TECHNOLOGICAL ADVANCEMENT BROUGHT BY ARTIFICIAL INTELLIGENCE IN DISABILITY: A CASE OF BINDURA.

BY

ADLITE TAMAI (B213165B)

A DISSERTATION SUBMITTED TO THE BINDURA UNIVERSITY OF SCIENCE EDUCATION, FACULTY OF SOCIAL SCIENCES AND HUMANITIES, DEPARTMENT OF SOCIAL WORK, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE BACHELOR OF SCIENCE HONORS DEGREE IN SOCIAL WORK

SUPERVISOR: MR. MAGOCHA

JUNE 2025

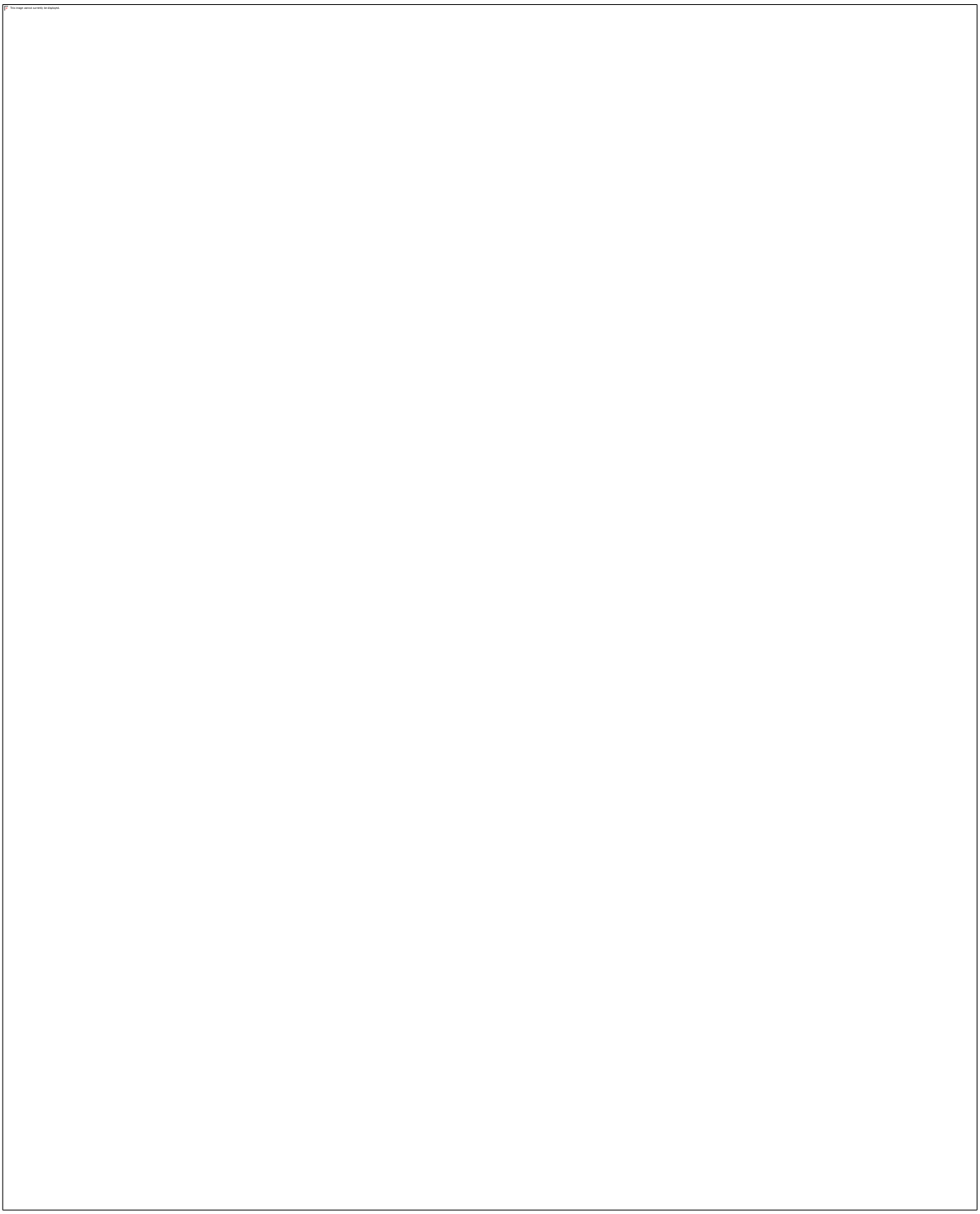
DECLARATION

I, Tamai Adlite (B213165B) declare that this dissertation on the topic "Technological Advancement Brought by Artificial Intelligence (AI) in Disability: A Case of Bindura" is my own work, and all the sources used in this dissertation have been acknowledged by means of references. This work has not been previously included or submitted to this or any other institution.

SIGNATURE. .....

DATE: 22/08/2025

RELEASE FORM



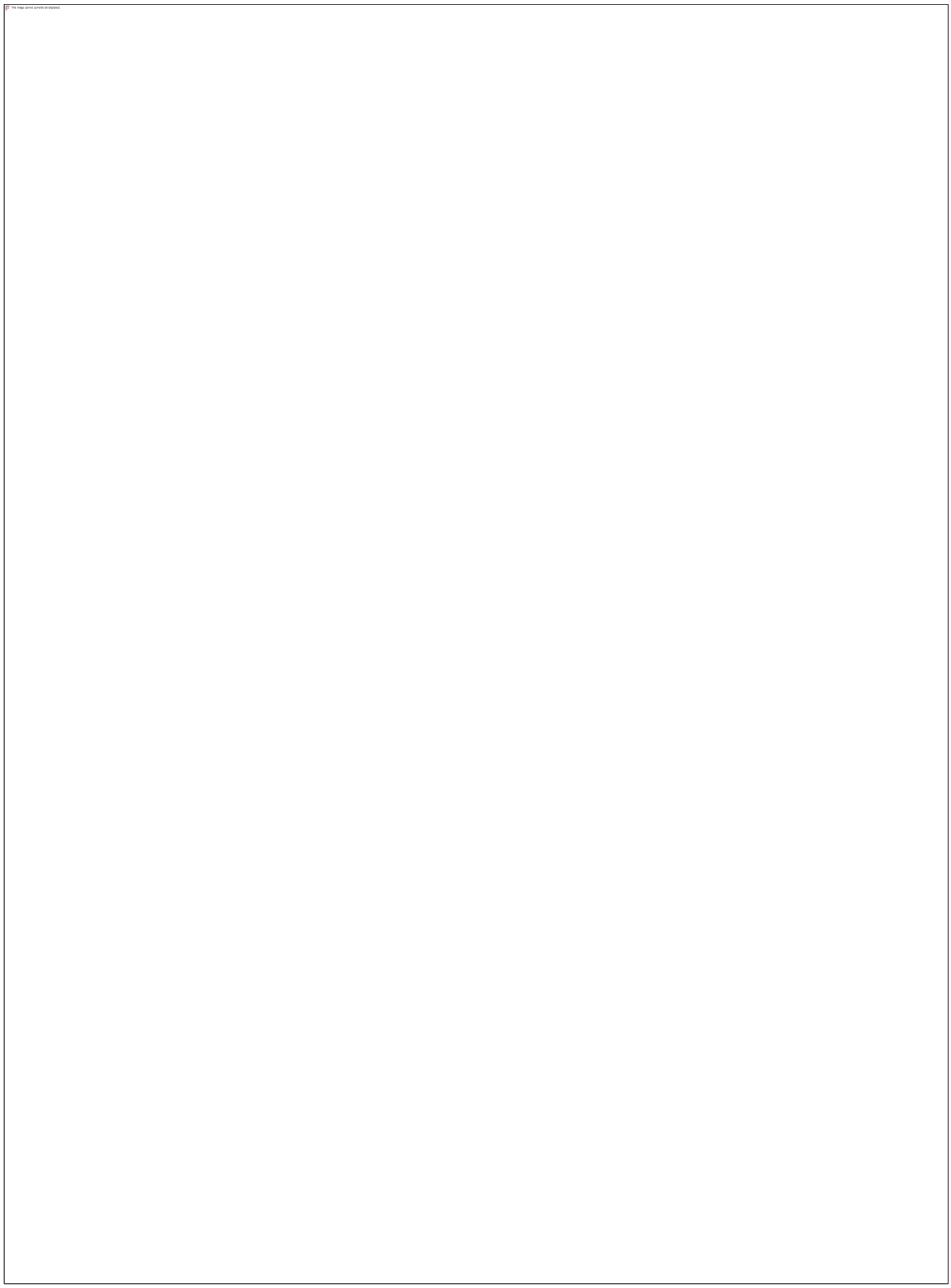
ACKNOWLEDGEMENTS

"I have run the race with endurance, I have fought the good fight, and I have kept the faith. As the psalmist says, 'Thy word is a lamp unto my feet and a light unto my path' (Psalm 119:105 KJV). I have leaned on God's promises and guidance throughout my journey at Bindura University of Science Education, and He has sustained me and brought me to this day. I would like to express my heartfelt gratitude to Mr. Magocha, whose guidance and mentorship were crucial to the successful completion of this research project. I am also grateful to the participants of this study for sharing their valuable insights and experiences with me. Without the contributions of these individuals, this research would not have been possible. Thank you all for your invaluable support and encouragement throughout this journey. In addition, I would like to thank my family and friends for their unwavering love and support throughout this journey and for their understanding and patience as I devoted countless hours to this project. I am particularly grateful to the Tamai family and the Chagonda family for their encouragement and for always believing in me, even when I doubted myself. Your faith in me has been a constant source of inspiration and motivation. I would like to express my deep gratitude to my dear friend Mclynn R. Mugondegwa, whose steadfast friendship has been a source of strength and encouragement throughout this journey. Her wise counsel, unwavering support, and gentle companionship have been a constant light in the darkness, a balm to my weary soul, and an anchor in the storm. Her friendship is truly a gift that I hold dear and cherish with all my heart.

DEDICATION

This paper is dedicated to the persons with disabilities who are vulnerable in society due to accessibility challenges related to Artificial Intelligence (AI) assistive devices. It is also dedicated to my mother, sister, and brother for their unwavering support, encouragement, and immeasurable efforts throughout the attainment of this undergraduate degree. Not forgetting one family group of friends, this is to the love we share and the friendship that no one can replace. May the sufficient mercies of the Lord God be with them all? Further recognition goes to the Bindura University of Science Education Department of Social Sciences and Humanities lecturers who contributed to the success of my studies.

PLAGIARISM REPORT



MARKING GUIDE

BINDURA UNIVERSITY OF SCIENCE EDUCATION

DEPARTMENT OF SOCIAL WORK

Name: Adlite Tamai

Registration No: B213165B

MARKING GUIDE: UNDERGRADUATE RESEARCH PROJECT

Chapter 1 INTRODUCTION	**Possible Mark**	**Actual Mark**
Abstract	**10**	
Background to the study- what is it that has made you choose this particular topic? Include objectives or purpose of the study	**20**	
Statement of the problem	**10**	
Research questions	**15**	
Assumptions	**5**	
Significance of the study	**15**	
Limitations of the study	**5**	
Delimitations of the study	**5**	
Definition of terms	**10**	
Summary	**5**	
Total	**100**	
Weighted Mark	**15**	

Comments……
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Chapter 2 LITERATURE REVIEW

Introduction- what do you want to write about in this chapter?	**5**	
Conceptual or theoretical framework	**10**	
Identification, interpretations and evaluation of relevant literature and citations	**40**	
Contextualisation of the literature to the problem	**10**	
Establishing gaps in knowledge and how the research will try to bridge these gaps	**10**	
Structuring and logical sequencing of ideas	**10**	
Discursive skills	**10**	
Summary	**5**	
Total	**100**	
Weighted Mark	**20**	

Comments……
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Chapter 3 RESEARCH METHODOLOGY

Introduction	**5**	
Research design	**10**	
What instruments are you using to collect data?	**30**	
Population, sample and sampling techniques to be used in the study	**25**	
Procedures for collecting data	**15**	
Data presentation and analysis procedures	**10**	
Summary	**5**	
Total	**100**	
Weighted Mark	**25**	

Comments……
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Chapter 4 DATA PRESENTATION, ANALYSIS AND DISCUSSION

Introduction	**5**	
Data presentation	**50**	
Is there any attempt to link literature review with new findings	**10**	
How is the new knowledge trying to fill the gaps identified earlier	**10**	
Discursive and analytical skills	**20**	
Summary	**5**	
Total	**100**	
Weighted Mark	**30**	

Comments ……
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Chapter 5 SUMMARY, CONCLUSION AND RECOMMENDATIONS

Introduction- focus of the chapter	**5**	
Summary of the whole project including constraints	**25**	
Conclusions- have you come up with answers to the problem under study	**30**	
Recommendations(should be based on findings) Be precise	**30**	
References	**5**	
Appendices i.e. copies of instruments used and any other relevant material	**5**	
Total	**100**	
Weighted mark	**10**	

Comments ……
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SUMMARY:-

	Actual	**Total**
Chapter 1		
Chapter 2		
Chapter 3		
Chapter 4		
Chapter 5		
Total	_____	_____

ABSTRACT

The study evaluated the technological advancement brought by Artificial Intelligence (AI) in persons with physical and sensory disabilities in Bindura Urban. To fully conduct the study, it was

conducted using three objectives: to identify the life experiences of persons with sensory and physical disabilities without access to Artificial Intelligence (AI) assistive devices, to analyze the opportunities of Artificial Intelligence (AI) assistive devices for persons with sensory and physical disabilities and to develop effective interventions aimed at improving access to Artificial Intelligence (AI) assistive devices for persons with sensory and physical disabilities to reduce vulnerability. The Technological Acceptance Model (TAM) was utilized as the theoretical framework for this study. The study employed the interpretivism research philosophy, which emphasizes that reality is socially constructed and can only be understood through the perspective of the people who live within it. The study utilized an inductive research, approach which enabled the research to gain more insight and understanding of the meaning and context of social phenomena by collecting and analyzing non-numerical data in order to gain a more insight and understanding of participants' social reality. Bindura Urban in Mashonaland Central Province in Zimbabwe was the study setting, targeted the population with sensory and physical disabilities as well as social workers from the Ruvimbo Simulation Centre organization in Bindura with a sample size of 10. Purposive sampling and snow balling sampling which are non-probability sampling techniques were utilized in the study. The study utilized data collection tools such as participant in-depth interviews using the interview guide research tool, key informant in-depth interviews using interview guide research tool, observation, and secondary data. The data was analyzed using thematic data analysis. The findings revealed the life experiences of persons with sensory and physical disabilities in Bindura Urban, in which indicated that most of them rely on informal jobs due to mobility and communication challenges. Accessibility of Artificial Intelligence (AI) assistive devices is a challenge due to poor legal and policies implementation, which makes persons with disabilities to be more vulnerable. For those who have Artificial Intelligence (AI) assistive devices, they indicated the transformation these devices has brought in their lives including enhancement in mobility and communication as well as independence. The study, however, recommended the practicability of legal frameworks and policies to enhance the accessibility of Artificial Intelligence (AI) devices in disability.

ACRONYM

AD …… Assistive Devices

AI ……Artificial Intelligence (AI)

DSD ……Department of Social Development

ILO…… International Labor Organization

PWD ……...Persons with Disabilities

TA ……..Technological Advancement

UNESCO……United Nations

UNICEF ……United Nations International for Children Emergency Funds

UNCRPWD.....United Nations Convention on the Rights of Persons with Disabilities

UNW…… United Nations for Women

ZIMSTAT…… Zimbabwe Statistics

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CHAPTER ONE: INTRODUCTION AND BACKGROUND

1.0 Introduction

The introduction of Artificial Intelligence (AI) assistive devices has brought a significant transformation in the lives of persons with disabilities in Bindura, especially persons with physical and sensory disabilities. Artificial Intelligence (AI) assistance devices reduce vulnerability among persons with disability in the sense that a person with a disability can perform daily activities without another person's assistance. The technology has brought a technology whereby an assistant has been replaced by machines and navigation devices for persons with disabilities, such as smart wheelchairs, exoskeletons, prosthetic arms and legs, phonic audio paradise hearing aids, Wewalk smart canes, echolocation glasses, and smart limbs, to mention but a few, and replaced traditional assistive devices that need manpower. People with physical disability usually face mobility challenges, which mostly hinder them from accessing health, education, and employment. Without access to mobility, they end up regarded as burdens in the family and community, which leads to segregation, and end up being vulnerable. Therefore, traditional assistive devices such as wheelchairs are being used but have the weakness of requiring personal assistance regardless of having it. However, despite the transformation brought by Artificial Intelligence (AI) for persons with physical and sensory disability in Bindura, accessibility to Artificial Intelligence (AI) assistive devices has become a stumbling block in Zimbabwe due to weak legal frameworks for persons with disabilities, which leads to an increase in vulnerability.

1.1 Background to the Study

Technological advancement in disability refers to the application of Artificial Intelligence (AI) technologies to assist, empower, and improve the lives of persons with disabilities (PWD) through various tools, including assistive devices, communication aids, mobility solutions, and personalized learning tools (UNICEF, 2024).

Globally, the World Health Organization (WHO) estimates that more than approximately 15% of the world's population lives with any form of disability. Despite international commitments like the UN Convention on the Rights of Persons with Disabilities (UNCRPD), many individuals still encounter systemic barriers to accessing artificial intelligence assistive devices. A 2020 report from the World Bank indicates that individuals with disabilities are more likely to be living in poverty, with nearly 80% residing in developing countries. Although traditional

assistive technologies can be beneficial, they often do not meet the diverse needs of users, leaving many at risk of social exclusion and economic hardship. For instance, the National Institute on Disability, Independent Living, and Rehabilitation Research reported in 2019 that nearly 70% of working-age individuals with disabilities in the U.S. were unemployed. This figure highlights persistent barriers in the labor market, where misconceptions about individuals with disabilities contribute to high unemployment rates. While mobility aids such as wheelchairs and walkers provide essential support, they often lack necessary accessibility features. A 2018 study by the Global Disability Rights Library found that only 10% of individuals with mobility impairments had access to suitable mobility devices, further increasing their vulnerability. Before Artificial Intelligence (AI) became prevalent, many individuals with mobility issues relied on traditional wheelchairs that often lacked adjustable seating or automatic navigation features. A 2018 case study from India revealed that only 15% of wheelchair users were satisfied with their mobility aids, citing concerns regarding maneuverability and comfort.

