The Effect of Healthcare Empowerment on Health Workers Commitment: Moderating Effects of Technological Innovation

[1]Linda Hyde-Quartey, [2]Zhang Xin Jie

[1](Corresponding author) School of Management Jiangsu University, China.

[2]School of Management Jiangsu University, China

Abstract: **This study investigates the impact of healthcare professional empowerment and community health empowerment on healthcare workers' commitment, with a focus on the moderating effects of technological innovation. Utilizing a quantitative approach, data were collected from healthcare workers in Ghana through a structured questionnaire. The findings reveal that both healthcare professional empowerment and community health empowerment positively affect healthcare workers' commitment. Additionally, technological innovation significantly moderates these relationships, enhancing the positive impact of empowerment on commitment. The results align with Self-Determination Theory, which suggests that technology can improve individuals' sense of competence and autonomy, thereby strengthening their commitment to their roles. These findings are consistent with existing literature and emphasize the value of integrating technological innovations in healthcare settings. Recommendations include investing in digital tools and platforms to support empowerment initiatives and engaging communities through technology. By adopting these strategies, healthcare systems can improve job satisfaction, reduce turnover, and enhance overall health outcomes.**

Keywords: **Empowerment; Commitment; Technological Innovation; Self-Determination Theory.**

1. INTRODUCTION

In many parts of Africa, the healthcare system faces significant challenges, including inadequate resources, limited access to care, and a shortage of healthcare professionals. The effectiveness of healthcare delivery is often compromised by these systemic issues, which lead to lower commitment among health workers and ultimately affect patient outcomes (S. K. Tessema et al., 2020). Healthcare empowerment, both for healthcare professionals and communities, has emerged as a crucial area of focus in addressing these challenges (Bill & Foundation, 2016). Empowerment in this context involves enhancing the capabilities and autonomy of healthcare workers and fostering active participation from communities in managing their health (Willmott et al., 2016). However, despite its importance, there remains a considerable research gap in understanding how different dimensions of healthcare empowerment impact health worker commitment and how technological innovation might influence this relationship (Henchiri et al., 2024).

Healthcare professionals' empowerment typically includes providing them with the necessary training, resources, and autonomy to make decisions and improve their working conditions (Adepoju, 2020). This empowerment is expected to increase job satisfaction and commitment among health workers, which can lead to better healthcare delivery. Simultaneously, community health empowerment focuses on educating and engaging communities to take charge of their health, which can improve overall health outcomes and reduce the burden on healthcare systems (Baba et al., 2021). Despite the theoretical benefits, empirical evidence on the effectiveness of these empowerment strategies in African settings is sparse. The role of technological innovation in moderating the effects of healthcare empowerment is an underexplored area (Tham-Agyekum et al., 2023). Technological advancements, such as electronic health records,

telemedicine, and health information systems, have the potential to enhance both healthcare professionals' and communities' empowerment (Henchiri et al., 2024). However, the impact of these technologies on health worker commitment and the integration of empowerment strategies in the context of technological innovation have not been extensively studied in developing countries in Africa as compared to developed countries or other developing countries in Asia (Wamema et al., 2023).

This research seeks to address these gaps by examining how healthcare empowerment both of professionals and communities affects health workers' commitment and how technological innovation might moderate this relationship. By exploring these dynamics, the study aims to provide insights into optimizing empowerment strategies and leveraging technology to improve healthcare outcomes in Ghana as understanding these relationships is essential for developing effective policies and interventions to strengthen health systems and enhance health worker commitment in the region.

2. THEORETICAL REVIEW AND HYPOTHESES DEVELOPMENT

2.1 Theoretical Review

Self-Determination Theory (SDT), developed by Deci and Ryan, provides a robust framework for examining how healthcare empowerment influences health workers' commitment and how technological innovation moderates this relationship (Bergman et al., 2023). SDT posits that human motivation and commitment are driven by the fulfillment of three basic psychological needs: autonomy, competence, and relatedness. In the healthcare context, SDT can explain how empowerment initiatives impact health workers' commitment (Thongworn & Sirisuk, 2018). Healthcare empowerment involves enhancing workers' autonomy by involving them in decision-making processes, increasing their competence through training and resources, and fostering relatedness through supportive organizational cultures and teamwork (Mph et al., 2022). When these needs are met, health workers are more likely to feel intrinsically motivated, which in turn enhances their commitment to their roles (Rolnik et al., 2020). For example, when healthcare professionals have the autonomy to make clinical decisions and access necessary resources, their sense of competence and job satisfaction are likely to increase, leading to greater commitment to their work and the organization (Bik-Multanowska et al., 2022).

Technological innovation plays a significant moderating role in this dynamic. According to SDT, technology that is perceived as enhancing one's ability to perform tasks and facilitating autonomy can positively influence motivation and commitment (Mph et al., 2022). User-friendly technologies that streamline work processes and improve efficiency can support health workers in meeting their psychological needs by making their roles less cumbersome and more rewarding (Athanasenas, 2015). For instance, advanced electronic health records and telemedicine tools that are easy to use and integrate into daily practice can enhance health workers' sense of competence and autonomy (Fan et al., 2019).

Conversely, if technological innovations are complex, cumbersome, or poorly integrated, they can create additional stress and hinder the fulfillment of psychological needs (Al-Hanawi et al., 2021). This can lead to reduced motivation and commitment. Therefore, the impact of healthcare empowerment on health worker commitment is likely to be moderated by the effectiveness of technological innovations in supporting or undermining the fulfillment of autonomy, competence, and relatedness (Lusambili et al., 2019). By applying SDT, this study aims to provide a nuanced understanding of how healthcare empowerment affects health worker commitment and how technological innovations influence this relationship, offering insights into optimizing both empowerment strategies and technological tools in healthcare settings (Westman et al., 2019).

2.2 Effects of empowerment on healthcare workers commitment

Healthcare professional empowerment involves providing healthcare workers with the autonomy, resources, and support needed to perform their roles effectively and make independent decisions (Romano & Scott, 2014). This form of empowerment is expected to positively impact healthcare workers' commitment for several reasons. First, autonomy, a core component of empowerment, allows healthcare professionals to exercise control over their work and make decisions that directly affect patient care (Jos & Guevara, 2021). According to Self-Determination Theory (SDT), autonomy is crucial for intrinsic motivation. When healthcare workers have the freedom to make clinical decisions and influence their work environment, they are likely to experience increased job satisfaction and commitment (Aljaeed et al., 2019). Autonomy not only enhances their sense of ownership and responsibility but also fosters a deeper connection to their work, leading to higher levels of commitment (Nyamuranga & Shin, 2019).

Studies have indicated that access to resources and opportunities for professional development is another key aspect of healthcare professional empowerment (J. Liu et al., 2019). Providing healthcare workers with adequate resources, such as training, equipment, and support staff, helps them perform their tasks more efficiently and effectively. This not only boosts their confidence and competence but also reduces job-related stress and burnout (Rutayisire et al., 2020). When healthcare workers feel competent in their roles and have the tools they need to succeed, they are more likely to remain committed to their work (Rutberg & Bouikidis, 2018). Empowerment through professional development opportunities also allows healthcare workers to grow within their roles and contribute to the organization in meaningful ways, further enhancing their commitment (Carrasco-Sánchez et al., 2021). Again, supportive work environments and recognition of achievements play a significant role in healthcare professional empowerment. When healthcare workers feel valued and appreciated for their contributions, they are more likely to exhibit high levels of commitment (Kirat et al., 2023). Recognition and support from supervisors and peers contribute to a positive work environment, which in turn reinforces workers' dedication and engagement. Empowerment initiatives that promote recognition and support are therefore expected to have a positive impact on healthcare workers' commitment (Aljaeed et al., 2019).

In the case of effects of community health empowerment on healthcare workers' Commitment community health empowerment define engaging and educating communities to take charge of their own health and well-being (J. Liu et al., 2019). This form of empowerment can positively influence healthcare workers' commitment through several mechanisms (Carrasco-Sánchez et al., 2021). First, when communities are empowered to manage their health effectively, healthcare workers often experience reduced workload and stress (McGee & Peterson, 2019). Empowered communities are better equipped to handle preventive care and manage chronic conditions, which can alleviate some of the burdens on healthcare professionals. This reduction in workload can lead to increased job satisfaction and commitment among healthcare workers, as they are able to focus on more complex and rewarding aspects of their roles (Al-hatamleh et al., 2021).

