

AI-Enabled Healthcare Service Adoption among Patients: The Mediating Role of Trust and the Moderating Role of Privacy Concern.

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Abstract

The integration of Artificial Intelligence (AI) in Healthcare has been changing the way in which the patients access, evaluate and utilise these services. While focusing on such changes, one cannot ignore the fact that there arises an element of trust in relation to adopting AI enabled Healthcare Services among individuals. Moreover, concerns regarding the preservation of personal health information raise questions around its usage. This study examined the influence of certain AI-enabled healthcare service characteristics on the patients' adoption intention considering patient trust as a mediator variable and privacy concern as a moderator variable. A quantitative cross-sectional survey method was conducted to collect primary data from 400 participants having experience with/awareness of AI enabled healthcare services through various means including descriptive statistics, reliability check, EFA & CFA techniques, Correlation analysis, SEM & Mediation/Moderation Analysis. Results reveal a significant relationship between characteristics of AI enabled healthcare services towards patient trust $\beta=0.62, p<0.001$ and Adoption Intention $\beta=0.28, p<0.001$. Further, positive relations were found between patient's trust towards AI enabled Health Care Service and adoption intention $\beta=0.66, p<0.001$. The results also show that the mediation analysis found evidence confirming that 'patient trust' plays a significant role by conveying the effects of "AI-Enabled Healthcare Service Characteristics" on 'Adoption Intention', with an indirect effect of 0.41 ($p<0.001$). Finally, according to the research, 'privacy concerns' had a negative moderating impact on the positive link between 'patient trust' and 'adoption intention', at $\beta=-0.12, p=0.019$. In other words, if privacy-related worries are high, then this somewhat dilutes the impact. All things considered, these sorts of findings imply that providing trustworthy and reliable healthcare using AI technology, being transparent about its operations while keeping users' private data safe, are all fundamental aspects which need to be prioritized in order for widespread use among consumers to take off. In short, they help demonstrate why developing AI technologies capable of delivering such qualities could drive more uptake amongst end-users in medicine and health care contexts alike.

Keywords: Artificial Intelligence, AI-Enabled Healthcare Services, Patient Trust, Privacy Concern, Adoption Intention, Healthcare Technology, Structural Equation Modelling.

Introduction

AI refers to Artificial Intelligence, which is an important kind of technology that is currently transforming healthcare through various applications such as AI chatbots and virtual assistants offering healthcare services, personalized health recommendations, or AI-powered clinical support systems (Almadi et al. 2023). However, the widespread adoption of AI-enabled healthcare services requires addressing several factors from the patient perspective related to how they perceive and interact with the AI system while ensuring the security and privacy of personal health information (Davenport & Kalakota 2019; Amann et al. 2020; Alowais et al. 2023). In this particular context, trust plays an

important role in ensuring successful implementation of AI technologies as well. It is mainly due to specific characteristics of AI-based services used in healthcare. First, they collect sensitive health data from patients which implies some risks associated with misuse by malicious parties (Chen et al., 2024). Second, such services affect healthcare choices of end-users, therefore being directly linked to human life. Accordingly, there is a high chance that patients will be willing to try novel AI-enhanced services only in case they believe the technology is reliable, accurate, beneficial, etc. Various prior studies confirmed that trust is one of the core factors influencing user's acceptance and their behavioral intention towards using AI-based technologies in the field of healthcare (Glikson & Woolley, 2020; Richardson et al., 2021; