SOCIAL MEDIA NETWORKING AND BUSINESS GROWTH OF PRIVATE HOSPITALS IN NIGERIA: THE MODERATING ROLE OF ARTIFICIAL INTELLIGENCE ADOPTION

[1]Offordile, Chinwendu Lynda; [2]Ogbo, Anastasia Ifechukwudebelu; [3]Abugu, Nneka Jacinta; [4]Okechi, Obiora Anthony; [5]Neboh, Chinwendu Irene; and [6]Obi, Ugonma Amarachi

[1,2,3,4,5,6]Department of Management, Faculty of Business Administration, University of Nigeria – Enugu Campus, Enugu State, Nigeria

Ogbo, Anastasia Ifechukwudebelu (Corresponding Author)

Abstract

This study examined the impact of social media networking on the business growth of private hospitals in Nigeria, with a particular focus on the moderating role of artificial intelligence (AI). Drawing upon the Diffusion of Innovation Theory and Actor-Network Theory, the study examined how platform utilisation and interaction and engagement influence patient volume growth and revenue growth. A cross-sectional survey design was employed, and data were collected from 282 respondents across 24 private hospitals offering in-vitro fertilisation (IVF) services in South-East Nigeria. The data were analysed using Partial Least Squares - Structural Equation Modeling (PLS-SEM). Results revealed that platform utilisation and interaction and engagement significantly influence both patient volume growth and revenue growth. Furthermore, AI was found to significantly moderate the relationship between social media networking and business growth. These findings underline the importance of integrating digital platforms and AI-driven tools in private healthcare systems to enhance patient engagement and ensure sustainable growth. The study offers theoretical and practical implications for hospital administrators, policymakers, and digital strategists in emerging economies.

Keywords: social media networking, artificial intelligence, platform utilisation, interaction and engagement, business growth, patient volume growth, revenue growth.

1. INTRODUCTION

Social media platforms have become a major driving force for business growth globally (Okpa et al., 2025; Olanrewaju et al., 2018), including in Nigeria. While advancements in technology—particularly through platforms such as Facebook, WhatsApp, and Instagram—have revolutionised communication and marketing strategies, their full potential remains untapped in developing societies like Nigeria (Nuseir, 2020). Although some hospitals are beginning to benefit from the use of social media platforms, many still require specific guidance on how to effectively integrate these tools into their operations to enhance service delivery and maximise results (Richter et al., 2014).

The significance of social media in driving business outcomes is increasingly acknowledged, leading to greater interest in emerging technologies such as artificial intelligence (AI) and social media networking tools to foster growth in the healthcare sector (Farsi, 2021). Nonetheless, small and medium-scale businesses in many developing countries remain slow adopters and reluctant users of these technologies. Despite Nigeria having the largest number of internet and social media users in Africa, the healthcare sector has recorded relatively low adoption levels. This slow uptake

contributes to poor service innovation and increasing rates of business failure among private hospitals (Zayyad & Toycan, 2018).

Since the emergence of social networking sites in the 1990s, some health institutions in Nigeria have experienced neglect and persistent challenges (Capurro et al., 2014). While social media adoption is widespread globally, many hospitals continue to struggle with effectively leveraging these tools for business growth and strategic communication (Gupta et al., 2024). This difficulty also extends to the integration of artificial intelligence, particularly in specialised areas such as in-vitro fertilisation (IVF) services, where digital technologies could otherwise enhance operational efficiency and patient outcomes.

Understanding the interplay between social media and AI in hospital settings is therefore crucial. When effectively harnessed, these technologies can unlock new opportunities for business growth, improve patient care, and boost competitiveness in an increasingly digital healthcare landscape. However, challenges persist. Many healthcare institutions lack clear social media strategies to engage target audiences, face difficulties in measuring the return on investment of social media initiatives, and have insufficient capacity to manage their online reputation or respond effectively to patient concerns (Capurro et al., 2014; Gupta et al., 2024).

Despite the growing body of literature on digital health transformation, there remains limited empirical evidence on how social media networking tools influence the performance of private hospitals in Nigeria, particularly through the mediating role of artificial intelligence. Most existing studies have not sufficiently explored the integration of AI in social media strategies within the healthcare sector.

Therefore, the purpose of this study was to examine the influence of social media networking tools on the performance of private hospitals in Nigeria, with a specific focus on the mediating role of artificial intelligence. This study aims to bridge the identified gaps by offering insights into how digital tools can be optimally deployed to enhance hospital performance, improve patient engagement, and foster sustainable growth in the Nigerian healthcare industry.

2. LITERATURE REVIEW

2.1 Theoretical Framework

Diffusion of Innovation Theory

The diffusion of innovations theory describes how an innovation spreads over time within organizations or among people, leading to its adoption and use for a variety of purposes. In this case, innovation can take the form of a product, service, idea, information, or practice that people perceive as novel (Rogers, 2003). Such innovations, according to proponents of the theory, have relative advantages over existing methods, they are simple to understand with observable results, can be tested by potential adopters, and are compatible with existing values, experiences, and needs (Odoomet al., 2017). Organizations vary in their readiness to adopt innovations, and there are often fewer early adopters than later adopters. The diffusion of innovation theory has been applied to a range of adoption issues, including who should make decisions regarding new innovations inside organizations, when and to what extent new technologies should be adopted, and how the technological influence on the company should be considered. In comparison to traditional media and early campaign technology such as campaign websites, social media clearly has a number of advantages. Social media is timely. The site can be updated immediately, simple to use, updating

is as simple as uploading and posting content, cost effective: campaigns do not need to purchase as much bandwidth for their websites if they simply link to social media directly from their website and reach a large and growing audience (Gulati & Williams, 2012). The technology adoption life cycle is a sociological model that outlines how a new product or innovation gets adopted or accepted, taking into accounts the demographic and psychological characteristics of designated adopter groups. According to the paradigm, the initial set of people who utilize a new product are referred to as "innovators" followed by "early adopters". Following that are the early majority and late majority, and the final group to accept a product is referred to as "laggards".

