Algorithmic Age: A Systematic Review of the Potential Impact of Artificial Intelligence on Mental Health in Sierra Leone through the Lens of the Technology Acceptance Model

©*John Alie Conteh*

MEd. Counseling Program, School of Education, University of Puget Sound, Tacoma, Washington, USA

Abstract

This systematic review explores the potential impact of artificial intelligence (AI) on mental health in Sierra Leone through the lens of the Technology Acceptance Model (TAM). The study synthesizes current literature on the integration of AI-driven tools such as chatbots, predictive algorithms, and digital screening systems within the mental health landscape of Sierra Leone, a nation grappling with substantial post-conflict trauma, limited resources, and a pronounced treatment gap. It examines the opportunities and challenges presented by AI adoption, including issues related to cultural validity, technological infrastructure, and the acceptance of novel digital interventions. The review highlights the critical role of user perceptions, digital literacy, and trust as determinants of technology acceptance, and discusses policy and research priorities necessary for effective AI integration. Findings underscore the transformative potential of AI to expand access, enhance service quality, and address systemic barriers, while emphasizing the importance of culturally-informed strategies and robust implementation frameworks tailored to the Sierra Leonean context.

Keywords: Artificial Intelligence (AI), Technology Acceptance Model, Mental Health, Sierra Leone, Technology

Introduction

Mental health disorders represent a substantial global concern. According to estimates from the World Health Organization (WHO), approximately one in eight individuals worldwide is affected by a mental health condition, resulting in an immense economic impact amounting to trillions of dollars annually (Dimension Market Research, 2025; WHO, 2023; WHO, 2022). The burden is particularly pronounced in low- and middle-income countries, where fragile healthcare systems, persistent stigma, and limited resources exacerbate the challenges. Sierra Leone, a nation in West Africa profoundly influenced by prolonged civil conflict and the catastrophic

effects of the Ebola epidemic, exemplifies these complexities (Akinsulure-Smith and Conteh, 2018; Betancourt et al., 2020). In recent years, artificial intelligence (AI) is increasingly being developed for integration into the Sierra Leone healthcare systems, including mental health.

Ndembi et al. (2025) define AI as computer systems capable of executing tasks traditionally associated with human cognition. The conscientious integration of AI into healthcare and emergency response systems across Africa holds the potential to enhance accessibility and broaden the reach of services, thereby reinforcing patients' moral agency (Ugar, 2025; Ndembi et al., 2025). According to a recent market analysis, the global AI market in mental health is valued at US $1.6 billion in 2025 and is projected to grow to US $11.9 billion by 2034 (Dimension Market Research, 2025).

Efforts in Sierra Leone have increasingly focused on the incorporation of digital technologies, particularly AI, within the mental health system (Dehbozorgi et al., 2025; Desrosiers et al., 2024). AI is being progressively employed in healthcare to advance diagnostic capabilities, facilitate monitoring, and support interventions. In the mental health sector, AI-driven tools including chatbots, predictive algorithms, and monitoring systems offer innovative approaches to expanding access and improving the quality of care (Dehbozorgi et al., 2025). Given the substantial treatment gap and limited resources in Sierra Leone, AI presents both significant opportunities and notable risks. Recent studies have highlighted a major concern regarding the cultural validity of AI applications, underscoring the necessity for Sierra Leone to strengthen its technological infrastructure to ensure relevance and applicability within its specific context. Furthermore, recent governmental initiatives aimed at digital integration emphasize the importance of incorporating AI tools across various sectors of the economy, such as health, mental health, and education (WHO Regional Office for Africa, 2025; WHO, 2023; Björkegren et al., 2025).

The World Health Organization (WHO) reports that mental health disorders are a major contributor to morbidity, disability, and socioeconomic loss. Disorders such as depression, anxiety, substance use, and trauma-related conditions constitute a significant portion of this burden and are prevalent among varied populations (WHO, 2023; WHO Regional Office for Africa, 2016). In low-income countries like Sierra Leone, these challenges are exacerbated by resource constraints, limited mental health literacy, and fragile healthcare systems.

Sierra Leone, a nation in West Africa, constitutes a uniquely high-risk environment characterized by intricate post-conflict trauma, elevated rates of substance use, a scarcity of psychiatric infrastructure, and a critical shortage of mental health professionals (Hopwood et al., 2021). The country is further challenged by an estimated 98% mental health treatment gap (Desrosiers et al., 2024). Considering these persistent and pressing mental health needs, Akinsulure-Smith and Conteh (2018) identified several future priorities, including enhanced government support and decentralization, culturally informed research, community sensitization and psychoeducation, the promotion of collaboration and partnerships, capacity building within the mental health workforce, and the development of multicultural and social justice competencies. More recently, Ager et al. (2025) emphasized the importance of research initiatives such as mapping health-seeking behaviors and barriers to care, identifying local idioms of distress, generating culturally relevant assessment tools, exploring social determinants of psychological distress, piloting community-based interventions, providing training and curriculum development for healthcare professionals, advancing community development efforts, and implementing a comprehensive mental health policy. These strategies are critical for contextualizing policy and practice related to mental health and psychosocial support services in

Sierra Leone. The current inadequacies of healthcare delivery systems underscore the potential value of AI in offering scalable and accessible mental health interventions.

Overall, this article conducts a systematic review of the prospective impact of AI within the framework of the Technology Acceptance Model (TAM) in Sierra Leone. Furthermore, it utilizes the TAM framework to examine the implications and opportunities associated with the integration of AI into mental health service delivery in Sierra Leone. For the sake of perspicuity, a brief conceptualization of the TAM is presented in the ensuing subsection.

Technology Acceptance Model

AI, which includes chat-based support systems, predictive analytics and digital screening platforms, has emerged as a viable solution for strengthening insufficient mental health infrastructures. TAM asserts that the adoption of technology is determined by users' perceptions of its usefulness and ease of use (Davis, 1989). This theoretical framework is particularly pertinent in the context of Sierra Leone, where factors such as digital literacy, trust in healthcare technologies, and infrastructural challenges may significantly affect the implementation and acceptance of AI-driven solutions. More on the TAM as a theoretical framework is presented after the relatively brief discussion of AI-driven platforms in Sierra Leone in the following section as a contextual backdrop.

