportion of the organization’s membership is made of persons with disabilities.

4.0 DEFINITIONS



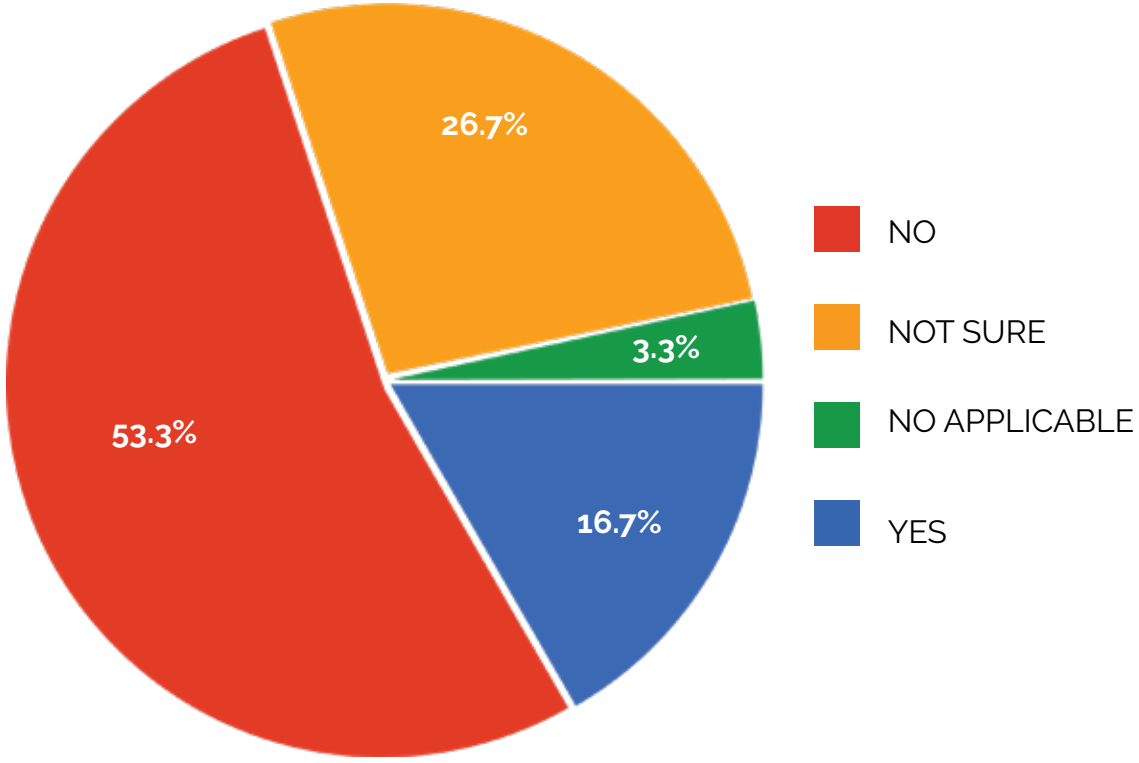
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5.0 FINDINGS



5.1 Disability-Inclusive Research and Innovation Policies

The study found only one substantive national disability legislation, which is the Persons with Disability Act, 715 promulgated in 2006. Although Act 715 meets certain international standards to promote the rights of persons with disabilities, the Act is found to be deficient in provisions relating to disability-inclusive research, technology and innovations. Notwithstanding, a few (n=5, 16.7%) of the participants indicated that their organisations have disability-inclusive research policies
(See Figure 2).



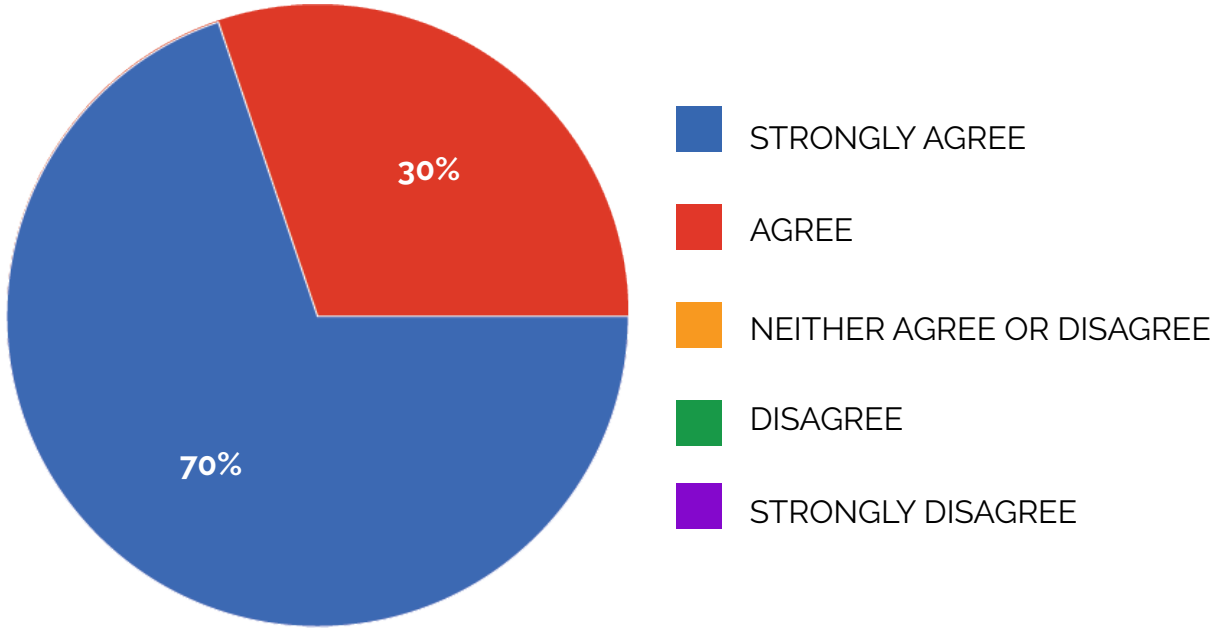
With reegards to weather the institutions of respondents has an inclusive research policy, slightly above half of the responses disagreed with the statement that their institution has a research policy that takes into consideration the needs of all persons with disabilities and researchers with disabilities. 26.7 were not sure if their institution had an inclusive research policy and 16.7% indicated they had an inclusive research policy in their organization.

Figure 2: Knowledge of disability-inclusive research policies

Not surprisingly, these institutions are organisations of persons with disabilities or places where researchers with disabilities work. However, the validity of this assertion could not be established from the secondary data. The secondary data established that there are a few disability inclusion policies, but they did not address disability inclusion research and innovation.

But when participants were asked whether ***'Disability-inclusive research and innovations should be prioritised by stakeholders'***, everybody either strongly agreed (70%) or agreed (30%) (See Figure 3).

It is also noteworthy that the stakeholder workshop revealed that some universities in Ghana, for example, the Kwame Nkrumah University of Science and Technology and the University of Ghana have research policies but there is no focus and clarity on disability-inclusive research. These two institutions also have disability inclusion policies that have also not made provisions for disability-inclusive research. Interestingly, these policies from the two universities make room for disability inclusion innovation to enable the inclusion of students and staff with disabilities in the university community. The policy of the University of Ghana is called Policy on Student and Staff with Disabilities whilst that of the Kwame Nkrumah University of Science and Technology is Disability Policy (0011).



In comparison to parts of the world, the study discovered four disability-inclusive research policies from Wales, England, and Scotland, in addition to the United Nations Convention on the Rights of Persons with Disabilities (See Figure 4).

DISABILITY INCLUSIVE RESEARCH POLICIES AROUND THE WORLD

01 UNITED NATIONS CONVENTION ON THE RIGHTS OF THE PERSONS WITH DISABILITY

02 DISABILITY RIGHTS IN WALES

03 HEALTH AND SOCIAL CARE ACT OF 2012 OF ENGLAND

04 COMMUNITY EMPOWERMENT (SCOTLAND) ACT 2015

Figure 4: Other Countries' Research Policies

Disability-inclusion research systems refer to resources: sufficient and reliable human resources, infrastructure, tools, materials, and informative resources, that support disability research programs, disability research improvements, and service delivery during disability research and strategies that promote the inclusivity of research practices. These research systems are disability centred, coordinate disability research projects, and are outcome-oriented. Research systems are built on inclusivity values, have facilitating conditions and inclusive environments and provide both generic and specialized support to persons with disabilities on research projects. Many of these research systems are found in Disability Centers in Higher Institutions of Learning, Associations and Networks focusing on disability-related issues, particularly research.



BOX 1

Definition of Disability-Inclusive-Research Systems in this Study

Disability-Inclusive-Research Systems refer to resources: sufficient and reliable human resources, infrastructure, tools, materials, and informative resources, that support disability research programs, disability research improvements and service delivery during disability research and strategies that promote the inclusivity of research practices.



Whereas three disability-inclusive systems were identified in Ghana, the United Kingdom and other countries have several systems (See Figure 5), including two from other African countries-Nigeria being one example. The disability-inclusive research systems in Ghana include the Office of Students with Special Needs (OSSN) of the University of Ghana, the Centre for Disability and Rehabilitation Studies (CEDRES) at the Kwame Nkrumah University of Science and Technology and the Ghana Federation of Disability Organizations.

The stakeholder validation workshop revealed additional systems, including the Office of Persons with Disability at the Kwame Nkrumah University of Science and Technology, the Resource Centre for Alternative Media, Assistive Technology Office at the University of Cape Coast, and the Special Education Reading Resource Centre at the University of Education Winneba. However, none of these systems are research-oriented.