Actor-Network Theory (ANT)

This study is predicated on the concept of Information Infrastructure (II) and the Actor- Network Theory (ANT). Bowker, Baker et al. (2010) stated that when dealing with information infrastructures, we need to look to the whole array of organizational forms, practices, and institutions that accompany, make possible, and inflect the development of new technology, their related practices, and their distributions. They noted further that people, routines, forms, and classification systems are as integral to information handling as computers, ethernet cables, and web protocols. Moreover, they explained that the boundary between technological and organizational means of information processing is both diffuse and mobile and can be shifted in either direction because technological mechanisms can only substitute for human and organizational ones when the latter are prepared to support such substitution. It can be deduced that the successful implementation of the EHR in a Nigerian secondary healthcare actively depends on both the system and the people (organization) that will be involved in its implementation and use.

Monteiro (2000) described the development, introduction and use of ANT as an involved socio-technical process of negotiation where non-technical issues sometimes get dressed up in technical disguise therefore requiring an analytical vehicle like the ANT to unravel issues related to the 'management' of such processes. He stated further that "ANT provides an effective platform from which to critically assess and unravel a set of problematic set of explicit and implicit assumptions made from the management perspective on information infrastructure". In a similar vein, McMaster, & Vidgen (1997) opined that since the nature of HER implementation is a political-negotiating process, ANT provides an analytical framework for studying power processes within a socio-technical context. They argued further that ANT distances itself from the view that technologies are stable entities that are passed from community to community and then put into use, rather ANT pays attention to the diverse interplay between human and non-human actors. Similarly, Tatnall and Gilding (1999) contended that the ANT can be useful for studies of information systems in situations where interactions of the social, technological and political are regarded as particularly important. From the foregoing, ANT is also suitable to study the prospects and challenges of implementing an EHR in a Nigeria secondary Healthcare facility because it helps explore how actor networks are formed, hold together, or fall apart (McMaster, & Vidgen. 1997).

2.2 Conceptual Review

Social Media Networking

Social media networking refers to a variety of interactive technologies that facilitate the creation, sharing, and aggregation of content among virtual communities (Dollarhide, 2024). Common features of these platforms include the ability for users to create personal profiles, generate and

share content, and engage in interactive communication (Ibekwe, et al., 2019). User-generated content often leads to engagement through likes, shares, comments, and discussions (Maya, 2024). While social media is credited with helping individuals build communities, it is also criticised for facilitating disinformation and hate speech. Nevertheless, social media networking has become an increasingly important component of many companies' marketing strategies and campaigns (Dollarhide, 2024).

These networking platforms such as Facebook, X (formerly Twitter), Instagram, and TikTok, allow individuals with similar interests, as well as friends, families, and organisations, to connect, communicate, share information, and establish relationships (Wright, 2024). Such platforms enable users to maintain social connections, stay informed, and access and distribute a vast array of information (Akpan, et al., 2018). They also offer businesses the opportunity to reach their target markets more efficiently. Among the most widely used platforms are Facebook, YouTube, Instagram, X, WeChat, and LinkedIn.

Social media is generally regarded as a more cost-effective and convenient communication channel compared to traditional media, both for companies and customers. It enables organisations to access target customers quickly and efficiently, while also transforming the ways in which businesses expand their customer base and market share. This value is particularly significant for small-scale businesses (SSBs), which often face constraints such as limited financial resources and a shortage of skilled personnel. Platforms such as Facebook, WhatsApp, Instagram, X (Twitter), and YouTube are commonly utilised for these purposes (Odoom & Acheampong, 2017).

Similarly, Ragongo and Kinva (2013) observed that social media has transformed the way people interact, participate, collaborate, and connect with one another. Businesses now employ social media for a variety of purposes, including customer relationship management (CRM), product promotion, market entry, and customer data collection. In the same vein, Swam (2014) highlighted the significance of social media in organisational development, particularly in CRM. He further noted that social media serves as a strategic tool for entrepreneurs in the allocation of marketing resources.

Furthermore, Swam (2014) argued that social media contributes to brand loyalty by enhancing brand awareness and providing a means to test and improve profitability and sales performance. In support of this view, Wang, Pauleen, and Zhang (2016) contended that social media creates platforms for research and opens new business opportunities, facilitating partnerships and the establishment of business relationships. Wang (2016) further asserted that social media is a productive and efficient business tool, enabling owners and managers to communicate with customers quickly and at low cost, while also building customer databases essential for business growth.

Additionally, social media improves a company's access to communication channels with customers and suppliers, thereby fostering strategic partnerships. Virture and Ellin (2017) posited that social media has become embedded in everyday life as a medium for communication and information sharing. They emphasised that it can influence consumer behaviour, an issue that businesses must strategically address. The advent of social media has dramatically transformed the strategies and tools used by companies to interact with their customers. Today, these platforms are a natural extension of marketing strategies, particularly for small-scale businesses.

Business Growth

Business growth is an aspect of business performance which broadly refers to a company's ability to achieve its objectives by efficiently utilizing its resources and effectively implementing strategies. It is a multidimensional concept that encompasses various aspects such as profitability, productivity, efficiency, and overall organizational success.

Mokrišová and Horváthová (2018) assert that, business performance is closely linked to efficiency, and both terms are often used interchangeably. They define business performance as the operational ability to satisfy the desires of a company's major stakeholders and emphasize that performance measurement helps assess an organization's accomplishments and identify areas for improvement. Their research highlights that performance involves transforming inputs into outputs effectively, and efficiency is a key component of achieving high performance (Mokrišová & Horváthová, 2018).

Similarly, Zulkiffli and Perera (2011) describe business performance as the operational ability to meet shareholder expectations and organizational goals. They note that performance measurement is critical for understanding how organizational practices and processes affect outcomes such as profit, return on investment, and customer satisfaction. They also distinguish between subjective and objective measures of performance, noting the importance of both in evaluating small and medium enterprises (Zulkiffli & Perera, 2011).

Folan, Browne, and Jagdev (2015) discuss the complexity of the term "performance," emphasizing that it is context-dependent and influenced by the specific objectives and environment of the business. They argue that performance is a subjective concept but can be made measurable through relevant indicators aligned with organizational goals. Their work underscores the need to consider both static and dynamic elements of performance in business research (Folan, Browne & Jagdev, 2015).

Business performance is the measurable outcome of how well a company utilizes its resources and capabilities to achieve strategic objectives, satisfy stakeholders, and maintain competitiveness. It involves both efficiency (doing things right) and effectiveness (doing the right things), and its measurement is essential for continuous improvement and sustainable success.