AI-driven Platforms in Sierra Leone

Since 2018, Sierra Leone has actively pursued the integration of technology within its healthcare system through the implementation of the National Digital Strategy 2018–2023 (Ministry of Health and Sanitation—MoHS, 2018). While this initiative was not exclusively focused on mental health, it constituted a comprehensive effort to advance digital health solutions across the sector. These foundational measures have established the infrastructure necessary for the future deployment of AI–driven mental health tools. For instance, the Ministry of Health and Sanitation (MoHS) subsequently introduced the National Digital Health Strategy (2023–2027) to facilitate the expansion of digital diagnostics and telemedicine. This strategic framework expressly identifies mental health as a priority area for the development of digital instruments aimed at enhancing access and improving data collection and reporting. Notably, the National Digital Health Strategy represents Sierra Leone's inaugural effort to systematically integrate technology with the objective of improving health outcomes, thereby aligning the nation with the "Health for All" mandate articulated in Sustainable Development Goal 3 (SDG3). The emphasis on Electronic Medical Records (EMR) demonstrates the country's willingness to adopt advanced technologies in the ongoing pursuit of accessible and high-quality healthcare services.

In Sierra Leone, AI tools are progressively being incorporated into maternal mental health screening as part of the expanding use of digital platforms. The implementation of AI-enabled tools for triage and screening has been piloted in various regions of the country, establishing a basis for wider adoption. According to the MoHS (2025), Sierra Leone is presently engaged in a collaborative initiative with the United Nations Children's Fund (UNICEF) and local community health workers (CHWs) to pilot programs that utilize digital data-capture tools enhanced by AI-based algorithms for the screening of maternal depression (Ministry of Health and Sanitation, 2025; World Health Organization Regional Office for Africa, 2025).

Theoretical Framework

To elucidate the potential adoption of AI within Sierra Leone's mental health system, this paper examines TAM as articulated by Davis (1989), which comprises the constructs of perceived usefulness and perceived ease of use in evaluating technology implementation. As mentioned earlier, AI-enabled tools, including chatbots, predictive screening platforms and mobile-based mental health support systems, possess the capacity to address existing gaps in service provision.

Humayun et al. (2025) assert that AI technologies such as predictive algorithms, conversational agents, and decision-support systems present innovative possibilities for the screening, diagnosis, treatment, and ongoing management of mental health conditions (see also Dehbozorgi et al., 2025; Humayun et al., 2025). Moreover, the implementation of AI within healthcare systems is shaped by an array of behavioral, social and technological determinants. TAM serves as a foundational framework for examining the integration of AI by highlighting the significance of perceived usefulness (PU) and perceived ease of use (PEOU), as well as their respective impacts on behaviors that facilitate the adoption of technological solutions (Davis, 1989; Venkatesh and Davis, 2000).

Perceived Usefulness

AI–enabled screening tools possess the potential to significantly enhance access to mental health services, particularly in underserved rural regions where conducting comprehensive mental health assessments remains challenging. Given the acute shortage of psychiatrists, psychologists, mental health counselors, and social workers within Sierra Leone, the deployment of digital solutions such as AI-driven screening, psychoeducational platforms and therapeutic chatbots can substantially broaden outreach efforts to populations with limited access to traditional services.

In a context characterized by a paucity of mental health specialists, AI-based task-shifting support tools may provide valuable assistance to nurse-led mental health units (MHUs) in the processes of diagnosis, triage, and ongoing patient monitoring. These technologies have the capacity to facilitate early detection and preventive interventions. For instance, predictive AI algorithms such as those capable of risk stratification based on responses to digital surveys can identify individuals at elevated risk for depression or relapse, thereby enabling timely and targeted interventions (Hopwood et al., 2021).

Perceived Ease of Use

With respect to PEOU, governmental mental health policy frameworks should incorporate strategies that address digital literacy, infrastructure limitations, and trust-building in relation to prevailing cultural beliefs. Promoting digital literacy among healthcare providers including nurses and community health workers as well as service users is paramount; ease of use will be contingent upon intuitive interfaces, language localization (such as Krio or other regional languages), and comprehensive training initiatives. Infrastructure challenges, including unreliable internet connectivity, intermittent power supply, and low rates of smartphone ownership, may impede the adoption of AI-based delivery systems. Notably, recent advancements in the deployment of AI tools via low-bandwidth and Short Message Service (SMS)-based platforms have proven to be developmentally suitable, with promising opportunities for further decentralization of mental health services. Furthermore, the

implementation of AI tools must consider the influence of cultural beliefs regarding mental illness, which may affect trust and acceptance. For instance, within Sierra Leone's collectivist context, there may be a prevailing preference for human interaction. Consequently, trust-building efforts will be vital to necessitate extensive mental health outreach programs that actively engage diverse stakeholders.

Moreover, external factors such as stigma and prevailing cultural beliefs significantly influence perceptions of mental health service delivery across African countries (Ndembi et al., 2025). For instance, since mental illness is frequently attributed to spiritual or supernatural causes, the acceptance of AI tools may necessitate their integration within culturally respected environments such as community dialogues and collaborations with traditional healers. Regarding the regulatory environment and governance, ongoing policy reforms are essential to effectively implement the recently established mental health policy. Such reforms should encompass provisions for data privacy and ethical standards to support the limited regulatory infrastructure. It is imperative that robust ethical safeguards are instituted to ensure user confidentiality and informed consent (Ndembi et al., 2025; Ugar and Malele, 2024). What follows is the research methodology that complements the theoretical framework in the grounding of the subsequent data analysis

Research Methodology

This paper utilized secondary sources subjected to a systematic literature synthesis by combining quantitative, qualitative, conceptual articles, government documents, international organization and analysis of AI efficacy and adoption in various publications on mental health in Sierra Leone. Using the TAM framework, I analyzed factors influencing AI integration within health and mental health systems in the country. The TAM framework was further employed to explore the emerging use of AI tools among healthcare providers and the implications for specific users and the general population.

The systematic review draws upon a range of sources, including peer-reviewed articles, policy papers, national health reports, and up-to-date digital health data. The main evidence for this analysis is derived from the Sierra Leone Ministry of Health and Sanitation, telecommunications statistics, scholarly research on AI applications in resource-limited environments, and documents outlining digital health strategies. TAM (Davis, 1989) was used as the conceptual framework to map the Sierra Leone mental health landscape that includes mental health burden, system governance, resources, and service uptake. I analyzed the potential impact of AI adoption in Sierra Leone through TAM’s constructs consisting of perceived usefulness, perceived ease of use, and behavioral intention, moderated by contextual variables such as infrastructure, policy, and cultural beliefs.

Data Sources

I performed a comprehensive literature search to gather relevant studies for this review. Search terms included “Artificial intelligence,” “mental health,” “Sierra Leone,” “digital health,” “technology acceptance model,” and “AI adoption.” The search strategy utilized major academic databases such as PubMed, Scopus, Frontiers in Psychiatry, BioMed Central Psychology, Lancet, and Journal of Medical Internet Research (JMIR), Medical Informatics, and Community Mental Health Journal, all of which regularly publish peer-reviewed articles on Sierra Leone’s mental

health systems.

Additionally, Google Scholar was used to locate peer-reviewed articles with specific phrases related to AI and mental health in Sierra Leone. The review also incorporated government reports, documents from international organizations, and reputable website resources. I also used inclusion criteria requiring that sources be authentically published according to the American Psychological Association (APA) 7th edition guidelines, represent peer-review publications including systematic reviews focused on AI applications in mental health, especially within low-resource or sub-Saharan African contexts, and address data on AI adoption and usability consistent with the TAM framework.

Analytical Framework

The findings of this study were systematically synthesized utilizing the TAM alongside an analysis of the prevailing mental health landscape. Specifically, the construct of PU was examined in relation to whether key stakeholders, including governmental bodies and international organizations, are implementing AI initiatives with the objective of enhancing mental health outcomes and increasing service delivery efficiency. Additionally, online searches and literature reviews addressed PEOU, which pertains to the extent to which AI tools are user-friendly, accessible, and suited to the levels of digital literacy present within the local population. Consideration was also given to behavioral intention, reflected in the anticipated willingness to adopt such technologies, as influenced by social factors, trust, and cultural relevance. The TAM framework was rigorously applied to interpret these dimensions within the specific context of Sierra Leone.

Burden of Mental Health Disorders in Sierra Leone

As noted earlier, Sierra Leone is confronted with a distinctive and complex mental health burden, shaped by the aftermath of a decade-long civil conflict, the 2014-2016 Ebola epidemic, and pervasive poverty (Harris et al., 2020; Kamara et al., 2017). Trauma-related disorders such as post-traumatic stress disorder (PTSD) and depression are notably widespread. In recent years, concerns regarding substance use among the youths, particularly the increasing prevalence of "kush," a widely available synthetic drug, have further exacerbated community challenges (Lahai et al., 2025). Despite the high prevalence of mental health conditions, most cases remain untreated, primarily due to inadequate mental health services, insufficient public awareness, and cultural beliefs that frequently ascribe mental illness to spiritual or supernatural causes. Recent epidemiological data from Sinnah et al. (2025) indicate that substance use disorders (SUDs) constitute most mental health diagnoses (60.7%), with acute psychosis accounting for 24.8%, and the remaining 14.5% comprising bipolar disorder, depression, epilepsy, and other conditions.

A program evaluation conducted in 2021 assessed the performance of decentralized nurse-led mental health units (MHUs) across 13 districts. Between 2015 and 2017, the evaluation documented 2,401 referrals, of which 43.5% were diagnosed with epilepsy or seizure disorders and 17.5% with psychosis. The rates of reported depression and suicide attempts were comparatively low at 8.6%. Notably, approximately 24.7% of the cases required medication that was not accessible at the time. The study further indicated that regions affected by Ebola exhibited elevated incidences of grief, trauma, and medically unexplained symptoms (Hopwood et al., 2021).

The mental health landscape in Sierra Leone is marked by fragmented service provision, a limited pool of specialized professionals, and the lack of comprehensive community-based care initiatives. In 2010, the National Mental Health Strategic Plan (2010-2025) as well as a Mental Health Policy were developed, finalized, and formally launched (Akinsulure-Smith and Conteh, 2018; WHO Mental Health in Development, 2012). The 2010 mental health policy was plagued by funding and resource limitations. While another mental health policy and plan were established in 2019, the absence of dedicated mental health legislation undermines the enforcement of human rights protections, and there are no clearly defined human resource estimates or allocations to facilitate the policy's implementation. Despite recent advancements in the training of psychiatric nurses and community health officers, the mental health workforce remains critically insufficient, with only a few qualified professionals serving the entire nation (WHO Mental Health Atlas, 2022). Many individuals seeking mental health care rely predominantly on family support, traditional healers, or religious organizations. These challenges are compounded by the presence of a single psychiatric facility, the Kissy National Referral Psychiatric Hospital, which has a maximum capacity of approximately 120 beds, resulting in a highly centralized system that significantly limits access for those residing in rural areas (WHO Mental Health Atlas, 2022).

Mental Health System Governance, Resources, and Service Availability Uptake

In recent years, the MoHS has revised mental health policy documents and incorporated mental health into essential health service frameworks. These efforts have been undertaken in conjunction with international partners to enhance workforce training and optimize resource distribution (WHO Mental Health Atlas, 2022). The initiatives encompass the integration of mental health services within primary health care, the expansion and monitoring of outpatient care facilities and utilization rates (measured by visits per 100,000 population), the establishment and oversight of inpatient care facilities and capacity (evaluated by beds and admissions per 100,000 population), the management of mental hospitals including assessment of average length of stay, the development of community-based mental health services, and the documentation of the treated prevalence of psychosis disaggregated by sex (WHO Mental Health Atlas, 2022).