INTERNATIONAL DISABILITY INCLUSIVE RESEARCH SYSTEMS UNITED KINGDOM

01 SCOTTISH COPRODUCTION NETWORK

02 THE DISABILITY RESEARCH GROUP AT THE UNIVERITY OF STRATHCLYDE

03 UNIVERSITY OF GLASGOW CENTRE FOR DISABILITY STUDIES

04 DISABILITY ADVOCACY RESEARCH IN EUROPE (DARE)

05 GETTING THINGS CHANGED RESEARCH PROJECT BY THE UNIVERSITY OF BRISTOL

06 UNIVERSITY OF LEEDS CENTRE FOR DISABILITY STUDIES

OCEANIA COUNTRIES

01 DISABILITY INNOVATION INSTITUTE

02 THE NATIONAL DISABILITY RESEARCH PARTNERSHIP

03 DISABILITY POLICY & RESEARCH WORKING GROUP OF AUSTRALIA

04 THE CRITICAL DISABILITY STUDIES RESEARCH NETWORK

05 DISABILITY RESEARCH COLLECTION

06 DISABILITY RESEARCH NETWORK

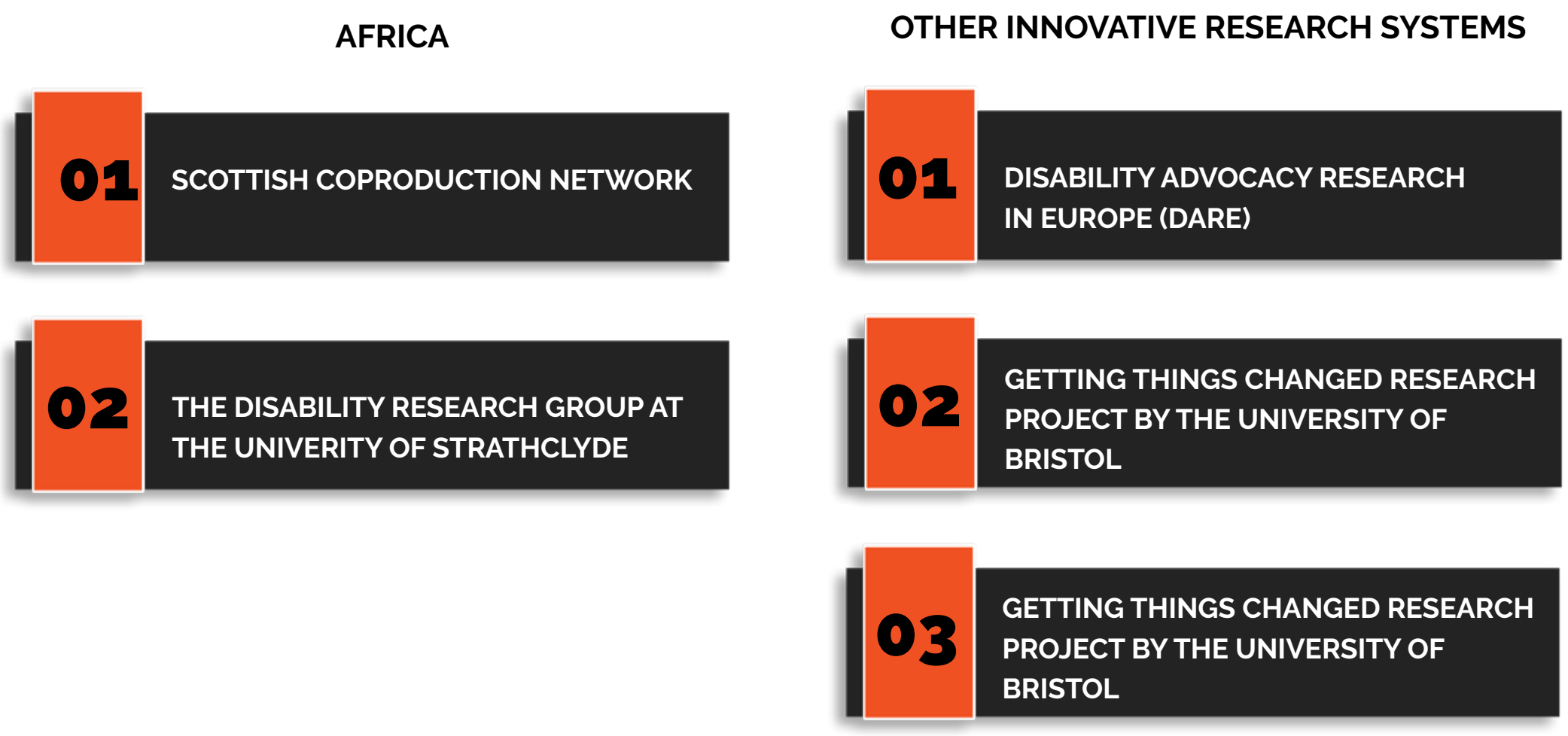


Figure 5: Disability -Inclusive Research Systems

5.3 Innovative Products and Services

The term "innovation" refers to the development of novel processes, products, and services. The innovative products and services identified in the study are either significantly better versions of existing products and services or completely new products and services that are available on the market and help consumers solve their problems in new and exciting ways. These innovative products and services are distinguished by enhancements to their design, appearance, efficiency, usability, and improved user experience. These include household products for daily use, products, and services relevant to the workplace, healthcare, and education.

Customers are supposed to receive value that is specifically tailored to their needs from innovative products and services, but the question is ...

How many of these innovations are available in Ghana?

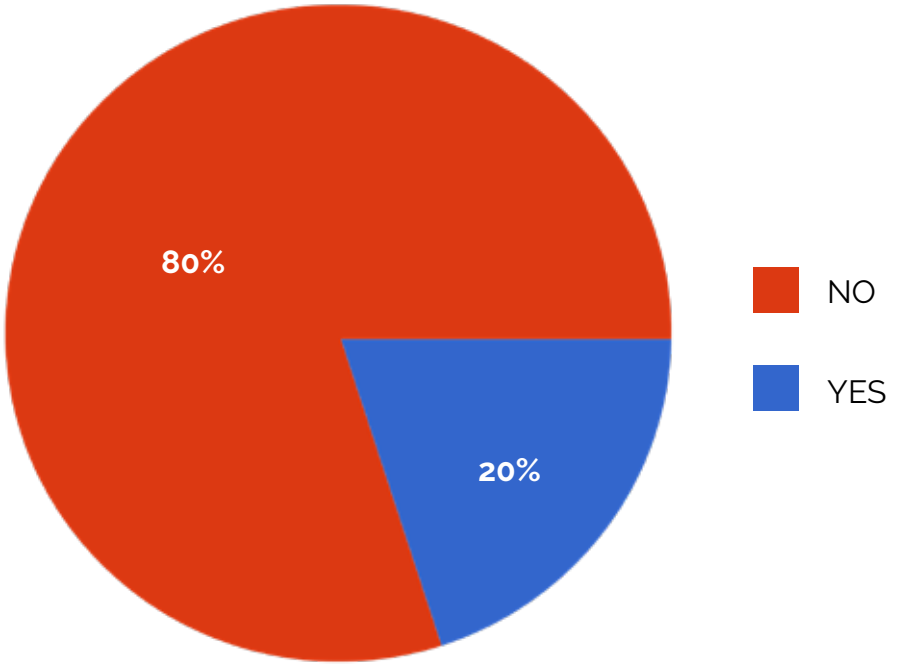
Can persons with disabilities use them?

And how many persons with disabilities can afford to buy them?

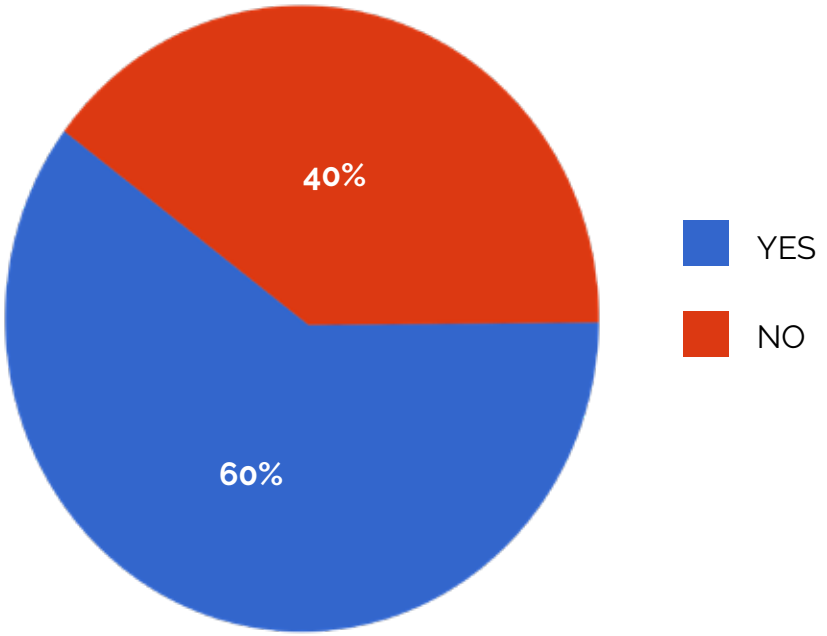


Ghana

The overwhelming majority (80%) of the respondents of the survey indicated that they did not know of any disability-inclusive innovations in the Ghanaian ecosystem (see Figure 6).



However, a few innovations were identified in the ecosystem of Ghana from the interviews. These are grouped under applications for meetings such as Zoom and Skype, and applications for research, including Computerized Assisted Personal Interviews (CAPI) and Google Forms, which allow access for screen readers. Some of the participants indicated that they had personally utilized these innovations and attested to their accessibility.



Other innovations from outside of Ghana identified by a little over half (60%) of the survey respondents were voice-overs and voice initiators, voice activators for customer service for those with hearing impairment and Universal Design (See Figure 7).

Also, the desk review presented varied outcomes regarding research and innovation in the ecosystem of Ghana. Several innovative products and services were identified from the secondary data in the Ghanaian ecosystem that are relevant for the use of everyone, including persons with disabilities (See Figure 8). The research team identified 12 innovative and digitized products and services in Ghana. Not surprisingly, virtually none has accessible features to benefit persons with disabilities.

INOVATIVE PRODUCTS AND SERVICES GHANA

- DIGITAL PROPERTY ADDRESS SYSTEM
- PAPERLESS PORTS
- FINANCIAL TECHNOLOGY
- AGRITECH
- DIGITAL PAYMENT SYSTEMS
- DIGITAL REGISTRATION
- DIGITAL CURRENCY
- A CAR TRANSPORTATION
- MPHARMA
- MAPTECH SOLUTIONS
- EPHARMACY
- DRONES

GLOBALLY

DIDABILITY INCLUSIVE PRODUCTS AND SERVICES GLOBALLY

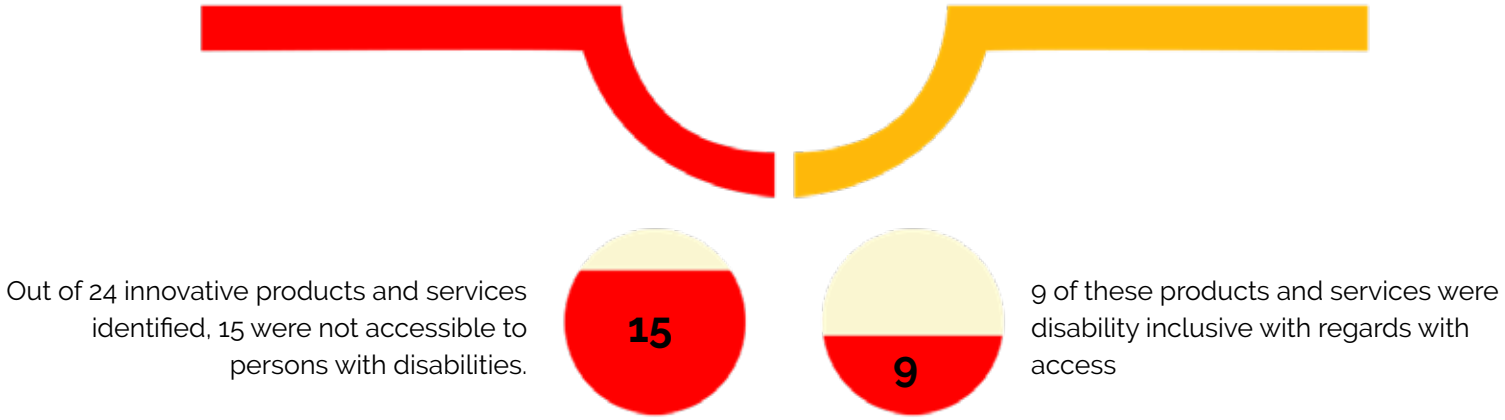


Figure 9: Innovative products and services-summary

As has always been the case, developed countries are endowed with several innovative products and services to better the lives of their citizens. We identified 24 digital and innovative products and services in the global ecosystem. It is noteworthy that almost all these products and services were accessible for persons with disabilities, unlike the case of Ghana where virtually none were accessible. Fifteen out of the 24 products and services identified had disability-accessible features (See Figure: 9). See Figure 10 for the list of products and services in the global ecosystem.

INNOVATIVE PRODUCTS AND SERVICES GLOBALLY



Figure 10: Innovative products and services details

5.4 Best Practices

The term best practices are potential strategies that are considered essential in planning and seeking to involve persons with disabilities in research endeavours. These practices represent alterable variables that stakeholders can adapt and use to promote the participation of people with disabilities in research projects to make the disability-inclusive (Kirst-Ashman & Hull, 2014). This study identified several best practices from the secondary data (See Figure 11). These participatory and inclusionary practices ranged from including persons with disabilities in research advisory committees, research groups/ committees, co-investigators, and principal investigators. Persons with disabilities could also be part of research teams including those who recruit participants, trainers of other team members with disabilities, data collection team, note takers, and research validation workshop facilitation team members. These practices are empowering and give voice to persons with disabilities.

DISABILITY INCLUSIVE RESEARCH BEST PRACTICES



Figure 11: Best Practices

5.5 Implementation Challenges

Several challenges were identified to hinder the implementation of best disability-inclusive research practices and innovative technology in the Ghanaian ecosystem. These challenges include negative perceptions, sociocultural beliefs and practices and acceptance issues.

5.5.1 Negative Perceptions

Two types of perceptions were identified in the study: (1) the perception about the capability of persons with disabilities for meaningful participation and (2) the perception that disability inclusion is expensive. The negative perceptions discovered in this study relate to the perceptions of researchers about the capabilities of persons with disabilities to participate in research as respondents and co-researchers. The perceptions about the capabilities of persons with disabilities sometimes result in the use of alternatives (e.g., proxies and surrogate respondents), who may have some knowledge about disability, instead of persons with disabilities who live the experience. The question is whether these alternatives can communicate the real experiences to inform policy and practice that could effectively address their issues as queried by one of the participants in this quote. “Somebody giving you data on disability issues on behalf of persons with disabilities can be a major challenge and this could be because people lack the understanding of disability”.

The other perception that impedes inclusive innovation and technology is the assumption that disability-inclusive systems could be expensive. Most times, people believe that disability inclusion can be expensive, although there is evidence that the expenses associated with inclusive designs could be negligible compared with the benefits. Incorporating the needs of persons with various forms of disabilities including women, children and older adults at the design level could be less expensive than modifying existing structures, things, information and mediums of communication (Waller, Bradley, Hosking & Clarkson, 2015).



5.5.2 Acceptance of Change

Traditionally, persons with disabilities have been marginalised and not given the opportunity to maximise their potential. The inclusion of Ghanaians with disabilities in all spheres of life is still challenging due to the existence of social, physical, transportation, information, and communication barriers. The respondents lamented the plight of persons with disabilities and feared that the acceptance of inclusive research, innovation and technological ideas may be challenging due to negative perceptions about persons with disabilities, the lack of awareness about their needs and existing tools that could help smoothen technological inclusion processes in the ecosystem.

The participants insisted on possible resistance of best practices and policies from other countries by Ghanaian duty bearers. Resistance by duty bearers in this study manifested with phrases such as ***"cuts in budgets allocated for disability issues"*** and the fear that ***"the government would say that there are no resources to address disability issues"***.



5.5.3 Geo-Socioeconomic-Cultural and Technological Context

Disability is dynamic, and so are the issues of persons with disabilities. The geo-socio-cultural and political environmental differences could impact the replication of disability-inclusive research and innovation models from other countries to address the needs of Ghanaians with disabilities. Let's assume that we find some best practice models of disability-inclusive research and technology, perceptions about the capabilities of persons with disabilities to meaningfully participate in mainstream society could affect the adaption and implementation of the products and services. These perceptions are rooted in some of our cultures that associate disability with a curse from the gods, evil, bad luck, sorcery, and witchcraft and hence, consider children with disabilities as water babies "nsuomma," or snake babies (Agbenyega 2005; Ocloo 2005).



Poverty, which is known to be a huge problem among persons with disabilities (Kassah 2008; Mitra 2006; Naami, 2015; 2019, WHO, 2011), could also impact the transfer of best-practice disability-inclusive research and innovation interventions. Poverty could impact the ability of persons with disabilities to purchase innovative products and services.

We should make efforts to ensure that these issues, as well as others, are taken into consideration. Context-specific solutions are required to address the research and technological exclusion of persons with disabilities. "Best models of disability-inclusive research and innovations must be adjusted to suit the Ghanaian context." "Direct transfer could bring a reality gap which could impact results."

The levels of training and skills required by the best practice research and innovation interventions would also determine the transferability and outcome of the interventions. The geo-socioeconomic-cultural analysis is imperative for the effective transfer of best intervention models.

5.6 RECOMMENDATIONS

Participants made several recommendations, and these are grouped under general and specific. Specific recommendations were made for the government, industry, university/research institutions and organisations of persons with disabilities.



5.7.0 GENERAL RECOMMENDATIONS

Funding, disability research, employment of persons with disabilities, capacity building and collaborations with organisations of persons with disabilities were among the general recommendations.



5.7.1 Funding

Subsidies/Incentives to facilitate Availability, Accessibility and Affordability

The cost of technological products and services could be expensive but necessary for the inclusion of persons with disabilities. The cost could affect the availability, accessibility and affordability of innovative products and services. The government should "Show a lot more commitment in financing disability-inclusion." Other stakeholders should support the government to ensure disability-inclusive innovations are available, accessible and affordable in the Ghanaian ecosystem.

The government could motivate producers to produce innovative technology that is accessible and affordable by giving incentives to producers of new inclusive technological products and services. The government could also subsidize the cost of production to make these products available for persons with disabilities.

Moreover, the government could give grants and subsidies to individuals with disabilities to enable them to have increased access to innovative products and services. Using digital platforms, for instance, requires the use of Android phones and internet services. However, internet data costs are relatively expensive in Ghana (Mensah, 2021) and many persons with disabilities cannot afford Android mobile phones due to poverty (Naami & Mfoafo-M'Carthy, 2020). Poverty could deter many persons with disabilities in the Ghanaian ecosystem from using relevant technologies to better their lives. Persons with disabilities in rural Ghana, where poverty is prevalent, could even be more vulnerable due to geographic location. Besides the difficulty of paying for Android phones and internet services, some of these areas are yet to be connected to the national electricity grid.

To increase access to technology and innovative products and services for persons with disabilities, the government could mandate institutions that employ persons with disabilities to provide accommodations for their employees with disabilities by ensuring that the technology and digital space are made accessible.



Funding to operationalise Disability-Inclusive Innovations and Technology

Industry is also recommended to use corporate social responsibility funds to support the production of disability-inclusive innovative products and services. This effort could, in turn, increase access to disability-inclusive innovative products and services to benefit persons with disabilities. Subsidising the production cost could also make the products more affordable for persons with disabilities, the majority of whom live in poverty.





Bilateral and Multilateral Donors

The role of donor partners in ensuring disability-inclusive research and innovations was also suggested. The participants insisted that donor partners could add disability-inclusive research and innovation as one of the major criteria for government funding.

Foundations, Philanthropic Organisations and Individuals

Foundations, philanthropic organisations, and individuals can support disability-inclusive research and innovations. They should be motivated and given opportunities to donate towards this good cause to enable inclusivity and participation of persons with disabilities.



5.7.2 Disability Research

Another recommendation was funding for disability-inclusive research. Disability-inclusive research could create awareness about disability issues and the needs of persons with disabilities, which could eventually promote the rights of persons with disabilities. The government, universities, research institutions and industry could provide funding for disability-inclusive research. Universities and research institutions should encourage researchers to conduct disability-related research. The outcome of such research could inform industry decisions regarding the disability-related technological needs of persons with disabilities and how to address these needs to improve the lives of people with disabilities. Organisations of persons with disabilities should also be given funding for disability-related research for evidence-based advocacy.

This recommendation emanated from the assertion that researchers must ensure research is disability-inclusive as seen from the responses in Figure 12, where almost all the respondents, except 2 (6.7%) strongly agreed or agreed to the statement "researchers should have a duty to ensure that their research is disability-inclusive."

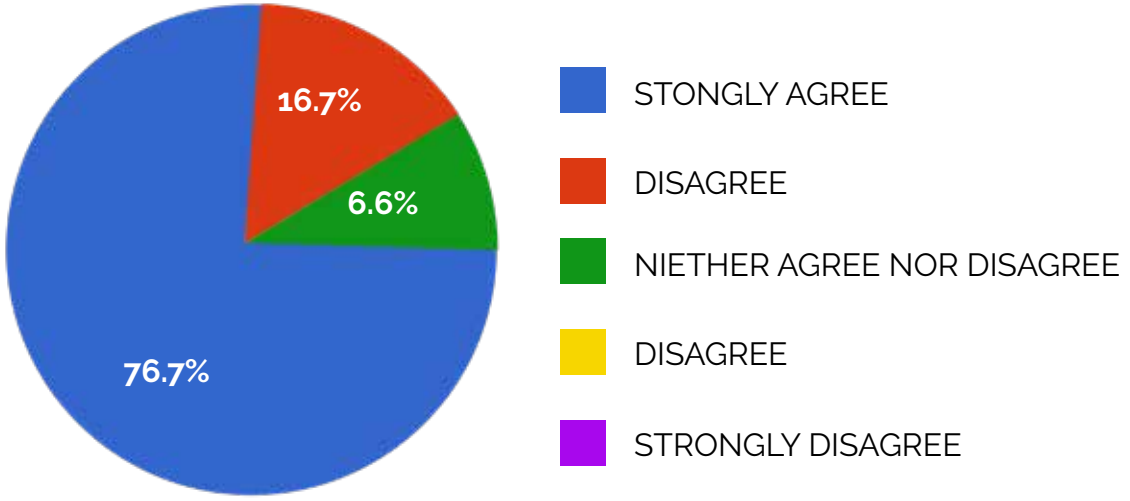


Figure 12: Statement about making research disability-inclusive

5.7.3 Employment of Persons with Disabilities

A disability-inclusive technology and innovation policy that would give quotas to industries for the employment of persons with disabilities was recommended. Persons with disabilities could also be empowered to take up positions in the digital technology and innovation space. There should also be policy provisions to promote the self-employment of persons with disabilities in the digital technology space. Universities and research institutions should engage the services of persons with disabilities as research assistants or in any other capacity deemed appropriate.



5.7.4 Capacity Building

For developers to produce disability-inclusive technology, they first need to understand disability issues, thus, disability awareness training is required. They need to know the importance of disability inclusion, which could lead to acceptability, a major challenge to implementing disability-inclusive technology and innovations. The developers/designers also need to know what tools and resources exist in the ecosystem that they can tap into when the need arises.

Persons with disabilities require technological literacy to enable them to use new technology. Persons with all forms of disabilities should be assisted appropriately to enable them to use the new technology. A centre dedicated to training persons with disabilities in technological literacy should be established. All trainers must be trained in disability sensitivity before training persons with disabilities to use inclusive technology and innovations.

Universities can also provide training and support to students and researchers about disability-related issues and ensure that their "campus and activities are accessible and inclusive to everyone". Universities should train and mentor young and early-career faculty and their students to improve their knowledge and experience in disability-inclusive research and innovation.



5.7.5 Collaboration with Organisations of Persons with Disabilities

All other stakeholders should collaborate with organisations of persons with disabilities throughout the research and innovation development and implementation processes. They should seek the guidance of persons with disabilities and learn to listen to their perspectives in this space since they are the expert knowers of their issues and can help find solutions to their needs. The organisations of persons with disabilities can help test the usability of new products and research methodologies.

5.8.0 GOVERNMENT

Recommendations for the government included enactment of and enforcement of policy, prioritising disability-inclusive policies and implementation and monitoring among others.

5.8.1. Enactment and Enforcement of Policy

The government and all other stakeholders, including universities, research institutions and industry, should endeavour to independently and/or jointly develop policies that would advance disability-inclusive research and innovations since virtually none of these entities has legislation regarding disability-inclusive research and innovation. However, several of the policy recommendations were directed towards the government to provide a policy guide and direction for the country. It was, therefore, recommended that the Persons with Disability Act, 715, which was alleged to be deficient in provisions relating to research and technology, be amended to be more relevant to the evolving digital world.

There were also calls for the government to develop additional policies to safeguard the rights of persons with disabilities in the digital and technology space. Also, a policy to guide universities, research institutions and industry to drive disability-inclusive research and innovations was recommended. Emphasis is placed on legislation to mandate inventors to include accessibility features to their products and services to make them more accessible to persons with disabilities. The new legislation is also to promote the rights of the "more vulnerable, especially persons with disabilities" not only to access innovative products and services but, also to address any challenges that the new technology will present to persons with

5.8.2 Prioritise Disability-inclusive Policies and Implementation

The lack of political will on the part of the government and state legislature to promulgate and pass disability-inclusive policies was bemoaned by the participants. This is evident from the fact that only one substantive national disability legislation exists in the ecosystem of Ghana, which does not adequately safeguard the rights of persons with disabilities, compared to other policies. Adequate budget allocation to effectively implement disability-inclusive research and technology was also recommended by the government. Participants bemoaned the non-allocation of budget to address disability issues in Ghana. The universities and other institutions are also recommended to prioritize policies for disability-inclusive research and innovations.



5.8.3 Monitoring

Many policies and legislations in Ghana encounter implementation challenges, including lack of enforcement emanating from lack of monitoring. It is recommended that both government and stakeholders keep track of and monitor the implementation of policies in the research and innovation ecosystem in Ghana. The government could charge the National Council on Persons with Disabilities to keep track of, monitor and evaluate disability-inclusive research and innovations. The disability-inclusive research and innovation policy could mandate that every contract signed in this space includes a clause on disability-inclusive research and innovation. The contractors should do due diligence and adhere to the provisions of the policy before final payment.

Another monitoring tool is a task force to ensure compliance with disability-related policies by all stakeholders in the research and innovation ecosystem. Another suggestion was the institution of a disability desk at all government and stakeholder agencies to ensure compliance.

5.9.0 INDUSTRY

5.9.1 Disability-Inclusive Design Department



01

There is a need for industry to invest in a department that will be responsible for addressing disability inclusion issues in the company. This department should be responsible for conducting a market analysis to find out what the needs of persons with disabilities are and how those needs could be addressed.

02

This department will address questions such as, "What exact products would persons with disabilities need? How should these products should be designed? Who should be responsible for ensuring that these goods are designed as required? How large is the market?

03

The department is necessary given that not much is known in the industry about the needs of persons with disabilities and the services that they require that are not in the market. The department is also necessary given that disability is unique, and all these dynamics should be considered in developing products and services to allow for the inclusion of persons with all forms of disabilities, including women, children and older people with disabilities.