Studies indicate community health empowerment fosters stronger partnerships between healthcare workers and the communities they serve (Talaoui et al., 2023). When communities are actively involved in health initiatives and decision-making processes, healthcare workers are more likely to develop a sense of shared purpose and collaboration. This sense of partnership can enhance job satisfaction and commitment, as healthcare workers feel more connected to their work and see the tangible impact of their efforts on community health outcomes (Carrasco-Sánchez et al., 2021). Empowered communities often have better health outcomes, which can positively affect healthcare workers' commitment. When communities take proactive steps to improve their health, the overall demand for healthcare services may decrease, leading to a more manageable workload for healthcare workers (Halawi et al., 2019). This reduction in demand can contribute to lower levels of burnout and increased commitment to their roles. Additionally, seeing the positive effects of their work on community health can provide healthcare workers with a sense of accomplishment and fulfillment, further reinforcing their commitment (Waschkau et al., 2020).

Technological Innovation Affects healthcare workers' commitment as it encompasses a range of advancements, including electronic health records, telemedicine, and advanced diagnostic tools (Mph et al., 2022). These innovations are expected to positively impact healthcare workers' commitment through several key mechanisms. First, technological innovations can enhance the efficiency and effectiveness of healthcare delivery (Stosic et al., 2021). Tools such as electronic health records streamline administrative tasks, reduce errors, and improve communication among healthcare teams. By reducing the time and effort required for administrative tasks, healthcare workers can focus more on patient care, leading to increased job satisfaction and commitment (Monney, 2014). Efficient technologies that simplify workflows and reduce manual tasks contribute to a more rewarding work experience, thereby strengthening healthcare workers' commitment (Moick et al., 2019).

Technological innovations often improve the quality of patient care, which can positively affect healthcare workers' commitment (Aloisio et al., 2021). Advanced diagnostic tools and telemedicine platforms enable healthcare professionals to provide more accurate diagnoses and timely interventions (Monney, 2014). When healthcare workers have access to cutting-edge technologies that enhance their ability to deliver high-quality care, they are likely to experience greater job satisfaction and commitment. The ability to deliver better care and see positive outcomes in patients can reinforce healthcare workers' sense of purpose and dedication to their roles (Lee et al., 2011). technological innovations can support professional development and continuous learning. Many healthcare technologies come with built-in training and educational resources that help healthcare workers stay updated on the latest advancements and best practices (Iddrisu et al., 2019). Access to these resources can enhance healthcare workers' skills and knowledge, contributing to their

professional growth and commitment. Continuous learning opportunities provided by technological innovations can also foster a sense of competence and achievement, further reinforcing commitment to their work (Prof et al., 2019).

The positive effects of healthcare professional empowerment, community health empowerment, and technological innovation on healthcare workers' commitment are supported by several mechanisms (Suess et al., 2022). Healthcare professional empowerment enhances autonomy, competence, and relatedness, leading to increased job satisfaction and commitment. Community health empowerment reduces workload and fosters collaboration, which can improve commitment among healthcare workers (Cheung et al., 2022). Technological innovations enhance efficiency, improve patient care, and support professional development, all of which contribute to higher levels of commitment. Each of these factors plays a crucial role in strengthening healthcare workers' dedication to their roles and improving overall healthcare delivery (Högstedt et al., 2022).

H1: *Healthcare professional empowerment has positive effects on healthcare workers commitment*

H2: *Community health empowerment has positive effects on healthcare workers commitment*

H3: *technological innovation has positive effects on healthcare workers commitment*

2.3 Effects of Technological Innovation on Health Empowerment

Technological innovation has emerged as a transformative force in the healthcare sector, offering new opportunities for both healthcare professional empowerment and community health empowerment (Djambazov et al., 2018). The integration of advanced technologies into healthcare systems not only enhances the efficiency and quality of care but also plays a crucial role in empowering both healthcare professionals and communities (Wu et al., 2021). This discussion explores how technological innovation positively impacts healthcare professional empowerment and community health empowerment, addressing the mechanisms through which these effects occur and the potential benefits for the healthcare ecosystem (Iyanna et al., 2022). Technological innovation significantly contributes to healthcare professional empowerment by improving the tools and resources available to healthcare workers, enhancing their autonomy, competence, and overall job satisfaction. One of the primary ways technological innovations empower healthcare professionals is through the streamlining of administrative and clinical processes (Rahi et al., 2021). Electronic health records (EHRs), for example, have revolutionized the way patient information is managed and accessed. EHRs enable healthcare professionals to efficiently document, retrieve, and share patient data, reducing the time spent on paperwork and administrative tasks. This allows healthcare professionals to focus more on direct patient care, thereby enhancing their sense of competence and job satisfaction (Kruse et al., 2020). By automating routine tasks and improving information accuracy, EHRs support healthcare professionals in performing their roles more effectively, contributing to their overall empowerment (Wamema et al., 2023).

Telemedicine represents another significant technological advancement that empowers healthcare professionals (Iyanna et al., 2022). Telemedicine platforms enable healthcare workers to conduct remote consultations, monitor patients, and provide care without the constraints of physical location (Kruse et al., 2020). This innovation not only expands access to healthcare services for patients, particularly those in remote or underserved areas but also empowers healthcare professionals by offering them greater flexibility and control over their work (Q. Liu et al., 2021). Telemedicine facilitates more efficient use of time and resources, allowing healthcare professionals to manage their caseloads more effectively and improve work-life balance (Chin et al., 2023). The ability to work remotely or offer virtual care can lead to increased job satisfaction and a sense of autonomy, as healthcare professionals have more control over how and when they provide care (Raman et al., 2016).

In addition to EHRs and telemedicine, other technological innovations such as decision support systems and advanced diagnostic tools also play a crucial role in empowering healthcare professionals (Straube et al., 2020). Decision support systems provide real-time guidance and evidence-based recommendations to healthcare workers, aiding them in making informed clinical decisions. These systems enhance healthcare professionals' confidence in their clinical judgments and reduce the likelihood of errors, thereby improving their sense of competence (Yoon et al., 2022). Advanced diagnostic tools, such as imaging technologies and laboratory automation, enable healthcare professionals to obtain more accurate and timely diagnoses, further enhancing their ability to provide high-quality care (Rahi et al., 2021). By equipping healthcare professionals with cutting-edge technologies that support their clinical decision-making and diagnostic capabilities, these innovations contribute to their empowerment and overall job satisfaction (Kruse et al., 2020).

Technological innovation also positively impacts community health empowerment by providing communities with tools and resources to manage their health and well-being more effectively (Iyanna et al., 2022). One of the key ways technological innovation empowers communities is through the provision of health information and education. Digital health platforms, such as health apps and online resources, offer individuals access to a wealth of information about health conditions, prevention strategies, and treatment options (Webb et al., 2024). These platforms enable individuals to make informed decisions about their health, engage in self-management, and access resources that support their well-being (Kruse et al., 2020). By providing communities with easy access to reliable health information, technological innovations empower individuals to take an active role in managing their health and making informed choices (Addotey-Delove et al., 2022).

Technological innovations such as remote monitoring and wearable health devices further contribute to community health empowerment (Webb et al., 2024). Wearable devices, such as fitness trackers and smartwatches, enable individuals to monitor their physical activity, heart rate, and other health metrics in real-time (Kim & Lee, 2016). This data allows individuals to track their health progress, set personal health goals, and make lifestyle changes based on objective measurements. Remote monitoring technologies also enable individuals with chronic conditions to track their health status and communicate with healthcare providers from their homes (Monney, 2014). These innovations empower individuals to take control of their health management, improve adherence to treatment plans, and engage in preventive care, ultimately enhancing their overall well-being. Telemedicine is another significant technological innovation that has a profound impact on community health empowerment (Cui et al., 2023). Telemedicine services provide individuals with access to healthcare consultations and support without the need for in-person visits (Silva et al., 2022). This is particularly beneficial for individuals in rural or underserved areas who may face barriers to accessing healthcare services (Q. Liu et al., 2021). Telemedicine empowers communities by expanding access to care, reducing travel time and associated costs, and providing timely medical advice and support. The ability to receive care remotely helps individuals manage their health more effectively, adhere to treatment plans, and address health concerns in a timely manner (Silva et al., 2022).