According to the 2020 Sierra Leone country report from the Mental Health Atlas, there has been partial integration of mental health services into primary care, as evidenced by a score of three out of five on the evaluation checklist. The report documented the presence of 14 mental health outpatient facilities affiliated with hospitals in 2020. The total number of admissions to mental health hospitals stood at one for the reporting period. Follow-up care for individuals discharged from mental health hospitals within the previous year was limited, with only 25% or fewer discharged persons receiving a follow-up appointment within one month. Furthermore, just 25% or fewer inpatients received timely diagnosis, treatment, and follow-up for concurrent physical health conditions such as cancer, diabetes, or tuberculosis (WHO Mental Health Atlas, 2022).

Also, based on the 2020 country report for Sierra Leone published by the WHO Mental Health Atlas, several challenges were identified within the mental health system. These included the absence of community-based or non-hospital mental health outpatient facilities, a lack of other outpatient centers such as mental health day care or treatment facilities, and no dedicated outpatient services specifically for children and adolescents. Furthermore, there was no

documentation available regarding the number of visits made by service users in the past year to mental health outpatient facilities, affiliated hospitals, or community-based and non-hospital outpatient centers. The report also noted the absence of records on service user visits to other outpatient facilities, including mental health day care centers, as well as the number of visits to outpatient facilities specifically designated for children and adolescents. Additional infrastructural deficiencies encompassed the lack of psychiatric units within general hospitals, community residential facilities, inpatient facilities for children and adolescents, beds and annual admissions in general hospital psychiatric units, community residential beds and annual admissions, and inpatient beds and admissions for child and adolescent populations. In relation to mental health hospitals and patient length of stay, there were no involuntary admissions, ongoing concerns regarding follow-up care, and pronounced deficits in the areas of hospital length of stay, community-based mental health services, and the documented treated prevalence of psychosis by sex (WHO Mental Health Atlas, 2022).

Mental Health Promotion and Prevention in Sierra Leone

With respect to mental health promotion and prevention, as of 2020, initiatives encompassed several categories of programs, including the scope, management, and operational functionality of each intervention. Available program types and corresponding examples included mental health awareness and anti-stigma campaigns such as national and governmental training sessions focused on Coronavirus Disease (COVID)-2019-related stigma workplace mental health prevention and promotion, which were integrated into national and governmental work-related initiatives, and mental health and psychosocial components embedded within disaster preparedness and disaster risk reduction strategies at both national and governmental levels (WHO Mental Health Atlas, 2022).

As pointed out earlier, many challenges persist, including insufficient resources dedicated to suicide prevention, early childhood development, school-based mental health prevention and promotion, as well as parental and maternal mental health initiatives. The implementation of AI tools such as mobile-based psychoeducation and digital resources for suicide risk mitigation holds promise for enhancing prevention efforts, particularly among younger people who exhibit high rates of mobile phone usage. In addition, digital platforms may facilitate the initiation and expansion of community healing dialogues, psychosocial support systems, and the integration of mental health services within primary health care. Although international organizations, including the WHO, have commenced community-level training for social workers and nurses to facilitate group dialogues and mutual support sessions (WHO Mental Health Atlas, 2022), pervasive public stigma remains a significant obstacle. Mental illness is frequently attributed to supernatural causes such as curses or sorcery, thereby deterring individuals from seeking formal care (Akinsulure-Smith and Conteh, 2018).

The Current Research

Multiple initiatives are underway to incorporate AI digital tools within Sierra Leone, particularly due to their promising applications in mental health counseling. This paper advocates for rigorous empirical and systematic investigations into the integration of technology, with an emphasis on AI tools, across diverse mental health practices. Notably, one documented advancement involves the MoH's targeted efforts to enhance Electronic Health Records (MoHS,

2020; World Health Organization Regional Office for Africa, 2025). Nevertheless, as Sierra Leone adopts emerging technologies, several critical challenges must be addressed, including the decentralization of services, reliable electricity supply, mobile phone accessibility and utilization, and strategic government investment in mental health infrastructure. The aim of this paper is to provide a systematic literature synthesis that examines the current mental health landscape, evaluates the potential impact of AI, integrates the TAM framework, and explores the implications and opportunities for AI tool utilization within Sierra Leone.

Results and Application in Mental Health

The discussion in this section is segmented into two subsections. This is essential for improving readability, making the material easier to navigate, and helping readers see how the information is organized.

Potential Positive Impacts of AI on Mental Health in Sierra Leone

The integration of AI has the potential to significantly enhance mental health service delivery and systems in Sierra Leone through various mechanisms, including expanding access to care, facilitating early detection and screening, enabling robust monitoring and follow-up, providing scalable interventions, and fostering ethical and culturally sensitive adaptations. To address the existing gaps in mental health service provision, evidence from recent studies in Africa (Ugar, 2025; Ugar and Malele, 2024; Gres and Staver, 2025) indicates that AI-powered tools such as chatbots can offer emotional support, assist in crisis management, and complement traditional therapeutic approaches. Given the limited availability of mental health professionals and constrained resources in Sierra Leone, the adoption of AI within mental health systems represents a promising and sustainable strategy to broaden access, particularly in rural and underserved communities.

In terms of early detention and screening, and ethical and cultural adaptation, digital systems in the form of AI-powered tools and machine learning models can be used to predict mental health by analyzing patterns in speech, text, behavior, or physiological data (Cruz-Gonzalez et al., 2025). Given the diverse cultural landscape, culturally-adapted screening tools like the Sierra Leone Psychological Distress Scale (Horn et al., 2021; Humayun et al., 2025), a locally contextualized model, could potentially be digitized and integrated into AI-driven platforms, thereby enabling community health workers or even individuals themselves to detect distress early. The scale considers cultural idioms of distress and explanatory models, and measures of distress tailored to local context. Embedding local idioms of distress (as have been developed through Sierra Leone research) into AI tools supports culturally responsive practice. Such integration of scalable AI interventions into existing community mental health initiatives (e.g., community healing dialogues) could potentially increase acceptability and reduce stigma.

Effectively monitoring and follow-up using AI systems can support continuous monitoring of mental health systems in Sierra Leone. For example, this can be done by analyzing user engagement or language, offering insights into when someone might be deteriorating or improving (Cruz-Gonzalez et al., 2025). Since Sierra Loene has several non-mental health specialists, effective monitoring ensures capacity for regular clinical follow-up, resulting in more efficient triaging, and early intervention.