In Asia, the World Bank reported that only 5% of individuals with disabilities have access to assistive device technologies, in contrast to over 30% in developed countries, and they live in extreme poverty, highlighting the necessity for comprehensive support systems that address both economic and social barriers. This discrepancy underscores the urgent need for targeted interventions to enhance accessibility and reduce vulnerabilities. A 2021 study by the Human Sciences Research Council in Europe found that 60% of employers in the employment sector were hesitant to hire individuals with disabilities, primarily due to misconceptions about their productivity and reliability. This employment gap is primarily due to a lack of accessible education and job training programs, combined with the inaccessibility of assistive devices, leaving many unprepared for the workforce. Furthermore, the Australian Bureau of Statistics reported in 2018 that the unemployment rate for people with disabilities was 10.5%, compared to 5.3% for those without disabilities.

In Africa, individuals with disabilities face particularly severe challenges. A 2019 report from the African Union indicated that persons with disabilities experience significant discrimination, resulting in substantial social and economic disparities due to a lack of Artificial Intelligence (AI) assistive devices accessibility. For example, in countries such as Namibia, the employment gap is primarily due to a lack of accessible education and job training programs, combined with the inaccessibility of assistive devices, leaving many unprepared for the workforce. Additionally, the World Bank reported in 2020 that approximately 25% of South Africans with

disabilities with access to Artificial Intelligence (AI) assistive devices are more independent and less vulnerable than those without access or the ones still using traditional assistive devices.

In Zimbabwe, the Zimbabwe National Statistics Agency (2022) found that only 10% of individuals with disabilities had access to Artificial Intelligence (AI) assistive devices, significantly limiting their independence and quality of life. Shakespeare et al. (2018) argue that societal attitudes, combined with inadequate policy frameworks, contribute to the marginalization of this population. They assert that without a fundamental shift in societal perceptions of disability, progress will remain slow. Kett et al. (2019) emphasize the necessity of incorporating disability considerations into national development agendas to ensure inclusive growth, pointing out that countries that adopt inclusive policies tend to achieve better outcomes for individuals with disabilities. The legal framework for disability rights in Zimbabwe is still developing, which hampers the enforcement of policies that could facilitate access to Artificial Intelligence (AI) assistive devices. Also in Zimbabwe, disability issues are often sidelined in political agendas. This lack of prioritization leads to insufficient support for initiatives aimed at improving access to assistive technologies. Furthermore, corruption and mismanagement can divert resources away from disability services and assistive technology programs. Mismanagement of funds intended for disability support in Zimbabwe further limits the availability of necessary resources, leaving many individuals without the assistance they require.

In Bindura Urban, only 5% of the population with sensory and physical disabilities according to the Zimbabwe National Statistics Agency (2022), have access to Artificial Intelligence (AI) assistive devices. Only 20% of persons also have access to traditional assistive devices, which means persons with physical and sensory disabilities in Bindura Urban are vulnerable in the case that their mobility is being hindered due to accessibility challenges to assistive devices. One cannot acquire Artificial Assistive devices if he or she cannot afford to access traditional assistive devices. Therefore, accessibility to Artificial Intelligence (AI) has to be improved to increase in disability, mostly in persons with sensory and physical disabilities.

1.2 Statement of the Problem

The government of Zimbabwe has tried many strides to advocate assistive devices to persons with disability through legal frameworks and instruments to reduce their vulnerability. The Constitution of Zimbabwe Amendment Act of 2013 (22) (3) (a) emphasizes the state and all

institutions and agencies of the government to develop welfare programs for persons with disabilities. The Disability Act, chapter 17:01, indicated that persons with disabilities must not be denied access to employment. According to the National Disability Policy of 2021, assistive devices must be provided by the government for free, and where this is not possible, the cost of assistive devices must be regulated by the government to foster affordability for persons with disabilities. The 2024 national budget indicated that the government has made great strides in recognizing the rights of persons with disabilities by creating the post of director responsible for gender, wellness, and inclusivity, which deals with issues of disability in every ministry, as well as providing incentives such as rebates of duty on equipment used by the physically and sensory challenged and assistive devices such as wheelchairs, crutches, artificial limbs, and spectacles. There is a gap in the accessibility of Artificial Intelligence (AI) assistive devices which hinders persons with physical and sensory disabilities from accessing Artificial Intelligence (AI) assistive devices. The accessibility gap is caused by hindrances such as politics, economic challenges, lack of education among persons with disability and the community at large, and sociocultural barriers, which are caused by weak legal frameworks. The legal framework for persons with disabilities to access assistive devices is only on paper, not in practice. Artificial Intelligence (AI) in terms of assistive devices brought a crucial transformation in reducing vulnerability among persons with disabilities in Bindura in contrast with the traditional assistive devices that need personal assistance regardless of having an assistive device. As Artificial Intelligence (AI) technology rapidly advances, there is a growing potential to provide innovative solutions that address the unique challenges faced by persons with these specific disabilities. Therefore, access to Artificial Intelligence (AI) assistive devices has to be improved for there to be a greater transformation in reducing vulnerability in persons with physical and sensory disability.

1.3 Aim

The aim of this study is to evaluate the technological advancement brought by Artificial Intelligence (AI) in disability in Bindura.

1.4 Objectives

- To identify the life experiences of persons with sensory and physical disabilities without access to Artificial Intelligence (AI) assistive devices.

- To analyze the opportunities of Artificial Intelligence (AI) assistive devices for persons with sensory and physical disabilities.
- To develop effective intervention aimed at improving access to Artificial Intelligence (AI) assistive devices for persons with sensory and physical disabilities to reduce vulnerability.

1.4.1 Research Questions

- What life is being experienced by persons with sensory and physical disabilities without access to Artificial Intelligence (AI) assistive devices?
- What opportunities are brought by Artificial Intelligence (AI) assistive devices to persons with physical and sensory disability?
- Why do persons with sensory and physical disabilities face accessibility challenges regarding Artificial Intelligence (AI) assistive devices?
- What interventions can be employed in improving access to Artificial Intelligence (AI) assistive devices for persons with sensory and physical disabilities to reduce vulnerability?

1.5 Justification of the Study

The study is significant as it identifies the life experienced by persons with disabilities without access to Artificial Intelligence (AI) in persons with sensory and physical disabilities, opportunities brought by Artificial Intelligence (AI) as well as interventions to improve accessibility of Artificial Intelligence (AI) assistive devices. It will help social workers to have an insight into the life experienced by persons with disabilities due to technological advancement and also to advocate for them. It will also equip the community with knowledge on the other rights of persons with disabilities which is a right to access assistive devices to reduce vulnerability. The study is significant as it will bring social change in the country towards persons with disabilities. In other communities of Zimbabwe, especially in rural areas, there is a belief that disability is a cause of God's punishment, (Barlow, 2020). By instilling that mind, they are discriminating against persons with disabilities by avoiding them in contact with the community or access to education, employment, health, community engagement, or

economic participation, which increases their vulnerability since they will always be indoors doing nothing productive. The study will also be a tool for legal framework amendment, formulation, and implementation that meets the unique needs of persons with disabilities since there is a legal framework gap which hinders accessibility to Artificial Intelligence (AI) assistive devices.

1.6 Definition of Key Terms

1.6.1 Artificial Intelligence (AI)

Artificial Intelligence (AI) refers to the creation of computer systems that can carry out operations that normally call for human intelligence. These tasks include problem-solving, decision-making, language understanding, and pattern recognition (Russell & Norvig, 2020). Artificial Intelligence (AI) is a set of technologies that enable computers to perform a variety of advanced functions, including the ability to see, understand, and translate spoken and written language; analyze data; make recommendations; and more.

1.6.2 Technological Advancement

It is a technological development.It refers to the development and improvement of scientific knowledge that lead to new or improved products, processes, and systems.

1.6.3 Assistive Device

Assistive devices in disability are tools designed to help individuals with disabilities perform tasks more easily and independently. They enhance functionality, improve quality of life, and promote greater participation in daily activities. Examples include mobility aids, hearing aids, visual aids, environmental control systems, and communication devices, (O'Brien, 2023).

1.6.4 Artificial Intelligence (AI) Assistive Device

Artificial Intelligence (AI) assistive devices are technological tools that leverage machines to enhance functional capabilities of persons with disabilities. These devices are designed to support users in overcoming challenges related to mobility, communication, sensory perception, and daily activities, thereby promoting independence and improving quality of life (Krishman, 2024).

1.6.5 Traditional Assistive Devices

Traditional assistive devices are devices designed to help persons with disability to perform tasks more easily but require more labor and a personal assistant.

1.6.6 Ethics

Ethics in disability refers to moral principles and values that guide interaction, policies, and practices concerning individuals with disabilities. It includes respect for autonomy, justice, beneficence, non-maleficence, dignity, inclusion, and participation.

1.6.7 Disability

Disability refers to a physical, mental, or intellectual condition that significantly hinders an individual's ability to perform certain activities or engage with the environment. Disability can be congenital at birth or acquired (resulting from injury or illness) and can affect various aspects of life, including mobility, communication, cognition, and sensory perception (World Health Organization, 2019).

1.6.8 Vulnerability

Vulnerability in disability refers to the heightened risk of harm or disadvantage faced by individuals with disabilities due to various factors. These factors include social marginalization, economic disadvantage, health risks, discrimination and stigma, and dependence on support systems. Understanding these vulnerabilities is essential for developing effective policies and practice that promote inclusion, support, and empowerment for individual with disabilities (Moyo, 2019).

1.7 Dissertation Outline

1.7.1 Chapter One: Introduction and Background

This chapter includes the background of the research topic globally, regionally, in Africa, and in Zimbabwe. Also includes the interventions that have been made as a response to the problem. It also includes the statement of the study. It is where aims and objectives that are SMART (specific, measurable, attainable, relevant, and time-bound) and research questions are included. The chapter also has the justification of the study and definitions of key terms.

1.7.2 Chapter Two: Literature Review

In this chapter it is where the research objectives are being discussed globally, regionally, and locally. It also includes the theoretical framework aligned with the research problem.

1.7.3 Chapter Three: Research Methodology

In this chapter it is where research methodology is being discussed. It includes the strides, which was implemented to carry out research. It includes the research methods employed, study area, population, techniques, limitations, validity and reliability, and ethical considerations.

1.7.4 Chapter Four: Presentation, Interpretation, Analysis and Discussion of Findings

The chapter includes the discussion of research findings found from the research conducted. The data are represented and interpreted depending on the type of research method used in chapter 3.

1.7.5 Chapter Five: Summary, Conclusions and Recommendations

The chapter includes a summary of the findings of the whole dissertation. It is also the conclusion of what was drawn from the study: what should be done and to whom based on policy, stakeholders, community, and social work. It is where recommendations and areas for future study are being stated.

1.8 Chapter Summary

The adoption of AI assistive devices is worldwide. The chapter provided the background of the technological advancement brought by artificial intelligence in disability. Purpose of the study has been established drawing it from the statement of the problem. The chapter presented the aim and objectives of the study, a description of the issue statement, a key research question, a list of research questions, justification of the study, and a list of definitions.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

The transformation brought by Artificial Intelligence (AI) in disability has had a greater impact on reducing vulnerability for persons with disabilities, offering personalized support in various aspects of life. It has revolutionized the lives of individuals with physical and sensory disabilities. These innovations not only enhance mobility and independence but also improve the overall lives of people. They empower individuals to engage more fully in society, breaking down barriers and promoting inclusivity. Different types of Artificial Intelligence (AI) assistive devices are used depending on the category of disability a person has. The use of assistive devices globally is different due to accessibility challenges because of different factors, which different scholars tried to explain. These challenges increase their vulnerability, which Artificial Intelligence (AI) technology is trying to reduce.

2.1 Theoretical Framework

The use of technology in the disability sector has ushered in transformation opportunities across various sectors, be it schools, health, occupations, or communities. In developing countries like Zimbabwe, where legal instruments are only on paper, a lack of financing limitations often exacerbates the challenges faced by persons with disabilities. Mutsangwa (2020) asserted that Artificial Intelligence (AI) presents an avenue to reduce vulnerability and foster inclusion. The world Health Organization (WHO) (2019) argues that assistive device technologies are instrumental in improving independence and functionality, which reflects a high perceived usefulness among users, especially in underserved areas. However, the success of technology adoption depends not only on availability but also on the extent to which they are accepted and adopted by the intended users.

The Technology Acceptance Model (TAM) is a theoretical framework that was proposed by Fred Davis in 1989. It explains how users come to accept and use technology. It posits that there are two main factors that influence technology adoption. Perceived Usefulness (PU), which is the degree to which a person believes that using a particular technology will enhance their job performance or daily life. Perceived Ease of Use (PEOU) is the extent to which a person believes that using the technology will be free from effort. Davis (1989) asserted that perceived usefulness and ease of use are the primary determinants of technology acceptance, making them essential concepts for understanding how persons with disabilities decide to adopt Artificial Intelligence (AI) assistive devices. Chikwature (2019) argues that the theory explains the relationship between external factors and actual systems such as social influence,

infrastructure, accessibility, disability type, age, and educational level. These factors influence the Attitude Toward Use (ATU), which subsequently shapes Behavioral Intention to Use (BIU) and ultimately Actual Use (AU).In relation to the study being undertaken, the extent of the Perceived Ease Of Use (PEOU), degree of persons with disabilities is mostly low because they have no knowledge of how Artificial Intelligence (AI) assistive devices can make them free from using effort. This is as a result of inaccessibility to Artificial Intelligence (AI) assistive devices. One cannot tackle the benefits of something if he or she has not been exposed to it.

Zimbabwe and many other developing countries faced systematic challenges in accommodating persons with disabilities. According to the Zimbabwe National Statistics Agency (ZIMSTAT), persons with disabilities constitute approximately 7% of the population. They often encounter barriers to accessing education, employment, healthcare, and transport. Social exclusion, stigma, and economic marginalization contribute to heightened vulnerability. This situation is due to limited access to Artificial Intelligence (AI) assistive devices. Artificial Intelligence (AI)-driven technologies hold the potential to bridge these gaps (Hersh, 2019). However, for the technologies to have an impact in reducing vulnerability in the lives of persons with disabilities, they must be accepted and integrated into the daily lives of their users.

The ease with which persons with disabilities can operate Artificial Intelligence (AI) tools plays a crucial role in their acceptance. In Zimbabwe, where digital literacy levels vary and many people with disabilities may have limited prior exposure to advanced technologies, complex user interfaces or foreign languages may hinder adoption. For example, visually impaired persons must be able to navigate Artificial Intelligence (AI) voice assistance without visual cues, and it should ideally support local languages such as Shona and Ndebele. Mutswanga (2020) asserted that developers and implementers must therefore focus on localization, intuitive design, and usability testing with persons with disabilities. Training sessions and user manuals in accessible formats, along with community support systems, are vital to improve Perceived Ease of Use (PEOU).

Attitudes towards using technology are driven by social perceptions, prior experience with technology, and the individual's confidence. In Zimbabwe, traditional beliefs and stigma around disabilities may hinder how persons with disabilities view new tools, especially when they are seen as foreign or complicated. Additionally, trust in new technology is a crucial factor. News Zimbabwe (2024) illustrated that Artificial Intelligence (AI) is beginning to change the lives of people in Zimbabwe by offering intelligent solutions that cater specifically to people

with disabilities, signaling a positive shift in local innovations and inclusion. Artificial Intelligence (AI) assistive technology is viewed with skepticism due to its perceived complexity and black box nature. For full adoption, users must trust that these technologies are reliable and safe and respond to their unique needs. Davis (1989) argues that behavior intentions to adoption increase when users see their peers benefiting from them. Peer mentorship programs, inclusive technology clubs and testimonies from early adopters can positively influence attitudes and intentions. Users are more likely to adopt technology when they perceive it as both useful and easy to use, a principle that directly applies to Artificial Intelligence (AI) assistive devices in disability inclusion.

There is a need for exposure and access for easy adoption. Persons with disabilities must have access to Artificial Intelligence (AI) assistive devices, which help them increase the extent of Perceived Usefulness (PU) and Perceived Ease of Use (PEU). That might help them adapt to the technology and have knowledge of the benefits of it. Artificial Intelligence (AI) technology, such as smart wheelchairs, will help individuals to reduce efforts in their daily activities. For example, persons with physical impairments can travel to work with the help of smart wheelchairs without a helper and human labor. The United Nations (2021) asserted that there is a need to leverage Artificial Intelligence (AI) assistive device technology, which is a key strategy for achieving the Sustainable Development Goals (SDGs).

2.2 Adoption of Artificial Intelligence (AI) Assistive Devices Usage in the Disability Sector

Globally, Artificial Intelligence (AI)-powered assistive devices are being integrated into health care and daily living to support independence, increase communication, and increase mobility. These advancements are reshaping traditional support systems by enabling smarter, more responsive, and personalized solutions among persons with disabilities to reduce vulnerability. (Smith, 2020). Artificial Intelligence (AI) powered assistive devices, such as robotic arms, exoskeletons, smart spectacles, canes, and wheelchairs, are providing greater autonomy and ease of movement. Institutions across continents have explored how Artificial Intelligence (AI)-enhanced tools can improve the lives of persons with sensory and physical disabilities, (Cowen, 2021). Countries across the globe, including the United States, Japan, Germany, and India, are investing in research and development of these technologies. Non-profit Organizations (NGOs), technology companies, and governments are collaborating to improve

accessibility and affordability, making Artificial Intelligence (AI)-driven assistance a vital part of inclusive development.

Regionally, the adoption of Artificial Intelligence (AI) assistive devices for persons with disabilities to reduce vulnerability has been shaped by economic capacity, technology infrastructure, policy frameworks, and cultural attitudes towards disability. In North America and countries such as Japan and the United States, Artificial Intelligence (AI) technologies in disability are widely researched and increasingly commercialized. Artificial Intelligence (AI)-driven assistance devices have moved from research labs to real-world applications, particularly in high-income countries, (Hersh, 2020). Nations like Japan, USA, and Germany are leading in Artificial Intelligence (AI) driven assistive devices for disability support, with significant funding dedicated to research and device deployment. They have heavily invested in rehabilitation and accessibility, (Young, 2022). In Western Europe, in countries such as Germany and Sweden, smart mobility aids, robotic companions, and real-time translation systems for sign language are actively used and supported by government health systems, (Hersh, 2020). East Asia has also seen growth in Artificial Intelligence (AI) assistive devices, especially in vision and hearing technologies, but access remains limited. Therefore, non-governmental organizations and startups are piloting low-cost Artificial Intelligence (AI) assistive solutions like speech recognition apps for the visually impaired, but large-scale adoption is hindered by infrastructure and affordability. Efforts in Latin America are also being made where Artificial Intelligence (AI) assistive devices are developed for persons with motor impairments. Therefore, artificial intelligent technology adoption across all regions is greatly increasing.

