

**SOCIAL ECONOMIC DYNAMICS AND THE PERFORMANCE OF DIGITAL BRAILLE
TECHNOLOGY PROJECT IN SCHOOLS IN KITUI COUNTY, KENYA**

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MANAGEMENT FROM THE UNIVERSITY OF NAIROBI**

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DECLARATION

This research project report is my own unique work, and it has not been submitted for a degree or any other award at any other university.

Signature:



Date: **June 8, 2023**

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L50/78065/2015

This project report has been submitted for the review with my approval as university supervisor.

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DEDICATION

This research undertaking is wholeheartedly dedicated to the cherished memory of my late father, Stephen Ngungua Mbuso, a beacon of wisdom and inspiration in my life. I express my deepest gratitude to him, as his enduring impact continues to shape my journey. In profound appreciation for his unwavering support and invaluable guidance, I embark on this academic pursuit, striving to honor his legacy with each step. Though he may no longer be physically present, his spirit resonates in every facet of my work, serving as a perpetual source of motivation and gratitude. This endeavor stands as a testament to the profound influence he has had on my intellectual and personal development, and I am eternally thankful for the enduring lessons and love he bestowed upon me.

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I also acknowledge the boards and management of my immediate former employer, Kilimanjaro Blind Trust Africa (KBTA) and my current employer the Kenya Society for the Blind (KSB) for the many years of experience in digital Braille and the general assistive technology space. Special thanks to Ms. Suparna Biswas, Ms. Nancy Mwali, Samson Waweru, Mr. Solomon Bukhala and my mentor for many years, Mr. Martin Kieti. Many thanks to the administration, instructors, and students of Kitui County's numerous schools for taking the time to reply to my study questionnaire. You contributed to the success of this study.

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ABSTRACT

Paper and mechanical Braille writers have been used as the major medium of education and learning for people with vision impairments all across the world. Braille is a tactile reading and writing method made up of 6-dots that represent alphabets, numerals, and symbols. In recent years, digital Braille devices with refreshable Braille displays have been developed, which is known as Digital Braille technology. Digital Braille technology is the use of refreshable Braille devices for writing, reading/access to written material by persons with print disability. This Braille technology has been in use in developed countries and now it is being implemented in developing countries including Kenya. However, due to different variables such as socioeconomic, there has been a limited uptake of this technology in Kenya; consequently, in an effort to better understand how social and economic variables impact performance, this study of in several Kitui County schools, students use digital braille technology. This study sought to answer three questions: (1) What role does household income have in the success of the Digital Braille technology initiative in Kitui County, Kenya? (2) How does school infrastructure impact project performance in specific schools in Kitui County, Kenya? (3) How does social support impact the project's effectiveness in specific schools in Kitui County, Kenya? The descriptive research design was used in this investigation. A descriptive survey approach was used in this inquiry. Teachers of these students, non-governmental organizations carrying out the Braille project, and county officials from the relevant ministry were among the 130 people who participated in the poll. This study's sample size is 104. Stratified random sampling was used to identify research beneficiaries. To collect data from participants, the study team used a survey form and an interview schedule. To gather data, the researcher utilized a drop-and-pick strategy using questionnaires; participants were given time to fill them out at their own leisure and then collected later. The data acquired in the field was analyzed qualitatively and quantitatively. To establish the link between the independent and dependent variables, the following model was used. The formula was developed using a regression equation ($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$). The study discovered that the overall independent variable, socioeconomic dynamics, has an impact on the performance of Braille technology in schools.

CHAPTER ONE

INTRODUCTION

1.1 Study Background

In many parts of the world, including Africa, people with visual impairments have limited access to education, employment, and other opportunities due to the lack of appropriate technologies and resources. The World Health Organization (WHO) estimates that 36 million people are blind and an additional 253 million are visually impaired on a global scale. Braille technology has been a critical tool for those with visual impairments in improving reading and communication. In Africa, persons with visual impairments face severe challenges due to a lack of access to Braille technology and resources. Only approximately 5% of books in Africa are available in accessible forms, such as Braille, according to the African Union of the Blind (AFUB, 2019). Additionally, the expense of Braille technology and a lack of training in its usage are impediments to the acceptance and use of Braille in Africa. Braille technology has comparable obstacles throughout East Africa, especially Kenya, as it does at the continental level. According to a study by Kibona et al. (2020), the limited availability of Braille technology and resources, as well as the high cost and lack of maintenance, are significant challenges for people with visual impairments in East Africa. In Kenya, the government has made efforts to promote Braille technology by integrating it into the education system. However, the implementation of Braille technology in Kenya faces challenges such as low funding, absence of standardization, and the need for more training on the use of Braille technology (Nzomo et al., 2018).

This study is grounded in two key theories: the Diffusion of Innovation Theory, which explains how innovations spread and helps analyze factors influencing the adoption of Braille digital technology, and the Technology Acceptance Model (TAM), which investigates user acceptance by focusing on perceived usefulness and ease of use. These theories provide a comprehensive framework for assessing the adoption and performance of Braille digital technology, aiming to improve accessibility for visually impaired individuals by addressing potential barriers to user acceptance.

1.1.1 Project performance.

The success of a project is determined by meeting its objectives, as defined by the project management team and the project owner (PMI, 2018; AlBarami, Thiruchelvam, & Ibrehem, 2020). In building projects, meeting the interests of all stakeholders is essential to fulfill the project. Collaboration, mutual objectives, clear leadership, and stakeholder commitment are necessary for a successful project (Nevstad, Tage and Eskerod, 2021). Project performance is multidimensional and involves different perspectives, including those of the project team, the contractor, the project beneficiaries, and the

project managers (Kwak, Liu, Patanakul, & Zwikael, 2014). Project performance is viewed widely on satisfaction levels, cost implications, time period, and achievement of project objectives, quality, environmental milestones, and other factors. Therefore, a comprehensive project performance criterion should represent different views, interests, and dimensions. Time also plays a factor in viewing project performance, with short term or longer-term interests.

1.1.2 Social economic factors.

Community empowerment projects aim to alleviate poverty, improve living standards, and enhance the well-being of society by engaging people in important processes such as recognizing their basic rights and promoting democracy. However, the effectiveness of these projects is shaped by deep-rooted socio-economic factors. According to Ogot (2014), According to the research, community empowerment programs are greatly impacted by socio-economic issues.

In Nepal, socio-economic factors such as family size, level of education, age, and support from the government are important considerations for farming projects. Community empowerment interventions in both developed and developing economies should also take into account socio-economic factors such as project diversity and financial development, according to Wang et al. (2020). Having a diverse project team can lead to better skills and contribute to the success of the project. However, language barriers may arise when foreign workers implement projects in the host country, affecting communication with the local community, as noted by Wu et al. (2019).

Participation in community interventions in Nigeria is impacted by a variety of socioeconomic characteristics, including gender, age, marital status, and income level (Olusa, 2018). Shared by Jacob, Shagbaor, Agbanugo, and Chimela (2019) are the following socioeconomic variables that enhance the efficacy of the majority of treatments: age, family size, degree of education (literacy), and income. Palamuleni (2013) proposed that employment position, education level, and age of involvement were socioeconomic variables that enhanced health care interventions in Malawi. This study involved a large number of stakeholders.

Some important socioeconomic factors that may affect project success include the availability of resources and the ease of access to finance (Gachuhi, 2016). Project success is determined by three factors, according to Nianjun (2014), who studied road building projects in Kenya: the education level of workers, financial stability, and community engagement. Social and economic issues are external environmental concerns that significantly affect the effectiveness of interventions (Musa, Bin-Amirudin, Sofield, & Mus, 2015). Maina and Gathenya (2014) expressed similar sentiments, claiming that funding that is influenced by the availability of finances might improve project performance.