Technological innovations can also facilitate community engagement and participation in health initiatives (Lou et al., 2021). Online health communities, forums, and social media platforms provide individuals with opportunities to connect with others who share similar health experiences, exchange information, and offer support. These platforms foster a sense of community and collective empowerment by enabling individuals to share knowledge, seek advice, and collaborate on health-related projects (Djambazov et al., 2018). The ability to engage with others and participate in online health communities enhances individuals' sense of connection and support, contributing to their overall empowerment and well-being (Top et al., 2019). Technological innovations can support community health empowerment by enabling more effective public health interventions and programs (Q. Liu et al., 2021). Data analytics and health informatics tools allow public health organizations to analyze health data, identify trends, and develop targeted interventions. For example, predictive analytics can help identify populations at risk for certain health conditions and inform the design of preventive programs (Silva et al., 2022). By leveraging technology to enhance public health efforts and address community health needs, technological innovations contribute to the empowerment of communities and improve overall health outcomes (Cheruiyot & Brysiewicz, 2019).

Technological innovation plays a pivotal role in empowering both healthcare professionals and communities (Arsawan et al., 2022). For healthcare professionals, technological advancements such as electronic health records, telemedicine, decision support systems, and diagnostic tools enhance autonomy, competence, and job satisfaction, leading to greater empowerment and improved care delivery (Negrini et al., 2020). For communities, technological innovations such as digital health platforms, wearable devices, remote monitoring, and telemedicine expand access to health information, support self-management, and facilitate engagement in health initiatives, ultimately empowering individuals to take control of their health and well-being (Kang, 2022). The positive effects of technological innovation on healthcare professional empowerment and community health empowerment highlight the transformative potential of technology in enhancing healthcare systems and improving health outcomes (Arsawan et al., 2022).

H4: Technological innovation has positive effect on healthcare professional empowerment

H5: Technological innovation has positive effects on community health empowerment

2.4 Moderating Effects of Technological Innovation

Technological innovation has the potential to significantly moderate the relationships between healthcare professional empowerment, community health empowerment, and healthcare workers' commitment (Tajeddini et al., 2023). The interplay between these factors is complex and multifaceted, with technology influencing the dynamics in several key ways (Kang, 2022). Technological innovation can enhance the effects of healthcare professional empowerment on commitment by improving the tools and resources available to healthcare workers (Lokesh et al., 2022). When healthcare professionals are empowered through autonomy, skill development, and support, the addition of advanced technologies can amplify these effects (Shyr et al., 2019). For instance, electronic health records (EHRs) and decision support systems can streamline administrative tasks, provide real-time clinical guidance, and reduce errors, thereby boosting healthcare workers' sense of competence and efficiency. This increased efficiency and reduced workload contribute to higher job satisfaction and commitment (Chin et al., 2023).

Technologies such as telemedicine and advanced diagnostic tools can offer healthcare professionals greater flexibility and control over their work (Cheruiyot & Brysiewicz, 2019). Telemedicine platforms allow for remote consultations, which can lead to a more manageable caseload and better work-life balance (Lokesh et al., 2022). When healthcare professionals can work remotely or access cutting-edge diagnostic tools, they experience enhanced autonomy and a reduced burden, which positively influences their commitment to their roles (Negrini et al., 2020). In essence, technological innovations act as catalysts that enhance the positive effects of professional empowerment by making work processes more efficient and less stressful (Iyanna et al., 2022). The impact of community health empowerment on healthcare workers' commitment can also be moderated by technological innovation (Rahi et al., 2021). When communities are empowered to manage their health through technology such as health apps, remote monitoring devices, and online health resources they can take a more active role in their care (Kruse et al., 2020). This empowerment leads to better health outcomes and a reduced demand for healthcare services. Consequently, healthcare workers experience a decrease in workload and stress, which can enhance their commitment (Yoon et al., 2022).

For example, wearable health devices that allow individuals to track their physical activity and health metrics can improve self-management and adherence to treatment plans (Djambazov et al., 2018). This proactive approach by the community can lead to fewer urgent care visits and a more manageable patient load for healthcare professionals. As the burden on healthcare workers is alleviated, their job satisfaction and commitment levels tend to increase (Top et al., 2019). Technological innovations that support community health also foster a sense of collaboration between healthcare workers and the communities they serve, enhancing mutual respect and commitment. Community engagement through digital health platforms and telemedicine can create stronger partnerships between healthcare workers and communities (Q. Liu et al., 2021). These platforms facilitate communication and collaboration, allowing healthcare workers to better understand community needs and preferences (Silva et al., 2022). When healthcare professionals see the direct impact of their work on empowered communities and experience positive feedback through digital channels, their commitment to their roles is reinforced (Q. Liu et al., 2021).

The overall impact of technological innovation on the relationships between healthcare professional empowerment, community health empowerment, and healthcare workers' commitment is multifaceted (Silva et al., 2022). Technological innovations not only enhance the efficiency and effectiveness of healthcare delivery but also amplify the benefits of empowerment initiatives. By improving tools and resources, offering greater flexibility, and facilitating better communication, technology strengthens the positive effects of empowerment on commitment (Wu et al., 2021). Technological innovation moderates the relationships between healthcare professional empowerment, community health empowerment, and healthcare workers' commitment by enhancing the effectiveness of empowerment initiatives (Top et al., 2019). It streamlines work processes, reduces workload, fosters collaboration, and improves health outcomes, all of which contribute to increased commitment among healthcare professionals (Q. Liu et al., 2021). The synergistic effects of technology and empowerment highlight the importance of integrating advanced technologies into healthcare systems to optimize both individual and community health outcomes (Lou et al., 2021).

H6: Moderating effects technological innovation on the relationship between healthcare professional empowerment and commitment

H7: Moderating effects technological innovation on the relationship between community health empowerment and commitment

2.5 Conceptual Framework

The hypotheses of the study are shown in the conceptual framework below.
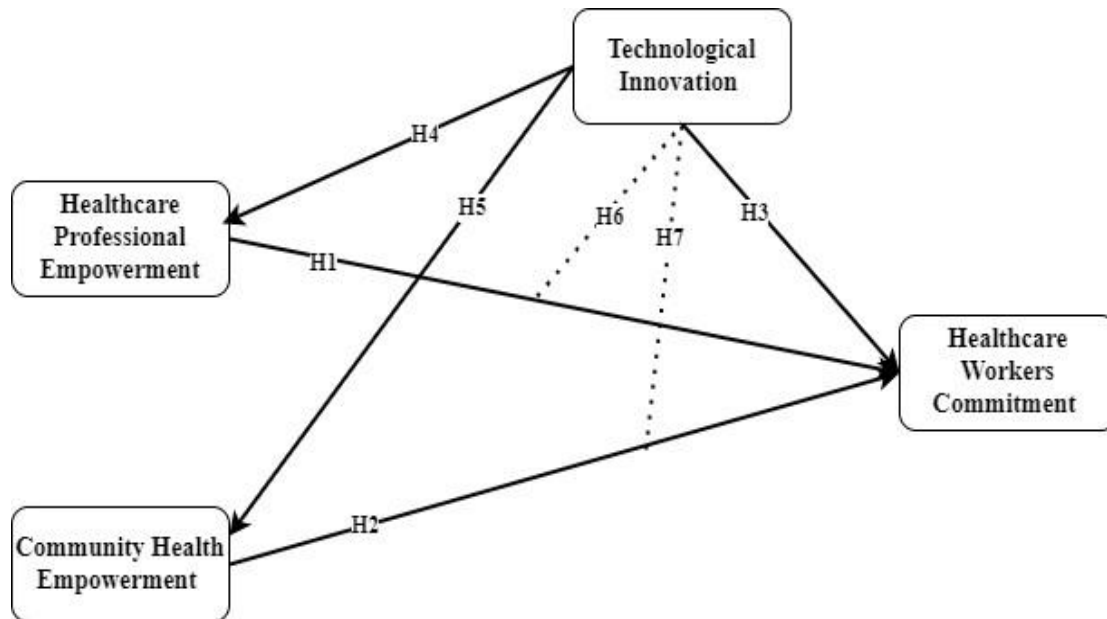

Figure 1: Conceptual Framework

3. RESEARCH METHODOLOGY

The researcher utilized a quantitative research approach by administering a questionnaire to gather data from a representative cross-section of the population. This method was selected to collect information from a diverse group of respondents, which supports the generalization of the study's findings to the broader population.

3.1 Study Population and Selection Criteria

The study population comprises healthcare workers from the Tema metropolis in Ghana, including those from various departments such as health administration and public health. Given that the study focuses on community health, the researcher deemed it important to include respondents from multiple departments within the metropolis. To ensure a representative sample, purposive sampling was used. This technique involved selecting respondents based on specific criteria: they must be healthcare workers from one of the sub-metros in the area, have at least three years of experience in their role, and be willing to participate in the study.