In Africa, the use of Artificial Intelligence (AI) assistive devices in persons with disabilities is still emerging. While mobile-based Artificial Intelligence (AI) assistive apps have gained traction in urban areas in education and communication for children with disabilities, particularly in Kenya, South Africa, and Nigeria, rural areas have faced barriers due to limited internet access, high device costs, and a lack of inclusive policy frameworks. In countries such as Nigeria, Botswana, and South Africa, the adoption of smart wheelchairs, smart walking canes and smart hearing aids is slightly increasing among elite persons due to the countries' weak legal framework implementations and purchasing costs. However, accessibility remains uneven across socioeconomic countries.

Locally, in Zimbabwe, the adoption of Artificial Intelligence (AI) assistive devices in disability is still emerging and is in its early stage but shows growing potential. The country faces significant barriers due to a lack of specialized training, poor policy implementation, limited funding, poor infrastructure, and the unavailability of technological assistive devices from manufacturing companies. However, the mobile-based solutions integration is becoming increasingly relevant due to high mobile penetration, (Chikuta et al., 2021). Local innovations supported by Non-Governmental Organizations and universities such as the University of Zimbabwe have begun to explore voice-to-text applications in Shona and Ndebele for people with hearing impairment and Artificial Intelligence (AI)-based reading tools for persons with visual impairments. Despite challenges, there is an increase in policy push for inclusive technology. Zimbabwe National Disability Policy (2021)'s recognition of the roles of emerging technologies in the disability sector in supporting persons with disabilities through specific strategies for Artificial Intelligence (AI) integration is still under development. The African Union's Digital Transformation Strategy (2020-2030) emphasizes the importance of inclusivity in digital technological development, and the vision could support Zimbabwe's efforts through funding, partnership, and policy alignment.

2.3 Types of Artificial Intelligence (AI) Assistive Devices in Disability

2.3.1 for Persons with Physical Disabilities

2.3.1.1 Smart Wheelchairs

These are Artificial Intelligence (AI)-powered integrated motorized wheelchairs for persons with mobility impairment. It is equipped with sensors, batteries, cameras, and Artificial Intelligence (AI) algorithms that allow automatic navigation, voice control, and obstacle avoidance. Chikuta (2021) asserted that smart wheelchairs can learn and remember certain common routes or adapt to new environments. They are controlled by joysticks and tracking technology.

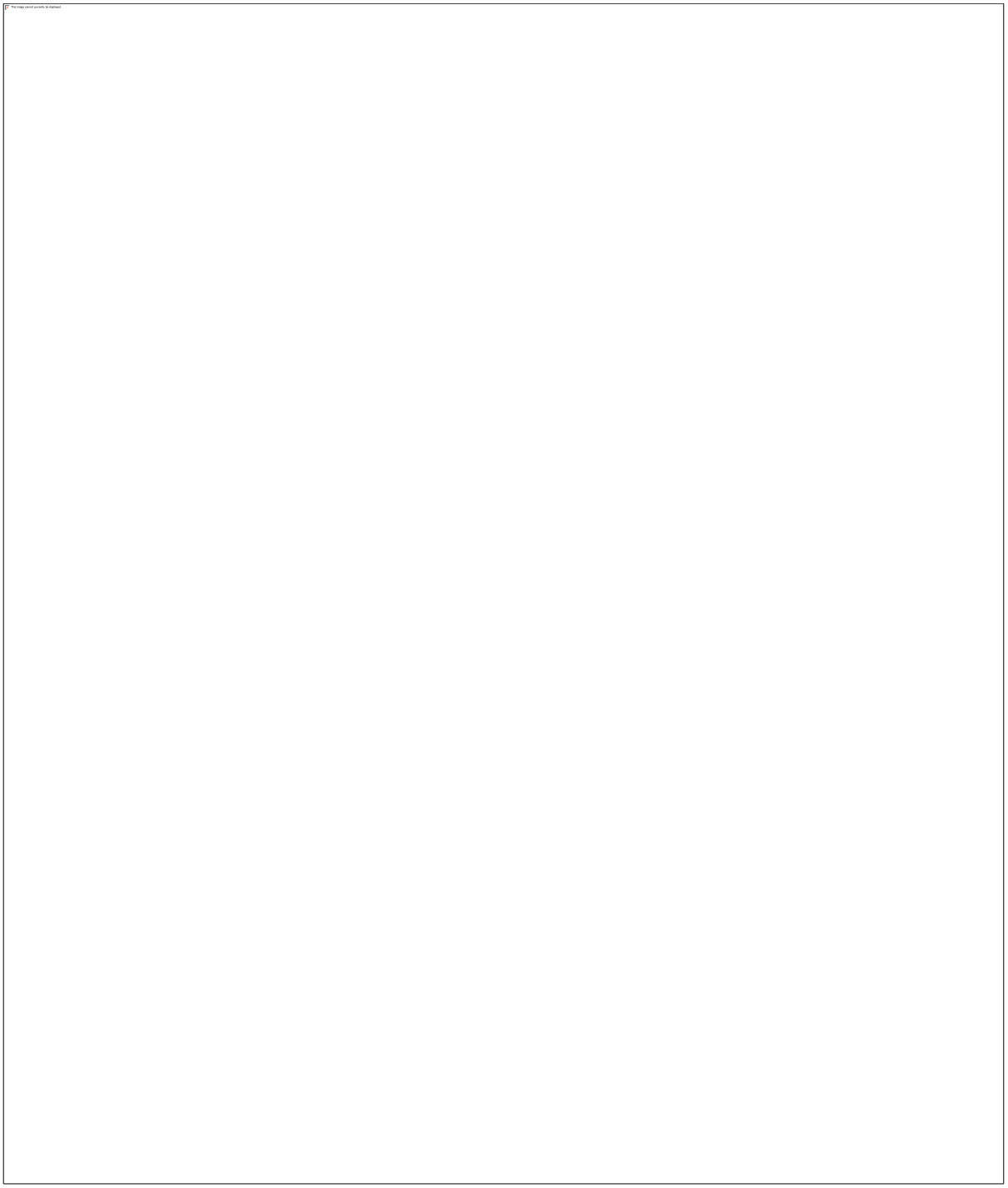

Fig 2.3.1.1 Smart Wheelchairs

2.3.1.2 Robotic Skeletons

These are wearable Artificial Intelligence (AI)-powered devices that support movement for individuals with spinal cord injuries, stroke, or muscular dystrophy. They support them to stand and walk. They interpret user movements or intentions using sensors and enable motorized assistance.

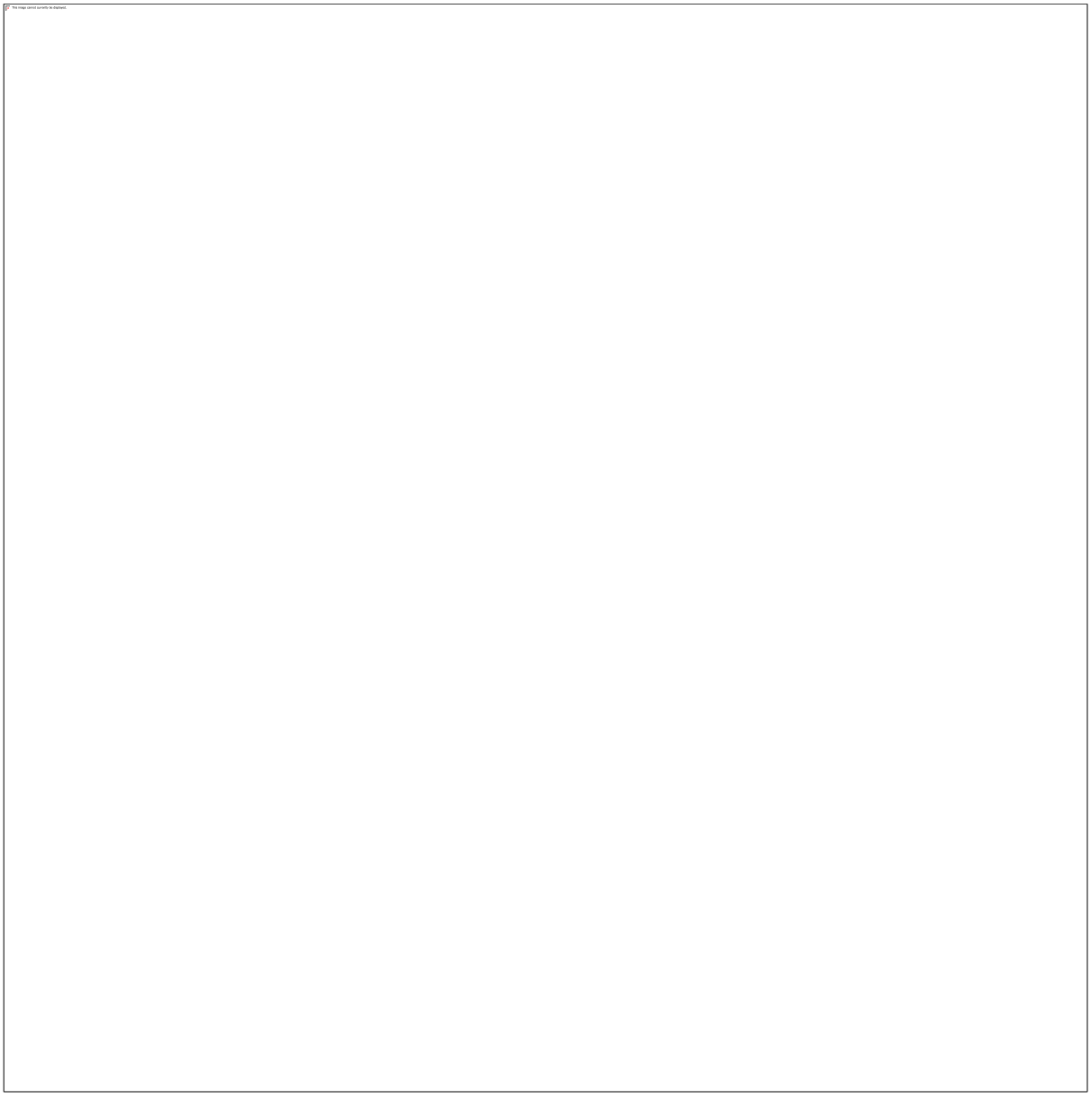

Fig 2.3.1.2 Robotic Skeleton

2.3.1.3 Artificial Intelligence (AI)-Powered Prosthetics Limbs

Cowan (2021) defines it as Artificial Intelligence (AI)- powered prosthetic limbs and arms that adapt to movement patterns using machine learning and sensors for natural motion and grip. They mimic leg and arm movement. They can learn from user behavior to improve control and functionality.

2.3.2 for Persons with Sensory Disability

2.3.2.1 Smart Walking Canes

Hersh (2020) argues that these are Artificial Intelligence (AI) powered sticks used by persons with visual impairments. They integrate various technologies to provide enhanced navigation, obstacle detection, and connectivity, thereby promoting independence and safety. They use GPS navigation to help users navigate unfamiliar areas and location tracking.

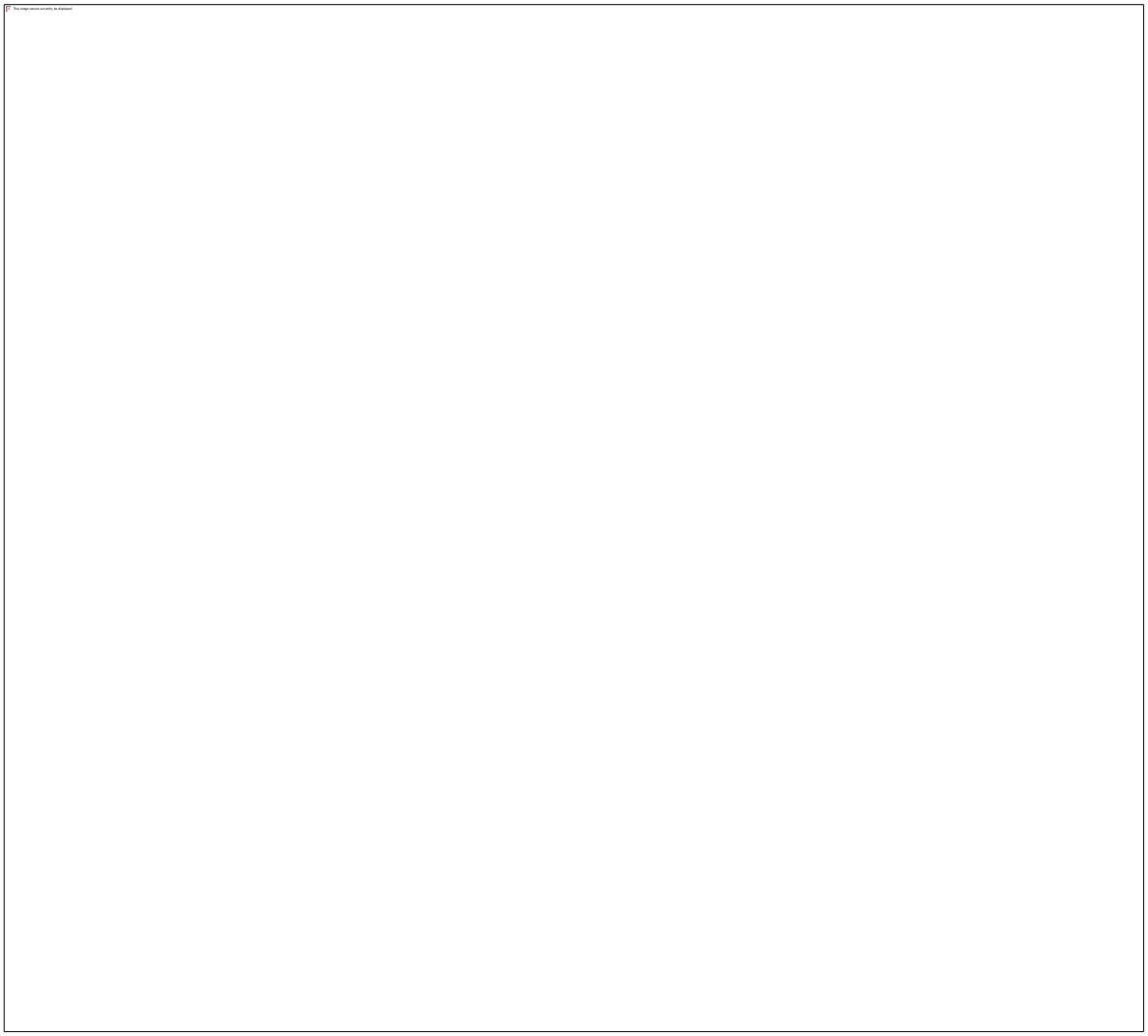

Fig 2.3.2.1 Smart Walking Canes

2.3.2.2 Smart Glasses

These are glasses used by persons with visual impairments. They are equipped with miniature cameras, processors, and speaker, (Mhlanga, 2022). These glasses detect objects, texts, and faces and provide instant audio feedback. Some glasses even include gesture control of eye-tracking and can recognize multiple languages and switch between them. Useful in schools, workplaces, and public spaces. It combines GPS and obstacle detection using LiDAR sensors.

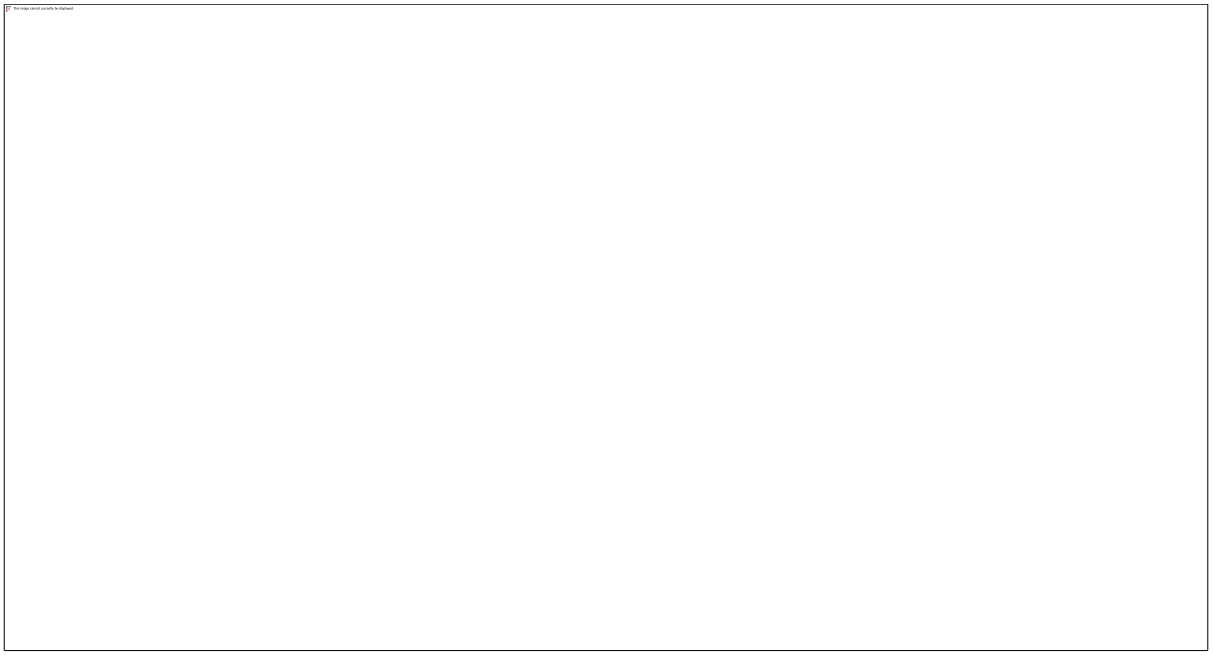

Fig 2.3.2.2 Smart Glasses

2.3.2.3 Smart Hearing Aids

These are used by persons with hearing impairments. These are no longer just amplifiers. They use Artificial Intelligence (AI) to automatically adjust to environments, for example, busy streets versus quiet rooms. They are worn in or behind the ear to amplify sound, (Jones, 2024). They use microphones to pick up sounds. They filter out background noise and even detect emotional tone or health conditions, for example, heartbeat rate and fall detection. It reduces listening fatigue by focusing on speech clarity.