Figure 12: Disability Inclusive Design Department

5.9.2 Baseline Market Study or Needs Assessment

A baseline market study or needs assessment is relevant to understanding what is needed in the market. The study could also reveal the possible threats and solutions. The geo-socioeconomic-cultural and technological contexts should be adequately accessed during this period to determine the kinds of technology that will be suitable for the Ghanaian ecosystem and at the same time adequately address the needs of persons with various forms of disabilities, including women, children, and older adults with disabilities and those living rural Ghana.

5.10.0. UNIVERSITIES AND RESEARCH INSTITUTIONS



5.10.1 Create Disability-Inclusive Research Units

Universities and research institutions should engage in disability-inclusive research to augment the knowledge of disability issues and the needs of persons with disabilities. This could also inform policies and practices that could better address disability issues.

5.11.0 ORGANISATIONS OF PERSONS WITH DISABILITIES

Organisations of persons with disabilities have been tasked with several activities including advocating for their rights, empowerment of members and the engagement of policy players and industry.

5.11.1 Advocacy

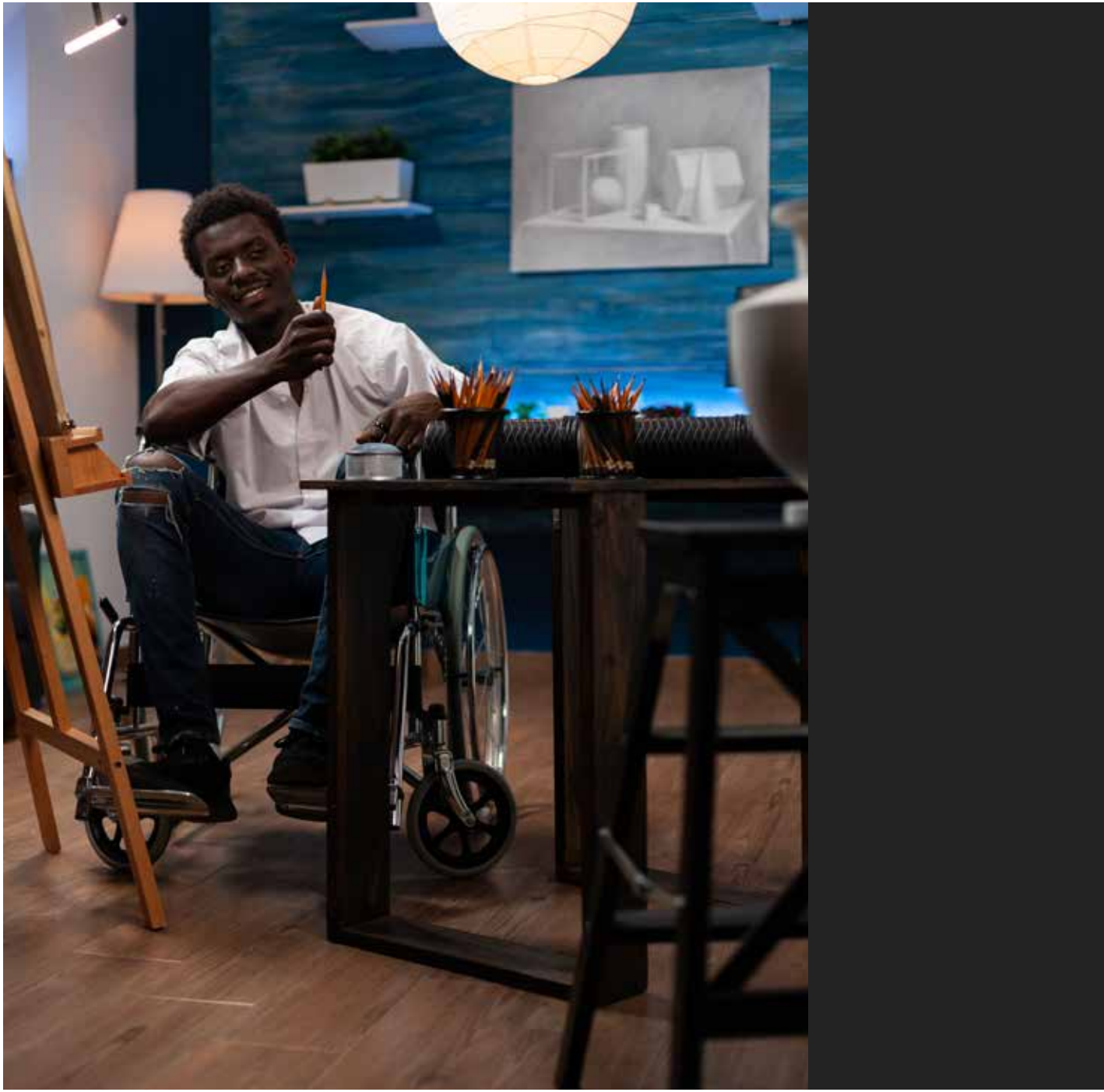
Organisations of persons with disabilities, such as the Ghana Federation of Persons with Disabilities, could advocate for disability-inclusive research and innovations, which are more likely to better their lives. They live their experiences and hence, "They should let their voices be heard". They should engage in advocacy that is driven by research and create more awareness about issues that affect persons with disabilities. Organisations of persons with disabilities could also engage policymakers to address inclusion issues. Given the entrenched negative perceptions and prejudice against persons with disabilities, organisations of persons with disabilities are advised to "Target election windows for effective advocacy for digital disability inclusion." They are also advised to engage industry players on how best to make their products and services accessible and inclusive.



5.11.2 Capacity Building for Members

The organisations of persons with disabilities should endeavour to empower members "with skills to be d-ready [digital ready] to occupy the digital spaces". The organisations of persons with disabilities should use different strategies to ensure that persons with different forms of disabilities, including women, children and older adults with disabilities benefit from the training. The training should be constant because of frequent technological changes; "PWDs should be trained/upgraded regularly to know what is available at all times since the technology keeps upgrading frequently". Regular training could update them about what is happening (new technologies) in the digital spaces and what they need to know.

Research institutions can also collaborate with organizations of persons with disabilities and other stakeholders to ensure that their research is inclusive and relevant. Organisations of persons with disabilities should collaborate with universities to build the capacity of their members to conduct disability-inclusive research.



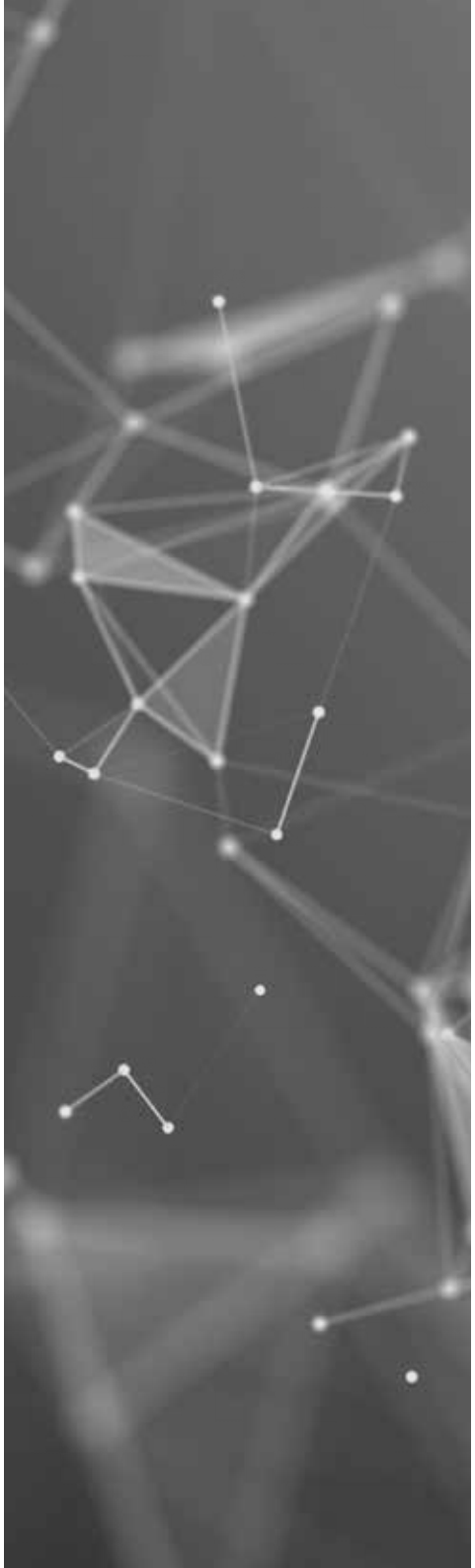
6.0 ANALYSIS OF ACCESSIBILITY, AFFORDABILITY AND UTILISATION OF TECHNOLOGY AND INNOVATIONS

The importance of technology in solving life's issues and promoting development cannot be overemphasized, likewise, the cost of technological products and services cannot be overlooked.



The cost of technology could affect the availability, accessibility and affordability of innovative products and services for persons with disabilities. Further, negative perceptions, stigma and discrimination towards persons with disabilities (Kassah, 2008; Mills, 2018; Naami, 2015) and resistance to change could affect the availability of disability-inclusive innovations.

Also, poverty could deter many persons with disabilities in the Ghanaian ecosystem from using relevant technologies to better their lives as they are overrepresented among the poor because they are less likely to have access to education, jobs, and regular income, in addition to high disability-related expenses (Naami, 2015; Naami, 2019; World Bank, 2021). For example, the few innovations that exist require the use of smartphones and internet services. However, many persons with disabilities cannot afford to buy smartmobile phones due to poverty (Naami & Mfoafo-M'Carthy, 2020). Those who have mobile phones encounter other barriers, including internet data costs, which are relatively expensive in Ghana (Mensah, 2021). Apps and services that address the needs of persons with disabilities could be more data-consuming because of the use of features such as voice and video conferencing. The lack of technical know-how of persons with disabilities in the use of these devices is yet another barrier.



Persons with disabilities in rural Ghana, where poverty is prevalent (Ghana Statistical Service [GSS], 2018), could even be more vulnerable due to geographic location. Besides the difficulty of buying smartphones and paying for internet services, some of these areas are yet to be connected to the national electricity grid. All these factors could complicate the experiences of persons with disabilities in rural Ghana. Women with disabilities are also likely to be affected adversely because of the interaction of gender and disability. Women with disabilities are not only more likely to be poorer than women without disabilities but also than their male counterparts with disabilities (Mitra 2006; Naami, 2015; WHO, 2011).

7.0 DISABILITY-INCLUSIVE RESEARCH AND INNOVATIONS IMPLEMENTATION STRATEGY blue print

The importance of technology in solving life's issues and promoting development cannot be overemphasized, likewise, the cost of technological products and services cannot be overlooked.



7.1 Proposed Paradigm

A paradigm shift from the top-down to the bottom-up approach to problem-solving is proposed to promote disability-inclusive research and innovations. This paradigm seeks to foster greater dialogue among government, universities, research institutions, industry and OPDs for engagement in the development of disability-inclusive research and innovative policy processes. The principle underpinning this paradigm is dialogue at all levels. Integrating the perspectives of stakeholders is necessary to effectively respond to the needs of persons with disabilities in ways that could make innovative products and services accessible, affordable and usable to them. All stakeholders should seek the guidance of persons with disabilities and learn to listen to their perspectives in this space, since they are expert knowers of their issues and needs and could help in finding solutions to their challenges.

For disability-inclusive research and innovation to become available, accessible, affordable and usable for persons with disabilities, the following recommendations have been made. They include policy, funding, policy enforcement and monitoring, disability-inclusive research, disability-inclusive design, capacity building, employment of persons with disabilities and advocacy. Each recommendation is accompanied by a set of strategies and suggested actions to operationalize the strategies.



7.2 Policy

Policy direction includes disability-inclusive innovation policy and research policy that considers ethical standards and rights of persons with disabilities, a policy that mandates the employment of qualified persons with disabilities in the digital technology and innovation space and provides appropriate disability-inclusive innovation accommodation for employees with disabilities. Another dimension is a policy that mandates government, industry, university, and research institutions to incorporate disability-inclusive research and innovation funding into their budgets.

The government must actively engage all stakeholders in this sector (universities, research institutions, the industry and organisations of persons with disabilities) in the policy-making processes. A Research and Innovation Advisory Forum (RIAF), consisting of the government (NCPD, MoGCSP), academic and research institutions, industry, and organisations of persons with disabilities should be established. The RIAF should oversee the conduct of needs assessments and determine priority areas and direction for disability-inclusive research and innovations before enacting disability-related policy.