In terms of scalable interventions, since AI-based interventions can be cost-effective once

developed, AI tools like chatbots or guided digital therapies can support mental health providers particularly in low-resource settings such as Sierra Leone. Human-AI collaboration has shown relevant feedback from AI systems enabling peer supporters respond more empathic conversations using text-based peer-to-peer mental health support (Sharma, et al., 2023) to empower community-based mental health workers, who are essential in Sierra Leone's mental health infrastructure.

Adoption Barriers and TAM Analysis

Table 1 entails summaries of the adoption barriers and potential mitigation strategies of the TAM analytical framework apropos its application on the case of Sierra Leone. The attendant discussion of the results follows immediately thereafter.

Table 1: Illustrative Adoption of the TAM Analysis Framework

TAM Construct	Barriers in Sierra Leone	Potential Mitigation Strategies
Perceived Usefulness (PU)	Lack of evidence for local effectiveness; skepticism of AI	Pilot programs, co-designed interventions, culturally adapted algorithms
Perceived Ease of Use (PEOU)	Low digital literacy; infrastructure limitations	Offline-capable applications, mobile-friendly interfaces, training programs
Behavioral Intention	Mistrust, stigma, social influence	Community engagement, local endorsements, trust-building measures

Source: Self-generated by the Author

Discussion of the Results

The utilization of AI in Sierra Leone presents opportunities for scaling mental health services in the country, particularly through data management, early detection, chatbots, and decision-support tools, all of which will significantly improve the technological capacity of the country. It is important to note that technological capacity alone is insufficient since adoption is contingent upon perceived usefulness, ease of use, and trust, which are key constructs within the TAM framework. In this regard, cultural adaptation, infrastructure support, and ethical governance are critical to maximize uptake and minimize harm in a low-income country that continues to rely on international donors for mental health financing.

The TAM framework explicates adoption modalities that health workers and patients are more likely to embrace AI tools, when they are user-friendly, demonstrably improve outcomes, intuitives, and align with social and cultural norms. Since AI tools are currently being applied in public health and medical sectors (Chukwu et al., 2022; MoHS, 2019), transferability of such knowledge can support and expand delivery of mental health services (WHO, 2023). As also noted in recent research (Ager et al., 2025; Dehbozorgi et al., 2025; Desrosiers et al., 2024), pilot interventions designed with intentional integration of local contexts can enhance both PU and PEOU, thereby fostering sustainable mental health care delivery systems using technology enhanced systems.

Implications for Sierra Leone Using TAM

The analysis here is divided into three subsections. This is done for the sake of clarity.

Perceived Usefulness

Evidence from AI integration shows that chatbots can enhance access where mental health workers are scarce, triage systems reduce delays in identifying severe cases, and AI-supported decision tools improve diagnostic accuracy for non-specialists (Cruz-Gonzalez et al., 2025; Dehbozorgi et al., 2025; Horn et al., 2021; Humayun et al., 2025). With careful consideration of and ethical lens, integrating AI into the healthcare sector supports emergency response (Ndembi, et al., 2025). These outcomes directly address Sierra Leone's shortage of specialists.

Perceived Ease of Use

Since AI can operate via SMS, low-data applications and voice interfaces, this can minimize adoption barriers (Horn et al., 2021; Humayun et al., 2025). Ease of use is especially high when tools are provided in culturally-relevant context (e.g., Ager et al., 2025; MoHS, 2025) such as the use of Krio language, a commonly spoken lingua franca in the country suggests evidence that could potentially increase uptake significantly (e.g., Horn et al., 2021; Humayun et al., 2025).

External Factors

Stigma still affects adoption; hence, an ethical responsible use of AI is important to foster improved anonymity and increase engagement. Responsible use of AI in African healthcare systems can strengthen a patient's moral agency (Ager et al., 2025). System trust is growing as Sierra Leone expands E-health records and digital maternal health programs (WHO Regional Office for Africa, 2025).

Implications of AI Use in Mental Health Systems in Sierra Leone

Like any other system, AI use in African mental health systems is not without associated risks, challenges, and ethical concerns (Alaran et al., 2025; Ndembi et al., 2025), especially in a low-resource context like Sierra Leone. Ndembi et al., (2025) identified the following challenges to the development of AI in African health sector: technical, ethical, legal, social and inclusivity challenges. Among the many considerations highlighted were diverse infrastructure, data network limitations, insufficient workforce skillsets, data quality, informed consent privacy regulations, data regulations, cultural sensitivity and inclusion, alignment with social norms, demographics, economic status, and equity.

Ndembi and colleagues (2025) further developed a framework for the development and integration of AI in the African health sector. This includes needs assessment and goal definition, stakeholder engagement and collaboration, data collection and analysis, technology selection and development, testing and validation, regulatory compliance and approval, implementation and training, continuous monitoring and improvement, and documentation of experiences. Some identified implications include data quality, algorithmic biases and cultural insensitivity (Alaran et al., 2025; Cruz-Gonzalez et al., 2025; Shin & Luke, 2025), privacy and ethical issues (Alaran

et al., 2025; WHO: Europe, 2023), overreliance and dehumanization (Dohnany et al., 2025; Gres & Staver, 2025), and interoperability and infrastructure constraints (Chukwu et al., 2022).

Regarding data quality, algorithmic bias, and cultural insensitivity, AI models have demonstrated limitations in their training data (Alaran et al., 2025; Cruz-Gonzalez et al., 2025). AI research reviews (eg., Shin and Luke, 2025) identified challenges such as misrepresentation of past and present events, difficulty in recognizing nuanced associations, and a tendency to adopt a deficit-based lens in selective analyses. Various gaps exist in Large Language Models (LLMs) such as ChatGPT that include the lack of representativeness, leading to bias, and potential poor performance in underrepresented populations in low-income countries such as Sierra Leone where there is data scarcity, limited digitized mental health data, and poor representation of ethnic groups as well as the general population in existing AI datasets. In a recent qualitative study, Shin and Luke found generative AI (specifically ChatGPT) "occasionally struggled to capture implicit meanings, particularly in narrative continuity and cultural-contextual analysis" (2025, p1).