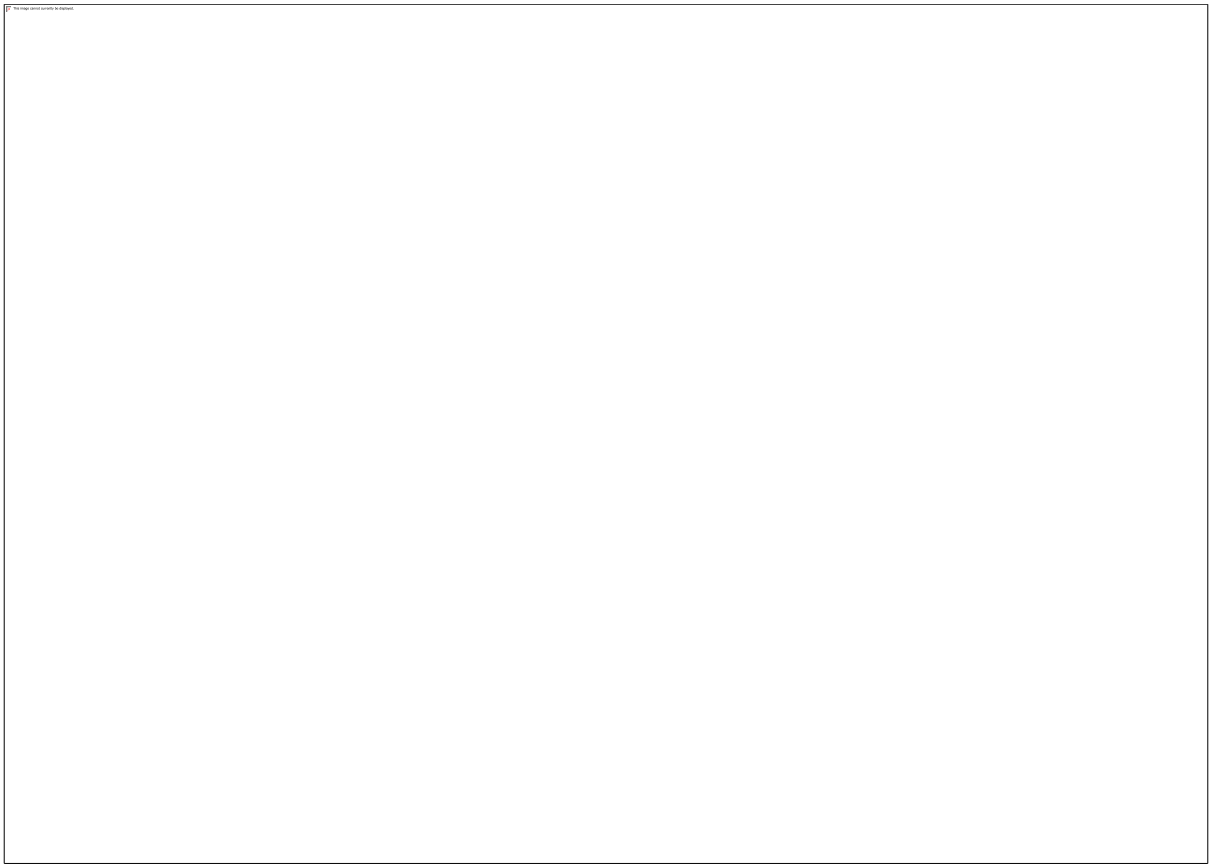

Fig 2.3.2.3 Smart Hearing Aid

2.4 Life Experiences of Persons with Sensory and Physical Disability without Access to Artificial Intelligence (AI) Assistive Devices.

Globally, persons with physical and sensory disability without access to Artificial Intelligence (AI) assistive devices have different living experiences, and they often engage in living experiences that are shaped by limited mobility, societal barriers, legal barriers, cultural barriers, economic barriers, discrimination, and constrained access to resources since they are using traditional assistive devices, which need more effort. They usually engaged in informal sectors, home-based enterprises, self-employment services, and pierceworks, (Chataika, 2022). These people face exclusion since they lack access to mobility, while Artificial Intelligence (AI) powered technology has the potential to reduce the vulnerability and revolutionize their lives.

2.4.1 Rely on Assistance from the Government

In Asia, persons with physical and sensory disabilities often rely on assistance from the government. In countries such as Thailand and Bangladesh, they provide financial support in cash every month, which is inadequate to cater for a person's needs and wants. These programs

are done under the Ministry of Social Development and Human Security It is because they cannot work for themselves to be able to cater for their needs and wants, (Mhlanga, 2022). A disaster that is created by the inaccessibility of technological assistive devices.

2.4.2 Rely on Informal Work

In the African region, in all countries, persons with physical and sensory disabilities without access to Artificial Intelligence (AI) assistive devices rely on subsistence-based livelihoods or informal work that requires minimum physical movement, (Lang, 2019). For example, persons with disability in Nigeria engage in street vending, begging in urban streets and in buses, selling homemade foods in town streets, basketry, and small-scale gardening in rural areas because they have mobility challenges. Mitra (2023) noted that individuals with mobility impairments are significantly less likely to be employed than able-bodied individuals. Unemployment among persons with disabilities can be up to twice as high as for persons without disabilities, particularly when mobility constraints are present, (International Labor Organization 2021). Their exclusion from formal sectors pushes them into informal jobs and begging, a gap that is exacerbated by the absence of technology in assistive devices.

2.4.3 Live in Poverty

The majority of persons with disabilities without technological assistive devices live in developing countries, which are characterized by low to middle income, where access even to basic or traditional assistive devices such as wheelchairs is critical. The African Development Bank (2020) indicated that more than 80% of persons with disabilities in sub-Saharan Africa live below the poverty datum line. However, discrimination, mobility challenges, lack of inclusive effective legal frameworks, and the cost of Artificial Intelligence (AI) assistive devices become barriers. A relationship between poverty and disability is bidirectional and deeply entrenched regionally, especially in Africa.

2.4.4 Education Access Limitations

The education system continues to be poorly equipped for students with disabilities in most schools, especially without technological assistive devices. Those using traditional assistive devices such as manual wheelchairs or basic hearing aids face significant challenges in navigating campuses. According to the UNESCO Institute for Statistics (2018), over half of children with disabilities in developing regions are out of school, largely due to infrastructure

and attitudinal challenges. Developing regions. Students who do often attend rely on resourceful strategies to cope. Children who use manual wheelchairs or use crutches may have difficulty travelling on uneven terrain, narrow school corridors, and pit latrines that are not accessible, (Choruma, 2020). For instance, in Kenya, children who use traditional assistive devices are dropping out of school due to the lack of sufficient usefulness of traditional assistive devices which require unnecessary effort for mobility. This is due to a lack of inclusive digital policies in Kenya. Traditional assistive devices do little to bridge the gap in environments that are physically and socially unaccommodating, (Mutepfa, 2019). Without advanced technology like Artificial Intelligence (AI) in assistive devices these children often require assistance from family members or peers, reducing their independence and being regarded as burdens.

2.4.5 Health Facilities Access Limitations

In Zimbabwe, persons with sensory and physical disabilities without access to Artificial Intelligence (AI) assistive devices are experiencing challenges in accessing health care facilities. Traditionally, assistive devices such as locally made crutches and manual wheelchairs are often not ergonomically friendly for their use, causing discomfort or secondary health issues, (Chireshe, 2023). Hospitals and clinics remain largely inaccessible due to step ramps, narrow entrances, and lack of accessible toilets, (Mutswanga, 2019). Persons with disabilities are travelling long distances to access basic medical services, often with no transport assistance; hence, traditional assistive devices make the journey physically taxing. Those with chronic or degenerative diseases in families and communities often suffer silently and later die, (Mukurira, 2020). There must be a call for Artificial Intelligence (AI)-driven technologies in assistive devices to reduce vulnerability among persons with disabilities.

2.4.6 Gender-Based Discrimination

Women with sensory and physical disabilities without access to Artificial Intelligence (AI) powered assistive devices in both rural and urban areas of Zimbabwe mostly face multiple forms of discrimination due to patriarchal society and public perception towards disability. They are less likely to own an assistive device and more prone to poverty, gender-based violence, and literacy, (Naami, 2020). Traditional devices such manual wheelchairs and wooden walking sticks are often not adapted to women's specific needs, such as reproductive health and child care responses. In the absence of systematic support, families often play a crucial role in ensuring the survival of persons with disabilities. They assist with transportation,

caregiving, and sometimes forgo income opportunities to support their family members with disabilities, (Loeb, 2019). This dependency limits the autonomy of women with disabilities but is the only strategy to safety net living. Caregivers, especially in rural and urban settings, also become advocates, mobilizing for inclusive resources or engaging with community leaders. Despite those efforts, burnout and poverty are common among households supporting individuals with disabilities, especially when Artificial Intelligence (AI) powered assistive devices are insufficient and inaccessible.

2.5 Opportunities of Artificial Intelligence (AI) Assistive Devices in Persons with Disabilities

2.5.1 Enhance Learning Outcome

Smart spectacles exemplify the effectiveness of Artificial Intelligence (AI) assistance devices in education for visually impaired students globally, especially in urban schools of developed countries like Japan. It enhances learning outcomes. Devices like OrCam MyEye use advanced Artificial Intelligence (AI) to read text aloud, recognize faces, and identify products. Students with visual impairments can participant more actively in class activities thanks to these features. According to Kumar (2020), students who wore smart glasses reported better academic performance worldwide and greater participation in class discussion. In educational settings, this autonomous access to information improves learning outcomes and creates a feeling of community.

2.5.2 Advancement in Mobility

To improve the quality of life for people with disabilities in a variety of areas such as education, healthcare, employment, and community involvement. Smart wheelchairs, smart canes, smart glasses and prosthetic limbs are being development and put into use . For people with physical disabilities, wheelchairs could greatly increase access to services (Mandipa and Manyatera, 2019). Local projects in Asian nations such as Japan are concentrating on creating reasonable priced smart wheelchairs that can move through both urban and rural settings.

2.5.3 Enhance Social Inclusion and Community Engagement

Technology enhance smart canes are revolutionizing how people with visual impairment navigate. With features such as GPS navigating and obstacle detection, the smart cane which

was created in India allow for safer public space navigation. Users of start canes report notable improvements in navigating complex environments,which increases community engagement, according to Asian publications in 2021,(Tom and Munemo,2019). Persons with disabilities are now feeling safer travelling through cities, which promotes social interaction and efficient us of local resources.

2.5.4 Restore Sense of Normalcy

In the health sector, Artificial Intelligence (AI)-powered prosthetic limbs have shown remarkable effect in improving the quality of life for individuals with limb loss in communities in the African region. The Artificial Intelligence (AI) powered prosthetic limbs is crucial as it aids in rehabilitation and moving mobility. A more natural range of emotions is made possible by these sophisticated prosthetics which use machine learning algorithms to adjust to the users' movement. For example, in nations such as South Africa, the Luke arms can react to muscle signals, allowing users to carry out tasks like gripping and object manipulation. According to Prez (2020), people who use prosthetics driven by artificial intelligence (AI) report increased functionality and a notable decrease in psychological barriers. By reestablishing a sense of normalcy in daily activities, this development not only promotes physical health but also enhances mental well-being.

2.5.5 Enhanced Communication

The introduction of smart hearing aids in Zimbabwe has shown considerable effectiveness in improving communication for individuals with hearing impairments. For example, Phonak Marvel hearing aids connect to smartphones, allowing users to stream phone calls and music. Chikate (2020) noted that users experience improved communication with colleagues, leading to greater job satisfaction and performance. Employees equipped with smart hearing aids feel more included in discussions and are more likely to participate actively in meetings, fostering a collaborative workplace culture.

2.5.6 Increased Autonomy

Artificial Intelligence (AI) devices allow individuals with sensory and physical disabilities to perform daily tasks independently, reducing reliance on caregivers. Smith (2020) asserted that Artificial Intelligence (AI) assistive technologies significantly enhance the autonomy of individuals with sensory and physical disabilities by providing personalized solutions that cater

to their specific needs, fostering a sense of independence and self-efficacy. For example, smart home assistive devices enable users to control their environment with voice commands, while navigating aids help them move freely in public spaces. By fostering decision-making and self-management, Artificial Intelligence (AI) enhances confidence and dignity.

2.6 Artificial Intelligence (AI) Assistive Devices Accessibility Barriers

Despite the opportunities brought by Artificial Intelligence (AI) to persons with disability, accessibility of these technological advancements is hindered by poor legal framework implementation. The legal frameworks and policies are failing to address social, economic, cultural, and political factors that affect persons with disabilities from accessing technologically enhanced assistive devices. Barriers that impede fair access to these devices are caused by inadequate regulations and a lack of reinforcement of current laws. In addition to restricting access to essential technologies, a weak legal framework also makes social stigma and economic disparities worse. Al-Hendawi et al.(2021) highlighted the accessibility issues of lax legal frameworks, which include;

- Lack of dedicated funding for disability-related institutions.
- High purchase and maintenance cost. Advanced assistive devices are expensive, limiting access for low-income individuals.
- Complexity of use. Users may find it challenging to operate sophisticated devices, leading to reluctant Artificial Intelligence (AI) adoption.
- Lack of awareness. Some persons do not know that Artificial Intelligence (AI) assistive devices exist in disability.
- Technological barriers. Limited digital literacy among some users may prevent them from fully utilizing Artificial Intelligence (AI) devices.
- Public opinion. Societal attitudes towards persons with disabilities can discourage them from seeking assistive devices.
- Government assistance limitations. Insufficient government programs of financial aid for assistive devices aimed at supporting individuals with disabilities can leave many without the help they need.

- Lack of availability. Some Artificial Intelligence (AI) may not be widely available in other countries especially developing countries.

2.7 Interventions Aimed at Improving Access to Artificial Intelligence (AI) Assistive Devices

2.7.1 Global Inclusive Policy Frameworks and Advocacy

Implementation of inclusive policy frameworks and advocacy globally is a strategy that can increase accessibility of Artificial Intelligence (AI) assistive technologies among persons with disabilities to reduce vulnerability. The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) signatory stated to promote the availability of Artificial Intelligence (AI) technology devices that enable persons with disabilities to fully participate in societies, (United Nations, 2019). Article 4 of the convention also calls for research and development in Artificial Intelligence (AI) assistive technologies, especially those that enhance mobility and communication. Almalki (2020) supported that these forums provide a space for countries to share best practices and set targets for inclusive technology adoption. Also, these global policy efforts promote accountability and foster a global culture of inclusion that prioritizes technological equity for persons with disabilities and reduces vulnerability.

2.7.2 Public and Private Partnership

The government has to collaborate with public and private donors regionally. The partnership will help the financing department of the country to get help from outsiders, which helps persons with physical and sensory disabilities to get assistive technologies to reduce vulnerability. By bringing together the strength of government institutions, private technology companies, civil society organizations, and academic institutions, public and private partnerships can bridge the gap of accessibility, funding, innovation, and service delivery (Ndung'u, 2020). In the African region, where accessibility is uneven, the strategy is an essential mechanism for scaling up digital solutions in a sustainable manner. For instance, South Africa's Department of Science and Innovation has collaborated with local universities and multinational tech firms to support the development of Artificial Intelligence (AI)-driven community devices for individuals with speech impairments, (Mhlanga, 2020). In Kenya, the government has partnered with Safaricom and Non-Governmental Organizations to create mobile platforms that use Artificial Intelligence (AI)-based voice recognition to help visually impaired users access health, education, and employment. The partnership enhances Artificial

Intelligence (AI) accessibility regionally. McKinsey (2021) points out that this collaborative model can be adapted by other regions facing similar challenges. Ndung'u (2020) also asserted that such partnerships can fill gaps in technology and funding that often hinder marginalized groups.

2.7.3 Practicability and Revising of Legal Frameworks

There has to be implementation action in legal frameworks in Zimbabwe, (Simeon, 2020). This helps persons with disabilities to have access to Artificial Intelligence (AI) assistive devices since the legal practices that advocate for their rights, including to assistive devices are only in theory, not on paper. The legal framework, such as the National Development Strategy, disability policies, and acts along the constitution of Zimbabwe. If the gap between policy making and implementation is covered, the persons with sensory and physical disabilities will have more access to Artificial Intelligence (AI) assistive devices. There has to be enforcement of practical disability policies and frameworks in Zimbabwe, (Mhlanga, 2020). The budget of Zimbabwe has to fulfill the aims written towards persons with disabilities towards assistive technologies in Zimbabwe. The Disabled Person Act remains outdated and does not reflect the technology of Artificial Intelligence (AI) assistive devices. The Zimbabwe National Disability Plan of 2021 marked a milestone in recognizing the rights of persons with disabilities but forgot to remove the accessibility challenges to service and potential of Artificial Intelligence (AI). Therefore, there is a need for policy and legal framework amendments to meet and support the research and development of technology in order to reduce vulnerability among persons with disabilities nationwide.

2.7.4 Financing Institution That Deals With Persons with Disabilities

Since the financing part in Zimbabwe is very weak, there have to be strides to cover the gap. Zimbabwe, as a country, is facing financing problems, but as the National Development Strategy-1 and national budget set certain amounts towards technology assistive towards persons with disabilities, it has to be practical, not on paper alone, (Artscale,2023).The Department of Social Development that caters to persons with disabilities has to be fully financed. Why? Because the Department of Social Development has a program for persons with disabilities to provide assistive devices, persons with disabilities come to apply for assistive devices, and the list will be sent to the government. But if the financing department remains too weak to fully finance those institutions, persons with disabilities will be more

vulnerable. Also, more finances of the government have to be directed to persons with disabilities since they are the most vulnerable population in the country.