7.3 Funding

Funding areas include government incentives to motivate producers to produce disability-inclusive innovative products and services, subsidies for designers and developers of disability-related innovative products and services, and grants/subsidies to support persons with disabilities to access innovative products and services. Also, funding from corporate social responsibility, donors, foundations, philanthropic organisations and individuals could be used to subsidise innovative products and services to make them affordable for persons with disabilities. In addition, support to fund the activities of persons with disabilities in the inclusive research and innovation space is recommended.



Several actions are required to make funding available to promote research and innovations that are accessible and affordable to persons with disabilities. The government could establish a unit under the Ministry of Finance to oversee funding support for disability-inclusive research and innovations. A funding regulatory body is necessary to work out modalities to operationalise funding for disability-inclusive research and innovations. This unit should be made up of representatives from Ministries of Finance, Trade and Industry, Gender, Children and Social Protections and Communication and Digitisation. Efforts should be made to foster relationships between funders, innovators, and academic and research institutions working on disability-inclusive research and innovations to maximise impact. The regulatory body will work with funding institutions to incorporate disability-inclusive research and innovation requirements into calls for funding.

7.4 Enforcement and Monitoring

For the effective implementation of disability-inclusive research and innovative policies, the government must allocate a budget for enforcement. Political will to promote enforcement and monitoring cannot be overemphasised. Effective monitoring would ensure that innovative products and services address the needs of persons with all forms of disabilities, including women, children, and adults with disabilities and those from rural Ghana.

The government could establish a disability desk at the presidency, in addition to the NCPD for effective monitoring and implementation of disability-inclusive research and innovation policy. These two entities will provide information (e.g., the outcome of needs-based assessments, disability-related issues, available support systems, and other resources in the Ghanaian ecosystem) to the general public, OPDs, industry, and academic and research institutions working to address disability-inclusive research and innovations. The two entities (disability desk and NCPD) should also develop a guide for evaluating disability-inclusive research and innovations and set measures to identify and mitigate risks and negative impacts of innovation for persons with disabilities.



7.5 Disability-Inclusive Research

Universities, research institutions and other researchers must conduct disability-inclusive research and use findings to create disability awareness. Study outcomes could inform the technological needs of persons with various kinds of disabilities including women, children, and older adults with disabilities and those in rural Ghana. Universities and research institutions should create disability-inclusive units that would supervise the implementation of disability-inclusive research. The unit would monitor adherence to ethical standards and the use of co-creation and participatory research methodologies. Academic and research institutions will collaborate with OPDs to empower the university community (lecturers, researchers, technicians, managers, communication officers, support staff, and students) to become acquainted with disability-inclusive issues. The units would also work with the institutions' management to motivate professors, lecturers, graduates and teaching assistants to incorporate disability-inclusive research and innovation principles in their syllabi as well as use persons with disabilities as guest lecturers. Universities should develop mandatory courses on disability inclusion and encourage departments/programmes to incorporate disability-inclusion principles in their curricula. Academic and research institutions can help test the usability of the methodology and innovation prototypes (i.e., piloting with persons with disabilities).



7.6 Disability-Inclusive Design

Two main dimensions of disability-inclusive designs, innovative products and services (e.g., digital platforms services) are recommended. To operationalise disability-inclusive innovations must establish a disability-inclusive design department (DIDD), which will oversee the development of innovations. The department must conduct a baseline market study or market analysis about the needs of persons with disabilities. Industry will co-create user-driven innovations and will collaborate with OPDs to co-design innovations (e.g., by testing the usability of the products with PWDs). The DIDD will also ensure that innovations are suitable for the local context and tailored to the needs of persons with disabilities. The DIDD will ensure that innovative products and services are accessible to persons with all forms of disabilities, including women, children, and older adults with disabilities.

7.7 Capacity Building

Capacity building is necessary to implement disability-inclusive research and innovations. Various levels of capacity building are necessary: capacity building for PWDs, industry actors and academic and research institutions.

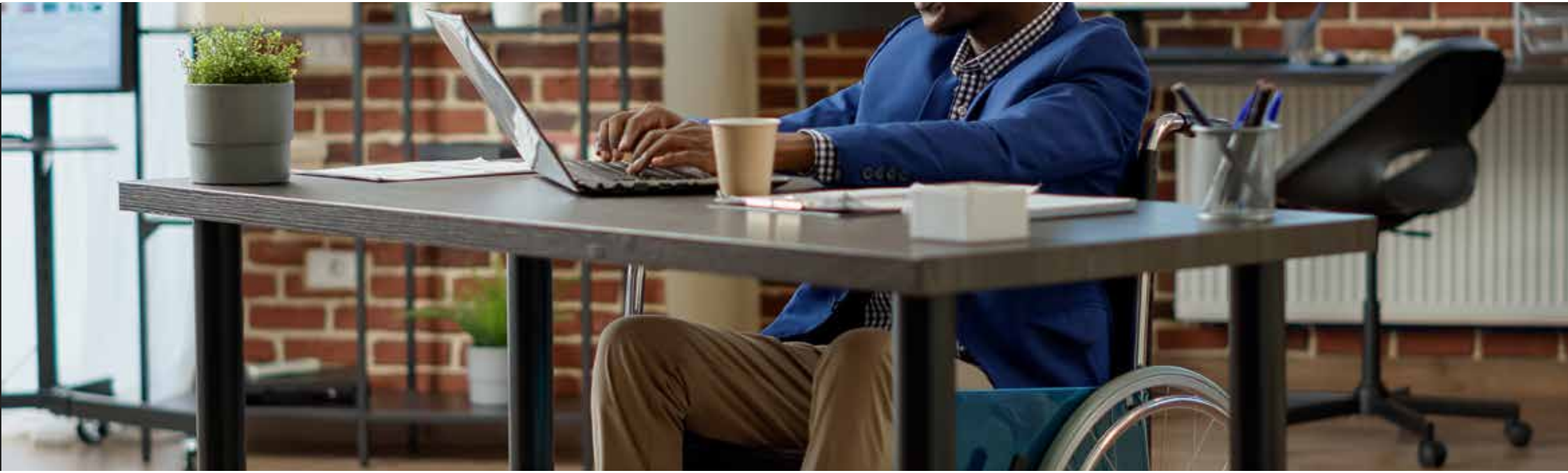
Organisations of persons with disabilities and the NCPD should provide technology literacy for PWDs. For example, they can empower PWDs to know about available innovative products and services in the ecosystem and how to access them. The government, specifically the Technical Vocational and Education Training (TVET) should collaborate with industry, OPDs and the NCPD to build the capacity of persons with disabilities in the digital space to enable them to work in this sector.

The Disability-Inclusive Design Department (DIDD) could collaborate with OPDs and the NCPD to build the capacity of the staff of industry, universities and research institutions about disability issues and to enhance awareness of the negative consequences of not using inclusive innovative products and services. The DIDD should also organise training about tools and other resources available in the ecosystem to aid disability-inclusive research and innovation.



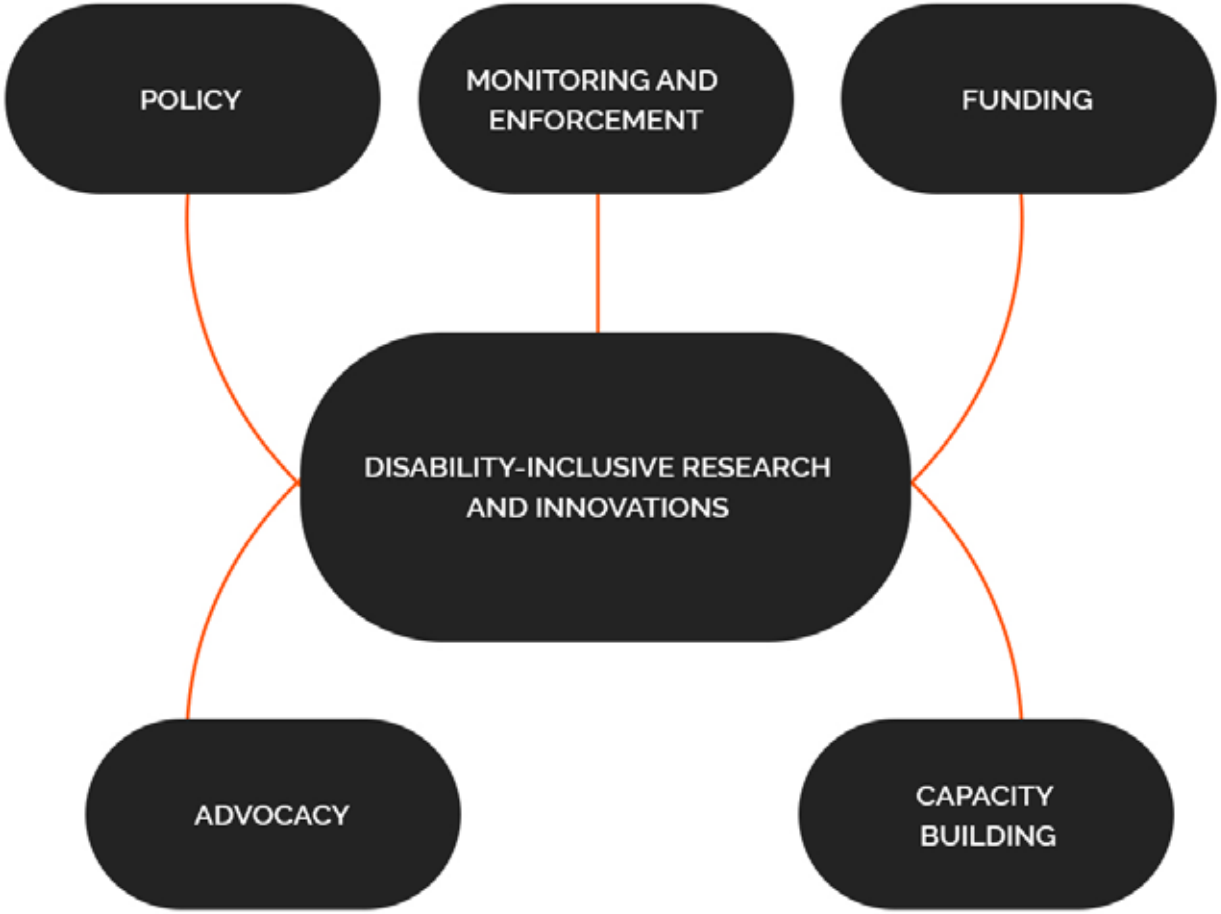
7.8 Employment of Persons with Disabilities

Two dimensions of employment of PWDs are proposed: government policy quota provisions (for government and private institutions) and empowerment (e.g., start-up capital) for PWDs. For implementation, academic and research institutions could employ PWDs as co-researchers, research assistants, secretaries, IT specialists and software engineers. The government and industry could also employ qualified PWDs. Government financial/technical support for the self-employment of PWDs is necessary for the employment of PWDs in the technology and digital space.



7.9 Advocacy

Advocacy strategies will focus on creating more awareness about the issues that affect persons with disabilities, using existing research to inform advocacy and empowering members of OPDs to conduct disability-inclusive research to inform advocacy, policy, and practice. Efforts will also target engaging industry players to make products and services inclusive and accessible, academic and research institutions to make research disability inclusive and the media to support advocacy efforts of OPDs.