3.2 Measures

Healthcare professional commitment was measured with toiled tool developed by Martin, J., & Jones, K. (1996) This scale is tailored to measure the commitment of healthcare workers specifically, assessing their dedication and attachment to their roles and the healthcare organization. While healthcare profession empowerment was measured with tools developed by Spreitzer (1995), measures the psychological aspects of empowerment in the workplace, including meaning, competence, self-determination, and impact. Lastly technological innovation was measured with Parasuraman (2000) which indicates the impacts of technology on commitment of performance.

3.3 Data Collection

Questionnaires were adapted from similar studies that examined the same variables. Given that these previous studies were conducted in different locations, the adapted questionnaires were reviewed and modified by two experts to better fit the local context of this study. The research involved four healthcare units within the sub-metros, where the researcher, in collaboration with the unit leaders, selected respondents who met the established criteria and obtained their consent to participate. The questionnaires were uploaded to the Google platform and distributed via WhatsApp to the selected respondents, who were given a 14-day period to complete them. Out of the 868 respondents recruited, 823 completed and returned the questionnaires.

3.4 Data Analysis

The study employed the Statistical Package for the Social Sciences (SPSS) version 24 and Analysis of Moment Structures (Amos) version 23 for data analysis. SPSS was used to conduct exploratory factor analysis (EFA), which helped identify how items were grouped under their respective constructs. Additionally, Amos was utilized for confirmatory factor analysis (CFA) to evaluate the goodness of fit of the data. Amos was selected for its robust capabilities in ensuring data accuracy and its effectiveness in detecting negative variance or data indeterminacy while assessing the goodness of fit, thereby reinforcing confidence in the data's accuracy and suitability. The data analysis confirmed that there was no negative variance or inadmissible solutions, which supported the reliability of the findings. To assess construct reliability and validity, the Amos Plugin developed by Gaskin and Lim in 2016, as cited by Quansah, Zhu, and Obeng (2021), was used. This tool facilitated the evaluation of the measurement properties of the variables. In line with recommendations from previous studies, such as Senarat and Gunawardena (2011), factor loading values of 0.50 or higher were considered acceptable for practical significance. This threshold, based on the rule of thumb suggested by Hertel-Joergensen et al. (2018), indicates that a factor loading of 0.50 or greater is deemed a good minimum for an item, provided it does not exhibit cross-loadings.

3.5. Ethical Clearance

The study protocol was reviewed and approved by the Social Science Review and Ethical Commission, receiving approval Before number SSREC 2024/03/773. Prior to participation, respondents were required to sign informed consent forms, which outlined their rights and the study's procedures. They were also informed of their right to withdraw from the study at any time without consequence.

4. RESULTS

4.1 Demographic Variables

A total of 823 respondents completed the questionnaires, out of which 796 were deemed suitable for analysis. Among these respondents, a significant majority of 76.4% were female, while the remaining respondents were male. This demographic distribution reflects a notable gender representation within the sample. In terms of professional experience, a substantial 63.8% of the respondents reported having worked in the health profession for a period ranging from 4 to 6 years, indicating a considerable level of experience among the participants. Regarding age distribution, the most prevalent age group was between 20 and 25 years, comprising 67.2% of the respondents. This high percentage suggests that a large portion of the sample is relatively young, which may influence various aspects of their professional engagement and perspectives. The demographic profile of the respondents provides valuable insights into the characteristics of the healthcare workforce represented in the study, reflecting a predominantly young and female cohort with a moderate level of professional experience.

4.2 Mean, Standard Deviation and Correlation Between Variable

The preliminary analysis of the relationships between the variables was conducted using correlation testing. According to the results presented in Table 1, a correlation was observed among the variables. The mean values for these variables ranged consistently from 3.3090, indicating a stable average across the variables. Meanwhile, the standard deviations varied between 0.59826 and 0.71220, reflecting the degree of variability or dispersion around the mean values.

Table 1: Inter-Factor Correlation

Variables		Mean	SD	1	2	3	4	5	6	7
1	Age	2.20	.756							
2	Gender	1.76	.430	--						
3	Duration	3.8570	.59826	.402						
4	HPE	3.3090	.64058	.036	.330**	--				
5	CHE	3.6537	.71220	.042	.629**	.452**	--			
6	TI	3.7040	.61925	.088	.625**	.446**	.596**	--		
7	HWC	3.6647	.64896	.022	.718**	.354**	.467**	.575**	.048**	--

*p <0.05; **p<0.01; ***p< 0.001;   HPE = Healthcare Professionals Empowerment; CHE = Community Health Empowerment; TI = Technological Innovation*

4.3 Data validation

The table 2 details the psychometric properties for constructs in the study: Healthcare Professional Empowerment, Community Health Empowerment, Technological Innovation, and Healthcare Workers Commitment. Factor loadings, all exceeding the 0.50 threshold, demonstrate strong item-construct relationships (Ahmadi & Shahmohammadi, 2015). Cronbach's Alpha values are above the acceptable 0.70 level, indicating good internal consistency, with Community Health Empowerment achieving the highest value of 0.916. Composite Reliability values, also above 0.70, suggest that the constructs are reliably measured, with Community Health Empowerment showing the highest at 0.925. Average Variance Extracted (AVE) values, all exceeding 0.50, confirm adequate convergent validity, with Community Health Empowerment leading at 0.713. Overall, these results indicate that the measurement scales for Healthcare Professional Empowerment, Community Health Empowerment, Technological Innovation, and Healthcare Workers Commitment are both reliable and valid (Moick et al., 2019).

Table 2. Data validation

Key = HPE = Healthcare Professionals Empowerment; CHE = Community Health Empowerment; TI = Technological Innovation

Constructs	Code	Factor Loading	Cronbach Alpha	Composite Reliability	Average Variance Extracted
Healthcare Professional Empowerment	HPE1	.778	.854	.895	.633
	HPE2	.828			
	HPE3	.803			
	HPE4	.777			
	HPE5	.787			
Community Health Empowerment	CHE1	.825	.916	.925	.713
	CHE2	.705			
	CHE3	.721			
	CHE4	.998			
	CHE5	.998			
Technological Innovation	TI1	.983			
	TI2	.754	.901	.907	.662
	TI3	.731			
	TI4	.821			
	TI5	.751			
Healthcare Workers Commitment	HWC1	.787	.855	.896	.632
	HWC2	.804			
	HWC3	.828			
	HCW4	.777			
	HCW5	.779			

HPE = Healthcare Professionals Empowerment; CHE = Community Health Empowerment; TI = Technological Innovation

4.4 Testing hypotheses

Hypotheses 1- 7 were tested in models 1-7 on table3 using age, gender and experience as control variables. From model1 the results indicated that healthcare professional empowerment has positive effects on healthcare workers commitment with b= .092; p = 0.05 similarly in model 2 and model3 community health empowerment and technological innovation also have effects on healthcare workers commitment b =.066; p = 0.05, and b = .663; p =0.001 respectively. From model mode4 and model5 it was revealed that technological innovation has positive effects on healthcare professional empowerment and community health empowerment with b=.553; p = 0.001, and b = .607; p = 0.001 respectively. finally, from model6 and model7 technological innovation moderate the relationship between healthcare professional

empowerment and healthcare workers' commitment and also moderate the relationship between community health empowerment and healthcare workers commitment with b = .527; p = 0.001. and b =.084; p =0.001

Table 3: testing direct and moderating effects using hierarchical linear regression.

Variables	Model1 Healthcare Workers Commitment	Model2 Healthcare Workers Commitment	Model3 Healthcare Workers Commitment	Model4 Health Professional Empowerment	Model5 Community Health Empowerment	Model6 Healthcare Workers Commitment	Model7 Healthcare Workers Commitment
	B*(t)	B*(t)	B*(t)	B*(t)	B*(t)	B*(t)	B*(t)
(Constant)	4.015***(22.796)	1.876***(7.375)	1.445***(8.207)	2.042***(11.206)	1.538***(7.346)	2.033***(10.961)	3.684***(13.597)
Age	.017(.997)	.002(.165)	.002(.162)	.004(.316)	.001(.085)	1.986E-5(.001)	.019(1.134)
Gender	.003(.054)	.010(.214)	.018(.435)	.014(.306)	.055(1.159)	.006(.134)	.008(.141)
Duration	.045(1.113)	.041(1.312)	.015(.519)	.041(1.222)	.008(.154)	.026(.841)	.044(1.103)
HPE	.092*(1.712)						
CHE		.066*(1.671)					
TI			.663***(20.468)				
TI				.553***(16.409)			
TI					.607***(15.868)		
TI*HPE						.527***(15.989)	
TI*CHE							.084***(11.697
R	.640	.719	.627	.630	.341	.643	.779
R-square	.409	.518	.393	.397	.116	.413	.607
F	54.816***	84.971***	51.295***	52.073***	10.414***	46.352***	86.812***