1.1.3 Digital Braille Technology in Kitui County

The use of electronic equipment and software programs to transform text and other visual material into Braille, Digital Braille Technology is a tactile system of writing and reading used by the blind or persons with visual disability. Individuals with visual difficulties can use this technology to access a wide range of digital material, such as books, papers, websites, and electronic displays. Digital Braille devices generally use a mixture of tiny pins or cells that may be raised or lowered to generate Braille letters, allowing users to read and interact with digital material by touch. These devices often come in the form of Braille displays or embossers, and they are an essential tool for fostering accessibility, independence, and inclusion for individuals with visual impairments in various aspects of their daily lives, including education, employment, and leisure activities.

Kitui county forms part of the counties which are benefiting from the digital braille technology programs in Kenya. There are more than 800 pupils and students who are benefiting from this program in more than 20 schools both primary and secondary. The program has been of great importance to many students for they can now read, write and access curriculum and extra curriculum materials in digital format. Over the years, the assistive devices provided to the beneficiaries include mechanical braille machines, slates & stylus and braille paper. Recently, digital Braille technology was introduced in Kenya with the use of various brands of refreshable Braille notetakers. The most common device across provided across the schools serving learners with visual impairments, including Kitui county is the Orbit Reader 20, which is a low-cost Braille notetaker and a book reader with a 20-cell refreshable Braille display.

This program has however experienced various challenges such as not supporting the entire population of the schools and beneficiaries due to financial constraints. There is also lack of enough trained teachers in using digital braille technology and lack of curriculum textbooks in digital Braille format.

1.2 Problem Statement

At the community level, socioeconomic considerations influence how individuals participate in project activities (Kakumba & Nsingo, 2008). For example, a low education profile might be associated with a disadvantaged portion of the population, and so they are often excluded from consultation during project interventions. In certain cultures, specialized duties, such as child raising, are reserved for women, limiting their capacity to participate in significant communal choices. The availability of funds impacts both poverty and the capacity to engage in community development initiatives. Community development projects will also benefit from better team composition.

Education and information were among the socioeconomic variables highlighted by Khoza, Senyolo, Mmbengwa, Soundy, and Sinnett (2019) as influencing the decision-making capacity of smallholder farmers in South Africa about their involvement in the agro-processing business. Hussein (2017) analyzed the ways in which people's socioeconomic position and degree of education affect their level of engagement in redevelopment planning issues. In his study of the Yatta Constituency's Youth Enterprise Development programs, Gaitho (2016) found that training, mentor assistance, and education were among the socioeconomic variables that affected the programs' success. Tax cuts and enhanced safety were among the topics covered by Gachuhi (2016), who looked at the interplay between socioeconomic factors and entity growth. Concerns such as financial situation, community engagement, and degree of education were identified by Nianjun (2014) as part of the socioeconomic issues that relate to the execution of road construction projects in Nyeri. Considering that socioeconomic variables have a bigger role in the success of most community development initiatives, Rono and Aboud (2001) focused on these aspects in relation to the capability of community programs, particularly in Western Kenya.

Some of the studies mentioned above did not include South Africa (Khoza et al., 2019) or focused on organizational growth (Gachuhi, 2016) instead of project performance, therefore there were gaps in the information. In light of these deficiencies, the present investigation seeks to address the issue, "How do socioeconomic factors influence the performance of the Digital Braille Technology Project in selected schools in Kitui County, Kenya?"

1.3 Research Objectives

- i. To look at the effect of household income on the performance of the Digital Braille technology project in Kitui County, Kenya.
- ii. To determine the impact of school infrastructure on the effectiveness of the Digital Braille technology program in selected Kitui County, Kenya schools.
- iii. To evaluate the effect of social support on the execution of a digital Braille technology project in Kitui County, Kenya.
- iv. To determine the extent to which social identity effects Digital Braille technology project performance in selected Kenyan schools.

1.4 Value of the Study

The study provides valuable insight into the effectiveness of Digital Braille technology in improving the performance of visually impaired students in Kitui County. This information can be useful to researchers and educators interested in developing and implementing similar programs in other parts of Kenya or other countries. The study can help inform policy recommendations regarding the integration of Digital Braille technology in schools across Kitui County and beyond. This can help government officials and other stakeholders to make informed decisions about funding and implementing programs aimed at improving the education outcomes of visually impaired students.

The study's findings can contribute to improving the education outcomes of visually impaired students in Kitui County and beyond. By identifying areas where the Digital Braille technology project has been successful and areas where improvements can be made, educators and policymakers can work to develop and implement effective strategies for supporting visually impaired students. The study has the potential to bring attention to the difficulties experienced by visually impaired students and the significance of providing them with the necessary tools and resources to assist them in their education. It can also contribute to advocacy efforts aimed at securing additional funding and resources for programs that support visually impaired students.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this section, we delve into a thorough exploration of both the existing literature and the theoretical foundations that directly relate to our study. Throughout this chapter, we take a deep dive into identifying and understanding the gaps in current research. We then proceed to unravel the conceptual framework that forms the bedrock of our study. Bringing this chapter to a close, we articulate our research hypotheses, providing a well-informed and structured foundation for our investigative journey. To enhance the depth and richness of our discussion, we've expanded on key points, offering a more detailed examination of the scholarly landscape and theoretical constructs shaping the context of our study.

2.2 Theoretical Framework

Two ideas led this study: **the diffusion innovation theory** and **the technological adoption model**.

2.2.1 Diffusion of innovation theory.

Rogers' 1962 Diffusion of Innovation Theory is a theoretical framework that describes how new ideas, goods, or technology move across a community or organization. It implies that innovation adoption follows a predictable pattern, with various categories of users embracing technology at varying rates. This theory might be applied to the Digital Braille technology project to evaluate the elements that drive technology dissemination, such as the characteristics of early adopters and the techniques utilized to promote the technology.

2.2.2 Technology acceptance model.

In 1989, Fred Davis developed the Technology Acceptance Model (TAM) to provide a theoretical framework for studying how customers embrace and utilize new technologies. The Technology Acceptance Model (TAM) posits that people's propensity to adopt new technologies is affected by their perceptions of how valuable the technology is and how easy it is to use.

How much a person thinks a piece of technology might help them out or make their job easier is what we call its perceived usefulness. On the other side, how easy and painless a person thinks it would be to utilize a certain piece of technology is known as its perceived ease of use.

In the context of the Digital Braille technology project, the TAM was used to investigate the factors that contribute to user acceptance of the technology. For example, the project team could assess how users perceive the usefulness of the technology in enhancing accessibility to digital content for visually impaired individuals. They could also explore how easy the technology is to use and whether it requires any significant effort to learn or operate.

By using the TAM, the project team could identify potential barriers to user acceptance of the technology and work to address them. For instance, if users do not perceive the technology as useful or find it challenging to use, the project team could modify or improve the technology's features to increase its perceived usefulness or simplify its user interface to improve its ease of use. Ultimately, this could lead to greater user adoption and more significant benefits for visually impaired individuals seeking to access digital content.

2.3 Literature Review

The literature review section serves as a comprehensive examination of prior scholarly contributions within the same area of study. This critical analysis encompasses the thorough review conducted by esteemed scholars, elucidating their insights, methodologies, and findings. By delving into the extensive body of existing research, this section aims to contextualize the current study within the broader academic discourse.

2.3.1 Household Income and Performance of Digital Braille technology project.

A household's entire revenue from all sources, such as earnings, salaries, investments, and other sources is referred to as its household income. It measures the financial resources that are accessible to a household and is frequently used as a gauge of financial stability or poverty. Household income can be used to examine the relative economic position of households within a certain geographic area or demographic group because it is often recorded on an annual basis.

Busienei (2017) performed research on income-generating techniques and their relevance to the financial sustainability of Nairobi-based non-governmental organizations (NGOs). According to the research, the success of development projects is significantly affected by household income. Children from low-income households have difficulty learning using Braille technology, according to Hoskin et al. (2022), who assessed the efficacy of technology for Braille literacy education. Martiniello, Wittich, and Jarry (2018) discovered that education level, perceptions, and income levels impacted the adoption of Braille technology in learning in their study on The perception and usage of technology

within Braille teaching. According to these research, financial level is an essential element in the performance of Braille initiatives.

In their study, Barasa and Abong'o (2020) looked at how household income relates to the success of microbusinesses in Kenya. Household income and project performance were shown to be positively correlated., indicating that greater household incomes were linked with better project success. The research also showed that access to financing and educational attainment were significant determinants of the association between household income and project performance.

2.3.3 Quality of Infrastructure and performance of Digital Braille technology project.

Projects involving Braille technology have been found to perform significantly better when the infrastructure is of high quality. According to studies, Braille technology projects must have access to dependable and high-quality infrastructure, such as energy and internet connectivity, in order to be implemented and sustained effectively. Inadequate infrastructure can cause problems like erratic electricity and poor connectivity, which can make it difficult to utilize Braille technology devices and reduce the efficacy of Braille literacy initiatives. As a result, it is critical for stakeholders to recognize infrastructure as a critical component of the success of Braille technology projects and to take the required steps to improve infrastructure where these projects are being implemented.

In their study, Mashiata et al. (2022) explored the impact of visual impairment support technology, which is crucial for a significant portion of the global population who need assistance with everyday activities. The development of various devices has helped individuals with visual impairment to identify objects and obstacles and navigate indoor and outdoor environments. However, the study highlights that the quality of technology and supporting infrastructure are major factors that determine the effectiveness of such tools.

Ramalingam et al. (2021) and Kassim et al. (2021) suggest that equipment and infrastructure are crucial factors in project success and performance. Their studies indicate that solar panels or modules are a cost-effective and environmentally friendly alternative to batteries, especially in developing countries. They recommend the use of devices that utilize solar panels instead of batteries and encourage researchers to consider renewable energy sources in their projects. Additionally, the studies demonstrate the potential of energy harvesting systems in assistive devices that utilize human motion, as well as in wireless charging systems for wearable travel aid devices. Thus, the integration of energy harvesting systems in assistive technology projects could enhance their performance and decrease their dependence on traditional energy sources.

2.3.4 Level of education on the performance of Digital Braille technology project.

A person's proficiency with reading, writing, and understanding written language is often referred to as their literacy level. Individual differences in reading levels are possible, and factors including education, socioeconomic background, and linguistic ability can all have an impact. The growth of the community and the economy as a whole are significantly influenced by literacy. When a town's residents are more literate, the community benefits. Proper literacy abilities open doors to additional employment and educational opportunities, eradicating poverty in the community (Morgan, 2016). To stay up with the more dynamic and globalized economy, members of the community must struggle to expand their knowledge while also learning relatively new talents. Before participating in community empowerment programs, an individual must have adequate reading abilities.

A person's ability to read and understand information can be improved with better literacy abilities, which can promote political engagement and strengthen democracy. Literate people are more likely to participate in civic activities such as voting and advocating democratic concepts and values (Jones, 2018). This is especially important for persons with disabilities, who may benefit from literacy's potential to help them overcome hurdles and fully participate in society on an equal footing as those without disabilities in a study conducted by Queiruga-Dios, López-Iesta, Díez-Ojeda, Sáiz-Manzanares, and Vazquez Dorrio in 2020. The correlation between functional literacy and socioeconomic status in Ghana was studied by Arko and Addison (2009). The study involved 100 participants who had taken part in a functional literacy program. The results showed that individuals who had undergone the program were able to read, write, and perform basic arithmetic operations with numbers. According to Putri-Anggini and Siti Rodliyah (2020), it's essential for immigrants to Canada to speak enough English to establish relationships and get along with locals. Being literate enough to comprehend knowledge about community governance, a crucial component of empowerment, is also necessary. With the ability to communicate clearly and hold project managers accountable, people with literacy skills may launch and manage community empowerment initiatives.

2.3.5 Influence of Social Identity on the Performance of Digital Braille technology project.

A big part of improving the quality of life for persons with visual impairments has been assistive technology. A type of assistive technology used to improve the literacy abilities of those with visual impairments is digital Braille. The employment of digital Braille technology has the ability to strengthen individuals' social identities and encourage their participation in society. According to studies, social identity is a major factor in the acceptance and usage of digital Braille technology. According to Okunoren and Oyeyemi's research from 2017, users' identification with their handicap

status was a strong predictor of how interested they were in a project involving Digital Braille technology. In a similar vein, people who strongly identified with the blind population were more likely to utilize a digital Braille technology device, according to a study by Kim and Lee (2015). Additionally, how effectively and how valuable individuals perceive digital Braille technology depends on their social identities. Users who strongly identified with the blind population had more favorable attitudes and thought Digital Braille technology was more successful, according to Chen, Huang, and Chen's (2015) research. This shows that social identity may have an impact on how users assess the technology's utility and their propensity to embrace it.

The social support users of Digital Braille technology receive may vary depending on their social identification. According to Bessarabova, Hill, and Betz's (2016) research, users who strongly connected with the blind community reported receiving more social support from friends and family members, which in turn increased their engagement with the technology.

But social identity can also be a hindrance to using digital Braille technology. Users who did not strongly identify with the blind community faced emotions of embarrassment and stigma connected with using Digital Braille technology in public settings, according to Smith, Grindrod, and Almeida (2016). This emphasizes how crucial it is to take social identification constraints into account while designing and implementing Digital Braille technology projects. Additionally, demographic variables including age, gender, and educational attainment may have an impact on how social identity and the usage of Digital Braille technology are related. In a study by Queiruga-Dios, López-Iesta, Díez-Ojeda, Sáiz-Manzanares, and Vazquez Dorrio (2020), for instance, it was discovered that age was a key predictor of the usage of Digital Braille technology, with younger users being more likely to utilize the technology. They also discovered that literacy played a significant role in the adoption and usage of digital Braille technology, with literate consumers more likely to profit from it.

2.4 Conceptual framework

Independent Variables

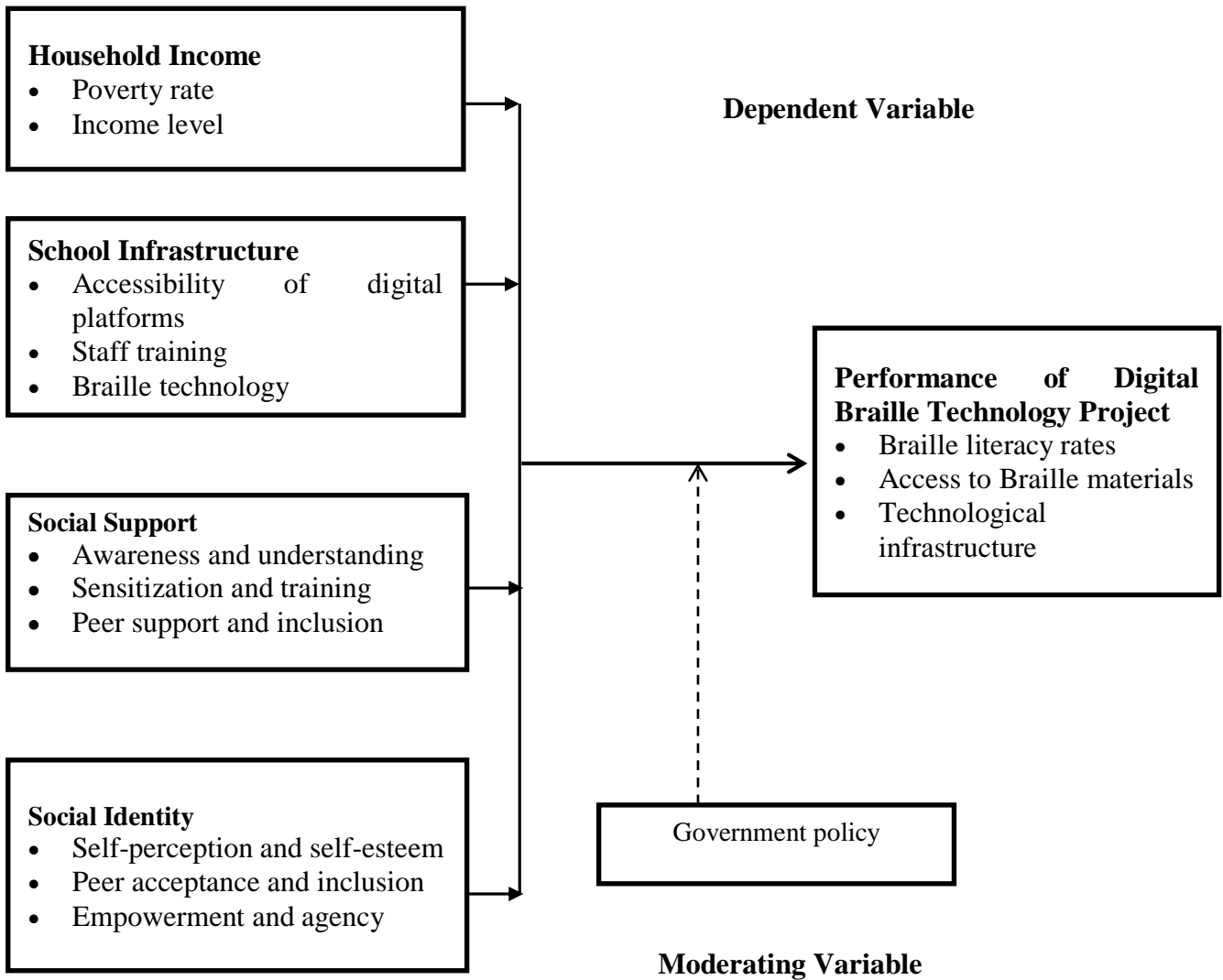


Figure 2.1: Conceptual Framework

2.5 Research Hypothesis

This research was guided by the following research hypothesis:

H01: There is no statistically significant association between family income and the performance of the Digital Braille technology initiative in Kitui County, Kenya.

H02: There is no substantial association between school infrastructure and the success of the Digital Braille technology initiative in Kitui County, Kenya's selected schools.

H03: There is no statistically significant association between social support and the performance of the Digital Braille technology initiative in Kitui County, Kenya.

H04: There is no substantial association between socioeconomic identification and the performance of the Digital Braille technology initiative in Kitui County, Kenya's chosen schools.

2.6 Research Gaps

The following table provides a summary of the research gap identified by the study.

Author	Title	Research Findings	Research Gap
Hoskin, E. R., Coyne, M. K., White, M. J., Dobri, S. C. D., Davies, T. C., & Pinder, S. D. (2022)	A thorough study of the efficacy of technological interventions in the instruction of Braille to young learners	The systematic review assessed the usefulness of technology for children's Braille literacy education; however, the precise conclusions are not mentioned in the reference.	Investigating the unique discoveries and usefulness of technology for children's Braille literacy instruction.
Martiniello, N., Wittich, W., & Jarry, A. (2018)	The perception and use of technology within Braille instruction: A preliminary study of Braille teaching	The study investigated the perception and usage of technology in Braille training using Braille teaching, however the precise conclusions are not mentioned in the reference provided.	Braille teaching is investigating particular results linked to the perception and usage of technology in Braille learning.
Barasa, L. M., & Abong'o, B. O. (2020)	Effects of household income on project performance: A case of micro-enterprise projects in Kenya	The study focused on the effects of household income on project performance in micro-enterprise projects in Kenya.	Investigating the effects of household income on project performance specifically in the context of technology-enabled Braille literacy education for children.

Author	Title	Research Findings	Research Gap
Mashiata, M., Ali, T., Das, P., Tasneem, Z., Badal, M. F. R., Sarker, S. K., Hasan, M. M., Abhi, S. H., Islam, M. R., Ali, M. F., Ahamed, M. H., Islam, M. M., & Das, S. K. (2022)	A evaluation of the existing situation and future prospects for aiding visually impaired people	The study presented an overview of the existing state of affairs and future prospects for supporting visually impaired people, but it did not discuss particular research findings.	Investigating the current status and future prospects of technology for Braille literacy education and its effectiveness for visually impaired children.
Ramalingam, M., Chinnavan, E., Puviarasi, R., & Yu, N. H. (2021)	Assistive technology for harvesting footstep energy in IoT enabled Smart shoe for the visually impaired	The report described the creation of assistive technology in the form of IoT-enabled smart shoes that capture footstep energy to serve visually impaired people.	Exploring the effectiveness and usability of IoT-enabled smart shoes as assistive technology for the visually impaired in Braille literacy education.
Morgan, L. A. (2016)	Developing Civic Literacy and Efficacy: Insights Gleaned through the Implementation of Project Citizen	The report addressed the ideas acquired from Project Citizen's implementation for enhancing civic literacy and efficacy, but no particular study findings were given.	Examining the potential impact of technology-based civic literacy programs on the Braille literacy and civic engagement of visually impaired children.
Arko, A. D., & Addison, K. (2009)	The impact of functional literacy on socio-economic lives of beneficiaries: A case	The study looked at the influence of functional literacy on the socioeconomic life of recipients in	Investigating the impact of functional literacy, particularly Braille literacy, on the socio-

Author	Title	Research Findings	Research Gap
	study of the Agona district of Ghana	Ghana's Agona area, however the particular conclusions are not supplied in the reference.	economic lives of visually impaired individuals

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter encompasses a comprehensive exposition of the study's methodology, delving into various facets such as ethical considerations, the validation and reliability of research instruments, methodologies for data analysis, operational definitions of variables, the intricacies of the study design, characteristics of the target population, the rationale behind determining the sample size, and the detailed methodology and strategies employed for data gathering. Each of these elements is thoroughly elucidated, providing a comprehensive understanding of the meticulous approach undertaken in the research process.

3.2 Research Design

In order to answer research questions, researchers employ research designs, which are conceptual frameworks (Orodho, 2005). This investigation made use of a descriptive survey research strategy. Finding out what is and how things are right now are the main concerns of a descriptive survey, say Gall and Borg (2009). This method enables researchers to examine a wide population by analyzing data from a representative sample, all while avoiding the manipulation of any variables that may affect the results. The researcher felt this strategy was ideal since the investigation required collecting data. Qualitative and quantitative approaches were utilized.

3.3 Target Population

The target population included beneficiaries of digital Braille technology devices in Kitui County. The study targeted teachers in special and integrated schools who teach these students, NGOs implementing Braille project, county and national government education officials in the relevant ministry totaling to 138 respondents.

3.4 Sample Size and Sampling Procedure

3.4.1 Sample size.

For the sake of drawing conclusions (inferential statistics were employed in this study), it serves as a representation of the larger population. See below for an illustration of how the (Yamane formula 1967) was used to determine the sample size for this investigation: $N = \left\{ \frac{N}{1+N(e)^2} \right\}$

Where:

n =sample size

N = sample population; and

e =Marginal error

Given that:

N = 138

e = margin error of 0.10 or 10%.

The standard confidence level is 90%, for better accuracy which give a margin error of 0.10 or 10%.

$$n = 138 / 1 + 138(0.10)^2(0.10)^2$$

therefore, n = 99

In addition to the 99 who are the beneficiary of Braille technology, the study involved five project stakeholders who are: 2 respondents from the implementing NGOs, 1 from the national government ministry and 2 from county government. Therefore, the sample size for this study is 104.