ACCESSIBILITY, AVAILABILITY AND AFFORDABILITY

DISABILITY-INCLUSIVE RESEARCH AND INNOVATIONS STRATEGY

Table 1

KEY RECOMMENDATIONS	STRATEGIES/DIMENSION	ACTION POINTS	ACTORS
KEY RECOMMENDATIONS **Policy**	**Policy Dimensions:** 1. Disability-inclusive research policy that considers ethical standards and rights of persons with disabilities. 2. Disability-inclusive innovation policy 3. A policy that mandates appropriate disability-inclusive innovation accommodation for employees with disabilities 4. Policy that mandates the employment of qualified PWDs in the digital/innovation space 5. Policy dimension that incorporates disability-inclusive research and innovation into funding (Government, industry, university, and research institutions)	1. Form a Research and Innovation Advisory Forum (RIAF), consisting of the government, academic and research institutions, industry and OPDs. 2. RIAF oversees the conduct of a needs assessment. 3. RIAF determines priority areas and direction towards inclusive research and innovations before enacting disability-related policy. 4. Government engages in inclusive policy-making processes, where all stakeholders are actively involved.	Government (National Council on Persons with Disabilities-NCPD, Ministry of Gender, Children and Social Protection-MoGCSP) Research Unit, Industry, Universities, Research Institutions, OPDs

Funding	1. Government incentives to motivate the production of inclusive innovative products and services. 2. Government subsidies to developers 3. Government grants/subsidies to support PWDs to access innovative products and services. 4. Corporate social responsibility • Donor funding, • Foundations, philanthropic organisations and Philanthropists 5. Funding support to enable active participation of PWDs in inclusive research and innovation space	1. Establish a government unit under the Ministry of Finance to oversee funding support for inclusive research and innovation. 2. Funding regulatory body: The representatives from (Ministry of Finance, Ministry of Trade and Industry, Ministry of Gender Children and Social Protections, and Ministry of Communication and Digitisation) will form a regulatory body that will work out modalities to operationalise funding for disability-inclusive research and innovation. 3. Foster relationships between funders, innovators, and academic and research institutions working on inclusive research and innovations to maximise impact. 4. Task funding teams to incorporate disability-inclusive research and innovation requirements into funding calls.	Government, Ministry of Finances, Ministry of Trade and Industry, Ministry of Gender Children and Social Protections, Ministry of Communication and Digitisation, funders, academic and research institutions, and industry
Enforcement and Monitoring	1. Budget allocation for enforcement 2. Political will to promote enforcement and monitoring. 3. Donor requirement for funding 4. Ensure the right products are produced for persons with all	1. Create a disability desk at the presidency. 2. The disability desk and the NCPD will be responsible for monitoring and implementing the disability inclusion research and innovation policy. 3. Provide information (e.g., needs-based assessment, disability issues, available support systems, tools) to the public, OPDs, industry, and academic and research institutions working to address inclusive research and innovations.	MoGCSP, NCPD, OPDs

	forms of disabilities. 5. Strong commitment of Government to enforcement of policies	4. Gather tools and resources to guide universities, researchers, and industry, in disability-inclusive research and innovation development. 5. Develop a guide for evaluating disability-inclusive research and innovations. 6. Set measures to identify and mitigate the risks and negative impacts of innovation for PWDs. 7. Institute fines for non-compliance.	
Disability-Inclusive Research	1. Conduct disability-inclusive research 2. Use research outcomes for disability awareness creation. 3. Use research outcomes to inform the technological needs of persons with various kinds of disabilities.	1. Create disability-inclusive units within academic research institutions and TVET. 2. Use co-creation and participatory and transformational research methodologies for disability-inclusive research. 3. Adherence to ethical standards 4. Academic and research institutions will collaborate with OPDs to empower the university community (lecturers, researchers, technicians, managers, communication officers, support staff, and students) to become acquainted with disability inclusion issues. 5. Professors, lecturers, and teaching assistants can also be motivated to incorporate inclusive research and innovation principles in their syllabi and use guest PWDs as lecturers. 6. Departments/programmes could incorporate disability inclusion in their curricula 7. Create awareness about disability inclusion in the university community. 8. Academic and research institutions can help test the usability of methodology (piloting) with OPDs and their constituents in urban/rural areas as well as representation of all categories of PWDs and by gender and age. 9. Develop university-required courses.	OPDs, Universities, Research Institutions

		10. Work with OPDs and NCPWDs to develop disaggregated data on PWDs to inform decision-making	
Disability-Inclusive Design	1. Innovative products 2. Innovative services (e.g., digital platforms services)	1. Establish a disability-inclusive design department (DIDD) which will oversee the development of innovations. 2. Conduct a baseline market study or market analysis about the product and service needs of PWDs. 3. Co-design innovations with OPDs (e.g., they can test the usability of the products with PWDs) 4. Co-create user-driven innovations. Ensure that innovations are suitable to the local context and are tailored to the needs of PWDs. 5. Ensure that innovative products and services are accessible to persons with all forms of disabilities	Industry, academic and research institutions-including technical institutions, Technical Vocation and Education Training-TVET, OPDs
Capacity building	1. Capacity building for PWDs 2. Capacity building for industry actors 3. Capacity building for academic and research institutions	**Capacity building for PWDs** 1. OPDs/NCPD embark on training of PWDs about available innovative products and services in the ecosystem and how to access them. 2. OPDs/NCPD train PWDs in technology/digital literacy 3. The government (TVET) should collaborate with the industry, OPDs/ NCPD to build the capacity of PWDs in the digital space to enable them to work in this sector. 4. Collaborate with the TVET to train PWDs in **Industry** 1. DIDD collaborate with OPDs to create staff awareness and knowledge about disability.	Industry, OPDs, NCPD, TVET, universities and research institutions

		2. DIDD collaborate with OPDs to enhance awareness of the negative consequences of not using inclusive innovations. 3. Training about tools and other resources that exist in the ecosystem	
Employment of Persons with Disabilities	1. Quota for the employment of PWDs in government and private institutions 2. Empowerment of trained PWDs	1. Academic and research institutions should employ PWDs as co-researchers, research assistants, secretaries, IT specialists, software engineers, etc. 2. The industry should employ qualified PWDs in the sector. 3. The government should employ qualified PWDs to work in government agencies in IT/digital space. 4. PWDs should be empowered to work in the digital space through short courses and training in TVET. 5. Government financial/technical support for self-employment of PWDs.	Ministry of Employment and Labour Relations, OPDs, Universities, Industry
Advocacy	1. Quota for the employment of PWDs in government and private institutions 2. Empowerment of trained PWDs	1. Create more awareness about issues that affect persons with disabilities such as physical, social, and information barriers. 2. Use existing research to inform advocacy. 3. Empower members to conduct disability-inclusive research to inform advocacy, policy, and practice. 4. Engage industry players on how best to make products and services inclusive and accessible to various categories of PWDs. 5. Engage academic and research institutions on how to make research disability-inclusive. 6. Engage the media in all advocacy efforts, including the use of social media platforms	OPDs, Industry, Academic and Research Institutions, Media

Workplan

Based on approved activities by Heritors Labs during the inception meeting, implementation of the assignment is scheduled to be completed at the end of April 2023 as presented in Table 2.

		February 2023					March 2023					April 2023					Tentative Dates
Stages	**Activities**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Stage 1: Inception	Signing of Contract																08/02/2023
	Inception Meeting																20/02/2023
	Development of an inception report																28/02/2023
Stage 2: Assessment Roll-out	Data collection																15/03/2023
	Paradigm assessment draft																31/03/2023
	Development of blueprint																07/04/2023
Stage 3: Analysis and Reporting	Stakeholder engagement workshop																13/04/2023
	Submission of final blueprint																28/04/2023

REFERENCES

Agbenyega, J. (2005). The power of labelling discourse in the construction of disability in Ghana. In A paper presented at the Australian Association for Research in Education conference, Newcastle, Association of Active Educational Researchers (AARE) (Vol. 16).

Badu E, Agyei-baffour P, Peprah Opoku M (2016). Access barriers to healthcare among people with disabilities in the Kumasi Metropolis of Ghana. Canadian Journal of Disability Studies, 5(2), 131–151.

Blunt, C., Blyth, C., Chapman, R., Frost, L., Hayward, D., Hughes, R., ... & Townson, L. (2012). The research and work of learning-disabled people with their allies and supporters. [Special issue]. British Journal of Learning Disabilities, 40, 83-84.

Braun, A. & Naami, A. (2019). Access to higher education in Ghana: Examining the experiences through the lens of students with mobility disabilities. Journal of Disability, Development and Education, 68(1). https://doi.org/10.1080/1034912X.2019.1651833

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative research in psychology, 3(2), 77-101.

Creswell, J. W. (2014). Research Design: Qualitative, Quantitative and Mixed Methods Approaches (4th ed.). Thousand Oaks, CA: Sage.

Danker, J., Strnadová, I., Tso, M., Loblinzk, J., Cumming, T. M., & Martin, A. J. (2022). 'It will open your world up': The role of mobile technology in promoting social inclusion among adults with intellectual disabilities. British Journal of Learning Disabilities. Disability & Society, 23(2), 163-170.

Ghana Statistical Service. (2018). Ghana Living Standards Survey Round 7 (GLSS 7): Poverty

Ghana Statistical Service. (2021). Ghana 2021 population and housing census: General report (Vol. 3). Accra

Hayashi, R., & May, G. (2011). The effect of exposure to a professor with a visible disability on students' attitudes towards disabilities. Journal of Social Work in Disability & Rehabilitation, 10(1), 36–48.

Johnson, K., & Walmsley, J. (2003). Inclusive research with people with learning disabilities: Past, present and futures. Jessica Kingsley Publishers.

Kassah A. K (2008). Disabled people and begging justifications in Accra-Ghana.

Kirst-Ashman, K. K., & Hull Jr, G. H. (2014). Brooks/Cole empowerment series: Understanding generalist practice. Cengage Learning.

Mensah, C. (2021). Using web-survey to collect data on psychological impacts of COVID-19 on hotel employees in Ghana: A methodological review. Cogent Psychology, 8(1), p.1880257.

Mills, A. A. (2019). Inclusive education for children with intellectual disability in Ghana: Challenges and implications for social work. Advances in Social Work, 19(2), 329-348. DOI:10.18060/22539.

Mitra, S. (2006). The capability approach and disability. Journal of disability policy studies, 16(4), pp.236-247.

Naami, A., & Hayashi, R. (2012). Perceptions about disability among Ghanaian university students. Journal of Social Work in Disability & Rehabilitation, 11, 100-111. DOI: 10.1080/1536710X.2012.677616

Naami, A. & Mfoafo M'Charty, M. (2020). COVID-19: The vulnerabilities of persons with disabilities in Ghana. African Journal of Social Work, 10(3), 9-16

Naami, A. (2015). Disability, gender, and employment relationships in Africa: The case of Ghana. African Journal of Disability Studies, 4(1), 1-11 file:///C:/Users/tina/Downloads/95-2186-1-PB%20(1).pdf

Naami, A. (2019). Ethical concerns regarding rights of people living with disabilities in Ghana. In Y. A. Frimpong-Mansoh & C.A. Atuire (Eds.), Bioethics in Africa: Theories and praxis. Wilmington, US: Vernon Press. https://vernonpress.com/book/512

Naami, A., Mills, A.A. & Abbey, E. Financial Capability and Asset Building (FCAB) for Persons with Disabilities in Ghana: The Role of Social Workers. Glob Soc Welf (2022). https://doi.org/10.1007/s40609-022-00250-x

Ocloo, M. A., Morttey, D. B., & Boison, C. (2005). Comprehensive study notes on special education. Accra: Salt and Light.

Schillo, R. S., & Robinson, R. M. (2017). Inclusive innovation in developed countries: The who, what, why, and how. Technology Innovation Management Review, 7(7).

Shannon, C. D., Schoen, B., & Tansey, T. N. (2009). The effect of contact, context, and social power on undergraduate attitudes toward persons with disabilities. Journal of Rehabilitation, 75(4), 11–18.

Singleton, Jr. R. A. & Straits, B. (2010). Approaches to social research, 5th Edn. Oxford University Press: New York.

Tijm M.M, Cornielje H, Edusei A.K (2011). 'Welcome to my life!' photovoice: Needs assessment of and by persons with physical disabilities in the Kumasi metropolis, Ghana. Disability, CBR and Inclusive Development, 22(1), 55-72.Trends in Ghana 2005–2017. Accra, Ghana.

Waller, S., Bradley, M., Hosking, I., & Clarkson, P. J. (2015). Making the case for inclusive design. Applied ergonomics, 46, 297-303.

Walmsley J. & Johnson K. (2003) Inclusive Research with People with Learning Disabilities Past, Present and Futures. Jessica Kingsley, London.

Walmsley, J. (2001). Normalisation, emancipatory research, and inclusive research in learning disability. Disability & Society, 16(2), 187-205.

Walmsley, J. (2004a). Inclusive learning disability research: the (nondisabled) researcher's role. British Journal of Learning Disabilities, 32 (2): 65-71.

Williams, V., Ponting, L., Ford, K., & Rudge, P. (2009). 'A bit of common ground': personalisation and the use of shared knowledge in interactions between people with learning disabilities and their personal assistants. Discourse studies, 11(5), 607-624.

World Health Organization. (2011). World report on disability, viewed June 27, 2014, from http://www.who.int/disabilities/world_report/2011/report.pd

APPENDIX 1: SURVEY

DEVELOPMENT of Inclusion, Enablement, Availability, Accessibility & Utilisation Framework for PWD in Research and Innovation Ghana

KEY STAKEHOLDER QUESTIONNAIRE

Basic information

Name of Institution .....