Navigating privacy and ethical issues in AI systems continue to evolve since there is the potential to collect sensitive personal data. For example, the WHO and some researchers have warned of these issues (Alaran et al., 2025; WHO Europe, 2023). Although there is an existing mental health policy in Sierra Leone, there are notable challenges with its implementation (WHO, 2022: Mental Health Atlas 2020 Country Profile: Sierra Leone). Legal implementation can promote strong regulations focused on data governance, privacy, informed consent, and security to ensure that users' vulnerability is prevented. In addition, without regulation, there is a potential risk of predatory technology, exploitation, and exacerbation of inequities. Therefore, regulatory frameworks in the Sierra Leone mental health systems must protect misuse of data and its consequences.

As AI tools emerge in the Sierra Leone mental health landscape, overreliance and dehumanization is another challenge for consideration. For example, while chatbots provide support, there is a lot more research needed to expand on the understanding of human empathy, therapeutic alliance, and nuanced clinical judgment. Recent research (e.g., Gres and Staver, 2025) found that while AI use is emerging, it cannot totally replace human mental health providers. Also, emerging research warns of possible adverse psychological effects such as attachment, overdependence, and delusional thinking in vulnerable users interacting with AI chatbots (Dohnany et al., 2025). Therefore, overreliance could undermine development of local capacity for mental health delivery systems in Sierra Leone.

Interoperability and infrastructure constraints (e.g., Ndembi et al., 2025) are prevalent in the existing digital health and mental health systems in Sierra Leone. Currently, the country faces challenges in interoperable digital systems (Chukwu et al., 2022) such as poor Internet connectivity, limited smartphone utilization, and unreliable power supply that could hinder deployment of AI-based mental health tools.

Strategic Opportunities and Recommendations for Sierra Leone

In recent years, the adoption of AI within mental health systems in Western nations, particularly the United States, has increased significantly. Nevertheless, this rapid growth underscores the necessity for further research to fully understand the associated opportunities and challenges. Notably, the counseling profession has experienced substantial integration of AI tools, thereby highlighting the urgent need for comprehensive research to assess their applicability in both

academic curricula and clinical practice (Castaneda, Noble and Shaikh, 2025; Jeong, Lee, Yang, Park and Lee, 2025; Sheperis, Annan-Coultas and Rush, 2025; Shin and Luke, 2025). Within the context of Sierra Leone, key strategic opportunities for AI integration include the expansion of research initiatives, the piloting of locally tailored AI interventions and investments in infrastructure, the development of capacity and promotion of human-AI collaboration, as well as the establishment of robust monitoring and evaluation frameworks. The rest of the analysis in this section is subsumed under four subsections for cohesiveness.

Research, Education, and Training

Recent research in mental health highlighted the rapidly expanding world of AI in daily lives (Jeong, et al., 2025). In Sierra Leone, the emergence of integrating digital delivery systems into the health sector is a promising step for the utilization of AI tools. Nevertheless, emerging research on AI tools integration is lagging and their use raises potential ethical implications. Inclusion of AI tools in training programs and research at the College of Medicine and Allied Health Sciences (COMAHS) and collaboration with international training partners can be leveraged for continued expansion. Given the benefits and risks associated with AI, Sierra Leone could potentially improve its mental health delivery systems with culturally-tailored implemented legal and ethical procedures.

Pilot Locally-Adapted AI Interventions and Infrastructural Investment

According to Chukwu et al. (2022), a field mapping study emphasized the importance of accounting for local context in the development of digital systems within Sierra Leone. The country faces significant infrastructural challenges, including unreliable electricity, limited access to computing hardware, and inadequate Internet connectivity, all of which could substantially hinder the implementation of AI-based solutions. These infrastructural barriers were among the key recommendations identified in field mapping research (e.g., Chukwu et al., 2022). To address these issues, it is recommended to initiate small-scale pilot studies utilizing AI chatbots or digital screening tools that are specifically tailored to Sierra Leone's cultural and linguistic environment. Additionally, incorporating locally-developed metrics into training datasets and screening algorithms is advised (Chukwu et al., 2022). Furthermore, adopting mobile-first strategies to ensure AI interventions are compatible with basic smartphone technology and may enhance the delivery of mental health services. Collaborating with community health workers to test AI tools in real-world settings could foster greater acceptance and ensure cultural appropriateness (Dehbozorgi et al., 2025; Desrosiers et al., 2024).

Capacity-building and Human-AI Collaboration

Given Sierra Leone's commitment to an integrated mental health service delivery model encompassing medical doctors, nurses, psychologists, social workers, mental health counselors, and other allied health professionals, there is a strong rationale for incorporating AI training into university mental health curricula. For instance, the University of Makeni (UNIMAK), which educates undergraduate mental health practitioners and has recently launched a graduate program in mental health, as well as Njala University and the University of Sierra Leone, which offer social work and mental health trainings, could embed AI education within their respective

programs. Equipping mental health practitioners, community health workers, and non-specialists with the skills to engage with AI tools would facilitate the provision of practical feedback and enhance peer support mechanisms (Sharma et al., 2022). In addition, recent research by Watson and colleagues underscores the importance of advancing research training curricula that integrate AI-powered tools, highlighting both the opportunities and challenges these technologies present for mental health professionals (Watson, Leeth, Wong and Schroeder, 2025). Thus, investing in digital and AI literacy among mental health providers is essential for promoting responsible AI adoption within the wider population.

Monitoring and Evaluation

The WHO Mental Health Atlas country report highlights significant setbacks in monitoring and evaluation, as demonstrated by the absence or lack of reporting of data across multiple categories (WHO, 2022). As Sierra Leone prepares to integrate AI into its health and mental health systems, it is essential to undertake rigorous evaluations of AI interventions, assessing not only their effectiveness but also their safety, equity, and any unintended consequences. Accordingly, it is crucial to establish partnerships with research institutions to facilitate comprehensive, long-term studies examining outcomes, user satisfaction, and potential risks.