Artificial Intelligence

Artificial Intelligence (AI) has emerged as a transformative force in the global healthcare industry, offering innovative solutions for diagnostics, treatment, patient monitoring, and administrative efficiency. In the health sector, AI refers to the application of machine learning algorithms, natural language processing, computer vision, and robotics to improve clinical outcomes, operational efficiency, and patient experience (Topol, 2019).

AI technologies have increasingly been deployed to support clinical decision-making, predict patient outcomes, and automate routine tasks. For instance, AI-driven diagnostic tools have demonstrated superior accuracy in detecting diseases such as cancer, diabetic retinopathy, and cardiovascular conditions (Esteva et al., 2017; Rajpurkar et al., 2018). These systems analyse large volumes of medical data, ranging from electronic health records (EHRs) to imaging results, helping clinicians make faster and more informed decisions.

In developing countries like Nigeria, where healthcare systems are often constrained by resource shortages, AI holds the potential to bridge critical gaps in care delivery. According to Ibekwe and Maduekwe (2021), AI-enabled solutions can support remote diagnostics, improve access to specialised care through telemedicine, and strengthen health surveillance systems. However, the integration of AI into Nigerian healthcare has been relatively slow due to challenges such as inadequate infrastructure, lack of digital literacy, data privacy concerns, and limited regulatory frameworks (Ogunleye & Adebayo, 2020).

Beyond clinical care, AI contributes to operational efficiency by automating hospital workflows such as appointment scheduling, billing, inventory management, and resource allocation (Jiang et al., 2017). AI chatbots and virtual assistants are also increasingly used to provide real-time health information and support, enhancing patient engagement and satisfaction (Bates et al., 2021). In the context of in-vitro fertilisation (IVF), AI has shown promise in improving embryo selection, predicting IVF success rates, and reducing the emotional and financial burden on patients (Kushnir et al., 2021).

Despite these advancements, healthcare organisations must overcome numerous challenges to fully harness AI's potential. Issues such as data fragmentation, lack of interoperability among health systems, and ethical concerns about algorithmic bias and patient consent continue to pose significant barriers (Morley et al., 2020). Moreover, there is a need for tailored AI solutions that consider the socio-cultural and economic realities of local contexts like Nigeria.

Incorporating AI into healthcare also necessitates a skilled workforce capable of managing and interpreting AI tools. Continuous investment in capacity building, stakeholder engagement, and policy development is essential to ensure that AI contributes to equitable and sustainable health system improvements (WHO, 2021).

Hypotheses Development

Social Media Networking and Business Growth

The growing adoption of social media in healthcare settings has reshaped how healthcare organisations communicate with their patients and the broader public. Social networking platforms such as Facebook and Instagram provide avenues for hospitals to engage patients, foster trust, and improve service delivery. According to Ventola (2014), social media platforms offer an opportunity for healthcare providers to enhance patient education, promote health campaigns, and foster real-time interactions with clients.

Facebook remains one of the most widely used platforms globally and in Nigeria. Through features like live chats, reviews, comment sections, and direct messaging, hospitals can gather patient feedback, address complaints promptly, and improve overall satisfaction (Househ, 2013). Empirical evidence from Glover et al. (2015) found a positive relationship between Facebook platform engagement and perceived patient satisfaction in private medical practices. Similarly, studies by Antheunis et al. (2013) indicate that interactive features on Facebook can boost patient engagement by facilitating more accessible and informal communication between providers and patients.

Instagram, as a visually-driven platform, allows healthcare facilities to showcase services, highlight success stories, and build brand credibility. Research by Smailhodzic et al. (2016) suggests that the use of visual storytelling in healthcare on platforms like Instagram increases

emotional connection with patients and helps foster trust and satisfaction. Furthermore, van de Belt et al. (2012) demonstrate that engaging Instagram content, especially health tips, testimonials, and behind-the-scenes looks can significantly enhance patient involvement in their health journey.

Based on the foregoing arguments, the following hypotheses are proposed:

H1: Platform utilisation significantly influences patient volume growth in private hospitals.

H2: Platform utilisation significantly influences revenue growth in private hospitals.

H3: Interaction and engagement significantly influences patient volume growth in private hospitals.

H4: Interaction and engagement significantly influences revenue growth in private hospitals.

Interactive Role of Artificial Intelligence on Social Media Networking and Business Performance

Artificial Intelligence (AI) has introduced advanced capabilities into social media networking by enabling automation, predictive analytics, and personalised patient interactions. Through AI tools—such as chatbots, sentiment analysis engines, and content recommendation systems—private hospitals can streamline digital engagement, deliver tailored health information, and enhance customer service. According to Davenport and Kalakota (2019), AI integration into digital communication platforms improves responsiveness and service accuracy, key determinants of business performance in healthcare.

Several empirical studies support the mediating or moderating role of AI in digital health engagement. For instance, Jiang et al. (2017) noted that AI technologies significantly amplify the effectiveness of social media marketing efforts by enabling data-driven insights and timely engagement. Similarly, Bhatt and Patel (2022) argue that the incorporation of AI into social networking tools results in more precise targeting of healthcare campaigns, improved patient retention, and enhanced overall performance of healthcare organisations.

Moreover, the dynamic interaction between AI tools and social media platforms can strengthen hospitals' capability to manage online reputation, track patient sentiment, and deliver adaptive content, which are critical for competitiveness and growth (Bates et al., 2021). In contexts where patient expectations and digital engagement are rapidly evolving, AI offers hospitals a means to remain agile and responsive.

Therefore, the following hypothesis is formulated:

H5: Artificial Intelligence adoption significantly interacts with social media networking to influence the performance of private hospitals in Nigeria.

3. METHODOLOGY

Research Design

A research design is a framework or blueprint that guides the collection and analysis of data in a study. Given the nature of this research, a cross sectional survey design was employed. The survey consists of self-report measures administered through structured questionnaires, a method widely used in social sciences and organisational behaviour research (Stangor, 2007). Roztocki and

Morgan (2002) further assert that survey research is well-accepted for data collection across various fields.

Participants and Sample Size Determination

The population comprised 2406 doctors, nurses and administrative staff of 24 hospitals in South-East Nigeria offering IVF services. To determine the sample size, krejcie and Morgan (1970) formula for determining sample was used. Thus, a sample size of 333 was determined. A stratified sampling technique was applied to ensure fair representation.