Unit/section/division.....

Position/rank: .....

1. Gender:
   a. Female
   b. Male
2. Age
   a. 20 - 25
   b. 26 – 31
   c. 32 – 37
   d. 38 – 43
   e. 44 – 49
   f. 50 – 55
   g. 56 and above.
3. What is your level of Educational?
   a. SSS Certificate
   b. O' Level Certificate
   c. A' level Certificate
   d. Polytechnic Degree
   e. Bachelor Degree
   f. Master's Degree
   h. PhD Degree
   i. Other, please specify.....
4. What type of Institution do you work in?
   a. Private Institution
   b. Public Institution
   c. Non-Governmental Institution
5. Please specify your institution:
   a. Academic Institution
   b. Research Institution
   c. Other, please specify.....
6. Years of overall working experience
   a. 1 – 5 years
   b. 6 – 10 years
   c. 11 – 15 years
   d. 16 years and above
7. Years of working experience in the current organization
   a. 1 – 5 years
   b. 6 – 10 years
   c. 11 – 15 years
   d. 6 years and above
8. Are you a person with a disability?
   a. Yes
   b. No
9. Do you directly work with persons with disabilities in your role?
   a. Yes
   b. No

QUESTIONNAIRE

For each of the statements below, indicate the extent to which your institution has addressed the issues raised.

My institution has……	YES	NO	NOT SURE	N/A
1. My institution has a disability policy that takes into consideration the needs of all persons with disabilities.				
2. My institution has a disability policy with sections on disability-inclusive research. ***NOTE:*** **a. Please proceed to the rest of the questions if you answered yes to this question.** **b. Please do not proceed with the rest of the questionnaire if you answered no to this question.**				
3. My institution has a research policy that takes into consideration the needs of all persons with disabilities and researchers with disabilities (inclusive research policy). ***NOTE: If you answered not sure, briefly explain why……*** ***……***				
4. My institution has research documents that are accessible to all persons with disabilities (e.g., persons with visual and developmental disabilities).				
5. My institution has taken measures to create awareness of inclusive research policies internally.				
6. My institution has taken measures to implement inclusive research policies internally.				

7.	My institution has taken measures to create awareness of the sections on disability-inclusive research among external communities like the general public/any other measures like mass media among others.				
8.	My institution partnered with organisations of persons with disabilities in drafting the research policy				
9.	My institution has partnered with organisations of persons with disabilities/ disability experts/ researchers with disabilities to organise disability-related training/advice.				
10.	My institution seeks ethical approval for research work done.				
11.	Are there any best practices in disability research and innovation in Ghana that you know of.				
12.	If you answered yes, kindly list these best practices.				
Please rate the extent of your agreement with the statements below:		• Strongly agree, • Agree • Neither agree nor disagree • Disagree strongly • Disagree			
13	Researchers have a duty to ensure their research is disability inclusive.				
14.	Disability inclusive research and innovations should be prioritised by stakeholders in this space.	• Strongly agree, • Agree • Neither agree nor disagree • Disagree Strongly • Disagree			
15.	What is the role of the following stakeholders in promoting disability-inclusive research and innovations?	Yes No			

Government	List them
Universities	List them
Research Institutions	List them
Industry	List them
Organisations of Persons with Disabilities	List them

APPENDIX 2:
ANALYTICAL FRAMEWORK FOR DISABILITY SYSTEMS

SYSTEMS/INNOVATIONS/ BEST PRACTICES	QUESTIONS	YES	NO	COMMENTS
DISABILITY POLICIES IN GHANA				
The Disability Act 2006 (Act 715)	Does this policy address disability-inclusive research? If yes how?		NO	There is the mention of the promotion of studies and research on issues of disability and the provision of education and information to the public on issues of disability. However, the issue of inclusive research is not addressed in the act
1992 Constitution of the Republic	Does this system address disability-inclusive research? If yes how?		NO	Even though the constitution defines what "discriminate" means and relates to persons with disabilities, it makes no mention of research or engagement with persons with disabilities in matters concerning their lives and livelihoods.

SYSTEMS USED IN THE REST OF THE WORLD				
GLOBAL POLICIES				
The United Nations Convention on the Rights of Persons with Disabilities (CRPD)	Does this system address disability-inclusive research? If yes how?	YES		Article 32 of the convention stipulates that there should be the facilitation of cooperation in research and access to scientific and technical knowledge regarding disability issues.
Disability Rights in Wales	Does this system address disability-inclusive research? If yes how?	YES		With regards to the implementation of the CRPD in Wales, the Welsh Government states a framework based on four key values: confidence, cooperation, co-production, and choice and control which connotes an inclusive research agenda for persons living with disabilities.
The Health and Social Care Act of 2012 of England	Does this system address disability-inclusive research?	YES		The Act places obligations on public agencies to facilitate the coproduction, participation, and involvement of the general public in the process of

	If yes how?			decision-making. This is a good step toward ensuring that people's opinions are taken into account at all stages of policymaking.
The Community Empowerment (Scotland) Act 2015	Does this system address disability-inclusive research? If yes how?			The Community Empowerment (Scotland) Act 2015 supports the concept of coproduction by mandating that communities be given a larger voice in the decision-making process about matters that are relevant to their everyday life. The Act encourages both residents and public authorities to take shared responsibility for the development of communities that are conducive to the well-being of their members.
DISABILITY INCLUSIVE RESEARCH SYSTEMS IN GHANA				
Ghana Federation of the Disabled (GFD)	Does this system address disability-inclusive research?	YES		The federation does not describe its research activities as inclusive, yet it conducts studies based on the tenets of inclusive research.

				For instance, in a project titled "Strengthening the Disability Movement of Ghana Project" funded by DANIDA, the federation engaged some organisations of persons with disabilities to generate a database that could make suggestions towards the strengthening of the disability movement in the respective areas
Centre for Disability and Rehabilitation Studies-KNUST	Does this system address disability-inclusive research?	YES		The centre conducts studies on disability issues and collaborates with other institutions in matters regarding disabilities.
DISABILITY INCLUSIVE RESEARCH SYSTEMS GLOBALLY				
Centre of Excellence on Data for Children with Disabilities.	Does this innovation address inclusive research? If yes how?	YES		UNICEF launched the Centre of Excellence on Data for Children with Disabilities since it recognizes that data on children with disabilities is at the core of research about them, for them, and with them.

National Disability Authority of Ireland	Does this innovation address inclusive research? If yes how	YES		The Authority has several published resources on disability issues on its website and they develop guidance on collaborative research with persons with disabilities among several other activities.
United Nations	Does this innovation address inclusive research? If yes how?	YES		From the 2018 Disability and Development Report, The UN notes that the success of the 2030 Agenda requires a participatory and inclusive approach in which all stakeholders, including persons with disabilities, are engaged.
The World Health Organisation (WHO) and World Bank	Does this innovation address inclusive research? If yes how?	YES		The 2011 World Report on Disability suggests that the WHO and World Bank believe when Disabled people's organizations collaborate with researchers to support applied research, there could be enhanced service development.

Scottish Coproduction Network	Does this innovation address inclusive research? If yes how	YES		This is a group of individuals with the backing of the Scottish government who have the vision of ensuring that all people are valued and supported to meaningfully participate in shaping and delivering services, building, and strengthening their communities, and creating change.
Disability Policy & Research Working Group of Australia	Does this innovation address inclusive research? If yes how?	YES		This is a standing committee of the Community and Disability Services Ministers' Advisory Council in Australia that provides information about the work of the group and provides a forum for sharing information and publications about important issues in the disability sector.
Getting Things Changed research project by the University of Bristol	Does this innovation address inclusive research? If yes how?	YES		Getting Things Changed was a research study which had the mission of tackling disabling social practices across a wide range of areas. The project was co-produced with Persons with Disabilities and Disability Rights UK at the University of Bristol

University of Leeds Center for Disability Studies	Does this innovation address inclusive research? If yes how	YES		The Centre runs a regular and lively Conversation Series featuring guest speakers from disabled people's organisations, NGOs and academia. The centre views research and education as linked activities and adopts 'committed' participatory methods in its activities
University of Glasgow Center for Disability Studies	Does this innovation address inclusive research? If yes how?	YES		The mission of the centre is to engage with disabled people and their organisations to carry out research that is relevant to the lives of people with a range of impairments and advances the rights of disabled people. This they do by developing and employing a barriers-based approach
The Disability Research Group at the University of Strathclyde	Does this innovation address inclusive research? If yes how?	YES		The Disability Research Group brings together academics from across four faculties (Engineering, Humanities and Social Sciences, Science, and Business) who work on topics related to disability and are interested in exchanging ideas and knowledge. It aims to foster a comprehensive and multi-faceted

Inclusive Friends Association	Does this innovation address inclusive research? If yes how	YES		The association organizes learning sessions; and conducts training on research skills for PWDs, citizen election observation skills, data gathering skills and methodologies, etc. to ensure that PWDs have the requisite skills to drive advocacy for themselves.
The National Disability Research Partnership	Does this innovation address inclusive research? If yes how?	YES		This Research Partnership which will start in June 2023 seeks to fund research led by and with people with disability. It will help to facilitate a collaborative and inclusive disability research program that builds evidence for successful policy and practice.
Disability Innovation Institute at the University of New South Wales (UNSW)	Does this innovation address inclusive research? If yes how?	YES		The institute provides guidance on inclusive approaches to disability research and education for UNSW staff and students and highlights innovative practices through public events including interdisciplinary research seminars

Centre for Disability Research and Training (CDRT) of India	Does this innovation address inclusive research? If yes how	YES		The CDRT promotes and popularizes disability studies within the Indian academia. In the pursuit of the above goal, the Centre organizes a wide range of academic activities, from faculty development programs and certificate courses to international conferences and webinars on disability studies
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Disability Research Network	Does this innovation address inclusive research? If yes how?	YES		The Disability Research Network is a multi-disciplinary initiative aimed at enhancing collaboration between people with disabilities, academics, policymakers, practitioners and community and voluntary sector organisations with an interest in co-produced disability research
Disability Research Collection of the Analysis & Policy Observatory (APO) platform	Does this innovation address inclusive research? If yes how?	YES		APO is a not-for-profit collaborative knowledge infrastructure and web platform working with partners from universities and organisations across Australia, New Zealand, the Pacific, and beyond to provide a collection

				of accessible versions of documents regarding collaborative and inclusive disability research programs in plain language summaries, easy English or audio versions.
Disability Advocacy Research in Europe (DARE)	Does this innovation address inclusive research? If yes how?	YES		DARE equips a new generation of researchers to respond to global challenges facing persons with disabilities and policymakers. Its goal is to give legitimacy, through research, to the lived experience of persons with disabilities, as a basis for law reform.
The Advancing Disability Inclusive Research in Africa Network (ADIRA)	Does this innovation address inclusive research? If yes how?	YES		ADIRA sets out to build capacity for the conduct of research on disability by African researchers, in particular researchers with disabilities and conduct innovative and high-quality research on disability in Africa, that has the potential to shape policy and programmes.

The Critical Disability Studies Research Network	Does this innovation address inclusive research? If yes how?	YES		The network seeks to provide an organised, respectful, and partnership-focused framework for researchers to work with people with disabilities so that the latter are not consulted haphazardly and inappropriately.
INNOVATIVE PRODUCTS AND SERVICES IN GHANA				
Digital Property Address System	Does this product address disability inclusion?		NO	The national digital address system was launched in October 2017. It was called "GhanaPostGPS". The system works by ascribing locations and properties with a permanent digital address system by using a combination of GPS and the GhanaPost app.
Paperless Ports	Does this product address disability inclusion?		NO	Although paperless ports are for everybody to benefit from, however, there is a need for more education for the various groups of people in the country, and this includes persons with disabilities, to understand its use and benefits so that

				they can equally benefit from it
E-pharmacy	Does this product address disability inclusion?		NO	E-Pharmacy deals with the preparation and sale of prescription and non-prescription pharmaceuticals online. E-pharmacies accept orders online via the use of the Internet and mail the medications to their intended recipients.
Financial Technology	Does this product address disability inclusion?		NO	FinTech (financial technology) is a catch-all term referring to software, mobile applications, and other technologies created to improve and automate traditional forms of finance for businesses and consumers alike. FinTech can include everything from straightforward mobile payment apps to complex blockchain networks housing encrypted transactions
Drones	Does this product address disability inclusion?		NO	Also, in 2019, the government, in collaboration with Zipline Company in the United States, started using drones to distribute blood and essential medicines in four locations in Ghana. When COVID-19 broke out, drones were used to carry

				blood samples across the operation areas (WHO, 2022).
Agritech	Does this product address disability inclusion?		NO	Agritech, which refers to Agricultural technologies information use platforms and devices that are not accessible for persons with disabilities through mobile devices. Many of these features are not accessible to persons with disabilities.
Digital Payment Systems	Does this product address disability inclusion?		NO	Digital payment system is not disability inclusive because it involves the use of digital devices like mobile phones, tablets or computers and most persons with disabilities are not able to use these devices because most of these devices and their applications are not disability friendly. Most persons with disabilities also lack the technical know-how in the use of these devices and this is in addition to the inability to afford some of these devices.