Key: b = standardized coefficient; t-value in parenthesis; *p <0.05; **p<0.01; ***p< 0.001;   HPE = Healthcare Professionals Empowerment; CHE = Community Health Empowerment; TI = Technological Innovation

5. DISCUSSION

The findings from the study indicate that both healthcare professional empowerment and community health empowerment positively affect healthcare workers' commitment. This result aligns with existing literature, which consistently shows that empowerment in healthcare settings contributes to increased commitment among workers (Koehne et al., 2022). Healthcare professional empowerment refers to giving healthcare workers greater control over their work environment, decision-making processes, and professional development (Koehne et al., 2022). This form of empowerment has been shown to enhance job satisfaction, reduce burnout, and increase commitment to the organization. For instance, a study by Özçelik, Aybas, and Uyargil (2016) found that empowering work environments lead to higher levels of job satisfaction and commitment among nurses. Similarly, in the African context, research by Hor et al. (2010) and Adebayo and Adedayo (2019) highlighted that empowering healthcare professionals in Nigeria led to increased motivation and commitment, contributing to improved patient care and reduced turnover rates. This reflects the positive effect observed in our study, suggesting that healthcare professionals who feel empowered are more likely to be committed to their roles and organizations.

Community health empowerment involves involving communities in health decision-making processes and encouraging local participation in health initiatives (Trummer et al., 2023). This approach has been linked to improved health outcomes and increased commitment among healthcare workers who engage with empowered communities (Tjaden et al., 2022). A study by Tessema et al. (2021) in Kenya emphasized that community involvement in health programs resulted in greater commitment and dedication from healthcare workers, as they perceived their work as more impactful and supported by the community. Our study's finding that community health empowerment positively affects healthcare workers' commitment reinforces these observations, indicating that healthcare workers who see their community as empowered are more likely to stay engaged and committed.

Comparing these findings to similar studies within Africa, it is evident that the positive impact of both forms of empowerment on commitment is a recurring theme. For example, research conducted by Cabore et al. (2022) and Nkongho et al. (2020) in Cameroon revealed that when healthcare workers were given more control over their work and saw their communities actively participating in health initiatives, their job satisfaction and commitment levels increased significantly. This supports our findings and underscores the importance of both individual and community-level empowerment in enhancing healthcare workers' commitment. These findings are particularly relevant in the African context, where healthcare systems often face challenges such as limited resources and high turnover rates among healthcare workers (Cunningham et al., 2020). Empowering healthcare professionals and communities can be crucial strategies for improving job satisfaction and reducing attrition (Dorward et al., 2021). The results of our study contribute to a growing body of evidence suggesting that investment in empowerment strategies can lead to significant

improvements in healthcare worker commitment and, consequently, the quality of healthcare delivery in Africa (Park & Pierce, 2020).

The study's results demonstrate that technological innovation positively impacts healthcare professional empowerment, community health empowerment, and healthcare workers' commitment. This finding aligns well with Self-Determination Theory (SDT), which posits that technological advancements can enhance individuals' sense of competence, autonomy, and relatedness, thereby improving empowerment and commitment (Hirmer & Guthrie, 2016). Technological innovation facilitates healthcare professionals' empowerment by providing tools that enhance their competence and efficiency in delivering care (Hosen et al., 2024). For instance, advanced health information systems and telemedicine platforms enable professionals to access critical information and collaborate more effectively. According to a study by Linda, Phetlhu, and Klopper (2020) and Cresswell et al. (2013), the implementation of electronic health records (EHRs) improved healthcare professionals' job satisfaction and empowerment by streamlining administrative processes and enhancing decision-making capabilities. This supports our finding that technological innovation positively affects healthcare professional empowerment (Jaenes & Gazerani, 2021).

Similarly, technological innovation supports community health empowerment by improving access to health information and services. Digital platforms and mobile health applications allow communities to engage more actively in their health management (Wu et al., 2021). A Wamema et al. (2023) found that mobile health interventions significantly increased community engagement and empowerment by providing tailored health information and support. This aligns with our result, indicating that technological advancements contribute positively to community health empowerment. The positive effect of technological innovation on healthcare workers' commitment can be explained through SDT (Webb et al., 2024). Technologies that enhance job efficiency and provide support for professional development address workers' needs for competence and autonomy, thereby increasing their commitment (Addotey-Delove et al., 2022). Research by Kruse et al. (2020) highlights that innovations like decision support systems improve healthcare workers' job satisfaction and commitment by reducing workload stress and providing better tools for their tasks.

The study also finds that technological innovation moderates the relationships between healthcare professionals' empowerment and healthcare workers' commitment, as well as between community health empowerment and healthcare workers' commitment. This moderating effect suggests that technology enhances the strength of these relationships, making empowerment and community engagement more impactful on healthcare workers' commitment (Rahi et al., 2021). In the context of Africa, technological advancements have shown similar moderating effects. For example, the introduction of mobile health (mHealth) initiatives has been pivotal in moderating these relationships. A study by Harling et al. (2020) in Nigeria demonstrated that mobile health platforms improved healthcare workers' empowerment by providing real-time data and communication tools, thereby strengthening their commitment to their roles. By facilitating better access to information and support, these technologies amplified the effects of empowerment on job commitment (Bill & Foundation, 2016).

Similarly, in Kenya, mHealth programs have been instrumental in enhancing community health empowerment. Research by Jha and Schmidt (2021) found that mobile health technologies helped communities engage more actively in health initiatives, which in turn positively affected healthcare workers' commitment. The technology provided communities with better health education and support, thereby reinforcing the impact of community empowerment on healthcare workers' dedication (Jessell et al., 2018).

6. CONCLUSION AND RECOMMENDATION

In conclusion, the study highlights that both healthcare professional empowerment and community health empowerment positively influence healthcare workers' commitment. Additionally, technological innovation significantly moderates these relationships, enhancing the impact of empowerment on commitment. These findings are consistent with existing literature and underscore the role of technology in improving healthcare outcomes. Recommendations for healthcare organizations, especially in Africa, include integrating advanced technologies to support empowerment initiatives. Investing in digital tools such as mobile health platforms and electronic health records can enhance healthcare professionals' competence and efficiency, thereby boosting their commitment. Similarly, leveraging technology to engage communities in health management can strengthen community health empowerment and, consequently, increase healthcare workers' dedication.

Healthcare policymakers should prioritize technology adoption and training programs to maximize these benefits. Collaboration with technology providers to ensure that tools are accessible and tailored to local contexts is crucial. By enhancing both professional and community empowerment through technological innovations, healthcare systems can improve job satisfaction, reduce turnover, and ultimately, deliver better health outcomes.

REFERENCES

[1] Addotey-Delove, M., Scott, R. E., & Mars, M. (2022). The development of an instrument to predict patients' adoption of mHealth in the developing world. Informatics in Medicine Unlocked, 29. https://doi.org/10.1016/j.imu.2022.100898

[2] Adepoju, P. (2020). Africa turns to telemedicine to close mental health gap. The Lancet Digital Health, 2(11), e571–e572. https://doi.org/10.1016/s2589-7500(20)30252-1

[3] Ahmadi, A., & Shahmohammadi, N. (2015). Studying the Relationship between Mental Health, Spirituality and Religion in Female Students of Tehran Azad University: South Branch. Procedia - Social and Behavioral Sciences, 205(May), 236–241. https://doi.org/10.1016/j.sbspro.2015.09.065

[4] Al-Hanawi, M. K., Ahmad, K., Haque, R., & Keramat, S. A. (2021). Willingness to receive COVID-19 vaccination among adults with chronic diseases in the Kingdom of Saudi Arabia. Journal of Infection and Public Health, 14(10), 1489–1496. https://doi.org/10.1016/j.jiph.2021.08.002

[5] Al-hatamleh, M. A. I., Hatmal, M., Alshaer, W, E, E. N. S., Rahman, A., Mohd-zahid, M. H., Alhaj-qasem, D. M., Yean, C., Alias, I. Z., Jaafar, J., Ferji, K., Six, J., & Uskokovi, V. (2021). COVID-19 infection and nanomedicine applications for development of vaccines and therapeutics : An overview and future perspectives based on polymersomes. 896(February). https://doi.org/10.1016/j.ejphar.2021.173930

[6] Aljaeed, R., Altuwaijiri, S., & Albohairy, T. (2019). telemedicine in Riyadh region , Saudi Arabia. Journal of Infection and Public Health, 0–7. https://doi.org/10.1016/j.jiph.2019.04.006