2.7.5 Establishing National Funding Mechanisms and Incentives

The creation of a dedicated innovation and access fund within Zimbabwe's national budget increases the accessibility of Artificial Intelligence (AI) assistive technologies for persons with disabilities to reduce vulnerability, (Mhlanga, 2020). The fund will help to support local start-ups, research institutions, and Non-Governmental Organizations developing and distributing Artificial Intelligence (AI) assistive devices. Additionally, providing tax exemptions to businesses that transport these assistive technologies may help end users save money. The use of technology for inclusive development is already encouraged by the Zimbabwe national Information and Communication Technology (ICT) policy. However, the goal could be furthered by funding and rewarding it, with a focus on innovation related to disabilities, (Ministry of ICT,2020). A nation can improve access to necessary technologies for people with disabilities and foster a more inclusive atmosphere by putting these mechanisms into place.

2.8 Chapter Summary

The adoption of AI assistive devices in the disability sector has reached nationwide in reducing vulnerability. However, the accessibility of AI assistive devices is uneven for persons with physical and sensory disabilities due to gaps in legal framework implementation and financial constraints, and also there has to be exposure for persons with disabilities to be fully aware of AI assistive technology in disability sectors for full adoption. The effective mitigation strategies, such as public and private partnerships, enhanced policy and legal frameworks implementation, and financing, have to be put into consideration to mitigate the artificial intelligence assistive device accessibility challenges faced by persons with physical and sensory disabilities and reduce vulnerability.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

The purpose of this chapter is to outline the research methods, sampling methods, and data analysis methods used to analyzes the topic of the technological advancement brought by Artificial Intelligence (AI) in disability in Bindura Urban. The author will explain the

methodology employed in the study and the reasons behind its selection. The author also will describe the data collection methods utilized. Additionally, the chapter covers the study's location, demographics, research methodology, and ethical considerations.

3.1 Research Philosophy

The research used the interpretivism research philosophy. It emphasized the understanding of the subjective meaning and experiences of persons with disabilities in the research. It noted that reality is socially constructed and can only be understood through the perspectives of those who live within(Creswell, 2019). In this research, the transformation brought by Artificial Intelligence in disability can only be understood by persons with disabilities. The researcher chose interpretivism because it provides deep understanding, contextual sensitivity, and rich data leading to insightful and relevant findings of life experiences of persons with disabilities without access to smart assistive devices, opportunities of assistive devices, accessibility challenges, and mitigation strategies to improve accessibility of artificial intelligence assistive devices.

3.2 Research Approach

The research utilized an inductive research approach. It includes reasoning in which observations lead to broader generalization and theory development. The inductive research approach provides a rich understanding of the research objectives, enabling researcher to identify a more comprehensive understanding of the life experiences of persons with disabilities without access to smart assistive devices, the opportunities of assistive devices, accessibility challenges of smart assistive devices, and mitigation strategies to improve the accessibility of artificial intelligence assistive devices. It allows the researcher to acquire knowledge that improves the findings applicability and relevance, making them more significant in practical settings (Creswell, 2019). the method encourages a collaborative atmosphere where the voices of people with disabilities are vital in determining the research outcomes and empowers participants by appreciating their viewpoints and insights. It emphasizes participant centered thinking, contextual awareness, rich qualitative, data and theory development.

3.3 Research Design

The researcher employed a phenomenological research design. It seeks to understand and interpret the lived experiences of persons with disabilities with and without assistive devices. The design emphasizes the subjective nature of human experiences and to uncover meanings individuals ascribe to the experiences (Lippeveld et al, 2019). The approach uncovers the influences of social, cultural, and environmental factors on individuals' perceptions, revealing the complexities of human emotions and perceptions towards artificial intelligence in disability. It empowers participants to share their experiences, contributing to a more inclusive understanding of the research objectives.

3.4 Study Settings

Bindura Urban, Mashonaland Central Province of Zimbabwe, was the site of the study. The research was about to analyze technological advancement brought by Artificial Intelligence (AI) in disability in Bindura Urban. Bindura has a high rate of population with disabilities, according to Zimbabwe Statistics (2022), at approximately 718 households. Therefore, convenience and proximity were the reasons the researcher had chosen that place.

3.5 Target Population

The targeted population of the study were persons with sensory and physical disabilities in Bindura Urban and key inforants (social workers) from Ruvimbo Simulation Centre Organization. The selection was essential as it captured a wide range of insights and experiences, facilitating a holistic understanding of Artificial Intelligence (AI) assistive devices in disability. A study population comprises all the individuals or entities that are the subject of the research, typically belonging to a certain demographic group or geographic area (Singleton, 2020). According to Lippeveld et al. (2019), a population is the entire group of people with a common trait, such as age, gender, or geographic region that are being investigated. The selected population was the best participant to give information on the life experienced by persons with physical and sensory disabilities without access to Artificial Intelligence (AI) assistive devices, opportunities brought by Artificial Intelligence (AI), and effective interventions to increase access to Artificial Intelligence (AI) assistive devices.

3.6 Sampling

3.6.1 Sample Size

According to Maxwell (2020), the "sample size" refers to the number of individuals or groups of individuals who will participate in the study in which data will be collected. The larger the sample size, the more accurate the results are likely to be. The study considered other factors when determining the appropriate sample size, such as the nature of disability and the resources available. The sample size of the research consists of 8 persons with physical and sensory disabilities living in the Bindura Urban along with 2 social workers from the Ruvimbo Simulation Centre Organization in Bindura who have a better understanding of persons living with disabilities. Therefore, the whole sample size added up to 10 research participants.

3.6.2 Sampling Techniques

3.6.2.1 Purposive Sampling

The researcher utilized purposive sampling, which is a non-probability sampling technique, to collect qualitative data. The act of purposive sampling is when a researcher selects a sample population based on their own judgment, with the knowledge that they can obtain a representative sample for their research, (Creswell and Clark, 2018). Sharon (2009) states that it involves the deliberate selection of individuals for research due to specific reasons, such as having experienced a particular event or having an understanding of it. In the study, the researcher opted for 2 social workers at the Ruvimbo Simulation Centre Organization that deals with persons with disabilities in Bindura. The research had chosen purposive sampling because it targeted specific individuals or groups who had the information and experience needed for the study, which led to more focused and meaningful data collection. The research also used purposive sampling because it gave more control over the selection of participants, which ensured that the sample was representative of the population of interest.

3.6.2.2 Snowballing Sampling

The researcher utilized the snowballing sampling technique to reach 8 persons with sensory and physical disabilities, who are primary participants in the research. Snowballing is a non-probability sampling method. It is a method where new units are recruited by one unit to form part of the sample, (Braun and Clarke, 2019). According to Kessiani (2023), he suggested that the snowballing sampling technique can be a useful way to conduct research about people with specific traits who might otherwise be difficult to identify. The researcher had chosen the sampling technique because persons with physical and sensory disabilities are a hard-to-reach population, displaced, and cannot be found at the same time in the area. It also provides results

that are hard to generalize beyond the sample studied. However, snowballing divulges information about the people that they would prefer to keep confidential.

3.7 Data Collection Techniques and Tools

3.7.1 Participants In-depth Interviews

The research utilized the in-depth interview data collection technique to collect qualitative data from 8 persons with physical and sensory disabilities in Bindura Urban were interviewed face-to-face using an in-depth interview guide as a data collection tool. For those with speech impairment, the researcher made use of the sign language interpreter to comprehend language during the interview. Notes were used to document findings using a notebook to capture accurate transcription and accuracy in reporting and enabling a thorough study of the data collected. In-depth interviews were used in the study since they yielded contextualized, reachable data that questionnaires alone are unable to collect. An interview guide tool using open-closed questions was used. The tool recorded the information on the life experiences of persons with disabilities without access to Artificial assistive devices, opportunities brought by Artificial Intelligence (AI) assistive devices in disability, and effective intervention aimed at improving access to Artificial Intelligence (AI) assistive devices were gathered using an open-ended interview guide. Additionally, interviews are adaptable and permit probes or follow-up questions depending on the interviewee's answers (Lippeveld et al, 2019).

3.7.2 Key Informant In-depth Interview

The researcher made use of the key informant in-depth interview technique to collect qualitative data from 2 social workers at Ruvimbo Simulation Centre, an organization in Bindura which advocates for persons with disabilities. The research utilized an interview guide as a tool to gather data. The researcher had chosen a key informant in-depth interview with the organization because it has more information and is aware of the research‘s objectives.

3.7.3 Use of Secondary Data

The researcher made use of online secondary data sources in addition to primary data that was gathered through observation and interview guides. To comprehend the demographic setting of the study, the researcher examined journal publications and statistics data from Ruvimbo Simulation Centre Organization and the Department of Social Development. They offer a more

comprehensive framework for comprehending transformation brought by Artificial Intelligence (AI) in helping persons with disability to reduce vulnerability. The research made use of online materials. This knowledge aids in the interpretation of primary data and the formulation of research questions. According to Babbie (2018) gathering primary material is more expensive and time-consuming than using the internet. The study triangulates the facts and guarantees that the conclusions are solid and dependable by using both primary and secondary data.

3.7.4 Observation

The researcher gathered some information through observations. The researcher gathered home setup, the environment setup, clothing information, the behavior, interaction behaviors, facial expressions, and body clues and paid attention to verbal and nonverbal communication.

3.8 Research Procedure

It entails gathering relevant information for the research. Before beginning the collection of data, the researcher provided a photocopy of the research proposal, school research letter, and research tools to the Department of Social Development head offices in Harare. The researcher received an approval letter as permission to carry out the research involving persons with disabilities in Bindura. The researcher conducted a pilot study to identify potential problems in the research design and methodology before the main study and also to evaluate the effectiveness of the research tools. Following that, the researcher presented a written consent form from the Department of Social Development stating that the research is mainly for academic purposes only to ensure compliance with participants. The researcher started conducting participants' in-depth interviews using an interview guide for persons with physical and sensory disabilities in Bindura Urban. The researcher made use of a sign language interpreter to help with effective communication with speech-impaired individuals. The key informant interview guide was given to Ruvimbo Simulation Centre social workers. The time limits for interviews range from 15 to 20 minutes per participant. Furthermore, prior to the interviews, the researcher discussed the goal of the study and how confidentiality could be maintained throughout the study. Following the consent, the researcher interviewed one person at a time, prioritizing the confidentiality principle. The researcher utilized a notebook and mobile phone for recording the deliberations during the study. The interviews were conducted in a private and secure environment.

3.9 Validity and Reliability

To ensure the validity and reliability of the research instruments, the research used credibility using triangulation, which is the use of multiple data sources. To test reliability, the researcher utilized dependability using a code-recode strategy, Code-record strategy is coding data at two different times and comparing in order to assess the stability of research tools over time (Siegel, 2022). To test that, the researcher conducted a pilot study to know whether the interview guide for the primary population answers the research questions. It was also done as a preparatory phase that helps the researcher to ensure the quality, feasibility, and clarity of the study before investing much time and resources in the main research. A small sample size was selected as the first administration in the pilot study, and waited for a suitable time interval to conduct proper second administration research.

3.10 Data Analysis Techniques

The researcher used Braun and Clarke's thematic data analysis technique to examine interviews with individuals with disabilities. Braun and Clarke's thematic analysis, which examines interviews using thematic analysis stages which are familiarization, generating codes, searching for themes, reviewing themes, defining themes, writing up the findings, underscore artificial intelligence (AI)’s transformative role in enhancing the lives of individuals with physical and sensory disabilities. The researcher chose thematic analysis because it is flexible and adaptable.

3.11 Limitations

3.11.1 Low participation

It was difficult to reach a wide variety of participants (persons with physical and sensory disabilities) as others were reluctant to participate and had restricted availability. Low participation can limit the variety of viewpoints collected and provide a biased sample, (Siegel, 2022). The study employed a variety of recruitment techniques to increase accessibility, including contacting participants by setting up interviews at suitable times.

3.11.2 Language Barriers

Participants' ability to communicate and comprehend the study was hampered by different levels of the language speakers, such as English and sign language. Misunderstandings could

result in incorrect answers, which would compromise the reliability of the data, (Creswell, 2019). Ensuring that participants completely comprehend the questions and are able to articulate their opinions appropriately was achieved by using appropriate language and offering translated materials such as an interpreter.

3.11.3 Time Constraint

Time available for data collection was restricted by the academic calendar and participant schedules, by hectic times like project deadlines or finals. A hurried data-gathering process brought on by time constraints may provide responses of worse quality and incomplete data, (Lenth, 2019). In order to take care of this, the study limited the time for in-depth interviews and also scheduled data collection with schedule flexibility to fit participant availability.

3.12 Ethical Considerations

Carefully navigating ethical considerations is important in conducting research, especially within the framework of persons with disabilities. These factors support the fundamental ethics, beliefs, and principles of the research in addition to protecting the integrity of the research. This paper presents important dos and don’ts to guarantee ethical adherence to the 1948 Nuremberg Code during the study process.

3.12.1 Participant Informed Consent

Getting participants' informed consent were one of the fundamental ethical tenets of this study. The researcher's guiding philosophy was respect for each person's inherent worth and dignity. According to this concept, all participants was fully informed about the goals of the study, their part in it, and the intended use of their data. Before involving subjects, the researcher explained the goal of the study and obtained their consent. Additionally, they asked a qualified authority for authorization to carry out the research. The researcher made sure that there were no compulsion and that subjects agreed to engage voluntarily. It was possible for subjects to withdraw from the study at any moment. Providing information that is easy to understand and available promotes trust and is consistent with the values of transparency and respect.

3.12.2 Confidentiality

Participants' anonymity and privacy were not jeopardized during the data collection process. Strict safeguards were put in place to secure sensitive data, including anonymized data to make it impossible to identify specific individuals. Neglecting to protect personal information can result in serious ethical transgressions and discourage future research involvement. Respecting participants' rights and upholding the ethical standards and practices require adherence to institutional norms and data protection regulations. The researcher kept information private. Confidentiality, according to Berg (2007), is the ethical protection of the subjects of a study by ensuring that research data is kept private or hidden from the public and by not disclosing information that would allow for the assignment of particular responses to particular participants. Above all, the researcher reminded the participants that the information collected from them will be treated with the utmost care by preserving confidentiality and protecting their privacy and anonymity by leaving their names out of the data collection and display processes.

3.12.3 Plagiarism

A major ethical consideration is plagiarism, which is the unapproved use of another person's words or ideas without giving due credit, (Rudestam, 2019). It disregards other people's contributions and compromises the integrity of scholarly study. Every source, including books, statistics, and my own thoughts, shall be properly cited by the researcher. This dedication to innovation ensures that the research is reliable and trustworthy by upholding academic standards and the social.

3.13 Chapter Summary

The chapter reveals the methodology that was employed in the gathering of the information during research. It includes the tools intended to be used, the size, techniques, and the limitations that might be faced during the gathering of information, together with suitable practical solutions.

CHAPTER FOUR: PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.0 Introduction

In this chapter, findings of the study were presented, analyzed, and discussed. In chapter two, the results hereunder principally revolve around the desire to analyze the technological advancement brought by Artificial Intelligence (AI) in disability in the Bindura urban area. On the same footing, results mainly constituted primary data gathered through the use of interviews, observation, and secondary data. In navigating through the results, the set of variables that form the basis of study theory and hypothesis, highlighted in the theoretical framework in chapter two, were followed. Data was presented to dwell on the data related to research objectives.

4.1 Presentation of the Research Objectives

This section is going to illustrate the findings in relation to the study objectives, which are written as follows: to identify the life experienced by persons with sensory and physical disabilities without access to Artificial Intelligence (AI) assistive devices; analyze opportunities of Artificial Intelligence (AI) assistive devices for persons with sensory and physical disabilities; analyze the accessibility challenge of Artificial Intelligence (AI) assistive devices in disability; and analyze intervention strategies aimed at improving access to Artificial Intelligence (AI) assistive devices for persons with sensory and physical disabilities to reduce vulnerability. It was presented using thematic data analysis in themes and sub-themes in order to ensure clarity on the presentation of findings as discussed below.

4.2 Life Experiences of Individuals with Disabilities without Access to Technological Assistive Devices

4.2.1 Daily Challenges

The participants who have mobility impairment and have no Artificial Intelligence (AI) assistive devices in the Bindura urban area reported that they are experiencing daily challenges, including poverty and discrimination. The report from age groups between 21 and 40 years reported enduring significant poverty due to financial hardship. Additionally, societal biases frequently lead to discrimination against persons with disabilities, which also leads them to be in poverty. The discrimination manifests in various forms, such as education, employment, assistive technology, and health care. The family and the community have different perceptions towards persons with disabilities. Some take it as a God‘s punishment, some as misfortunes, and some as biologically caused. Their perceptions leads to how they treat persons with disabilities. The participants from the participants are below.

> *“Ndiri musikana akazvarwa ndiine urema hwekuoma mitezo. Izvezvi ndine makore 35 ekuberekwa. Handina kumboenda kuchikoro nekuti vanhu vemunharaunda vanondiona kunge urema hwangu ndakarohwa neshamhu yaMwari nekuti baba vangu vakauraya munhu ndichiri mudumbu raamai vangu. Baba vangu vakabva vanenda kujere, handitovazive. Nharaunda inondipa mazita akawanda ekundinyomba. Mai vangu vanoshanda kuRiverdale kumine kuti tirarame, uye ndovanondichengeta zvakanaka nekundinyaradza. Dzimwe nguva vanenge vasipo pamba vari kubasa ndosara ndega. Kuenda kuchimbuzi ndoita zvekugwesha. Handitorina muchina wekufambira nekuti*

handina kwandofamba ndichiienda ndongogara mumba. Muchina wakavandudzwa wacho handisati ndambouna. Dai zvaibvira nyika yedu yandimirirawo kundichengetedza kubva kune vemunharaunda." (I am a 35-years-old female, and I am paralyzed. I live indoors for the rest of my life. People in this community regard me as a product of punishment because my father killed someone when I was in the womb, and he is in jail. I do not know him. I live with my mother, who does illegal mining at Riverdale place for us to survive. She went to work here and there; sometimes I will be at home alone. I crawl to go to the pot if I am alone at home. She encourages me and comforts me always. The society labels me and gives me different names that made me not acquire education. I am afraid because of that. It is also unnecessary for me to get an assistive device because I cannot use it indoors. I do not know Artificial Intelligence (AI) assistive devices. I wish the laws in Zimbabwe could help and protect me from the society." (Participant 1).

"I have a physical impairment; I have had a stroke for the past 17 years. I was a teacher at a private school in Kwekwe. I lost my job the very day I got a stroke, and they claim that I cannot do anything productive at work. I do not go to work currently. My son, who is 24 years old, sells water in town for us to survive. I could not manage even to take him to school because of financial constraints and no family member to help. We eat once a day, especially around 8am. Sometimes we go out begging in buses and locations, but we cannot manage to get everything we need. We survive from the little we have. I am not familiar with technology in assistive devices." (Participant 2).