Digital Registration	Does this product address disability inclusion?	YES		Digital registration of lands and businesses are for the use of the general public however, its benefit will be assumed without creating awareness and educating persons with disability on the purpose, use and benefit of the system for them.
Digital Currency	Does this product address disability inclusion?		NO	There is less education on this product for both persons with and persons without disabilities. However, PWDs are at a disadvantage because of the several barriers and challenges they face in society, like lack of information, lack of education and lack of employment.
ACar Transportation	Does this product address disability inclusion?		NO	This product is not clear whether it is accessible for persons with disabilities or not.
Maptech Solutions	Does this product address disability inclusion?		NO	This product uses Geographic Information Systems (GIS) based applications so persons with disabilities who do not know how to use this application will find it difficult to use this product

INNOVATIVE PRODUCTS AND SERVICES GLOBALLY				
Smart pens	Does this product address disability inclusion?		NO	The smart pen is a type of writing instrument that has both a sensitive microphone and sophisticated software that can convert handwritten language into digital form. This innovation does not address the needs of the visually impaired when it comes to writing.
Tech backpacks	Does this product address disability inclusion?	YES		Not only do tech backpacks keep one's electronic equipment organized and protected, but they also make it possible to charge electronics without the use of an external plug socket. It addresses the needs of people with mobility challenges as they would not need to move around looking for sockets to charge their gadgets but can do so with the aid of their backpacks
Virtual keyboards	Does this product address disability inclusion?		NO	These are keyboards that make use of laser technology and act as wireless devices that can be connected to any

				mobile device or tablet via Bluetooth. This innovation does not address the needs of people with visual disability.
Robotic Process Automation (RPA)	Does this product address disability inclusion?	YES		Robotic Process Automation automates business activities such as analyzing applications, processing transactions, handling data, and even responding to emails. This technology has close ties to both artificial intelligence and machine learning. This innovation makes it easier for people with disabilities to work efficiently and effectively with less time.
Supermarket Barcode Scanners	Does this product address disability inclusion?		NO	Customers can use these gadgets to scan the barcodes of the things they pick up in stores. The shopper can give the scanner over to the cashier once they reach the checkout counter. This innovation does not address the needs of individuals with mobility challenges.

Online Banking Services	Does this product address disability inclusion?	YES		Online banking transactions can be done through a bank's website or the bank's specialized mobile application. Users of online banking can access all of their available financial services without having to leave the comfort of their homes. This innovation makes banking easier for persons with all types of disabilities except people with visual impairment.
Digital Workspace	Does this product address disability inclusion?	YES		The transformation of an organization from a hardware-centric to a software-defined infrastructure is what makes it feasible for employees to have access to a digital workplace, which in turn empowers employees. This innovation addresses the needs of people with mobility challenges.
Booking Kiosks	Does this product address disability inclusion?		NO	Customers can make their reservations using a booking system, which is based on the various options that are presented to them. This innovation does not address

				the needs of persons with mobility challenges.
Mellowcabs	Does this product address disability inclusion?		NO	The Mellowcab is an all-electric vehicle that operates as a mode of public transit in congested urban settings. This innovation does not address the needs of people with mobility challenges.
Charging Shoes	Does this product address disability inclusion?		NO	The usage of ultrathin chips of crystal that are put into the sole of a shoe is one amazing way that can be used to charge a mobile phone while the wearer is on the move. This innovation does not address the needs of people with mobility challenges.
Electric toothbrushes Charging Shoes	Does this product address disability inclusion?	YES		Electric toothbrushes were developed to assist individuals who lacked the strength, mobility, or control necessary to perform manual toothbrushing effectively

Medical delivery drones	Does this product address disability inclusion?	YES		Patients residing in remote or difficult-to-access regions of a country can get life-sustaining medical supplies thanks to the usage of medical delivery drones. This innovation addresses the needs of people with mobility challenges.
Chatbots and smart assistants	Does this product address disability inclusion?	YES		Chatbots and other forms of virtual assistants are examples of technologies that can provide customer service around the clock. This innovation addresses the needs of people with mobility challenges but does not address the needs of people with visual impairment.
Ludlow Traveller	Does this product address disability inclusion?	YES		The Ludlow Traveller suit is constructed with rumple-proof technology, which prevents creases from forming in the garment and guarantees that it always appears to have been freshly pressed. This represents a significant improvement that saves both time and work. This innovation addresses the needs of people with disabilities

iRobot Scooba 230	Does this product address disability inclusion?	YES		The iRobot Scooba 230 is a lightweight and portable robot designed to clean floors. In a single cleaning session, it can carry enough cleaning solutions for flooring areas that are up to 150 square feet in size. This innovation addresses the needs of people with mobility challenges.
Wearable Health Devices	Does this product address disability inclusion?	YES		Gadgets that are worn on the body and have sensors, such as the Apple Watch, can make a positive contribution to society by assisting with the health monitoring of vulnerable people. This innovation addresses the needs of people with mobility challenges.
Virtual reality	Does this product address disability inclusion?	YES		Technology for creating virtual realities, augmented realities, and mixed realities is advancing at a breakneck pace. One of the most important applications of this technology is that it enables people to go on virtual field trips to locations that would

				otherwise be inaccessible to them. This innovation addresses the needs of people with mobility challenges but does not address the needs of people with visual impairment.
Gamification	Does this product address disability inclusion?	YES		When people are having fun, they can retain more information. This idea is put into practice in the classroom using gaming, which integrates the enjoyable aspects of play with the essential skills and knowledge that the students are expected to acquire. This innovation addresses the needs of people with mobility challenges but does not address the needs of people with visual impairment.
Smart home technology	Does this product address disability inclusion?	YES		One of the most significant developments in technology over the past few years has been the proliferation of "smart home" technology, which can now be found in products that are used daily by consumers, such as door locks, light

				bulbs, and kitchen appliances. This innovation addresses the needs of people with disabilities.
Indoor positioning systems (IPS)	Does this product address disability inclusion?	YES		Users have been able to navigate inside locations more easily with the assistance of indoor positioning systems (IPS), which are utilized in places where GPS cannot be used. This innovation addresses the needs of people with mobility challenges but does not address the needs of people with visual impairment.

BEST PRACTICES

BEST PRACTICES	HOW DOES IT WORK
Apprenticeship Model	It works when the learner becomes a researcher by working alongside other more experienced researchers who act in the capacity of modeller of skills, mentor and critical friend (Nind et al., 2016).
Lifelong Learner Model	With this model, researchers identify their own need for continuing training by taking charge of their position in the marketplace. They register for courses as and when needed in addition to seizing upon informal opportunities to continue learning (Nind et al., 2016).
The Challenging Inequality model	For this model, researchers with and without disabilities learn together in acknowledgement that both need support and training to conduct quality research (Walmsley, 2004).
Addressing Deficits model	This model works in the sense that it believes people with disabilities need research training to be admitted into new roles in conducting research. For example, organizing workshops incorporating role-play and practice (Johnson, 2009). Iriarte et al. (2014) refer to filling the gaps in skills. Strnadova et al. (2014, p. 20-21), when adopting aspects of traditional research, training for 'colleagues with intellectual disabilities is necessary, so they are not disadvantaged in their skills and understanding as academic researchers have all had formal training on the research process'

Formal Training Model	This formal training model often but not always overlaps with the addressing deficits model, characteristically, it always involves getting a teacher and using a curriculum (Nind et al., 2016).
Co-Production	Co-production means the research that people do together between researchers and persons with disabilities. It promotes inclusive research in the sense that it ensures that there is mutual respect between the researcher and the co-researchers. It helps connect universities, people with disability and disability organizations. It brings out the fact that research is about what is important for persons with disabilities (UNSW, n.d).
Accessibility	Accessibility means making the research accessible to persons with disabilities. For example, encouraging persons with disabilities to respond to published research articles. With this practice persons with disabilities be they an author or not, can critique articles through writing text in easy-to-read formats, and/or other digital responses including video blogs. This is an opportunity to support people with disabilities to contribute to discussions in academic journals (O'Brien et al., 2022). Also, the research report must be in various formats for easy accessibility to persons with disabilities.
Participatory Research	This is an approach to research where the research process is viewed as a potential source of change and empowerment for the research participants as well as a process for influencing professional policy and practice by reflecting the views and opinions of service users (Walmsley 2001).

Emancipatory Research	Emancipatory research goes beyond the mere participation of PWDs in research to PWDs themselves controlling research and deciding who should be involved and how (Walmsley 2001).
Advisory Approach	It involves the participation of persons with disabilities in the process of examining and making comments regarding research projects (Grant & Ramcharan 2007). More commonly, persons with disabilities participate in research reference or advisory groups. These groups, which can either function independently or in conjunction with other individuals offer guidance to research teams regarding the overall scope of a project or a particular concern that has been brought to their attention
Leading or Controlling Approach	The goal of this approach is to empower persons with disabilities to initiate, direct, and carry out their research on topics that are meaningful to them. It is essential, according to the advocates of this approach, that people with disabilities take ownership of their research processes because if they do not take charge, researchers without disabilities will continue to be in charge of the generation of new knowledge relating to disability (Nind 2011).
Collaborative Approach	A collaborative group approach combines the abilities of people with disabilities with those of academic researchers or other individuals to develop new knowledge that neither group could do on their own. The group is distinguished by the existence of trust, and reciprocal connections among its members, as well as a belief that there is a great deal to gain by participating in research activities jointly (Bigby et al. 2010; Nind 2011).

Peer Research Approach	Those who are recruited, given basic research training, and then invited to interview others in a target population are commonly referred to as peer researchers (Elliot et al, 2002). For instance, individuals with disabilities might be educated on how to conduct interviews with other individuals with disabilities. This strategy appeals to research teams that might have trouble gaining participants' trust and maintaining participation from the group of people with disabilities they are studying.

APPENDIX 3: INTERVIEW GUIDE

Research Questions	Interview Questions
What systems exist in Ghana for disability-inclusive research and innovation?	1. Briefly tell us about the disability/research policy that your organisation has, if any. 2. Can you tell us about any policies, programmes, approaches, procedures, and regulations in Ghana that promote disability-inclusive research and innovations that you know? 3. How do any of the instruments identified in two above promote disability-inclusive research and innovation? 4. How has the government/or the entity responsible ensured that this instrument is promoting disability-inclusive research and innovation?

What best practice modes for disability inclusion research and innovation exist that could be replicated in Ghana?	1. What disability-inclusive research approaches do you use in conducting research? (For research institutions and universities only) 2. Can you tell us of any good practices for disability-inclusive research? a. What is it about? b. How does it work? c. What makes these good practices possible? 3. Kindly tell us about any research innovation system that you know of. a. What is the nature of this innovation? b. How does this innovation work? c. In your opinion is this innovation accessible/affordable for persons with various forms of disabilities? 4. Kindly share your opinion about the awareness of persons with disabilities in Ghana of these innovative systems. 5. Kindly tell us if you think that persons with disabilities in Ghana understand how to operate these innovative systems. 6. In your opinion, can persons with disabilities in Ghana afford these innovative systems? Why or why not?
How could best practice models of disability inclusion research and innovations be implemented in Ghana?	1. What should be done to implement best practice models of disability inclusion research and innovations in Ghana? 2. What, in your opinion, could be the challenges to the implementation of disability-inclusive best practice models and innovations in Ghana?

What roles should actors in this space play to promote disability inclusion research and innovation?	1. Kindly tell me what you think the following agencies should do (policy? regulation? Incentives? Resources?) to promote inclusive disability research in Ghana: a. Government b. Research institutions c. Industry d. Universities e. Organisations of persons with disabilities 2. What role do you think the following agencies should play in promoting inclusive innovation systems in Ghana? a. Government b. Research institutions c. Industry d. Universities e. Organisations of persons with disabilities


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