[7] Aloisio, L. D., Coughlin, M., & Squires, J. E. (2021). Individual and organizational factors of nurses' job satisfaction in long-term care: A systematic review. International Journal of Nursing Studies, 123, 104073. https://doi.org/ 10.1016/j.ijnurstu.2021.104073

[8] Arsawan, I. W. E., Hariyanti, N. K. D., Atmaja, I. M. A. D. S., Suhartanto, D., & Koval, V. (2022). Developing Organizational Agility in SMEs: An Investigation of Innovation's Roles and Strategic Flexibility. Journal of Open Innovation: Technology, Market, and Complexity, 8(3). https://doi.org/10.3390/joitmc8030149

[9] Athanasenas, A. L. (2015). Value Co-Creation in Services: An Economic Perception on the State of the Art in Economics, I.C.T. vs. Marketing. Procedia Economics and Finance, 33(15), 398–410. https://doi.org/10.1016/s2212-5671(15)01724-4

[10] Baba, E., Pavlovich, V., & Amfo, B. (2021). Green economy implementation in Ghana as a road map for a sustainable development drive : A review. Scientific African, 12, e00756. https://doi.org/10.1016/j.sciaf.2021.e00756

[11] Bergman, Å., Lindahl, C., Andersson, I., & Ros, G. (2023). Motivational factors for occupational safety and health improvements : A mixed-method study within the Swedish equine sector. 159(December 2022). https://doi.org/ 10.1016/j.ssci.2022.106035

[12] Bik-Multanowska, K., Mikocka-Walus, A., Fernando, J., & Westrupp, E. (2022). Mental distress of parents with chronic diseases during the COVID-19 pandemic in Australia: A prospective cohort study. Journal of Psychosomatic Research, 152(November 2021), 110688. https://doi.org/10.1016/j.jpsychores.2021.110688

[13] Bill, F., & Foundation, M. G. (2016). Global , regional , and national levels of maternal mortality , 1990 – 2015 : a systematic analysis for the Global Burden of Disease Study 2015. 1990–2015.

[14] Cabore, J. W., Karamagi, H. C., Kipruto, H. K., Mungatu, J. K., Asamani, J. A., Droti, B., Titi-ofei, R., Seydi, A. B. W., Kidane, S. N., Balde, T., Gueye, A. S., Makubalo, L., & Moeti, M. R. (2022). COVID-19 in the 47 countries of the WHO African region: a modelling analysis of past trends and future patterns. The Lancet Global Health, 10(8), e1099–e1114. https://doi.org/10.1016/S2214-109X(22)00233-9

[15] Carrasco-Sánchez, F. J., Fernández-Rodríguez, J. M., Ena, J., Gómez-Huelgas, R., & Carretero-Gómez, J. (2021). Medical treatment of type 2 diabetes mellitus: Recommendations of the Diabetes, Obesity and Nutrition Group of the Spanish Society of Internal Medicine. Revista Clínica Española (English Edition), 221(2), 101–108. https://doi.org/ 10.1016/j.rceng.2020.06.009

[16] Cheruiyot, J. C., & Brysiewicz, P. (2019). Nurses' perceptions of caring and uncaring nursing encounters in inpatient rehabilitation settings in South Africa: A qualitative descriptive study. International Journal of Africa Nursing Sciences, 11(October 2018), 100160. https://doi.org/10.1016/j.ijans.2019.100160

[17] Cheung, M. L., Leung, W. K. S., Aw, E. C. X., & Koay, K. Y. (2022). "I follow what you post!": The role of social media influencers' content characteristics in consumers' online brand-related activities (COBRAs). Journal of Retailing and Consumer Services, 66(January). https://doi.org/10.1016/j.jretconser.2022.102940

[18] Chin, M., Lee, C., Ying, B., Sim, H., & Tuckey, M. R. (2023). Asia Paci fi c Management Review Comparing effects of toxic leadership and team social support on job insecurity , role ambiguity , work engagement , and job performance : A multilevel mediational perspective. Asia Pacific Management Review, xxxx. https://doi.org/ 10.1016/j.apmrv.2023.09.002

[19] Cui, Y., Ma, Z., Wang, L., Yang, A., Liu, Q., Kong, S., & Wang, H. (2023). A survey on big data-enabled innovative online education systems during the COVID-19 pandemic. Journal of Innovation and Knowledge, 8(1), 100295. https://doi.org/10.1016/j.jik.2022.100295

[20] Cunningham, L. J., Campbell, S. J., Armoo, S., Koukounari, A., Watson, V., Selormey, P., Stothard, J. R., Idun, B., Asiedu, M., Ashong, Y., Adams, E. R., & Osei-Atweneboana, M. Y. (2020). Assessing expanded community wide treatment for schistosomiasis: Baseline infection status and self-reported risk factors in three communities from the Greater Accra region, Ghana. PLoS Neglected Tropical Diseases, 14(4), 1–22. https://doi.org/10.1371/ journal.pntd.0007973

[21] Djambazov, S. N., Giammanco, M. D., & Gitto, L. (2018). ScienceDirect Factors That Predict Overall Patient Satisfaction With Oncology Hospital Care in Bulgaria. Value in Health Regional Issues, 19, 26–33. https://doi.org/ 10.1016/j.vhri.2018.11.006

[22] Dorward, J., Khubone, T., Gate, K., Ngobese, H., Sookrajh, Y., Mkhize, S., Jeewa, A., Bottomley, C., Lewis, L., Baisley, K., Butler, C. C., Gxagxisa, N., & Garrett, N. (2021). The impact of the COVID-19 lockdown on HIV care in 65 South African primary care clinics : an interrupted time series analysis. The Lancet HIV, 8(3), e158–e165. https://doi.org/10.1016/S2352-3018(20)30359-3

[23] Fan, Y., Liao, X., Pan, Y., Dong, K., Wang, Y., & Wang, Y. (2019). Intravenous Thrombolysis Is Safe and Effective for the Cryptogenic Stroke in China: Data From the Thrombolysis Implementation and Monitor of Acute Ischemic Stroke in China (TIMS-China). Journal of Stroke and Cerebrovascular Diseases, 28(1), 220–226. https://doi. org/10.1016/j.jstrokecerebrovasdis.2018.09.041

[24] Halawi, M. J., Jongbloed, W., Baron, S., Savoy, L., Cote, M. P., & Lieberman, J. R. (2019). Patient-Reported Outcome Measures are not a Valid Proxy for Patient Satisfaction in Total Joint Arthroplasty. The Journal of Arthroplasty, 3–7. https://doi.org/10.1016/j.arth.2019.09.033

[25] Harling, G., Kobayashi, L. C., Farrell, M. T., Wagner, R. G., Tollman, S., & Berkman, L. (2020). Social Science & Medicine Social contact , social support , and cognitive health in a population-based study of middle-aged and older men and women in rural South Africa. Social Science & Medicine, 260(April), 113167. https://doi.org/10.1016/ j.socscimed.2020.113167

[26] Henchiri, M., Zhang, J., Li, S., Essifi, B., & Wilson, K. (2024). Comprehensive assessment of drought vulnerability and resilience over North and West Africa during 1980–2100. Agricultural Water Management, 296(April), 108804. https://doi.org/10.1016/j.agwat.2024.108804

[27] Hirmer, S., & Guthrie, P. (2016). Identifying the needs of communities in rural Uganda: A method for determining the 'User-Perceived Value' of rural electrification initiatives. Renewable and Sustainable Energy Reviews, 66, 476–486. https://doi.org/10.1016/j.rser.2016.08.037

[28] Högstedt, D., Jansson, I., Eriksson, E., & Engström, M. (2022). Three paths to a Swedish nursing license: Two for internationally educated nurses and one for regular nursing students – A cross-sectional study of self-rated professional competence, self-efficacy, and thriving. Nurse Education Today, 119(September). https://doi.org/10.1016/j.nedt. 2022.105595

[29] Hor, F. C., Huang, L. C., Shih, H. S., Lee, Y. H., & Stanley Lee, E. (2010). Establishing talent management for company's succession planning through analytic network process: Application to an MNC semiconductor company in Taiwan. Computers and Mathematics with Applications, 60(3), 528–540. https://doi.org/10.1016/j.camwa.2010.05.001

[30] Hosen, S., Raba, S., Arif, I., & Noormi, S. (2024). Heliyon Training & development , career development , and organizational commitment as the predictor of work performance. Heliyon, 10(1), e23903. https://doi.org/10.1016/j.heliyon.2023.e23903