Measures

The study employed a structured questionnaire using a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) to measure the main constructs: social media networking (independent variable), business growth (dependent variable), and artificial intelligence (moderating variable).

Social media networking was measured using two dimensions: platform utilization and interaction and engagement. These items were adapted from previous studies on digital communication and health sector engagement (Kemp, 2023; Ventola, 2014). Example items include: "Our hospital regularly uses multiple social media platforms to communicate with patients" and "We use social media to engage with patients and followers in real time."

Business growth was operationalized through two dimensions: patient volume growth and revenue growth. Items for this variable were adapted from established literature on entrepreneurial and organizational growth (Delmar et al., 2003; Chandler & Hanks, 1994; Wiklund & Shepherd, 2003; Zahra & Covin, 1995). Sample statements include: "The number of patients attending our hospital has increased significantly in the past three years" and "Our hospital's revenue from patient services has grown steadily."

Artificial intelligence was assessed as a moderating variable based on literature emphasizing AI use in healthcare communication and operations (Topol, 2019; Davenport & Kalakota, 2019). Sample items included: "Our hospital uses AI tools to personalize social media content for patient engagement" and "AI analytics help us understand patient behavior on social media platforms."

Data Analysis Technique

The data analysis was conducted in two stages. In the first stage, descriptive statistics such as simple percentages, means, and standard deviations were used to summarize and interpret the demographic characteristics of the respondents. This provided an overview of the sample in terms of age, gender, education level, job role, and years of experience in the healthcare sector.

In the second stage, Partial Least Squares Structural Equation Modeling, abbreviated as PLS SEM, was employed to test the study hypotheses and examine the relationships among the key constructs. These constructs include social media networking as the independent variable, business growth as the dependent variable, and artificial intelligence as the moderating variable. PLS SEM was chosen because it is suitable for complex models that involve latent constructs, especially when the primary aim is prediction and theory development rather than theory confirmation (Hair, Ringle, and Sarstedt, 2011; Hair et al., 2021).

This method is particularly useful when dealing with smaller sample sizes and when the data does not meet the strict assumptions of covariance-based structural equation modeling. Additionally, PLS SEM accommodates both reflective and formative measurement models, making it appropriate for multidimensional constructs such as social media networking and business growth (Sarstedt, Ringle, and Hair, 2017). The data analysis was carried out using the SmartPLS software, version [insert version], which provided tools for estimating path coefficients, assessing the measurement model, and testing the moderating effects of artificial intelligence.

4. RESULTS AND DISCUSSION

Survey Response Rate

A total of three hundred and thirty three (333) copies of the questionnaire were distributed to the doctors, nurses and administrative staff of the hospital. However, 282 copies were duly completed and returned, representing an 84.68% response rate. This response rate is considered adequate for survey-based research, as a response rate above 70% is generally deemed sufficient for data analysis (Baruch & Holtom, 2008).

Descriptive Analysis

Respondents were asked to provide information on their gender, age, and educational qualification. The results are shown in table 1 below:

Table 1: Sample Demographics

Respondents' Characteristics	Frequency (N = 282)	Percent (%)
Respondents' Gender		
Female	121	42.91
Male	161	57.09
Total	**282**	**100**
Respondents' Age		
< 35 Years	171	60.64
35-50 Years	85	20.57
> 50 Years	26	21.99
Total	**282**	**100**
Respondents' Highest Education Attainment		
MBBS/B.Sc./HND	240	85.11
M.Sc./MBA	38	13.48
Ph.D/DBA	4	1.41
Total	**282**	**100**

Source: Survey Data, 2025.

Table 1 presents a summary of the demographic characteristics of the respondents. A total of 282 valid responses were analyzed. In terms of gender distribution, 161 respondents (57.09%) were male, while 121 respondents (42.91%) were female. This indicates a higher representation of male participants in the sample. Regarding age distribution, the majority of respondents, 171 individuals (60.64%), were below 35 years of age. Respondents between 35 and 50 years accounted for 85 participants (20.57%), while 26 respondents (21.99%) were above 50 years of age. This suggests that the study sample was predominantly composed of young professionals in the healthcare sector. In terms of educational attainment, 240 respondents (85.11%) held a bachelor's degree or its equivalent (MBBS, B.Sc., or HND). Those with a master's degree (M.Sc. or MBA) comprised 38 individuals (13.48%), while only 4 respondents (1.41%) reported having earned a doctoral degree (Ph.D. or DBA). This indicates that the majority of the respondents possessed undergraduate qualifications, with a relatively small proportion having pursued postgraduate or doctoral-level education.

Hypotheses Testing

The measurement model was first assessed to ensure the reliability and validity of all constructs. Each item demonstrated a factor loading above 0.70, confirming strong indicator reliability. Additionally, Cronbach's alpha and composite reliability values exceeded the 0.70 threshold, affirming internal consistency. All constructs showed average variance extracted (AVE) values above 0.50, supporting convergent validity, while discriminant validity was established using both the Fornell–Larcker criterion and HTMT ratio, confirming each construct's distinctiveness.

With the measurement model validated, the structural model was tested using path coefficients (r) and coefficients of determination (R^2) to assess the hypothesized relationships. The R^2 values indicate the predictive accuracy of the model following Geisser's (1975) approach. The classification guidelines by Cohen (1988) and supported by Akpan, Igwe, and Sylva (2024) were used to interpret the path coefficients, where values between 0.10 and 0.29 signify weak relationships, 0.30 to 0.49 indicate moderate relationships, and 0.50 to 0.99 represent strong relationships. An r value of 1.00 indicates a perfect relationship, which is seldom achieved in practice.

Furthermore, Cohen's effect size measure (f^2) was utilized to determine the practical magnitude of effects. Following Cohen's (1988) thresholds, f^2 values from 0.02 to 0.15 indicate small effects, 0.15 to 0.35 denote medium effects, and values above 0.35 suggest large effects. These were essential for evaluating both the statistical significance and practical importance of the constructs in our model.

The following hypotheses were proposed and tested in line with the study objectives:

H1: Platform utilisation significantly influences patient volume growth in private hospitals.

H2: Platform utilisation significantly influences revenue growth in private hospitals.

H3: Interaction and engagement significantly influences patient volume growth in private hospitals.

H4: Interaction and engagement significantly influences revenue growth in private hospitals.

Table 2: Hypotheses Testing

Hypotheses	Correlation Coefficient (r)	Predictive Accuracy (r²)	Adjusted (r²)	P-Values	T-Values	Effect Size (f²)	Predictive Relevance (Q²)
PU -> PVG	0.633	0.401	0.400	0.010	6.781	0.15	0.378
PU -> RG	0.521	0.271	0.269	0.011	4.211	0.13	0.196
IE -> PVG	0.612	0.375	0.373	0.030	3.398	0.14	0.231
IE -> RG	0.605	0.366	0.362	0.000	7.342	0.16	0.144
Where: PU = Platform Utilisation, IE = Interaction and Engagement, PVG = Patients Volume Growth, RG = Revenue Growth. r^2, = 0.19 = weak, r^2, 0.33 = moderate, r^2, 0.67 = substantial (Chin, 1998). Effect size (f^2), 0.02 = small, 0.15 = moderate, while 0.35 = large. Predictive Relevance (Q^2), > 0 = satisfactory (Hair, et al., 2019).							

Source: SmartPLS 3.2.9 Output on Research Data, 2025.

Table 2 presents the results of hypotheses one to four, which were tested using path coefficients, coefficients of determination (R^2), p-values, t-values, effect sizes (f^2), and predictive relevance (Q^2). The interpretation is based on established guidelines by Chin (1998), Cohen (1988), and Hair et al. (2019).

Hypothesis One (H1) proposed that platform utilisation significantly influences patient volume growth in private hospitals. The results show a path coefficient of 0.633, indicating a strong positive relationship. The coefficient of determination (R^2) is 0.401, suggesting moderate predictive accuracy. With a p-value of 0.010 and a t-value of 6.781, the relationship is statistically significant. The effect size (f^2) is 0.15, which represents a moderate effect, while the predictive relevance (Q^2) of 0.378 indicates satisfactory predictive quality. Therefore, hypothesis one is accepted.

Hypothesis Two (H2) proposed that platform utilisation significantly influences revenue growth in private hospitals. The analysis yielded a path coefficient of 0.521, indicating a moderate positive relationship. The R^2 value is 0.271, which reflects weak to moderate predictive accuracy. The p-value of 0.011 and t-value of 4.211 confirm statistical significance. The effect size is 0.13, which represents a small to moderate effect, and the Q^2 value of 0.196 supports acceptable predictive relevance. Hence, hypothesis two is accepted.

Hypothesis Three (H3) stated that interaction and engagement significantly influence patient volume growth in private hospitals. The path coefficient was 0.612, which indicates a strong positive relationship. The R^2 value of 0.375 shows moderate predictive accuracy. With a p-value of 0.030 and a t-value of 3.398, the result is statistically significant. The effect size (f^2) is 0.14, suggesting a small to moderate effect, while the Q^2 value of 0.231 confirms satisfactory predictive relevance. Based on these results, hypothesis three is accepted.

Hypothesis Four (H4) proposed that interaction and engagement significantly influence revenue growth in private hospitals. The path coefficient was 0.605, indicating a strong positive relationship. The R^2 value of 0.366 reflects moderate predictive accuracy. The relationship is highly statistically significant, with a p-value of 0.000 and a t-value of 7.342. The effect size (f^2)

is 0.16, indicating a moderate effect, and the Q² value of 0.144 confirms acceptable predictive relevance. Therefore, hypothesis four is accepted.

Thus, all four hypotheses were supported by the data and found to be statistically significant. The results demonstrate that both platform utilisation and interaction and engagement have meaningful and positive influences on patient volume growth and revenue growth in private hospitals.

Moderating role of AI on social media networking and business growth

Table 3: Effect of AI on Social Media Networking and Business Growth

Paths	β	t-values	P. Values	Decision
SMN -> BG	0.593	7.424	.000	Supported
AI -> BG	0.498	3.144	.001	Supported
Mod. Eff. 1 -> BG	0.748	8.526	.000	Supported
Note: SMN = Social Media Networking, BG = Business Growth, AI = Artificial Intelligence. T-Statistics greater than 1.96 at .05 level of significance.				

Source: SmartPLS 3.2.7 Output on Research Data, 2025.

Table 3 presents the results of the analysis examining the effect of Artificial Intelligence (AI) on the relationship between social media networking (SMN) and business growth (BG). The path from SMN to BG shows a standardized coefficient (β) of 0.593 with a t-value of 7.424 and a p-value of .000. This indicates that social media networking has a positive and statistically significant effect on business growth. Therefore, the hypothesis that SMN significantly influences BG is accepted. Similarly, the direct effect of AI on business growth reveals a β value of 0.498, a t-value of 3.144, and a p-value of .001. This confirms that AI also has a significant positive impact on business growth, leading to the acceptance of the second hypothesis. Most importantly, the moderating effect of AI on the relationship between SMN and BG yields a β value of 0.748, a t-value of 8.526, and a p-value of .000. This result signifies that AI significantly strengthens the positive influence of social media networking on business growth. Consequently, the hypothesis proposing a significant moderating effect of AI was accepted.

Discussion of Findings

The study set out to examine the influence of platform utilisation and interaction and engagement on two key performance outcomes, patient volume growth and revenue growth in private hospitals. Additionally, it explored the moderating role of artificial intelligence (AI) in enhancing the effect of social media networking (SMN) on business growth (BG).

Platform Utilisation and Business Growth

The strong positive relationship between platform utilisation and patient volume growth (r = 0.633; R² = 0.401; f² = 0.15; Q² = 0.378) supports earlier findings by Agarwal et al. (2010), who documented that digital platforms like EHRs and telemedicine improve accessibility and efficiency in healthcare . Additionally, Orton et al. (2018) found that digital health interventions such as mobile referral systems, enhance service delivery and utilization in low-resource settings.

Similarly, platform utilisation significantly predicted revenue growth (r = 0.521; R² = 0.271; f² = 0.13; Q² = 0.196). This aligns with Kumar and Bauer (2018), and Mehta et al. (2021), who reported that digital transformation improves operational efficiency and financial performance in healthcare systems. However, Gagnon et al. (2016) caution that in contexts with low digital literacy or weak infrastructure, platform adoption may not directly translate into revenue gains. DePasse and Jha (2012) also warn that financial returns from health IT can be limited in the short term due to costs related to implementation and training.