Conclusion

This paper explores the growing adoption of AI in mental health services in Sierra Leone. While AI integration has accelerated in Western contexts, the paper highlights the urgent need for research and careful adaptation in low-resource settings. Key opportunities for Sierra Leone include expanding research, piloting locally-adapted AI tools, investing in infrastructure, building capacity through education and training, and fostering human-AI collaboration. The paper emphasizes practical strategies such as mobile-first interventions, culturally relevant data, and collaboration with community health workers to ensure effective and equitable implementation. It underscores the necessity of rigorous monitoring and evaluation, ethical considerations, and partnerships with research institutions to assess the impact and safety of AI solutions.

While AI offers significant potential to address Sierra Leone's complex mental health challenges, technology alone is insufficient. Success relies on culturally sensitive design, ethical governance, and community engagement, as described by TAM. This paper recommends future research on pilot implementations, long-term outcomes, and adapting AI models to local contexts in order to maximize benefits and close the mental health treatment gap in Sierra Leone.

References

Ager, A., Horn, R., Bah, A., Wurie, H. and Samai, M. (2025). Policy and practice implications of contextual understanding of –and tools to address—mental health and psychosocial support needs in Sierra Leone. *Frontiers in Psychiatry,* 16, 1419448

Akinsulure-Smith, A. M. and Conteh, J. A. (2018). The emergence of counseling in Sierra Leone. *Journal of Counseling & Development,* 96*(3),* 327–334

Alaran, M. A., Lawal, S. K., Jiya, M. H., Egya, S. A., Ahmed, M. M., Abdulsalam, A., Haruna, U. A., Musa, M. K. and Lucero-Prisno, D. E., 3rd. (2025). Challenges and opportunities of

artificial intelligence in African health space. *Digital Health*, *11*. https://doi.org/10.1177/20552076241305915

Baldeh, M., Williams, S. A. and Bah, A. J. (2024). Drug use among young people in Sierra Leone. *The Lancet,* 404 (10449), 238.

Betancourt, T. S., Keegan, K., Farrar, J. and Brennan, R. T. (2020). The intergenerational impact of war on mental health and psychosocial wellbeing: Lessons from the longitudinal study of war-affected youth in Sierra Leone. *Conflict and Health,* 14 (62)

Björkegren, D., Choi, J. H., Budihal, D., Sobhani, D., Garrod, O. and Atherton, P. (2025). Could AI leapfrog the web? Evidence from teachers in Sierra Leone. *ArXiv*. https://arxiv.org/abs/2502.12397

Castaneda, C. J., Noble, N. and Shaikh, A. N. (2025). Utilizing artificial intelligence therapeutic adjuncts to support autistic adults between counseling sessions. *Journal of Counselor Preparation and Supervision, 19*(3)

Chukwu, E., Garg, L., Foday, E., Konomanyi, A., Wright, R. and Smart, F. (2022). Electricity, computing hardware, and internet infrastructures in health facilities in Sierra Leone: Field mapping study. *Journal of Medical Internet Research Medical Informatics*, 10(2), e30040

Cruz-Gonzalez, P., He, A. W.-J., Lam, E. P., Ng, I. M. C., Li, M. W., Hou, R., … Sánchez Vidaña, D. I. (2025). Artificial intelligence in mental health care: A systematic review of diagnosis, monitoring, and intervention applications. *Psychological Medicine,* 55, (e18). https://doi.org/10.1017/S0033291724003295

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Management Information Systems Quarterly,* 13(3), 319-340

Desrosiers, A., Carrol, B., Ritsema, H., Higgins, W., Momoh, F. and Betancourt, T. S. (2024). Advancing sustainable implementation of an evidence-based mental health intervention in Sierra Leone's schools: Protocol for a hybrid type 3 implementation-effectiveness trial. *BioMed Central Public Health,* 24, 362. https://doi.org/10.1186/s12889-024-17928-w

Dehbozorgi, R., Zangeneh, S., Khooshab, E., Nia, D. H., Hanif, H. R., Samian, P., Yousefi, M., Hashemi, F. H., Vakili, M., Jamalimoghadam, N. and Lohrasebi, F. (2025). The application of artificial intelligence in the field of mental health: a systematic review. *BMC Psychiatry*, 25(1), 132

Dimension Market Research (2025). *AI in mental health market by component (software, hardware, and services), by technology, by disorder, by application, by end-user - global Industry outlook, key companies (Woebot Health, Ginger, Lyra Health, and Others), trends and forecast 2025-2034*. https://dimensionmarketresearch.com/report/ai-in-mental-health-market/

Greš, A. and Staver, D. (2025). The utilization of artificial intelligence in mental health. *Rivista di Psichiatria*, 60(4), 145–149

Harris, D., Endale, T., Lind, U. H., Sevalie, S., Bah, A. J., Jalloh, A. and Baingana, F. (2020). Mental health in Sierra Leone. *British Journal of Psychiatry International, 17*(1), 14-16

Hopwood, H., Harris, D., Sevalie, S., Iyawa, G. and Langan Martin, J. (2023). The barriers and facilitators to decentralised nurse-led mental health service delivery in Sierra Leone. *Community Mental Health Journal*, 59(6), 1071-1082

Hopwood, H., Sevalie, S., Herman, M. O. et al. (2021). The burden of mental disorder in Sierra Leone: A retrospective observational evaluation of programmatic data from the roll-out of decentralised nurse-led mental health units. *International Journal of Mental Health*

Systems, 15, 31. https://doi.org/10.1186/s13033-021-00455-1

Horn, R., Jailobaeva, K., Arakelyan, S. and Ager, A. (2021). The development of a contextually appropriate measure of psychological distress in Sierra Leone. *BioMed Central Psychology,* 9, 108. https://doi.org/10.1186/s40359-021-00610-w

Humayun A., Madawana A. M., Hassan A., Mahmud A., Kamaruddin N., Noor S. H. et al. (2025) Artificial intelligence as a predictive tool for mental health status: Insights from a systematic review and meta-analysis. *PloS One* 20(9), e0332207

Jeong, D., Lee, H., Yang, H., Park, J. C. and Lee, S. M. (2025). AI integration in counseling training: Aiding counselors-in-training in self-efficacy enhancement and anxiety reduction. *Journal of Counseling & Development,* 103 (3), 346-360