"Ndinogara nemukadzi akangodawo kundibatsira asiri hama yangu. Anoita basa rekusona ari pamba. Mari yavanowana mukusona pamwedzi haidariki $200. Hama dzangu chaidzo dzakandiramba nekuda kwedambudziko randiinaro rekuremara. Handizivi kuti kune zvigaro zvemavhiri zvakavandudzwa zvatokwanisa kushandisa isu vanhu vane urema. Handisati ndambozviona". (My family abandoned me because of my condition. I live with a well-wisher who is always at home because she is a tailor. She operates from home. Her job gives her no salary, but approximately she earns $200 per month. I am not familiar with Artificial Intelligence (AI) assistive devices; l have never seen one). (Participant 3).

" Persons with disabilities experience a mass poverty and discrimination due to lack of mobility and independence which deteriorates their mental health" (Key informant 1)

The information from the participants indicated that men and women experience different challenges due to gender and the nature of disability. It indicated that women are the population who are most vulnerable, as they suffer dual experiences, which are poverty and discrimination, in great numbers. In Bindura Urban, the majority f people with physical and sensory disabilities live in poverty and face discrimination form society; some of them do not even own conventional assistive devices. The results are consistent with a larger body of research by the African Development Bank (2020), which found that most people with disabilities live below the poverty thresholds and are unable to access work, education, and and health care. These findings are corroborated by Naami (2020), Choruma (2020) and Chireshe (2023). many participants attribute their conditions to bad luck and divine punishment, while others express feelings of stigmatization and abandonment. The experiences discussed, for example, demonstration how family dynamics and financial limitations with disabilities. Discrimination increases their vulnerability to poverty, particularly because of public perceptions. The family caregivers give and sometimes forgo income opportunities to support their family members with disabilities, as evidenced by participants' responses, which is also mentioned and supported by Loeb (2019) in the literature review. Also, some experienced the lives where persons with disabilities had opposite sex assistants. It is very hard as it jeopardizes gender privacy. Some personal assistants are not always home, which increases the vulnerability of persons with disabilities. Therefore, to address these issues, social workers should use a holistic approach to improve societal perceptions towards disabilities and enhance support systems. Also, social workers have to collaborate with the government and provide assistive help to reduce poverty among persons with disabilities who are financially unstable through the implementation of livelihood projects and financial help to enhance their lives.

4.2.2 Social Interaction

Due to a lack of opportunities in the formal job market, many individuals with sensory and physical disabilities in Bindura Urban rely on informal jobs or are unemployed. Many reported selling in the Bindura streets and ranks; some are shoemakers, and some travel in buses to Mt. Darwin and Harare and beg in the streets for food, money, and clothing. Some reported that they sell fast foods in shop areas in locations such as Tendai Hall. This reliance on low-paying informal jobs leaves a fulfillment gap in their needs and wants. Additionally, persons with physical and sensory disabilities in the Bindura area lack access to services such as education and health facilities. These barriers may include physical obstacles in the environment,

insufficient transportation options, and inadequately tailored services, which completely hinder their quality of life. They are unable to access those services because some of them have traditional assistive devices that need assistance and others do not have any. Some hospitals and schools have no services tailored for persons with disabilities such as ramps, toilets, and buildings, which limits their mobility, not letting out roads in locations. The following participants reported.

> "I am a 37-year-old female with a visual impairment that started in 2023 after I graduated from Kushinga Pikelele Polytechnical. I am a vendor, and I sell foot scrub bathing stones in Musika. I earn less than $5 a day. I did a diploma in engineering, but no company hired me because of my condition, which led me to sell to earn a living. The money I earn is insufficient to support my two children". (Participant 1).

> "I am a shoemaker, which l operate at home. I take care of my one sibling, for whom I am a breadwinner; no one is helping. The money l earn is not sufficient to take care of our needs and wants since no family member is helping. I am educated up to form 4, but I cannot work in any formal sector because I do not have even a simple hearing aid; communication is a challenge. I am not aware of Artificial Intelligence (AI) assistive devices". (Participant 2).

> "I stopped school in grade 6, but I have a talent for drawing. But due to mobility challenges, l cannot be exposed to customers. I was born with no legs. I use a simple wheelchair and an assistant. My sister is my assistant and is not always at home because she sells potatoes in town. When my assistant is not around, I use my arms to walk. I am always at home doing nothing. My parents passed away, and my sister is the one who takes care of me but cannot meet all my needs and wants. I am on a high blood pressure medication, so I go to the Chipadze clinic every month to collect my medication. The clinic corridors are narrow, which makes it very difficult to move with a wheelchair". (Participant 3).

> "I am visually impaired, but I cannot walk without an assistant each and every time around the location because of the potholes in the roads; I might fall". (Participant 4).

> "Persons with disabilities, most of them are into begging. Not only in Bindura but globally, the same experience exists. It is as a result that their mobility and communication are hindered to be in formal work". (Key informant).

Persons with physical and sensory disabilities in Bindura Urban, some rely on informal jobs, and others do not work, but they have qualifications for them to be in the formal sector, which is supported by Lang (2019), who stated that persons with disabilities rely on subsistence-based livelihoods and informal jobs. They rely on street vending, begging, and small-scale gardening, which makes their lives more prone to poverty. Participants also reported difficulties accessing services such as education and health facilities due to a lack of proper infrastructure in Bindura Urban. In clinics the setup is not convenient for persons with disabilities. Also the roads in the streets of Bindura are difficult to travel with a wheelchair or a traditional walking stick, even with an assistant, due to potholes and dusty roads. Also in schools and clinics, places where the corridors are narrow, to be able to transport with a wheelchair. It links with the information provided by Choruma (2020) and Mutswanga (2019), who asserted that some places are inaccessible to persons with sensory and physical disabilities due to poor infrastructure, and an urgent need to improve the accessibility and support for the marginalized population is needed. Therefore, the government, in partnership with humanitarian organizations, has to partner and implement livelihood projects such as poultry keeping for them to have a better source of income. The government also has to include these smart assistive devices in a national budget in order for persons with disabilities to be able to access smart devices regardless of being financially stable, which enhances persons with disabilities' access to services.

4.3 Opportunities of Artificial Intelligence (AI) Assistive Devices in Persons with Disabilities

4.3.1 Enhanced Mobility

Persons with smart wheelchairs. Smart canes, prosthetic limbs, and smart hearing aids reported that Artificial Assistive devices are enhancing their mobility in persons with physical and sensory disabilities in Bindura Urban. They are now able to travel long distances and times without hindrances. They are now able to access services anytime. They are now also able to participate in the community, which increases their involvement in the community. The participants responded below as follows:

> "I owned my smart wheelchair last year. Before this wheelchair, l used to use a manual wheelchair, and navigating to different places was difficult. But with this one l can move to wherever l want to go, no hindrances. I am a financial manager at United Nations for Women (UN Women) in Arundel Park in Harare; currently l am on sick leave." (Participant 1).

> "It was very difficult the years l was using crutches, as they were causing me blisters under my arms. So far l have no problem with my prosthetic leg, as l can move anywhere like an able-bodied person do. I want to thank technology for that." (Participant 2).

> "I used to use a wooden stick, and it was difficult for me to move from one place to another due to the land terrain in Bindura, which is stiff and has potholes. The change happened in January this year when I owned a smart cane that navigated the terrain and gave directions like what GPS does. My mobility is now enhanced." (Participant 3).

> "A great transformation in the lives of persons with sensory and physical disability has been recorded due to the introduction of technological advancement in assistive devices. Their mobility has been enhanced" (Key informant 1).

Prosthetic limbs, smart wheelchairs, smart walking canes, and hearing aids enhance the mobility of persons with physical and sensory disabilities in Bindura Urban, as reported. Participants report greater ease of movement and improved access to services, aligning with findings by Mandipa and Manyatera (2019) in a literature review. While these technologies foster autonomy, allowing users to navigate without assistance, they also introduce new challenges such as feelings of loneliness during solitary travel. This underscores the need for a balanced approach that not only promotes independence but also considers the social aspects of mobility, as highlighted by Smith (2022) in the literature. The findings from Bindura urban align with literature that stated that Artificial Intelligence (AI) assistive devices are transforming the lives of persons with disabilities even in Asia. Therefore, it means Artificial Intelligence (AI) assistive devices are enhancing the lives of persons with disabilities globally. The device's prevalence has to increase so that every person with a disability will be able to access it and reduce vulnerability.

4.3.2 Independence and Autonomy.

Participants in Bindura Urban responded that the introduction of Artificial Intelligence (AI) in their lives brought a great impact. They are now independent, and it enhances their autonomy, which improves self-management of daily tasks and personal empowerment. Before the introduction of these technologies, they were experiencing challenges of mobility and communication and needed an assistant all the time. The persons with physical and sensory disabilities in Bindura area without access to the smart assistive devices are wishing they could

be able to access these technologies to enhance their mobility and communication and reduce vulnerability. The participants' reports are below.

> "I am a woman aged 29, and I am physically challenged. Mobility was a challenge for me while using a manual wheelchair for the past years until 2024, when I managed to purchase a smart wheelchair. I used to have an assistant to help push my traditional wheelchair. Currently, with a technologically powered wheelchair I travel without assistance because I control the wheelchair using buttons and a gear. It navigates all terrains at a normal speed. But I am facing a challenge of feeling lonely while traveling alone since I used to travel with my assistant, talking and laughing all the way." (Participant 1).

> "I used to use a wooden stick. It was impossible to go even out of the gate alone without an assistance. The assistant was not always available, which was a challenge was for me. By the time I own a smart walking cane, I need no more assistance because I move everywhere alone. My device navigates ground level and uses GPS for directions; I would not get lost with my device." (Participant 2).

> "I used to have an assistant who used to assist me with writing, bathing, and touching, but since I managed to have a prosthetic arm, I don't need an assistant anymore because I am now able to use that hand. The prosthetic arm works like a normal arm and imitates my movements." (Participant 3).

> "I wish I could have a smart wheelchair so that I can travel to wherever I want without bothering anyone to take me there." (Participant 4).

Artificial Intelligence (AI) assistive devices increase independence and autonomy among persons with physical and sensory disabilities in Bindura Urban as they reported. Participants reported significant improvement in mobility, allowing them to navigate independently without relying on caregivers. The technological empowerment aligns with Smith (2020), who emphasizes the importance of personalized solutions in fostering independence. The findings of assistive technology in Bindura urban and smart devices manufactured in India in literature have the same advantages in the sense that they navigate complex environments, which is supported by Tom and Munemo (20210), along with the studies conducted in Asia in 2021. However, they are now facing challenges while using smart assistive devices. They are feeling lonely while traveling alone since they used to travel with an assistant talking. Therefore, the

dual experience highlights the need for supportive community networks that can help mitigate isolation while celebrating the newfound freedom enabled by assistive technologies.

4.3.3 Improved Communication

Persons with sensory disabilities are now able to communicate well using the technological advancements brought by Artificial Intelligence (AI) in the disability sector. Hearing in noisy public places was a challenge for them, and they were not able to participate in places such as community and workplaces. The participants' responses are as follows:

> "I use a technologically powered hearing aid. I can now participate in meetings with others at work. The smart hearing aid filters all background noise, so I can hear very well." (Participant 1).

> "I used to have a normal hearing aid. It was difficult to hear in public places and also to hear properly in no-noise areas. A person was supposed to speak loudly, like shouting, for me to hear. But with a smart-powered hearing aid, I can feel as if I have no hearing impairment due to its systems. It transformed my communication challenges with others to a greater extent." (Participant 2).

> "We have a member at this organization who used to have a traditional hearing aid. Communication was a challenge for him. To effectively communicate with him, one has to project their voice. He was also complaining that the device did not filter noise and it was possible to communicate in public places." (Key informant).

> The lives of persons with hearing impairments in Bindura urban have been profoundly challenged by the incorporation of smart software aids for communication and hearing, which has improved their capacity to communicate in a variety of contexts. Participants reported that by filtering background noise, these cutting edge devices enable them to converse without the difficulties that came with traditional hearing aids. In addition to enhancing auditory perception, this technological development promotes inclusivity and a sense of belonging in social and professional contexts. According to literature cited by Chikate (2020), having good -hearing in meetings increase job satisfaction and one's sense of participation in discussions at work. Such improvements are crucial , as effective communication is foundational to collaboration and team work, which are essential for organizational success and explanation. For better hearing, users can filter

background noise and project spoken voices. However, te lack of articificail intelligence assistve devices is still a problem because of financial difficuties. These transformative potential of smart hearing aids, thus emphasizes the significance of sustained investments in assistive technologies that promote inclusivity and communication for persons with sensory disabilities.

4.4 Barriers in Accessing Artificial Intelligence (AI) Assistive Devices

4.4.1 Lack of Awareness

Many participants in Bindura urban area reported that they are unable to access assistive devices due to lack of awareness. They do not know that there is assistive technology devices in the disability sector. There is less dissemination of information in disability sector. The participants reported as follows.

> "I have a stroke. I have never heard about Artificial Intelligence (AI) assistive devices. I only know manual wheelchairs, but I do not have one. I am always bedridden." (Participant 1).

> "I do not know how to operate a common cellphone, so how can I operate machines? I will use a wooden stick for mobility forever. I do not have a personal assistant as the family now regards my condition as a burden at home." (Participant 2).

> "Most people were not aware of artificial intelligence assistive devices until last year when Bindura hosted the Disability Expo." (Key informant).

> "I went to Bulawayo in March when I heard they had smart hearing aids, but when I got there they told me they had sold out, so I have to wait for 3 months to find one." (Participant 4, a 28-years-old female with a hearing impairement).

Many persons with disabilities in Bindura are not aware of the existence of Artificial Intelligence (AI) assistive devices in disability, which is a significant barrier for them to access it. For those who can benefit, the technologies that can enhance daily life often remain a mystery. They also do not know how artificial intelligence assistive devices works. Health care providers, who should be the ones guiding them, sometimes lack the latest information. Additionally, those with low digital skills may feel overwhelmed and unsure where to start. Community outreach is often minimal, allowing misconceptions to fester. It is illustrated by the Technological Acceptance Model (TAM), which says that the extent of perceived actual

use (PEOU) of a person is low if they have no knowledge of how Artificial Intelligence (AI) assistive devices can enhance their lives. One cannot tackle the benefit of something if there is no exposure. The response from persons with disabilities in Bindura Urban aligns with the study by Al-Hendawi et al. (2021). Therefore, to truly empower these individuals, it is essential for social workers and healthcare workers to prioritize education and awareness about the transformative potential of Artificial Intelligence (AI) assistive devices through social media and awareness campaigns.

4.4.2 Financial Constraints

Many persons with disabilities in Bindura Urban reported financial constraints as a barrier which is hindering them from accessing artificial intelligence assistive devices because of poverty, insurance coverage issues, high purchasing and maintenance costs of smart assistive devices, and government assistance limitations. They are into informal jobs in which they earn little money to manage their survival. They reported that they cannot manage to purchase an advanced assistive device. Also some who have insurance coverage are forced to pay the three-quarters of the amount to cover these devices. The ones who have assistive devices reported that the devices are expensive to maintain, which makes them shift to traditional assistive devices sometimes because they have no finances to maintain them every three years. The government's assistance towards persons with disabilities is limited, which hinders persons with disabilities from acquiring Artificial Intelligence (AI) assistive devices. Some of the responses are below.

> "I sell tomatoes in Musika to take care of my one child, for which l earn less than $50 a month. I cannot afford to purchase a smart hearing aid." (Participant1).

> "I cannot afford to buy an advanced prosthetic leg, which is $15,000, when l cannot even have a normal meal per day. I do not work or have medical assistance. It is very expensive. I have a diploma, but no company is willing to hire a person who uses a normal crutch." (Participant 2, a 37-year-old female with a physical disability).

> "I went to many hospitals in Zimbabwe in need of purchasing smart sunglasses to enhance my mobility, but l could not find one. They said their availability is low because they are not widely used in Zimbabwe. I ended up traveling to Singapore, where my elder son works, and purchased one. They enhanced my mobility, but they are very expensive to buy and maintain because they have to be renewed every 3 years.

They are also very complex to use. Someone who is not educated cannot use them". (Participant 3).

"I have a smart wheelchair. I am now running bankrupt due to maintaining it every time. It is very expensive to maintain. Sometimes I shift back to my traditional wheelchair". (Participant 4).

"I once applied for a manual wheelchair at the Department of Social Welfare in 2021, but I have not received one yet. They said the government has not yet released funds for assistive devices. Their policies are not effective. They already mentioned that they will set aside finances for assistive devices for disabilities but the economy of Zimbabwe is negative and could not fulfill what they wrote in national budgets, policies, and legal frameworks". (Participant 5).

From the responses from the participants, financial constraints hinder persons with physical and sensory disabilities in Bindura from accessing Artificial Intelligence (AI) assistive devices. Many of the technologies come with high costs and maintenance, making them out of reach for those with fixed incomes or those who have no financial source of income, as it aligns with what was indicated by Al-Hendawi et al. (2021) in the literature review. Unfortunately, insurance coverage often falls short, leaving people to shoulder the full expense themselves. Compounding this issue is the lack of effective governmental support; funding programs and policies are minimal, which means many individuals with disabilities miss out on the tools that could greatly enhance their independence and quality of life. Therefore, it is vital for the policies and legal framework of Zimbabwe to be practical in order to help persons with disabilities find jobs and technological devi*ces.*

4.4.3 Lack of availability

Lack of availability of smart assistive devices in Zimbabwe is another challenge, which participants in Bindura urban reported to be the factor which contributed to the inaccessibility of smart assistive devices. They reported that the devices are not widely available in private clinics and no company manufactures the smart devices. The participants reported that

> “In Zimbabwe there is not a company that manufactures smart assistive devices. Wheelchairs are available here and there and by order in private hospitals”. (Participant 1).

> “I went to Bulawayo in March when I heard they have smart hearing aids, but when I got there they told me they have sold out, so I have to wait for 3 months to find one”, (Participant 2).

> “In Zimbabwe I have not came across a companty which makes artificial devices for persons with disablities” (Key informantt).