3.4.2 Sampling procedure.

Beneficiaries for the research were identified using stratified random sampling procedures. The approach of purposeful sampling was employed to identify important informants as well as Braille recipients.

3.5 Methods of Data Collection

This topic discusses the instruments that were used for collecting data and data collection procedures.

3.5.1 Instruments of data collection.

To collect information from respondents, this study used a survey questionnaire and an interview schedule. Beneficiaries of digital Braille were given questionnaires. The interview schedule was utilized to conduct in-depth interviews with NGOs and school principals involved in Braille initiatives. The surveys were dropped and retrieved two days later by the researcher.

Closed-ended questions elicited more organized responses, facilitating the collecting of quantitative data, but open-ended questions aided in the gathering of extra data.

3.5.2 Data collection procedures

Primary data was supplied by respondents, whereas secondary data was derived from project records. The researcher used questionnaires and the "drop and pick" approach to collect data; participants were allowed two days to fill them out at their own pace after dropping them off. The researcher sent an invitation to anybody who were interested in taking part in the current investigation.

3.6 Validity of the Research Instruments

Validity refers to how well the observed phenomena matches the predictions made from the data. Validity tests also guarantee that the instrument is not biased in terms of language, format, or style of the data collecting tool (Kothari, 2004). The study sought the opinion of specialists in the disability sector to establish the validity of the research instrument. The content of the questionnaire was also evaluated for validity to verify whether it addresses all significant features of the variable. Expert feedback was included into the equipment before they were deployed in the field.

3.7 Reliability of the Research Instruments

One measure of an instrument's dependability is how well it holds up under repeated testing. (Kothari, 2004). The study instruments' dependability was improved by the use of piloting. Pilot research was conducted with 19 participants (10% of the sample size). The piloting helped to establish if the tools were capable of yielding accurate and dependable results.

The reliability of the data tools was also measured using the Cronbach Alpha technique (Gall & Borg, 2003). Using SPSS Statistics' Reliability Analysis, we determined the Cronbach's alpha. With reliability ratings of 0.7 or higher, the instruments were considered reliable.

3.8 Methods of Data Analysis

Data acquired in the field was examined quantitatively and qualitatively. To aid tabulation and understanding, quantitative data was summarized and coded for easy classification. The qualitative data was organized into topics and then summarized with frequency and percentages. Based on the study goals, content analysis was utilized to uncover developing patterns and themes.

Tables were used to exhibit quantitative data in order to demonstrate comparisons, trends, and clarity for simple comprehension of the findings.

Using multiple regression analysis, we looked for a correlation between the two variables. The following model was employed to determine the relationship between the independent and dependent variables.

The regression equation was as follows:

$$(Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon):$$

Where; Y = performance of Digital Braille technology project

 X₁ = household income

 X₂ = school infrastructure

 X₃ = social support

 X₄ = social identity;

Provided that,

β_0 β_1 β_2 β_3 and β_4 are the coefficients in the regression equations used to describe the factors at play.

ϵ = Error term which is assumed to be 0.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

Data presentation, analysis, and interpretation are covered in this section. A Digital Braille technology project was implemented in a subset of schools in Kitui County, Kenya, with the intention of gauging the effect of socioeconomic factors on the project's success. Everything is listed according to the sequence in which the results were collected. The demographic data of the participants is the starting point of the research.

4.2 Return Rate

The respondents in this study were given 99 questionnaires. The researcher then proceeded to gather the surveys. The researcher collected 86 surveys out of the 99 provided, representing an 86.6% response rate. This backs up Amyx's (2017) claim that a response rate of 50% is acceptable, while a response rate of 70% or more is deemed extremely positive.

4.3 Demographic Information

This portion tried to determine the respondents' demographic information, which included gender and age. The findings are organized under the following topics.

4.3.1 Gender of the respondents

The study intended to determine the gender of those who participated in the study. Table 4.1 displays the replies as follows:

Table 4.1 Gender of the respondents

Gender	Frequency	Percentage
Male	59	68.6
Female	27	31.4
Total	86	100

Among those who participated in the survey, men made up 68.6% and females 31.4%. From the responses, it appears that men were the majority when it came to employing Braille technology.

4.3.2 Age of the respondents

It was established that there were specific ages of respondents using Braille technology as presented from the analyzed data in table 4.2.

Table 4.2: Age of the respondents

Age	Frequency	Percentage
10-20	40	46.5
20-30	13	15.1
30-40	9	10.5
40-50	15	17.4
50 years and above	9	10.5
Total	86	100

The data in table 4.2 reveals that a significant proportion of the respondents were aged between 10-20 years forming 46.5% of the whole population, 17.4% of the respondents were 40-50 years, both 30-40 and 50 years and above had a score of 10.5%. Finally, 20-30 of the respondents formed 15.1%. This shows that majority of the respondents who took part in this research were aged between 10-40 years of age.

4.4 Analysis of Independent Variable

This section presents analysis of the independent variable which were: household income, school infrastructure, social support and social identity. This section presents analysis of each variable as shown:

4.4.1 Influence of household income.

The primary aim of incorporating this specific variable into our study was to thoroughly investigate and understand the nuanced dynamics between household income and the success of a Digital Braille technology initiative within a select group of schools situated in Kitui County, Kenya. To achieve this, a meticulously crafted questionnaire was administered to the respondents, where they were presented with a series of assertions pertaining to the correlation between household income and the effectiveness of the Digital Braille technology initiative. The respondents were then prompted to express their perspectives by indicating their level of agreement or disagreement with these claims. In the ensuing

sections, a detailed exposition of the outcomes obtained from this survey is presented, shedding light on the diverse viewpoints and perceptions within the sampled population.

Table 4.3 Household income

Statement	SA	A	N	D	SD	Mean	Std. Dev
Household income adequately meets our basic needs	8	18	4	60	10	4.13	0.308
Household income allows us to maintain a comfortable standard of living	2	4	6	48	40	3.75	0.301
Household income is sufficient to cover essential expenses	20	2	4	70	4	3.99	0.361
I am confident in my ability to meet unexpected financial expenses	2	6	2	60	30	3.95	0.313
Household income enables us to save for the future	30	2	6	2	60	3.45	0.335
Household income contributes significantly to our overall financial well-being	4	2	4	50	40	3.62	0.323

N= 86

Composite Mean = 3.968

Composite STD = 0.596

The composite mean for this measure was 3.968, indicating that all respondents believed that household had a substantial effect on the performance of digital braille technology, with a composite standard deviation of 0.596 indicating that there was no more variance in the replies.

The respondents disagreed with assertions that the majority of respondents disagreed with the statement that family income sufficiently covers our fundamental requirements, with 60% indicating that they are unable to meet their basic needs. This variable's mean score was 4.13, with a standard

deviation of 0.308. Respondents also disagreed with the statements that household income allows us to maintain a comfortable standard of living, that household income is sufficient to cover essential expenses, that I am confident in my ability to meet unexpected financial expenses, that household income allows us to save for the future, and that household income contributes significantly to our overall financial well-being. This shows that the respondents disagreed with almost all the statements an indication that there is little or a lack of income for most of the respondents especially parents and pupils who use Braille technology.

4.4.2 Influence of quality of infrastructure

Projects involving Braille technology have been found to perform significantly better when the infrastructure is of high quality. As a result, the aimed to determine the impact of the quality of infrastructure in schools that use Braille technology. Respondents were given questionnaires to judge how much they agreed or disagreed with statements on the quality of Braille technological infrastructure. The replies are displayed below.