Kamara, S., Walder, A., Duncan, J., Kabbedijk, A., Hughes, P. and Muana, A. (2017). Mental health care during the Ebola virus disease outbreak in Sierra Leone. *Bulletin of the World Health Organization,* 95(12), 842-847

Ministry of Health and Sanitation, Sierra Leone. (2025). *Digital Health Coordination Unit* https://mohs.gov.sl/digital-health/ (mohs.gov.sl)

Ministry of Health and Sanitation, Sierra Leone. (2018). *National Digital Health Strategy, 2018–2023*. https://extranet.who.int/countryplanningcycles/sites/default/files/public_file_rep/SLE_Sierra_Leone_National-Digital-Health-Strategy_2018-2023.pdf (WHO Extranet)

Ministry of Health and Sanitation (MoHS). (2019). *Digital Health Mapping Report*. https://portal.mohs.gov.sl/download/38/research-assessment-evaluation-and-other-reports/1626/sl-digital-health-mapping-report-2019.pdf

Ministry of Health and Sanitation, Sierra Leone. (2020). *Non-Communicable Diseases Strategic Plan 2020-2024.* https://portal.mohs.gov.sl/research-assessment-evaluation-and-other-reports/

Ministry of Health and Sanitation (n.d.). Sierra Leone Neglected Tropical Diseases (NTD) Master Plan 2023-2027 https://espen.afro.who.int/sites/default/files/content/document/Sierra_Leone_NTD_Master_Plan_2023_2027_Final.pdf

Meier, L. J., Hein, A., Diepold, K. and Buyx, A. (2022). Algorithms for ethical decision-making in the clinic: A proof of concept. *American Journal of Bioethics* 22 (7): 4-20.

Ndembi N, Rammer B, Fokam J. et al. (2025). Integrating artificial intelligence into African health systems and emergency response: Need for an ethical framework and guidelines. *Journal of Public Health Africa,* 16(1), a876

Lahai, M., Vandy, A., Turay, A., Kolipha-Kamara, M. and Conteh, E. (2025). Synthetic cannabinoids in Sierra Leone: Understanding the use of 'Kush' among youths and its socioeconomic impact in Sierra Leone and Sub-Region. *Public Health Challenges,* 4(1), e70031

Sharma, A., Lin, I. W., Miner, A. S., Atkins, D. C. and Althoff, T. (2023). Human-AI collaboration enables more empathic conversations in text-based peer-to-peer mental health support. *Nature Machine Intell*igence, 5, 46-57

Sheperis, C., Annan-Coultas, D. and Rush, C. (2025). Reimagining the counseling profession: Preparing counselors for AI and digital health integration. *Journal of Counselor Preparation and Supervision,* 19(3), 1-25

Shin, K. and Luke, M. M. (2025). A descriptive comparison of results from human and AI-driven interpretive phenomenological analysis. *Journal of Counselor Preparation and*

Supervision, 19*(3),* 1-15.
Sinnah., M., Jammeh, A., Sogbeh, S., Sheriff, A., Ikoona, E. and Negash Gebru, G. (2025). Prevalence of mental health disorders and predictors of substance use disorders among hospitalized patients at the Sierra Leone psychiatric teaching hospital, Freetown, Sierra Leone, 2020-2023. *Journal of Interventional Epidemiology and Public Health*, 8 Suppl 13:7. https://doi.org/10.37432/jieph.supp.2025.8.1.13. 7
Shoemaker, S., Freeburg, N. and Duquette, K. (2025). Artificial Intelligence in counselor education: Innovative strategies for teaching, supervision, and clinical training. *Journal of Counselor Preparation and Supervision,* 19(3*),* 1-34.
The World Bank. (2023). Sierra Leone climate and health vulnerability assessment. https://reportify-1252068037.cos.ap-beijing.myqcloud.com/media/production/s_86cb57c1_86cb57c11ef54244c98239628a948d3a.pdf?utm_source=chatgpt.com
Ugar, E. T. (2025). Promoting responsible use of AI in African healthcare: Strengthening patients' moral agency. *Asia Bioethics Review*, https://doi.org/10.1007/s41649-025-00357-1
Ugar, E.T. and Malele, N. (2024). Designing AI for mental health diagnosis: Challenges from sub-saharan African value-laden judgements on mental health disorders. *Journal of Medical Ethics* 50 (9): 592-595
Venkatesh, V. and Davis, F. D. (2000). A theoretical extension of the Technology Acceptance Model: Four longitudinal field studies. *Management Science,* 46(2), 186-204
Watson, J. C., Leeth, C., Wong, K. and Schroeder, J. (2025). Enhancing research training curricula through the ethical integration of AI-powered tools: Opportunities and challenges for counselor educators. *Journal of Counselor Preparation and Supervision,* 19(3), 1-14
World Health Organization. (2023, February 6). Artificial intelligence in mental health research: New WHO study on applications and challenges. *World Health Organization*. https://www.who.int/europe/news/item/06-02-2023-artificial-intelligence-in-mental-health-research--new-who-study-on-applications-and-challenges
World Health Organization Regional Office for Africa. (June 27, 2025). Sierra Leone sustains digital health gains through nationwide health facility device troubleshooting for eIDSR. https://www.afro.who.int/countries/sierra-leone/news/sierra-leone-sustains-digital-health-gains-through-nationwide-health-facility-device-troubleshooting (WHO | Regional Office for Africa)
World Health Organization. (2022). Mental Health Atlas 2020 Country Profile: Sierra Leone. https://www.who.int/publications/m/item/mental-health-atlas-2020-country-profile---sierra-leone
World Health Organization Regional Office for Africa. (2016). Improving access to mental health services in Sierra Leone. WHO | Regional Office for Africa
World Health Organization: Europe. (2023). Artificial intelligence in mental health research: New WHO study on applications and challenges. https://www.who.int/europe/news/item/06-02-2023-artificial-intelligence-in-mental-health-research--new-who-study-on-applications-and-challenges?utm_source=chatgpt.com
World Health Organization Mental Health in Development (2012). Profiles on Mental Health in Development: Sierra Leone. https://www.ecoi.net/en/document/1201933.html