The limited availability of smart assistive devices in Zimbabwe, particularly in areas such as Bindura, poses a significant challenge for individuals with disabilities. As highlighted by the participant, mobility and hearing impairments are exacerbated by the scarcity of essential technologies. The absence of local manufacturing for smart assistive devices means that individuals must rely on imported or specialized suppliers, often facing long wait times and inconsistent availability. The limited availability of Artificial Intelligence (AI) assistive devices presents a major challenge for persons with disabilities to access it in Bindura, which was explained by Al-Hendawi et al. (2021) in a literature review that access to technologies, mostly in developing countries, is restricted, leaving many without access to tools that enhance their quality of life. Even where artificial intelligence assistive devices can be found, they may not be found in local markets. Moreover, the findings also suggested that even when Artificial Intelligence (AI) assistive devices are available, they may not be tailored to the specific needs of users, leading to underutilization or abandonment of the devices. As revealed by the Technological Acceptance Model (TAM), training sessions and user manuals in accessible formats are vital to improve a person’s perceived usefulness (PU), the degree to which a person believes that technology will enhance their lives, and perceived ease of use (PEOU), the extent to which a person believes that using a particular technology will be free from effort, which is in relation to external factors such as inaccessibility. Therefore, the government has to partner with the private sector to enhance the importation of technological assistive devices in Zimbabwe. The government also has to incentivize technology manufacturing companies in other countries to increase its availability in Zimbabwe.

4.5 Interventions Aimed at Improving Access to Artificial Intelligence Assistive Devices

4.5.1 Policy and Advocacy

For the accessibility of Artificial Intelligence (AI) assistive devices to be enhanced in Zimbabwe, there have to be intervention strategies aimed at policy and advocacy. Persons with disabilities in Bindura urban and the key informant reported that disability laws and policy has to be practical in order to address social, economic, environmental, and cultural factors which hindered accessibility to smart devices in Zimbabwe. To enhance accessibility, there has to be practicability of legal frameworks, public and private partnerships, and financing disability institutions, establishing mechanisms and incentives, and combating discrimination.

> "I truly believe that implementing an inclusive policy framework is crucial for improving access to Artificial Intelligence (AI) passive devices. The UNCRPD guidelines should be actively adopted in Zimbabwe to ensure that our needs are met. When policies are not just theoretical but practical, we can see real change. I have experienced firsthand how inclusive technology can transform lives, but we need strong advocacy and accountability from our government." (Participant 1).

> "Public and private partnerships can significantly enhance access to assistive technologies. I see successful models in other countries, such as South Africa, where collaboration has led to innovative solutions for persons with disabilities. In Zimbabwe, we can foster similar partnerships. It could help bridge the gap in accessibility. We need technology companies and Non-Governmental Organizations to work together with the government to make these devices available and affordable." (Participant 2).

> "The establishment of a national funding mechanism for assistive technology is a step in the right direction. However, it is essential that this funding translate into actual devices that people can use. As someone affected by hearing impairment, l know how vital these technologies are for communication and daily life. Incentives for companies to develop and distribute these devices could lower costs and improve access for all of us." (Participant 3).

> "The government of Zimbabwe has to improve the practicability of disability-related laws and policies to enhance the accessibility of Artificial Intelligence (AI) assistive devices. Also policies and legal frameworks has to be amended to align with trending technology in disability sector." (Key informant).

The participants answers highlight how crucial inclusive policies are to enhancing Zimbabweans' access to assistive devices technology in individuals with disabilities. Most

participants made the point that these policies must be more than just words on paper. They emphasizes the point that although global standards such as the UNCRPD to provide a strong basis ,what really counts is how they are implemented. According to Mhlanga (2020) in literature, assistive devices are more than just tools to persons with disabilities, they stand for autonomy and the capacity to participate completely in the society. These frustrations were echoed by other participant who emphasizes that genuine support for persons with disabilities should result from the government's commitment. The participants expressed optimism that policies will eventually result in infrastructure and resources that fully satisfy their needs. This condiment is indicative of a larger desire for proactive policies that acknowledges their rights and give them the assistance they need to succeed. These voices highlighted a common struggle; bridging the gap between policy and day to day reality. Access to reasonably priced assistive technologies is one example of the concrete improvements that participants hope to see in their lives. In line with what Mhlanga (2020) outlines in the literatur.,they envision a cooperative effort involving partners from the public, private and civil society sectors to establish an inclusive culture.

The government of Zimbabwe has to collaborate with public and private sectors, as illustrated in literature that some countries such as the Republic of South Africa's Department of Science and Innovation, have collaborated with local universities and multinational tech firms to support the development of smart, driven community devices for individuals with speech impairment. Also Kenya partners with Safaricom and Non-Governmental Organizations (NGOs) Artificial Intelligence (AI) voice recognition mobile platforms to support visually impaired individuals. The partnerships is done in other countries to enhance the accessibility of technological advancement in disability sectors; Zimbabwe must do the same.

In the end, these answers shows that Zimbabwe needs to put the needs of persons with sensory and physical disabilities first if it want to became a fairer society. This means making sure that policies are not only formulated but also followed and implemented. The country can create a place where everyone can fully participate and live happily which is what Almalki (2020) said in the literature. This idea of inclusion is not just about technology; it s also about access to assistive technologies and empowers persons with disabilities to fully participate in societies.

4.6 Chapter Summary

The findings from persons with sensory and physical disability in Bindura Urban indicated that three-quarters of the majority are not aware of the Artificial Intelligence (AI) assistive devices in disability, and only a quarter of them own the devices. The challenges mentioned are the factors that are causing them not to access the technological devices. The technological assistive devices' unavailability is increasing their vulnerability. The participants implied that to navigate the challenge, there has to be practicability of the disability policies and laws in Zimbabwe to cater for the accessibility challenges.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter summarizes the key findings of this research and offers recommendations for future research practice. The research will highlight the main conclusion from this research and then move on to discuss the implications of these findings of Artificial Intelligence (AI) in disability in social work. Finally, the research will make some recommendations for future research and practice.

5.1 Summary of Findings

5.1.1 Experiences of Individuals with Disabilities without Access to Technological Assistive Devices

Persons with physical and sensory disabilities in Bindura urban without access to Artificial Intelligence (AI) assistive devices are very vulnerable. Some of them do not even own a traditional assistive device. The introduction of artificial intelligence-powered assistive devices was to curb their challenges they experience in their day-to-day life. Most of them are involved in informal jobs where they are involved in vending (selling in Musika and shops and in town), begging in buses and communities, and self-employed jobs such as shoemaking. Some of them do not have a source of income, which they reported is when the family started regarding them as burdens. Some of the persons with sensory and physical disabilities in Bindura Urban are

educated, but they are not formally employed because some companies have rejected them because of their condition of disability. Those experiences are because they do not have access to Artificial Intelligence (AI) assistive devices, which can enhance their mobility and communication and increase independence and autonomy.

Moreover, persons with sensory and physical disabilities in Bindura Urban have limited access to health, education, and employment places. They are hindered by mobility. Their personal assistants are not always home, which makes them unable to access these services. They do not own technological assistive devices which can make them access these services without assistance. Also, the societal opinions towards persons with disabilities are such that some are hindered from acquiring services due to fear of the community. They are being discriminated against. Last but not least, all these experiences make them more prone to poverty. They have a high rate of poverty because they have limited mobility and communication.

5.1.2 Opportunities Presented by Artificial Intelligence (AI) Assistive Devices

Persons with sensory and physical disabilities who have Artificial intelligence (AI) assistive devices in Bindura Urban are enjoying the benefits of the transformation brought by these technologies regarding their nature of disabilities.The technology has enhanced their lives by enhancing mobility. They are now able to access places such as health facilities and workplaces. The technology also enhanced communication for those with sensory disabilities. They are now able to communicate effectively using hearing aids, which filter background noise in public places for those with hearing impairment. Independence is also enhanced, as those with Artificial Intelligence (AI) assistive devices are now able to transport themselves alone without assistance, which increases autonomy and self-confidence. The opportunities brought by terminological advancement improve community integration and enhance participation of persons with disabilities in the community, workplaces, education, and other places. However, apart from the opportunities brought by Artificial Intelligence (AI) assistive devices for disabilities, participants with these devices in Bindura Urban reported that they are very complex to use because they need more technological skills, are expensive to maintain, and increase loneliness while travelling without an assistant.

5.1.3 Barriers in Accessing Artificial Intelligence (AI) Assistive Devices

The majority of persons with disabilities have no access to Artificial Intelligence (AI) assistive devices. Persons with disabilities reported that they are financially stable since some of them

rely on informal jobs. Lack of availability was another challenge found. Participants reported that these devices are not widely available in the country and not found in the market places. Lack of awareness was another factor noted that hindered the accessibility of Artificial Intelligence (AI) assistive devices. Some reported that they are not aware of technological assistive devices for disability, which makes them still use traditional assistive devices, which need more effort to use and which are not too effective in enhancing the lives of persons with disabilities.

5.1.4 Interventions Aimed at Improving Access to Artificial intelligence assistive Devices

Interventions to curb the challenges of Artificial Intelligence (AI) assistive device inaccessibility were also suggested. The suggestions emphasized the practicability of legal and policy frameworks. If these laws are put into practice, they will enhance the availability of these devices. It can also decrease discrimination against persons with disabilities in the community by instilling them with knowledge about disability. Also private and public partnerships have to be put into consideration to increase the availability of technological devices for disability. Another strategy suggested by participants is a national funding strategy. That is when the institutions and departments that advocate for persons with disability are being incentivized.

5.2 Conclusions

5.2.1 Experiences of Individuals with Disabilities without Technological Assistive Devices

This research elucidates the multifaceted experiences of persons with disabilities, especially those lacking access to artificial intelligence assistive devices. They mostly experience discrimination, poverty, gender disparities, infrastructure inaccessibility, and reliance on informal employment. These experiences are being faced by all age groups in the societies. Discrimination and poverty are deeply rooted in societal bias and discrimination in informal jobs due to a lack of effective assistive devices in workplaces. Such perceptions not only diminish personal dignity but also restrict opportunities and increases vulnerability and restrictions to access services such as healthcare, employment, and education. It also hinders community integration and increases self-doubt. Additionally, the inaccessibility of artificial assistive devices leads persons with disabilities to engage in low-paying jobs, including reliance on informal jobs and begging in streets and buses to earn a living. Moreover, poor

infrastructure in Bindura Urban is also a contributing factor to the life experiences of persons with disabilities. It indicated that without a proper infrastructure, persons with disabilities are not able to access healthcare, education, environment, and work places. Persons with disabilities need special infrastructure such as ramps, wide corridors, and toilets designed for special populations. This further reinforces their marginalization. Some persons with disabilities in Bindura Urban reported that their family members had left them, which shows how important is it to have a supportive systems and strong family. To help persons with disabilities who do not have access to artificial assistive devices, the government needs to make sure that assistive technologies are included in the national budget and that infrastructure is made more accessible to create an environment that includes everyone. Social workers must also take a holistic approach by working with the stakeholders to start effective livelihood projects like poultry farming, and small scale businesses that will last over time. Income generating sources for persons with disabilities help them to break the cycle of being vulnerable. The research stress out how important it is to provide all round support and raise awareness in the society in improving the lives of persons with sensory and physical disabilities. It also revels the necessity for systematic reforms and collaborative efforts to foster an inclusive environment that empowers marginalized populations.

5.2.2 Opportunities Presented by Artificial Intelligence (AI) Assistive Devices

The introduction of artificial intelligence assistive devices has greatly brought significant transformation in the lives of persons with sensory and physical disabilities. This transformation is evident in three primary dominants: enhanced mobility, enhanced communication, and increased independence. Firstly, assistive intelligence technology has markedly improved the mobility of users. Smart canes, spectacles, walking canes, wheelchairs, and prosthetic limbs have increased persons with disabilities' ability to navigate their environment, empowering them to travel longer distances and navigate services independently. These technologies eliminate and replace personal assistants or caregivers. This transformation not only increases mobility but also enhances community integration, a sense of belonging, and participation as well. Additionally, it enhances communication among persons with sensory disabilities. Technological hearing aids have transformed users' ability to engage in social and professional interactions since they filter background noise. This improvement in auditory perception not only enhances interpersonal relationships but also enhances job satisfaction and inclusion.

Despite these advancements, limited access to artificial intelligence assistive devices is a challenge. The results, which were deduced from persons with disabilities in Bindura urban, shows that accessibility is due to lack of financial constraints, limited availability, and lack of awareness. Some participants with disabilities reported of not having artificial assistive devices, neither do they know how it works. This shows the community needs more awareness outreaches and education. Also, money makes if even harder to access these devices because they are to expensive and for those with insurances, insurance cover does not cover them well enough. Many problems make it even harder to get these devices because they are too expensive and insurance does not cover them well enough. Additionally, unavailability of local technology manufacturing and unreliable supply chains strengthen these challenges. Therefore, there is a necessity for government and private sectors to collaborate to enhance the accessibility of artificial intelligence assistive devices and support persons with disabilities in enhancing their lives in Zimbabwe. Additionally, for those who have these technological devices are complaining that these devices cause loneliness, since the machines replaced the personal assistance. The research teaches that to address barriers, a multifaceted approach is needed to empower persons with disabilities to reduce vulnerability and improve their quality of life.

5.2.3 Interventions for Accessibility Improvements of Artificial Intelligence Assistive Devices

The finds stresses how important policies and advocacy are for making artificial intelligence assistive devices easier for persons with disabilities to get in Zimbabwe. The participants commented that the current legal frameworks and policies are not practical and good enough to deal with the social, economic, cultural, political, and environmental factors that make it hard for persons with disabilities in Zimbabwe to access artificial intelligence assistive devices. The insight gathered includes the necessity of a practical and inclusive policy and legal framework that aligns with the United Nations Convention on the Rights of Persons with Disabilities (UNCRPWD). There is also a need for partnership with social workers, government, non-governmental organizations, private and public stakeholders and technology companies to facilitate access to artificial intelligence assistive devices and also lead to innovative solutions like the Republic of South Africa did. These kinds of partnerships close the gap in service delivery and make sure that new technology is both available and affordable. Setting up a national funding system for assistive technology was seen as an important step.

However, participants made it clear that money must turn into real resources that people can use. This shows that there is a greater need for accountability in the implementation and funding of initiatives. Even well meaning policies may not make a real difference in the lives of persons with sensory and physical disabilities in Zimbabwe, if the government does not anything tangible about them. People want policies and laws that work, not the process of making them.This is because they need to take a proactive approach that puts the rights of persons with disabilities first and creates an environment that is open to everyone. Zimbabwe should learn from successful international models and adopt similar collaborative strategies to enhance the accessibility of artificial intelligence (AI) assistive devices in disability. It teaches that effective policy and collaboration are effective in addressing accessibility challenges of technological assistive devices in disability in Zimbabwe, which enhances persons with disabilities' ability to fully participate in community and enhance their lives.

5.3 Implications for Social Work

The study focused on the technological advancement brought by Artificial Intelligence (AI) in disability in Bindura Urban. To the field of social work practice, it instills social workers with knowledge on the life experiences of persons with disabilities without access to artificial intelligence assistive devices, opportunities brought by these devices, accessibility challenges to attain these technologies, and interventions aimed at improving accessibility of Artificial Intelligence (AI) assistive devices for persons with sensory and physical disabilities. Social workers should prioritize and protect the welfare of persons with disabilities for them to be able to access artificial intelligence assistive devices. It can be done by utilizing a holistic approach, integrated social work, and case management using casework, community work, group work, administration, and research social work methods. Social workers can also intervene by providing counselling to those who face discrimination, advocating for policies that favor inclusive technology, collaborating with private sectors to increase accessibility, and also researching how other countries are working to increase the accessibility of artificial intelligence assistive devices.

5.4 Recommendations

This section outlines the key recommendations aimed at enhancing the accessibility of Artificial Intelligence (AI) assistive devices for individuals with disabilities in reducing

vulnerability. By engaging various stakeholders, including communities, government, social workers, and policymakers. These recommendations seek to create a more inclusive environment that empowers individuals to identify who will do what.

5.4.1 to the Policymakers

- The policymakers including social workers and stakeholders, must revise, put into practice, and amend the National Developmental Strategy 1, the constitution of Zimbabwe, disability acts, and policies for them to fit the technological advancement trends in disability. Also, developing policies that prioritize accessibility of artificial intelligence assistive devices is essential. These frameworks should incorporate input from persons with disabilities to ensure they reflect real-world needs. Engaging affected communities can lead to more effective and meaningful regulations. Collection of feedback from users by the government through monitoring and evaluation is crucial as it improves areas for improvement and access policies practically.

5.4.2 to the Government

- The government should allocate funding and grants specifically for the development and distribution of artificial intelligence-powered assistive devices. This funding can support local setups and innovators working on accessibility solutions, promoting homegrown technologies that meet local needs. By investing in these initiatives, the government can stimulate economic growth while improving accessibility.

5.4.3 to the Community

- The community is recommended to partner with social workers, churches, and other institutions to work together in helping and understanding the experiences of persons with disabilities whose mobility and communication are hindered. The partnership will help instill them with disability knowledge and be able to advocate for them.

5.4.4 to Social Workers

- Social workers must increase community awareness campaigns. Communication can greatly benefit from awareness initiatives that highlight the advantages of smart assistive devices in disability in enhancing the lives of persons with disabilities. These

campaigns include workshops, road shows, and outreach through social media. By sharing successful stories and demonstrating how these technologies work, communities can foster understanding and acceptance. This helps individuals to recognize the potential of assistive devices to enhance independence and quality of life.

- Social workers must advocate for persons with disabilities and also act as brokers and liaisons for persons with disabilities to acquire Artificial Intelligence (AI) assistive devices. This can be done by actively participating in communities (community meetings) and group work. This can help them to influence the making of policies that better serve individuals with disabilities. Also, group work creates space for individuals with disabilities to share their thoughts and experiences, expressing what works for them and what does not. This ensures that the devices created truly address the real challenges persons with disabilities face.

5.4.5 to Stakeholders

- The public and private stakeholders, which include technological companies, nonprofit organizations, and academic institutions, recommended partnering with the government to enhance the accessibility of artificial intelligence assistive devices.