Table 4.4 Influence of Quality of infrastructure

Statement	SA	A	N	D	SD	Mean	Std. Dev
The school infrastructure is well-maintained and conducive to learning	20	10	26.7	26.7	16.7	3.30	1.253
The digital platforms used by the school are easily accessible and user-friendly	10	36.7	26.7	16.7	10	4.73	1.544
The staff at the school receive adequate training to effectively deliver education	10	10	33.3	23.3	23.3	3.31	1.264
The school provides Braille signage to facilitate navigation for visually impaired individuals	26.7	23.3	10	20	20	3.60	1.188

N=86

Composite Mean 3.985

Composite STD 0.8834

There was no clear consensus among respondents (mean = 3.30) as to whether or not the school's physical plant is clean and safe for students to learn in. Fifty percent of those who took the survey agreed with this statement, suggesting that, while not ideal, school facilities are well-maintained. A third of the people surveyed felt that the school's online resources are simple to navigate and understand. With a mean score of 3.31 and a standard deviation of 1.264, respondents were in disagreement with the assertion that school workers have sufficient training to efficiently offer instruction. Nearly half of the respondents (46.6%) were in significant disagreement with the statement even though they supported the claim that the school provides Braille signs to help visually impaired students navigate with a total of 50.0%, a mean of 3.60, and a standard deviation of 1.188. This demonstrates that the schools have Braille signage to help visually impaired students navigate. The composite means for all parameters stood at 3.985, suggesting that a significant majority of respondents concurred with the notion that infrastructure quality influences the performance of digital braille technology. This consensus is further underscored by a relatively low standard deviation of 0.8834, signifying minimal variation in the responses.

4.4.3 Influence of social identity

The employment of digital Braille technology has the ability to strengthen individuals' social identities and encourage their participation in society. To what extent does one's social identity influence how well the Digital Braille technology project turns out was the goal of include this variable. The results are displayed in table 4.5, which shows the percentage of respondents that agreed or disagreed with the assertions presented.

Table 4.5 Social identity

Statement	SA	A	N	D	SD	Mean	Std. Dev
Individuals have a positive self-perception and high self-	4.3	62.6	5.0	23.7	4.3	2.91	1.132

esteem regarding their social identity

Peer acceptance and inclusion are emphasized, fostering a sense of belonging and affirmation of social identities

3.6	69.1	5.8	16.5	5.04	2.58	0.971
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Empowerment and agency are encouraged, allowing individuals to have a sense of control and influence over their social identity.

5.8	29.5	7.2	51.8	5.8	3.42	1.121
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Individuals are supported in developing a strong sense of self-worth and confidence in their social identity.

36.7	43.2	1.4	15.8	2.9	3.26	1.127
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Peer acceptance and inclusion are actively promoted, creating an environment that values diversity and respects various social identities.

10.1	68.3	5.8	10.1	5.8	2.63	0.998
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Empowerment and agency are fostered through opportunities for active participation and decision-making, enabling individuals to shape and define their social identity.

9.4	50.4	5.8	32.4	2.2	2.78	0.976
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N= 86

Composite Mean 3.976

Composite STD 0.785

Results in table 4.5 indicate that respondents agreed with the following statements that individuals have a positive self-perception and high self-esteem regarding their social identity, that peer acceptance and inclusion are emphasized, fostering a sense of belonging and affirmation of social identities, that individuals are supported in developing a strong sense of self-worth and confidence in their social identity, that peer acceptance and inclusion are actively promoted, creating an environment that values diversity and respects various social identities and that empowerment and agency are fostered through opportunities for active participation and decision-making, enabling individuals to shape and define their social identity. A good large number of the respondents disagreed with the statement that empowerment and agency are encouraged, allowing individuals to have a sense of control and influence over their social identity. The results show that the respondents had varied opinion on the social identity. The overall composite mean for this variable was 3.976 indicating that the respondents agreed with the statement that social identity influence performance of digital braille technology in schools. The composite standard deviation was 0.785 which is a clear indication that there was minimal variance in respect to the responses given by the respondents.

4.4.4. Influence of social support

This section sought to gather information based on respondents' opinion on social support. The respondents were given questionnaire with statements in which they were to show the extent to which they agree or disagree with the statements. The results are presented in table 4.6 as shown:

Table 4.6 Social support

Statement	SA	A	N	D	SD	Mean	Std. Dev
There is awareness and understanding of social support services within the community.	3.6	19.4	59.7	16.7	0.7	2.71	0.738
Sensitization and training programs are in place to promote effective social support	13.7	65.5	17.3	3.6	0.0	2.113	0.657
Peer support and inclusion initiatives are implemented to foster a sense of belonging and support among individuals	11.5	69.8	13.7	5.0	0.0	2.126	0.675
The community actively promotes awareness and understanding of social support resources available.	4.3	22.3	61.9	9.4	2.2	2.893	0.794
Ongoing sensitization and training efforts are conducted to enhance the quality of social support services	5.0	25.2	64.0	4.3	1.4	2.62	0.893
Peer support programs are inclusive and create a supportive environment for individuals from diverse backgrounds.	13.7	69.8	15.1	0.7	0.7	2.35	0.758

N=86

Composite Mean 4.078

Composite STD 0.862

Results on social support indicate that majority of the respondents 59.7%, 61.9% and 64% had a neutral opinion on the statements that there is awareness and understanding of social support services within the community, that the community actively promotes awareness and understanding of social support resources available and that ongoing sensitization and training efforts are conducted to enhance the

quality of social support services. The respondents agreed with the statements that sensitization and training programs are in place to promote effective social support, that peer support and inclusion initiatives are implemented to foster a sense of belonging and support among individuals and that peer support programs are inclusive and create a supportive environment for individuals from diverse backgrounds.

The overall composite mean for this variable was 4.078, suggesting a generally positive agreement with the statement that social support influences the performance of digital braille technology in schools. The composite standard deviation was 0.862, indicating a moderate level of variance in responses among the respondents, but not a high level of inconsistency.

4.5 Regression Analysis

Regression analysis was done to test hypothesis H₁, H₂, H₃ and H₄. To test this hypothesis this research conducted a linear regression analysis of the

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$$

Table 4.7 Model summary β

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	0.618 ^a	0.368	0.347		0.55803

Table 4.8 Analysis of Variance ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sign.
Regression	10.315	1	2.687	14.284	0.000 ^b
Residual	28.112	84	0.263		
Total	38.427	86			

Table 4.9 Coefficients

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.789	.323		6.540	.000
	B₁ (Household income)	.139	.042	.266	3.476	.001
	B₂ (School infrastructure)	.578	.126	.454	4.995	.020
	B₃ (Social Support)	.217	.128	.167	1.794	.045
	B₄ (Social identity)	.261	.135	.188	1.657	.032

Table 4.7 reveals that the model summary's score was significant at 0.618, implying that using the model summary will result in a variance of 61.8% in the performance of the Digital Braille technology project in Kitui County. As a result, the study indicates that the model summary is suitable for usage. From the table the model was significant and therefore, $Y = a + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + \varepsilon$ is the prediction model

From table 4.8, the regression sum of squares was 10.315, the residual sum of squares was 28.112 and the total sum of squares was 38.427. At 0.00, the p-value was lower than the 0.05 threshold for statistical significance. We may thus say with 95% certainty that all combined social-economic forces have a strong influence and reject the null hypothesis.

According to the findings, a unit increase in household income contributes to a 13.9% rise in Braille technology performance. Digital Braille technology projects see a 26.1% improvement in performance for every unit increase in social identity, a 21.7% improvement for every unit increase in social support, and a 57.8% improvement for every unit increase in school infrastructure. The most important issue is school infrastructure.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, DISCUSSION, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER STUDY

5.1 Introduction

This study extensively explored the multifaceted socioeconomic dynamics that impact the performance of the Digital Braille technology project in Kitui County. In this section, we delve into a comprehensive discussion of the results meticulously obtained and presented in Chapter Four, unraveling the intricate web of factors shaping the project's effectiveness within the local socioeconomic context.