[31] Iddrisu, M., Aziato, L., & Dedey, F. (2019). International Journal of Africa Nursing Sciences A qualitative study on coping strategies of young women living with breast cancer in Ghana. International Journal of Africa Nursing Sciences, 11(October), 100173. https://doi.org/10.1016/j.ijans.2019.100173

[32] Iyanna, S., Kaur, P., Ractham, P., Talwar, S., & Najmul Islam, A. K. M. (2022). Digital transformation of healthcare sector. What is impeding adoption and continued usage of technology-driven innovations by end-users? Journal of Business Research, 153(July), 150–161. https://doi.org/10.1016/j.jbusres.2022.08.007

[33] Jaenes, S., & Gazerani, P. (2021). Psychoneuroendocrinology Competitive anxiety or Coronavirus anxiety ? The psychophysiological responses of professional football players after returning to competition during the COVID-19 pandemic. 129(May). https://doi.org/10.1016/j.psyneuen.2021.105269

[34] Jessell, M., Baratoux, D., Siebenaller, L., Hein, K., Maduekwe, A., Ouedraogo, F. M., Baratoux, L., Diagne, M., Cucuzza, J., Seymon, A., & Sow, E. H. (2018). New models for geoscience higher education in West Africa. Journal of African Earth Sciences, 148, 99–108. https://doi.org/10.1016/j.jafrearsci.2017.12.011

[35] Jha, P., & Schmidt, S. (2021). State of biofuel development in sub-Saharan Africa: How far sustainable? Renewable and Sustainable Energy Reviews, 150(May 2020), 111432. https://doi.org/10.1016/j.rser.2021.111432

[36] Jos, J., & Guevara, A. (2021). Public Health in Practice A critical narrative of Ecuador ' s preparedness and response to the COVID-19 pandemic. 2(March), 0–3. https://doi.org/10.1016/j.puhip.2021.100127

[37] Kang, H. Y. (2022). Technological engagement of women entrepreneurs on online digital platforms: Evidence from the Apple iOS App Store. Technovation, 114(January 2021), 102522. https://doi.org/10.1016/j.technovation.2022.102522

[38] Kim, B., & Lee, J. (2016). Relationships between Personal Traits, Emotional Intelligence, Internal Marketing, Service Management, and Customer Orientation in Korean Outpatient Department Nurses. Asian Nursing Research, 10(1), 18–24. https://doi.org/10.1016/j.anr.2015.10.005

[39] Kirat, T., Tambou, O., Do, V., & Tsoukiàs, A. (2023). Fairness and explainability in automatic decision-making systems. A challenge for computer science and law. EURO Journal on Decision Processes, 11(July). https://doi.org/10.1016/j.ejdp.2023.100036

[40] Koehne, F., Woodward, R., & Honig, B. (2022). The potentials and perils of prosocial power: Transnational social entrepreneurship dynamics in vulnerable places. Journal of Business Venturing, 37(4), 106206. https://doi.org/10.1016/j.jbusvent.2022.106206

[41] Kruse, C. S., Williams, K., Bohls, J., & Shamsi, W. (2020). Telemedicine and health policy: A systematic review. Health Policy and Technology. https://doi.org/10.1016/j.hlpt.2020.10.006

[42] Lee, T. H., Chang, C. H., Chang, Y. J., Chang, K. C., Chung, J., Liu, S. J., Liou, C. W., Chen, S. C., Lee, J. Der, Peng, T. Y., Chiu, T. F., Chang, C. J., & Lin, J. R. (2011). Establishment of electronic chart-based stroke registry system in a Medical System in Taiwan. Journal of the Formosan Medical Association, 110(8), 543–547. https://doi.org/10.1016/ S0929-6646(11)60081-8

[43] Linda, N. S., Phetlhu, D. R., & Klopper, H. C. (2020). International Journal of Africa Nursing Sciences Nurse educators ' understanding of spirituality and spiritual care in nursing : A South African perspective (Part 1). 12(April 2019).

[44] Liu, J., Zheng, J., Liu, K., Liu, X., Wu, Y., Wang, J., & You, L. (2019). Workplace violence against Nurses, job Satisfaction, burnout, and patient safety in Chinese hospitals. Nursing Outlook, 7. https://doi.org/10.1016/j.outlook. 2019.04.006

[45] Liu, Q., Liu, Y., Zhang, C., An, Z., & Zhao, P. (2021). Elderly mobility during the COVID-19 pandemic: A qualitative exploration in Kunming, China. Journal of Transport Geography, 96(August), 103176. https://doi.org/ 10.1016/ j.jtrangeo.2021.103176

[46] Lokesh, S., Chakraborty, S., Pulugu, R., Mittal, S., Pulugu, D., & Muruganantham, R. (2022). AI-based big data analytics model for medical applications. Measurement: Sensors, 24(August), 100534. https://doi.org/10.1016/ j.measen.2022.100534

[47] Lou, S., Zhang, B., & Zhang, D. (2021). Foresight from the hometown of green tea in China: Tea farmers' adoption of pro-green control technology for tea plant pests. Journal of Cleaner Production, 320(August), 128817. https://doi. org/10.1016/j.jclepro.2021.128817

[48] Lusambili, A., Jepkosgei, J., Nzinga, J., & English, M. (2019). What do we know about maternal and perinatal mortality and morbidity audits in sub-Saharan Africa ? A scoping literature review. 12(3), 192–207. https://doi.org/ 10.1108/IJHRH-07-2018-0052

[49] McGee, J. E., & Peterson, M. (2019). The Long-Term Impact of Entrepreneurial Self-Efficacy and Entrepreneurial Orientation on Venture Performance. Journal of Small Business Management, 57(3), 720–737. https://doi.org/10.1111/ jsbm.12324

[50] Moick, S., Simon, J., & Hiesmayr, M. (2019). Nutrition care quality indicators in hospitals and nursing homes: A systematic literature review and critical appraisal of current evidence. Clinical Nutrition, xxxx. https://doi.org/ 10.1016/j.clnu.2019.07.025

[51] Monney, I. (2014). Assessing Hand Hygiene Practices in Schools Benefiting from the Ghana School Feeding Programme. Science Journal of Public Health, 2(1), 7. https://doi.org/10.11648/j.sjph.20140201.12

[52] Mph, S. Y., Goh, H., Chan, A., Mbbs, R. M., Visaria, A., Matchar, D., Lum, E., Seng, B., Mbbs, C. R., Quah, S., Koh, M. S., Yee, P., Mbbs, T., Mong, Y., Mbbs, B., Mbbs, H. A., Devi, G., Mbbs, N., Graves, N., … Mbbs, M. E. H. O. (2022). Spillover Effects of COVID-19 on Essential Chronic Care and Ways to Foster Health System Resilience to Support Vulnerable Non-COVID Patients : A Multistakeholder Study. Journal of the American Medical Directors Association, 23(1), 7–14. https://doi.org/10.1016/j.jamda.2021.11.004

[53] Negrini, S., Donzelli, S., Negrini, A., Negrini, A., Romano, M., & Zaina, F. (2020). Feasibility and Acceptability of Telemedicine to Substitute Outpatient Rehabilitation Services in the COVID-19 Emergency in Italy : An Observational Everyday Clinical-Life Study. Archives of Physical Medicine and Rehabilitation, 1–6. https://doi.org/ 10.1016/j.apmr.2020.08.001

[54] Nyamuranga, C., & Shin, J. (2019). Public health expenditure and child mortality in Southern Africa. 46(9), 1137–1154. https://doi.org/10.1108/IJSE-12-2018-0643

[55] Özçelik, G., Aybas, M., & Uyargil, C. (2016). High Performance Work Systems and Organizational Values : Resource-based View Considerations. Procedia - Social and Behavioral Sciences, 235(October), 332–341. https://doi.org/ 10.1016/j.sbspro.2016.11.040

[56] Park, T., & Pierce, B. (2020). Impacts of transformational leadership on turnover intention of child welfare workers. Children and Youth Services Review, 108(November 2019), 104624. https://doi.org/10.1016/j.childyouth.2019. 104624

[57] Prof, A., Yılmaz, Z. K., & Betu, A. P. (2019). Evaluation of satisfaction and internet self-efficacy of inquirers using an internet-based drug information centre. 14. https://doi.org/10.1016/j.jtumed.2018.10.008

[58] Rahi, S., Khan, M. M., & Alghizzawi, M. (2021). Factors influencing the adoption of telemedicine health services during COVID-19 pandemic crisis: an integrative research model. Enterprise Information Systems, 15(6), 769–793. https://doi.org/10.1080/17517575.2020.1850872