5.5 Intervention Framework: Integration of Artificial Intelligence in Disability (IAID).

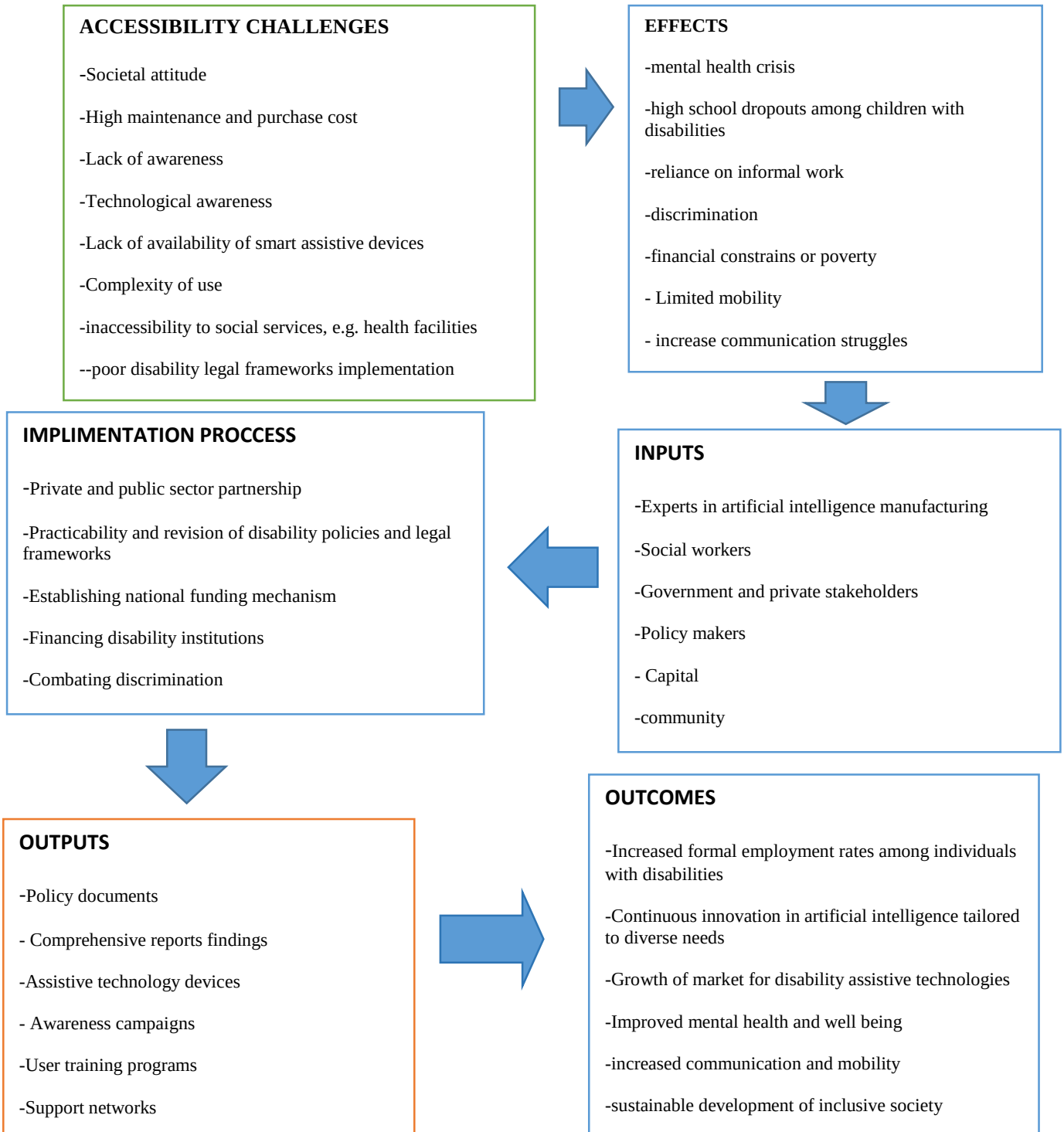

Fig 5.5 showing Integration of Artificial Intelligence in Disability (IAID) framework.

The Integration of Artificial Intelligence in Disability (IAID) framework is a framework that was drawn from chapter 6 of the interventions after the presentation and analysis of data drawn from the conducted research. The framework brings interventions which are not only theoretical but also practical. The framework seeks to address the research objectives, which are to identify the life experienced by persons with sensory and physical disabilities without access to Artificial Intelligence (AI) assistive devices, to analyze the opportunities of Artificial Intelligence (AI) assistive devices in disability and to develop effective interventions aimed at improving access to Artificial Intelligence (AI) assistive devices for persons with sensory and physical disabilities to reduce vulnerability.

The framework was designed in stages or phases. The first stage shows the challenges that are hindering the accessibility of Artificial Intelligence (AI) assistive devices, including poor disability policies and legal framework implementation. The second stage highlighted the effects caused by inaccessibility of Artificial Intelligence (AI) assistive devices among persons with disabilities which includes limited mobility and communication. The same effects are being faced by persons with sensory and physical disabilities without access to technological assistive devices. The third stage comprises inputs such as social workers who act as advocates for persons with disabilities to increase accessibility of technological assistive devices. Inputs are needed to curb the challenges and the effects of the inaccessibility of Artificial Intelligence (AI) assistive devices. The fourth phase is the implementation process. These are interventions which can be taken into consideration in order to tackle the challenges of inaccessibility of Artificial Intelligence (AI) assistive devices, which include practicability and revision of disability policies and legal frameworks. The fifth stage comprises outputs which are tangible results generated from the implementation process. The outputs include integrated legal frameworks and user training disability programs. Outcomes is the last stage, which are the

long-term results or effects that arise from the implementation of the framework. The outcomes includes increased formal employment rates among individuals with disabilities and enhanced mobility and communication of persons with disabilities.

The framework is important as it will instils the government policy makers and the social workers knowledge on the challenges and living experiences of persons with disabilities without access to artificial intelligence assistive devices and technologies for them to understand that these technologies are vital in enhancing the overall lives of persons with sensory and physical disabilities. The framework also will help the government and social workers to address the challenges being faced by persons with physical and sensory disabilities without access to technological assistive devices. If the framework is implemented well, it will bring a better change in the lives of persons with disabilities. The social work theories and models will also be utilized to have a better understanding of the social, cultural, environmental, and economic issues that align with the inaccessibility of technological assistive devices for persons with disabilities. The framework will be a better help to the government, policy makers, social workers, private stakeholders and organizations as long as the integration of artificial assistive devices in disability is still inaccessible.

5.6 Areas for Future Research

Areas for further study should be conducted focusing on the transformation of Artificial Intelligence (AI) on other types of disability, which is mental disability. The study only put more emphasis on physical and sensory disability and eliminates artificial intelligence (AI) technologies in mental disability. Also, there is a need to conduct research focusing on rural areas and urban areas in other provinces of Zimbabwe since the current study was only undertaken in urban areas of Bindura. This will help to comprehend the overall transformation brought by Artificial Intelligence (AI) in the disability sector as a whole.

5.7 Chapter Summary

The chapter presented the summary of findings from the research conducted in Bindura Urban in chapter four from both primary participants and key informants. The chapter also gives conclusions of what the research has taught the researcher and deductions. Recommendations were also described and who must do it. The recommendations was directed to policymakers, social workers, stakeholders, and the community. Lastly, the chapter mentioned areas for future

study since the research had deficits that needed to be addressed and concentrated on in the future.

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APPENDICES

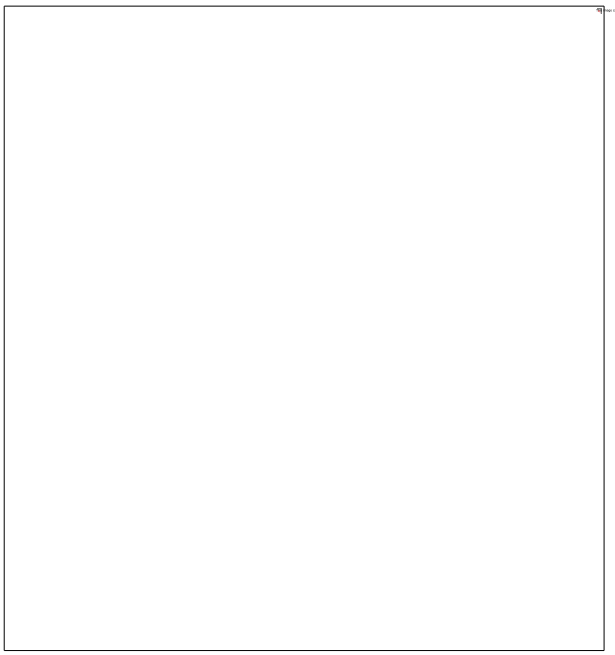
Appendix A: Informed Consent Form

BINDU RA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SOCIAL SCIENCES AND HUMANITIES

DEPARTMENT OF SOCIAL WORK

BACHELOR OF SCIENCE HONOURS DEGREE IN SOCIAL WORK (HBScSW)



Informed Consent Statement

Research topic: Technological advancement brought by Artificial Intelligence (AI) in disability. A case of Bindura.

Researcher:

My name is Adlite Tamai. I am a Social Work final year student at Bindura University of Science Education. I am conducting a research for the fulfillment completion of my degree. You were the best candidates selected to provide me with required information. Your information is vital in the progression of the research and my academics, and your cooperation is greatly appreciated.

The research is voluntary, which means no payment will going to be made. Ethical considerations will be prioritized for your privacy especially confidentiality. You are

encouraged to drawback if you feel uncomfortable. All in all, NONE of the information provided during the interview will be published to anyone even to you directly. Therefore, the information gathered will be used for academic purposes only.

Contact details

For any queries regarding the research please do not hesitate to contact Adlite Tamai at tamaiadlite18@gmail.com or 0783003917.

NB. A false name can be used for the purpose of confidentiality.

Signature of participant

……

Date

…….....

Thank you for your cooperation!

Appendix B: In-depth Interview Guide

Declaration

My name is Adlite Tamai, a final year Social Work student at Bindura University of Science Education. I am conducting these questionnaires as part of my research project. The information you provide will be kept confidential and will only be used for research purposes.

Demographic

1. What is your gender?
2. What is your age?
3. What is your level of education?
4. What is your nature of disability?

Research question i: What life being experienced by persons with sensory and physical disabilities without access to Artificial Intelligence (AI) assistive devices?

1. Are you familiar with Artificial Intelligence (AI) assistive device and do you have one? If so, are you able to use it and are you willing to use it?
2. How do you cope with your daily routine?
3. How do family and the community regard your condition?
4. How do you rate your daily personal assistance and is he or she always available?
5. What support systems or assistance you get from the community?
6. Are you able to access health facilities, education and work places?
7. Who is the breadwinner and level of earning?
8. Are you in any informal or formal sector job?

Research question ii: What opportunities brought by Artificial Intelligence (AI) assistive devices in person with physical and sensory disability in reducing vulnerability?

1. What specific benefits do Artificial Intelligence (AI) assistive devices provide in enhancing your daily functioning and independence?
2. How do you think Artificial Intelligence (AI) technologies impact the quality of life for your type of disability in terms of mobility, communication and social interaction?
3. What challenges do you face when integrating Artificial Intelligence (AI) assistive devices in your daily routine and how do these challenges affects the effectiveness of Artificial Intelligence (AI) assistive devices?
4. What are the key technological limitations that hinders you from accessing Artificial Intelligence (AI) assistive devices?
5. How do sociocultural and economic factors impact the availability and adoption of Artificial Intelligence (AI) assistive devices?
6. How do existing policies and regulations affecting your chance to access and affordability of Artificial Intelligence (AI) assistive devices?

Research question iii: What intervention can be employed in improving access to Artificial Intelligence (AI) assistive devices for persons with sensory and physical disabilities to reduce vulnerability?

1. What specific community projects do you think can help you access Artificial Intelligence (AI) assistive devices?
2. On your own option what the government of Zimbabwe can do to increase accessibility to Artificial Intelligence (AI) assistive devices?
3. What sociocultural, legal and economic barriers that can be addressed to increase accessibility chances to Artificial Intelligence (AI) assistive devices among persons with disabilities?

Thank you!!

Annexure C: Key Informant Interview Guide

Declaration

My name is Adlite Tamai, a final year Social Work student at Bindura University of Science Education. I am conducting these questionnaires as part of my research project. The information you provide will be kept confidential and will only be used for research purposes

Research question i: What life is being experienced by persons with sensory and physical disabilities without access to Artificial Intelligence (AI) assistive devices?

1. What livelihood strategies do individuals with physical disabilities utilize to sustain themselves in the absence of Artificial Intelligence (AI) assistive technologies?

2. How do sensory disabilities influence the choice of employment and income-generating activities among individuals lacking access to Artificial Intelligence (AI) assistive devices?

3. What community resources and support systems do persons with disabilities rely on to enhance their livelihood opportunities when Artificial Intelligence (AI) technologies are unavailable?

4. How do cultural and societal perceptions impact the living experience of individuals with disabilities who do not have access to Artificial Intelligence (AI) assistive devices?

5. What barriers do persons with physical and sensory disabilities face in accessing employment, and how do they navigate these challenges without technological assistance?

Research question ii: What opportunities brought by Artificial Intelligence (AI) assistive devices in person with physical and sensory disability in reducing vulnerability?

1. What specific benefits do Artificial Intelligence (AI) assistive devices provide to individuals with physical disabilities in enhancing their daily functioning and independence?

2. How do Artificial Intelligence (AI) assistive technologies impact the quality of life for persons with sensory disabilities in terms of communication and social interactions?

3. What challenges do users face when integrating Artificial Intelligence (AI) assistive devices into their routines, and how do these challenges affect their overall effectiveness?

4. How do user perceptions of Artificial Intelligence (AI) assistive devices influence their willingness to adopt these technologies among individuals with disabilities?

5. How do sociocultural and economic factors impact the availability and adoption of Artificial Intelligence (AI) assistive devices among persons with disabilities?

6. How do existing policies and regulations affect the accessibility and affordability of Artificial Intelligence (AI) assistive devices for people with disabilities?

Research question iii: What intervention can be employed in improving access to Artificial Intelligence (AI) assistive devices for persons with sensory and physical disabilities to reduce vulnerability?

1. What specific intervention strategies have proven effective in increasing awareness and understanding of Artificial Intelligence (AI) assistive devices among individuals with sensory and physical disabilities?

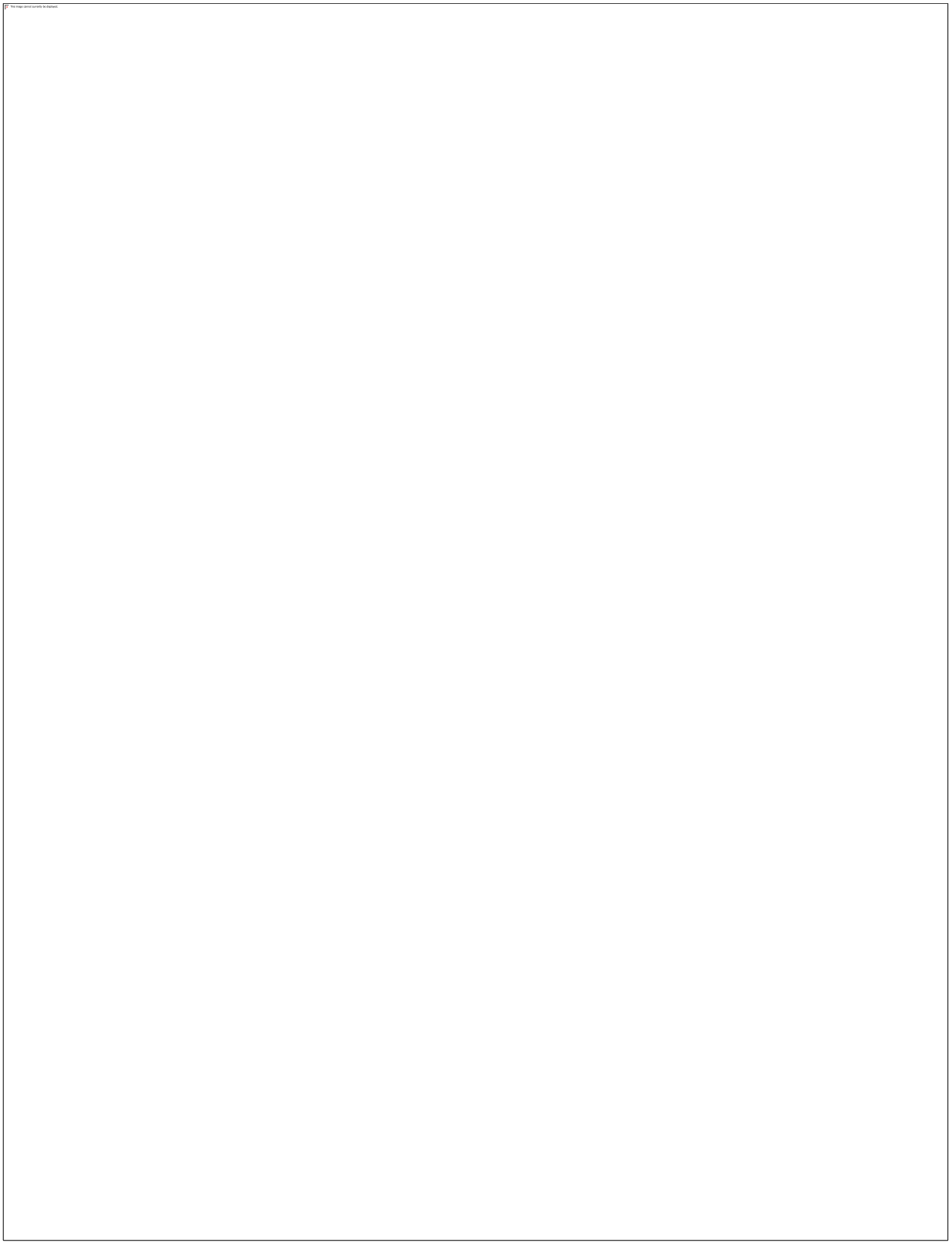
2. How can community-based programs be designed to provide hands-on training for users with disabilities to enhance their confidence and competence in using Artificial Intelligence (AI) assistive technologies?

3. What role can policy changes play in facilitating access to Artificial Intelligence (AI) assistive devices?

4. In what ways can collaboration between technology developers, disability advocates, and healthcare providers improve the design and distribution of Artificial Intelligence (AI) assistive devices?

5. How do financial assistance programs and subsidies impact the accessibility of Artificial Intelligence (AI) assistive devices for low-income individuals with sensory and physical disabilities?

Appendix D: Research Request Form from Institution



Appendix E: Research Approval Letter from Department of Social Development

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