5.2 Summary of the Findings

The study analyzed data collected on all the four independent variables of the study and the following forms the summary of the findings:

The study observed that household income was low among the majority of the respondents as was seen by the varied opinions from the respondents in which they strongly disagreed and disagreed with the statements which were used to measure the level of household income.

The respondents on objective two which looked at quality of infrastructure in school had different opinion on various aspects. It was noted that even though the infrastructure was available, its maintenance was not carefully done and this might act as an obstacle to the pupils using the Braille technology in these schools.

The study established that social identity plays a significant role on the performance of Braille technology. The respondents had also varied opinion on this indicator a clear indication that majority of the pupils who use these Braille technologies are not comfortable to be associated with it even their parents.

The final objective looked at social support. The study established that even though there is an element of social support, it is at very low extent and therefore majority of the users of the Braille technology may not fully make a maximum use of the technology without the necessary support from parents, teachers, donors and other stakeholders.

5.3 Discussion of the Findings

The study took into account the four independent variables and from the analyzed data, the following can be observed.

5.3.1 Household income and performance of Braille technology

The study found a positive correlation between household income and Braille technology performance, as shown by the coefficients. This variable received a score of 0.139, or 13.9%. Household income plays a very important role since it will determine how parents will cooperate with the school in an effort to support the school financially in order to discharge its mandate. A well of parent will give full support in terms of finance but if the parent is poor below the one-dollar mark per day, then this might be a challenge for them to offer financial support to the school and to the pupils themselves and this will in turn affect negatively the performance of Braille technology.

These findings are in agreement to those of Busienei (2017), whose findings found that household income has a significant influence on the performance of development projects. The parents also echoed these findings by noting that such a situation makes them not to participate fully on the implementation of some programs in the school.” *Let me tell you, the fact that I cannot meet some of the financial obligation makes my child to miss out in many programs which to me are very important. For example, if the school has been given food for the children, you know that food must be cooked and so when the children are sent home to get money for paying the cook say 150/= per child and I have 3 of them, that is 450/=.* Where can I get such money and I am a housewife, now if I do not my children that money, then they will definitely miss out in such a thing.” A composite means of 3.968 and a standard deviation of 0.596 show that there was little variation in the responses, thus the study concludes that household income has a significant influence on the performance of digital braille technology. The majority of respondents agreed with this statement, according to the study's findings.

5.3.2 School infrastructure and performance of Braille technology

Infrastructure plays a critical role on the performance of any project. The study fought that infrastructure plays a very pivotal role on the performance of Braille technology since students' needs specialized classes as well as storage facilities for the gadgets. The regression analyzed showed that school infrastructure had the highest score of 0.578 translating to 57.8% on the performance of Braille technology. The findings are in agreement with those of Ramalingam et al. 2021 who said that equipment and infrastructure are crucial factors in project success and performance. Their studies indicate that solar panels or modules are a cost-effective and environmentally friendly alternative to

batteries, especially in developing countries. They recommend the use of devices that utilize solar panels instead of batteries and encourage researchers to consider renewable energy sources in their projects. Additionally, the studies demonstrate the potential of energy harvesting systems in assistive devices that utilize human motion, as well as in wireless charging systems for wearable travel aid devices. The school infrastructure plays a pivotal role on the performance of digital braille technology in which the composite mean was 3.985 shows that the respondents agreed with the statement and this variable had a composite standard deviation of 0.8834 which is an indication that there was minimal variation on the responses.

5.3.3 Social Identity and Performance of Digital Braille technology project.

A big part of improving the quality of life for persons with visual disabilities has been assistive technology. A type of assistive technology used to improve the literacy abilities of those with visual impairments is digital Braille. The employment of digital Braille technology has the ability to strengthen individuals' social identities and encourage their participation in society. The study found out that social identity plays a very important role on the performance of Braille technology projects. This variable had 0.261 which shows that it can contribute to 26.1% on the performance of the Braille technology. These findings are in agreement with the head teacher's comment who noted that *"These pupils need to feel loved by their follow ones and that is where us here, we cultivate that culture of social identity that the children can feel that they are part of us. In fact, we engage them in all the activities of the school so that the other students will not see them as different from them. This has led to self-esteem and the students are very ok"*. The findings also agree with those of Okunoren and Oyeyemi's 2017 who observed that users' identification with their handicap status was a strong predictor of how interested they were in a project involving Digital Braille technology. The findings show that the respondents in overall agreed with the statement that social identity has a positive influence on the performance of digital braille technology and the analyzed results had a composite mean of 3.976 and a composite standard deviation of 0.785.

5.3.4 Social Support and Performance of Digital Braille technology project

In the realm Everybody needs support from fellow friends, guardians, parents and those close to them. It was established that there is positive relationship between social support and performance of digital Braille technology projects, particularly those involving innovative developments such as Digital Braille technology, the role of social support in shaping project performance has garnered significant attention. The findings agree with those of Katzenbach and Smith (1993) who observed that the interplay between social support, team cohesion, and morale emerges as a key determinant of project outcomes. They also contend that strong team cohesion nurtures positive dynamics, contributing to

project success. Elevated morale correlates with heightened productivity and improved project results. It is therefore very important to give social support to the donors, teachers and students who interact with the Braille machines/technology for their smooth learning. The survey discovered that with a composite mean of 4.078, the respondents largely agreed with the claims. The variable had a composite standard deviation of 0.862, indicating that, while respondents agreed on average that social identity has a role in digital braille technology performance, their views varied.

5.4 Recommendations of the Study

From the finding of the study, the researcher gives the following recommendation which form an important ingredient on the performance of Braille technology in Kenya:

Given that household income significantly influences the performance of digital Braille technology projects, it is recommended that educational institutions and organizations involved in such projects consider implementing targeted financial support programs for families with lower income levels. Scholarships, subsidies, or grants could be provided to ensure that all students have equal access to the technology, regardless of their family's financial situation. The pivotal role of infrastructure in the success of Braille technology projects emphasizes the need for schools and organizations to invest in suitable facilities to support these initiatives. There is need to delve into innovative approaches to designing and implementing infrastructure that caters specifically to the needs of students using Braille technology. To foster a sense of social identity and inclusivity among students using Braille technology, educational institutions should continue to promote an environment where all students feel valued and included.

Recognizing the significance of social support in Braille technology projects, it is recommended that project leaders and stakeholders prioritize creating a supportive environment for teachers, students, and stakeholders involved in these initiatives. Establishing support networks, regular feedback mechanisms, training and open channels of communication can contribute to the success of such projects.

Given the significant influence of household income on the success of Braille technology projects, policymakers should work towards the implementation of targeted financial support programs. This could include scholarships, subsidies, or grants aimed at providing Braille technology access to students from lower-income families. By ensuring that financial constraints do not hinder access, these programs will contribute to the overall success of Braille technology initiatives. Policymakers should prioritize the development of infrastructure that caters specifically to the needs of students using Braille

technology. This includes investing in suitable facilities within educational institutions and organizations.

5.5 Suggestions for Further Study

The statement emphasizes the necessity for additional research to thoroughly investigate the effectiveness of various financial assistance strategies within the domain of Braille technology and their tangible impact on project outcomes. These strategies can encompass a range of financial mechanisms, such as grants, loans, subsidies, and crowdfunding. By evaluating the extent to which these strategies contribute to the success of Braille technology projects, this research aims to shed light on the best practices for supporting innovation and accessibility within this field.

This study recommends further examination of the correlation between effective social support in technology-driven educational projects and its direct influence on participants' motivation and project outcomes in the context of Braille technology. Such social support can be provided by educators, peers, or mentors, and it plays a critical role in fostering motivation and, subsequently, the success of educational initiatives. Investigating this relationship will help in crafting strategies that optimize the learning experience and outcomes for those involved in Braille technology projects.