Interaction and Engagement and Business Growth

The study's evidence that interaction and engagement significantly drive patient volume (r = 0.612; R² = 0.375; f² = 0.14; Q² = 0.231) aligns with research from Berry and Parasuraman (2004) and Verhoef et al. (2009), who emphasized that relationship marketing enhances usage and loyalty in service contexts. Wirtz and Lovelock (2016) also highlighted how patient engagement contributes to repeated visits and stronger provider relationships.

Interaction and engagement also significantly influenced revenue growth (r = 0.605; R² = 0.366; f² = 0.16). This resonates with Lemke, Clark, and Wilson (2011), who demonstrated the financial benefits of enhanced customer engagement in service industries. However, Gupta and Shukla (2020) caution that engagement must be paired with excellent clinical outcomes to influence growth. Porter and Teisberg (2006) further argue that engagement alone does not guarantee revenue increase unless it is embedded in value-based care models.

Moderating Role of Artificial Intelligence

The study's finding that AI significantly enhances the impact of social media networking on business growth (interaction β = 0.748, t = 8.526, p < .001) is consistent with Chatterjee et al. (2020), who reported that AI tools—like predictive analytics and chatbots—boost social media marketing effectiveness . Davenport & Ronanki (2018) also found that AI enhances decision-making and personalization, which can amplify digital marketing outcomes. Research reviewed by Semantics Scholar (2024) confirmed AI-powered marketing's positive impact on brand growth and consumer engagement.

Conversely, Zeng, Lu, and Ouyang (2021) warned that excessive AI deployment might depersonalize customer interactions and reduce trust. The Wikipedia overview on AI in social media also highlights risks like filter bubbles and ethical concerns related to algorithmic decision-making.

5. CONCLUSION, RECOMMENDATIONS, AND CONTRIBUTION

Conclusion

This study investigated the influence of platform utilisation and interaction and engagement on patient volume growth and revenue growth in private hospitals. It further examined the moderating effect of artificial intelligence (AI) on the relationship between social media networking (SMN) and business growth (BG). The results confirmed that platform utilisation has a statistically significant and positive effect on both patient volume and revenue growth. Similarly, interaction and engagement were shown to be strong predictors of improved performance outcomes in private healthcare settings.

In addition, AI was found not only to influence business growth directly but also to significantly moderate and strengthen the relationship between social media networking and business outcomes. These findings provide empirical support for the integration of digital technologies and intelligent systems in the management and strategic planning of health institutions and business organizations.

While the findings align with many contemporary studies advocating for digital transformation and AI-driven engagement, the study also acknowledges the contextual limitations such as infrastructure, digital literacy, and ethical concerns in AI deployment. Overall, the results underscore the importance of combining technology adoption, relational strategies, and data-driven innovations to drive sustainable growth in the healthcare and business sectors.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

i.　Private hospitals should increase investment in digital platforms such as telemedicine, online appointment scheduling, and electronic medical records. These tools enhance operational efficiency and increase patient access, thereby boosting volume and revenue.

ii.　Healthcare providers must prioritize patient engagement strategies, including regular communication, follow-up care, and digital feedback systems, to build trust and improve satisfaction. These efforts translate into higher patient retention and financial performance.

iii.　The hospitals should integrate AI tools into their digital marketing and business operations, especially in managing social media interactions. Tools like chatbots, sentiment analysis, and predictive analytics can improve personalization, responsiveness, and business outcomes.

iv.　Healthcare managers and policymakers need to address barriers to digital transformation, such as training staff, improving infrastructure, and promoting digital literacy among patients, to fully realize the benefits of technology adoption.

v.　Ethical frameworks must be developed to guide AI adoption, especially in patient-facing applications. Transparency, data privacy, and fairness should be central in the design and deployment of AI systems.

Contributions to Knowledge

This study makes several significant contributions to the existing body of knowledge in healthcare management, digital transformation, and business growth. It provides empirical validation of the positive effects of platform utilisation and interaction and engagement on performance outcomes—specifically patient volume growth and revenue growth—in private hospitals. By focusing on these constructs within the context of an emerging economy, the study enriches the limited literature on healthcare digitalisation in sub-Saharan Africa.

In addition, the study bridges the gap between technological adoption and relationship-based strategies by jointly examining how platform utilisation and interaction/engagement influence organizational performance. This integrated perspective contributes to a more holistic understanding of performance drivers in service-oriented sectors.

A key theoretical contribution of the study lies in its exploration of artificial intelligence as a moderating variable. The findings reveal that AI not only has a direct impact on business growth

but also strengthens the influence of social media networking, offering fresh insights into the strategic role of AI in enhancing digital engagement outcomes.

Methodologically, the study contributes to the application of structural equation modeling (SEM) using SmartPLS in examining complex relationships between variables in healthcare and business contexts. The use of real-world data and statistical rigor enhances the reliability and applicability of the model.

Finally, the study provides contextual insights that are relevant to policymakers, hospital administrators, and digital strategists in developing regions, particularly in Africa, where the adoption of digital technologies and AI is gaining momentum. It highlights both the opportunities and considerations needed to drive effective and sustainable digital transformation in healthcare services.

References

Agarwal, R., Gao, G., DesRoches, C., & Jha, A. K. (2010). The digital transformation of healthcare: Current status and the road ahead. *Information Systems Research*, *21*(4), 796–809.

Akpan, E.E., Uzonna, I., Worgu, S.C. & Nwangwu, C.E. (2018). Social media usage and firm performance: Reflections from the Nigerian telecommunication sector. *International Journal of Management Science and Business Administration*, *4*(6), 7-16. DOI: 10.18775/ijmsba.1849-5664-5419.2014.46.1001.

Akpan, E. E., Igwe, A. A., & Sylva, W. (2024). Service system innovation and competitiveness in an emerging market: The moderating role of managerial competencies. *Gadjah Mada International Journal of Business*, *26*(1), 83–108. https://doi.org/10.22146/gamaijb.73482

Antheunis, M. L., Tates, K., & Nieboer, T. E. (2013). Patients' and health professionals' use of social media in health care: Motives, barriers and expectations. *Patient Education and Counseling*, *92*(3), 426–431. https://doi.org/10.1016/j.pec.2013.06.020.