[59] Raman, P., Sambasivan, M., & Kumar, N. (2016). Journal of Work and Organizational Psychology. Journal of Work and Organizational Psychology, 32(1), 25–37. https://doi.org/10.1016/j.rpto.2015.11.002

[60] Rolnik, D. L., Korman, T. M., Rindt, A., Stuart, R. L., Giles, M. L., Rawlins, J., Palmer, K. R., Stripp, A., Wallace, E. M., & Hodges, R. J. (2020). Coronavirus testing in women attending antenatal care. Women and Birth, xxxx, 24–27. https://doi.org/10.1016/j.wombi.2020.09.024

[61] Romano, V., & Scott, I. (2014). Using Health Belief Model to Reduce Obesity Amongst African American and Hispanic Populations. Procedia - Social and Behavioral Sciences, 159, 707–711. https://doi.org/10.1016/j.sbspro.2014.12.457

[62] Rutayisire, E., Nkundimana, G., Mitonga, H. K., & Boye, A. (2020). International Journal of Infectious Diseases What works and what does not work in response to COVID-19 prevention and control in Africa. International Journal of Infectious Diseases, 97, 267–269. https://doi.org/10.1016/j.ijid.2020.06.024

[63] Rutberg, S., & Bouikidis, C. D. (2018). Focusing on the Fundamentals: A Simplistic Differentiation Between Qualitative and Quantitative Research. Nephrology Nursing Journal : Journal of the American Nephrology Nurses' Association, 45(2), 209–212.

[64] Shyr, B., Shyr, B., Chen, S., Chang, I., Shyr, Y., & Wang, S. (2019). ScienceDirect Operative results and patient satisfaction after robotic pancreaticoduodenectomy. Asian Journal of Surgery, xxxx. https://doi.org/10.1016/j.asjsur.2019.08.012

[65] Silva, G. M., Dias, Á., & Rodrigues, M. S. (2022). Continuity of Use of Food Delivery Apps: An Integrated Approach to the Health Belief Model and the Technology Readiness and Acceptance Model. Journal of Open Innovation: Technology, Market, and Complexity, 8(3). https://doi.org/10.3390/joitmc8030114

[66] Stosic, M. D., Helwig, S., & Ruben, M. A. (2021). Greater belief in science predicts mask-wearing behavior during COVID-19. Personality and Individual Differences, 176(February), 110769. https://doi.org/10.1016/j.paid.2021.110769

[67] Straube, F., Lisa, A., & Junge, L. (2020). ScienceDirect ScienceDirect Sustainable Sustainable supply supply chains chains – – digital digital transformation transformation technologies ' technologies ' impact impact on on the the social social and and environmental environmental dimension dimensi. Procedia Manufacturing, 43, 736–742. https://doi. org/10.1016/j.promfg.2020.02.110

[68] Suess, C., Maddock, J., Dogru, T., Mody, M., & Lee, S. (2022). Using the Health Belief Model to examine travelers' willingness to vaccinate and support for vaccination requirements prior to travel. Tourism Management, 88(December 2020), 104405. https://doi.org/10.1016/j.tourman.2021.104405

[69] Tajeddini, K., Chathurika, T., Tajdini, J., & Ali, S. (2023). Journal of Retailing and Consumer Services Achieving sustained competitive advantage in retail and consumer service firms : The role of entrepreneurial orientation and entrepreneurial bricolage ☆. Journal of Retailing and Consumer Services, 75(July), 103495. https://doi.org/10.1016/j.jretconser.2023.103495

[70] Talaoui, Y., Kohtamäki, M., Ranta, M., & Paroutis, S. (2023). Recovering the divide: A review of the big data analytics—strategy relationship. Long Range Planning, December 2022, 1–40. https://doi.org/10.1016/j.lrp.2022.102290

[71] Tessema, G. A., Kinfu, Y., Dachew, B. A., Tesema, A. G., Assefa, Y., & Alene, K. A. (2021). The COVID- - 19 pandemic and healthcare systems in Africa : a scoping review of preparedness , impact and response. 1–14. https://doi. org/10.1136/bmjgh-2021-007179

[72] Tessema, S. K., Inzaule, S. C., Christoffels, A., Kebede, Y., Oliveira, T. De, Ouma, A. E. O., Happi, C. T., & Nkengasong, J. N. (2020). Comment Accelerating genomics-based surveillance for COVID-19 response in Africa. The Lancet Microbe, 1(6), e227–e228. https://doi.org/10.1016/S2666-5247(20)30117-8

[73] Tham-Agyekum, E. K., Wongnaa, C. A., Kwapong, N. A., Boansi, D., Ankuyi, F., Prah, S., Andivi Bakang, J. E., Okorley, E. L., & Laten, E. (2023). Impact of children's appropriate work participation in cocoa farms on household welfare: Evidence from Ghana. Journal of Agriculture and Food Research, 14(December), 100901. https://doi.org/ 10.1016/j.jafr.2023.100901

[74] Thongworn, S., & Sirisuk, V. (2018). Weight control specific compensatory health beliefs: Hypothetical testing and model extension. Kasetsart Journal of Social Sciences, 39(2), 312–319. https://doi.org/10.1016/j.kjss.2017.06.006

[75] Tjaden, A. H., Gibbs, M., Runyon, M., Weintraub, W. S., Taylor, Y. J., & Edelstein, S. L. (2022). Association between self-reported masking behavior and SARS-CoV-2 infection wanes from Pre-Delta to Omicron-predominant periods — North Carolina COVID-19 Community Research Partnership (NC-CCRP). American Journal of Infection Control, 000. https://doi.org/10.1016/j.ajic.2022.09.027

[76] Top, M., Konca, M., & Sapaz, B. (2019). Technical efficiency of healthcare systems in African countries : An application based on data envelopment analysis. Health Policy and Technology, xxxx. https://doi.org/10.1016/ j.hlpt.2019.11.010

[77] Trummer, U., Ali, T., Mosca, D., Mukuruva, B., Mwenyango, H., & Novak-Zezula, S. (2023). Climate change aggravating migration and health issues in the African context: The views and direct experiences of a community of interest in the field. Journal of Migration and Health, 7(January), 100151. https://doi.org/10.1016/j.jmh.2023.100151

[78] Wamema, J., Alunyu, A., Amiyo, M., & Nabukenya, J. (2023). Enterprise architecture requirements for standardising digital health in Uganda's health system. Health Policy and Technology, 12(4), 100805. https://doi.org/10.1016/ j.hlpt.2023.100805

[79] Waschkau, A., Flägel, K., Goetz, K., & Steinhäuser, J. (2020). Article in press. 1–7. https://doi.org/10.1016/ j.zefq.2020.07.001

[80] Webb, F. J., Bilello, L., Vaccaro, J., Jones, R., Neff, D., & Gaillard, T. (2024). Community engagement strategies for population health research with culturally diverse adults. Journal of Medicine, Surgery, and Public Health, 2(December 2023), 100037. https://doi.org/10.1016/j.glmedi.2023.100037

[81] Westman, B., Ullgren, H., Olofsson, A., & Sharp, L. (2019). Patient-reported perceptions of care after the introduction of a new advanced cancer nursing role in Sweden. European Journal of Oncology Nursing, 41(January), 41–48. https://doi.org/10.1016/j.ejon.2019.05.009

[82] Willmott, M., Nicholson, A., Busse, H., Macarthur, G. J., Brookes, S., & Campbell, R. (2016). Effectiveness of hand hygiene interventions in reducing illness absence among children in educational settings: A systematic review and meta-analysis. Archives of Disease in Childhood, 101(1), 42–50. https://doi.org/10.1136/archdischild-2015-308875

[83] Wu, D., Gu, H., Gu, S., & You, H. (2021). Individual motivation and social influence: a study of telemedicine adoption in China based on social cognitive theory. Health Policy and Technology, 10(3). https://doi.org/10.1016/j.hlpt. 2021.100525

[84] Yoon, S., Goh, H., Chan, A., Malhotra, R., Visaria, A., Matchar, D., Lum, E., Seng, B., Ramakrishnan, C., Quah, S., Koh, M. S., Tiew, P. Y., Bee, Y. M., Abdullah, H., Nadarajan, G. D., Graves, N., Jafar, T., & Ong, M. E. H. (2022). Spillover Effects of COVID-19 on Essential Chronic Care and Ways to Foster Health System Resilience to Support Vulnerable Non-COVID Patients: A Multistakeholder Study. Journal of the American Medical Directors Association, 23(1), 7–14. https://doi.org/10.1016/j.jamda.2021.11.004