There is an evident need to conduct a comprehensive study to assess the long-term cost-effectiveness and sustainability of incorporating renewable energy sources, particularly solar panels, into the infrastructure powering assistive devices in Braille technology. By exploring the economic viability and environmental impact of this integration, the research seeks to determine whether renewable energy solutions offer a reliable and eco-friendly means to power Braille technology, thus reducing reliance on conventional energy sources and enhancing the accessibility and sustainability of these essential devices.

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APPENDIX I: LETTER OF INTRODUCTION

ALEX KALUYU NGUNGWA

P.O.BOX 4664 - 00506,

NAIROBI

Dear Respondent

RE: INTRODUCTION LETTER

Dear respondent, I am Alex Kaluyu Ngungua, a student at the University of Nairobi undertaking a Master of Arts degree in Project Planning and Management. As a requirement for the award of the degree, am conducting my research entitled: “*Social-economic dynamics and performance of Digital Braille technology project in select schools in Kitui County, Kenya*”.

I am therefore requesting you to take your time and fill out the questionnaire by ticking the extent to which you agree or disagree with the statements provided in the questionnaire. Your information will be treated with utmost confidentiality and will be used for the purposes of research only.

Thank you for your kind consideration

Yours faithfully,



ALEX KALUYU NGUNGUA

APPENDIX II: RESEARCH QUESTIONNAIRE

This questionnaire is meant to collect data on social economic dynamics affecting the performance of the Digital Braille technology project in select schools in Kitui County, Kenya. You have been selected as a respondent to take part in this study, please take some time and fill out this questionnaire.

SECTION A: Demographic Information

This section contains demographic information of the respondents. Please tick where appropriately

1. Please indicate your gender

- a) Male
- b) Female

2. Please indicate your Age

- a) 18-24
- b) 25-34
- c) 35-44
- d) 45-54
- e) 55 years and above

3. Please indicate your marital status

- a) Single
- b) Married
- c) Divorced
- d) Widowed

SECTION B: Household Income

This section seeks to gather information based on your opinion on household income. On a scale of 1-5, please indicate the extent to which you agree or disagree with the following statements where by **1= Strong Agree, 2= Agree, 3= Neutral, 4= Disagree, 5=strongly disagree**

Statement	1	2	3	4	5

Household income adequately meets our basic needs					
Household income allows us to maintain a comfortable standard of living					
Household income is sufficient to cover essential expenses					
I am confident in my ability to meet unexpected financial expenses					
Household income enables us to save for the future					
Household income contributes significantly to our overall financial well-being					

SECTION C: School Infrastructure

This section seeks to gather information based on your opinion on school infrastructure. On a scale of 1-5, please indicate the extent to which you agree or disagree with the following statements whereby **1= Strong Agree, 2= Agree, 3= Neutral, 4= Disagree, 5=strongly disagree**

Statement	1	2	3	4	5
The school infrastructure is well-maintained and conducive to learning					
The digital platforms used by the school are easily accessible and user-friendly					
The staff at the school receive adequate training to effectively deliver education					
The school provides Braille signage to facilitate navigation for visually impaired individuals					

SECTION D: Social Support

This section seeks to gather information based on your opinion on social support. On a scale of 1-5, please indicate the extent to which you agree or disagree with the following statements where by **1= Strong Agree, 2= Agree, 3= Neutral, 4= Disagree, 5=strongly disagree**

Statement	1	2	3	4	5
There is awareness and understanding of social support services within the community.					
Sensitization and training programs are in place to promote effective social support					
Peer support and inclusion initiatives are implemented to foster a sense of belonging and support among individuals					
The community actively promotes awareness and understanding of social support resources available.					
Ongoing sensitization and training efforts are conducted to enhance the quality of social support services					
Peer support programs are inclusive and create a supportive environment for individuals from diverse backgrounds.					

SECTION E: Social Identity

This section seeks to gather information based on your opinion on social identity. On a scale of 1-5, please indicate the extent to which you agree or disagree with the following statements where by **1= Strong Agree, 2= Agree, 3= Neutral, 4= Disagree, 5=strongly disagree**

Statement	1	2	3	4	5
Individuals have a positive self-perception and high self-esteem regarding their social identity					
Peer acceptance and inclusion are emphasized, fostering a sense of belonging and affirmation of social identities					

Empowerment and agency are encouraged, allowing individuals to have a sense of control and influence over their social identity.					
Individuals are supported in developing a strong sense of self-worth and confidence in their social identity.					
Peer acceptance and inclusion are actively promoted, creating an environment that values diversity and respects various social identities.					
Empowerment and agency are fostered through opportunities for active participation and decision-making, enabling individuals to shape and define their social identity.					

INTERVIEW GUIDE

Hello dear respondent, my name is Kaluyu a student at the University of Nairobi taking a Master of Arts degree in project planning and management. Please take your time and allow me to ask some questions regarding your school

Section 1: Social Support

What are your perceptions of the social support services available in your community?

How aware and understanding do you think people in your community are about the social support resources?

Have you noticed any sensitization or training programs regarding social support services in your community?

In your opinion, how effective are the peer support and inclusion initiatives in promoting a sense of belonging?

Section 2: Social Identity

How do you perceive your own social identity, and how does it affect your self-perception and self-esteem?

To what extent do you feel accepted and included by your peers regarding your social identity?

Have you experienced any empowering moments or opportunities that have enhanced your sense of agency in relation to your social identity?

Section 3: School Infrastructure

How would you describe the overall condition of the school infrastructure in terms of its impact on learning?

Are the digital platforms used by the school easily accessible and user-friendly for all students?

Have you observed any efforts by the school to provide Braille signage or other accommodations for visually impaired individuals?

Section 4: Staff Training

In your opinion, are the staff members at your school adequately trained to meet the educational needs of diverse students?

Have you noticed any specific training programs or initiatives aimed at enhancing staff members' understanding of diverse identities and needs?

How do you feel the staff's training or lack thereof impacts the overall inclusivity and supportiveness of the school environment.

APENDIX III: TRANSMITTAL LETTER



UNIVERSITY OF NAIROBI
FACULTY OF BUSINESS AND MANAGEMENT SCIENCES
OFFICE OF THE DEAN

Telegrams: "Varsity",
Telephone: 020 491 0000
VOIP: 9007/9008
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P.O. Box 30197-00100, G.P.O.
Nairobi, Kenya
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Website: business.uonbi.ac.ke

Our Ref: **L50/78065/2015**

June 23, 2023

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: INTRODUCTION LETTER- NGUNGUA, ALEX KALUYU

The above named is a registered Master of Arts in Project Planning and Management student at the Faculty of Business and Management Sciences, University of Nairobi. He is conducting research on "**Social Economic Dynamics and Performance of Braille Digital Projects in Schools in Kitui County**".

The purpose of this letter is to kindly request you to assist and facilitate the student with necessary data which forms an integral part of the thesis.

The information and data required is needed for academic purposes only and will be treated in **Strict-Confidence**.


Your consideration will be highly appreciated.



Dr. Joshua Wanjare
Associate Dean, GBS & R
Faculty of Business and Management Sciences



JW/pgf


APPENDIX IV: RESEARCH PERMIT


REPUBLIC OF KENYA


**NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION**

Ref No: **901289** Date of Issue: **17/July/2023**


RESEARCH LICENSE




This is to Certify that Mr. ALEX KALUYU NGUNGUA of University of Nairobi, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Kitui on the topic: SOCIAL ECONOMIC DYNAMICS AND PERFORMANCE OF BRAILLE DIGITAL TECHNOLOGY PROJECT IN SELECT SCHOOLS IN KITUI COUNTY, KENYA for the period ending : 17/July/2024.

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901289
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