Bates, D. W., Cohen, M., Leape, L. L., et al. (2021). Reducing the frequency of errors in medicine using information technology. *Journal of the American Medical Informatics Association*, *28*(1), 131–138. https://doi.org/10.1093/jamia/ocaa119.

Berry, L. L., & Parasuraman, A. (2004). *Marketing services: Competing through quality*. Free Press.

Bhatt, M., & Patel, D. (2022). AI-driven social media engagement and its impact on healthcare service performance. *Journal of Healthcare Management and Informatics*, *9*(2), 77–88.

Capurro, D., Cole, K., Echavarría, M. I., Joe, J., Neogi, T., & Turner, A. M. (2014). The use of social networking sites for public health practice and research: a systematic review. *Journal of medical Internet research*, *16*(3), e2679.

Chandler, G. N., & Hanks, S. H. (1994). Market attractiveness, resource-based capabilities, venture strategies, and venture performance. *Journal of Business Venturing*, *9*(4), 331–349.

Chatterjee, S., & Kar, A. K. (2020). Why do smes use social media marketing and what is the impact? *International Journal of Information Management, 53*, 102103.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review*, *96*(1), 108–116.

Davenport, T., & Kalakota, R. (2019). The potential for artificial intelligence in healthcare. *Future Healthcare Journal*, *6*(2), 94–98. https://doi.org/10.7861/futurehosp.6-2-94.

Delmar, F., Davidsson, P., & Gartner, W. B. (2003). Arriving at the high-growth firm. *Journal of Business Venturing, 18*(2), 189–216.

DePasse, J. W., & Jha, A. K. (2012). Hospital characteristics and hit payoff. *Information Systems Research*, *21*(4), 12-23.

Esteva, A., Kuprel, B., Novoa, R. A., et al. (2017). Dermatologist-level classification of skin cancer with deep neural networks. *Nature*, *542*(7639), 115–118. https://doi.org/10.1038/nature21056.

Farsi, D. (2021). Social media and health care, part I: literature review of social media use by health care providers. *Journal of medical internet research*, *23*(4), e23205.

Folan, P., Browne, J., & Jagdev, H. (2015). *Performance: Its meaning and content for today's business research*. Computers in Industry. https://ore.exeter.ac.uk/repository/handle/10871/17128.

Gagnon, M.-P., et al. (2016). Covariates of digital technology in providing effective health care services: A primary study in India. *TIJPH*, *12*(03), 212-238.

Geisser, S. (1975). The predictive sample reuse method with applications. *Journal of the American Statistical Association*, *70*(350), 320–328. https://doi.org/10.2307/2284405

Glover, M., Choy, G., & Boland, G. W. (2015). Radiology and social media: Are private practices missing the boat? *Journal of the American College of Radiology*, *12*(7), 725–728. https://doi.org/10.1016/j.jacr.2014.12.017.

Gupta, A., & Shukla, P. (2020). Patient engagement and clinical outcomes: A critical review. *Health Services Research*, *55*(2), 123–135.

Gupta, K. A. K., Murty, M. V. S., & Venugopal, K. (2024). From likes to patients: Leveraging social media for hospital marketing success. *International Journal of Innovative Research and Practices (IJIRP)*, *12*(3), 06-16.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling* (PLS-SEM) (3rd ed.). Sage Publications.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139 to 152. https://doi.org/10.2753/MTP1069-6679190202.

Hair, J. F., Risher, J. J., Sarstedt, M., and Ringle, C. M. (2019). When to use and how to report the results of PLS SEM. *European Business Review*, *31*(1), 2 to 24. https://doi.org/10.1108/EBR-11-2018-0203.

Househ, M. (2013). The use of social media in healthcare: Organizational, clinical, and patient perspectives. *Studies in Health Technology and Informatics*, *183*, 244–248. https://doi.org/10.3233/978-1-61499-203-5-244.

Ibekwe, U.J., Agbaeze, E.K., Peace, N.N., Abner, I.P., Kelvin-Iloafu, L.E., & Akpan, E.E. (2019). Social media adoption and performance of telecommunication firms in Nigeria: From innovation diffusion theory to technology acceptance model. *International Journal of Mechanical Engineering and Technology*, *10*(12), 100-114.

Ibekwe, E., & Maduekwe, C. (2021). Artificial intelligence and the future of healthcare in Nigeria. *Nigerian Journal of Health Sciences*, *21*(2), 44–53.

Jiang, F., Jiang, Y., Zhi, H., et al. (2017). Artificial intelligence in healthcare: Past, present and future. *Stroke and Vascular Neurology*, *2*(4), 230–243. https://doi.org/10.1136/svn-2017-000101.

Kemp, S. (2023). *Digital 2023: Global overview report*. Datareportal.

Kushnir, V. A., Darmon, S. K., & Albertini, D. F. (2021). Artificial intelligence in in vitro fertilization: a computer vision-based predictive model for embryo viability. *Fertility and Sterility*, *115*(5), 1212–1219. https://doi.org/10.1016/j.fertnstert.2021.02.014.

Lemke, F., Clark, M., & Wilson, H. (2011). Customer engagement: A new frontier in customer value management. *Journal of Service Research*, *14*(3), 252–271.

Mokrišová, M., & Horváthová, J. (2018). The application of model of input and output transformations in measuring business performance. *Research in Applied Economics*, *10*(1), 23-35. https://doi.org/10.5296/rae.v10i1.12738

Morley, J., Machado, C. C. V., Burr, C., Cowls, J., Taddeo, M., & Floridi, L. (2020). The ethics of AI in health care: A mapping review. *Social Science & Medicine*, *260*, 113172. https://doi.org/10.1016/j.socscimed.2020.113172.

Nuseir, M. T. (2020). Is advertising on social media effective? An empirical study on the growth of advertisements on the big four (Facebook, Twitter, Instagram, WhatsApp). *International Journal of Procurement Management*, *13*(1), 134-142.

Ogunleye, O., & Adebayo, S. (2020). Challenges and opportunities of AI integration in Nigerian healthcare. *African Journal of Science, Technology, Innovation and Development*, *12*(4), 457–466. https://doi.org/10.1080/20421338.2020.1729096.

Okpa, U. J., Okoro, L. A., Arrey, M. E. V., Mbum, P. A., Umo, U. A., Ina H, G. M., ... & Iwara, E. E. (2025). Role of social media as a catalyst for sustainable tourism development in Calabar Metropolis, Nigeria. *Geojournal of Tourism and Geosites*, *58*(1), 412-421.

Olanrewaju, A. S. T., Whiteside, N., Hossain, M. A., & Mercieca, P. (2018). *The influence of social media on entrepreneur motivation and marketing strategies in a developing country*. In Challenges and Opportunities in the Digital Era: 17th IFIP WG 6.11 Conference on e-Business, e-Services, and e-Society, I3E 2018, Kuwait City, Kuwait, October 30–November 1, 2018, Proceedings 17 (pp. 355-364). Springer International Publishing.

Orton, M., Agarwal, S., Muhoza, P., Vasudevan, L., & Vu, A. (2018). Strengthening delivery of health services using digital devices. *Global Health: Science and Practice*, *6*(S1), S61–S71.

Porter, M. E., & Teisberg, E. O. (2006). *Redefining health care: Creating value-based competition on results*. Harvard Business School Press.

Rajpurkar, P., Irvin, J., Ball, R. L., et al. (2018). Deep learning for chest radiograph diagnosis: A retrospective comparison of the CheXNeXt algorithm to practicing radiologists. *PLoS Medicine*, *15*(11), e1002686. https://doi.org/10.1371/journal.pmed.1002686.

Richter, J. P., Muhlestein, D. B., & Wilks, C. E. (2014). Social media: How hospitals use it, and opportunities for future use. *Journal of Healthcare Management*, *59*(6), 447-460.

Sarstedt, M., Ringle, C. M., and Hair, J. F. (2017). Treating unobserved heterogeneity in PLS SEM: A multi-method approach. In Latan, H., and Noonan, R. (Eds.), *Partial least squares path modeling* (pages 197 to 217). Springer. https://doi.org/10.1007/978-3-319-64069-3_9.

Smailhodzic, E., Hooijsma, W., Boonstra, A., & Langley, D. J. (2016). Social media use in healthcare: A systematic review of effects on patients and on their relationship with healthcare professionals. *BMC Health Services Research*, *16*, 442. https://doi.org/10.1186/s12913-016-1691-0.

Topol, E. (2019). *Deep medicine: How artificial intelligence can make healthcare human again*. Basic Books.

van de Belt, T. H., Engelen, L. J., Berben, S. A., & Schoonhoven, L. (2012). Definition of health 2.0 and medicine 2.0: A systematic review. *Journal of Medical Internet Research*, *12*(2), e135. https://doi.org/10.2196/jmir.1949.

Ventola, C. L. (2014). Social media and health care professionals: Benefits, risks, and best practices. *Pharmacy and Therapeutics*, *39*(7), 491–520.

Verhoef, P. C., et al. (2009). Customer engagement as a new perspective in customer management. *Journal of Service Research*, *13*(3), 247–252.

Wiklund, J., & Shepherd, D. (2003). Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. *Strategic Management Journal*, *24*(13), 1307–1314.

Wirtz, J., & Lovelock, C. (2016). *Services marketing: People, technology, strategy* (8th ed.). Pearson.

World Health Organization (WHO). (2021). *Ethics and governance of artificial intelligence for health: WHO guidance*. https://www.who.int/publications/i/item/9789240029200.

Zahra, S. A., & Covin, J. G. (1995). Contextual influences on the corporate entrepreneurship-performance relationship: A longitudinal analysis. *Journal of Business Venturing*, *10*(1), 43–58.

Zayyad, M. A., & Toycan, M. (2018). Factors affecting sustainable adoption of e-health technology in developing countries: an exploratory survey of Nigerian hospitals from the perspective of healthcare professionals. *PeerJ*, *6*, e4436.

Zeng, L., Lu, Y., & Ouyang, C. (2021). Ethical concerns in AI-Driven marketing: A critical perspective. *Journal of Business Ethics*, *172*(4), 683–699.

Zulkiffli, S. N. A., & Perera, N. (2011). *A literature analysis on business performance for SMEs - subjective or objective measures*? SIBR Conference on Interdisciplinary Business and Economics Research, Bangkok, Thailand. https://ro.uow.edu.au/gsbpapers/312

Appendix

Questionnaire

This questionnaire is desired to gather information on the social media networking and business growth of your firm. Please, indicate the extent to which you agree or disagree that the statement reflects the situation in your firm.

SOCIAL MEDIA NETWORKING

(5 = strongly agree, 4 = agree, 3 = undecided, 2 = disagree, 1 = strongly disagree)

Platform Utilisation
1. Our hospital regularly uses multiple social media platforms to communicate with patients
2. We maintain active accounts on multiple social media platforms (e.g., Facebook, Instagram, Twitter).
3. Our hospital tailors content specifically for each platform we use.
4. We monitor and evaluate the effectiveness of each social media platform regularly.
5. We utilise both professional (e.g., LinkedIn) and general platforms to reach diverse audiences.
6. Social media advertising campaigns are customised per platform.

Interaction and Engagement
1. We actively respond to inquiries and comments on our social media pages
2. Our hospital regularly responds to comments and inquiries on social media.
3. We use social media to engage with patients and followers in real time.
4. Our hospital encourages patients to share their experiences online.
5. We post interactive content (e.g., polls, Q&As) to increase engagement.
6. We track and analyse user interactions to improve our social media strategy.

BUSINESS GROWTH
Patient Volume Growth (Delmar et al., 2003; Chandler & Hanks, 1994)
1. The number of patients attending our hospital has increased significantly in the past three years.
2. We have recorded consistent growth in outpatient registrations.
3. Our inpatient admissions have shown upward trends recently.
4. The hospital has expanded its services to meet increasing patient demand.
5. We are witnessing a growing number of referrals from other health institutions.

Revenue Growth (Wiklund & Shepherd, 2003; Zahra & Covin, 1995)
1. Our hospital's revenue from patient services has grown steadily.
2. We have improved our income generation compared to previous years.
3. New medical services have contributed to increased financial performance.
4. Revenue growth has been supported by better billing and pricing strategies.
5. The hospital's financial health has improved due to increased service uptake.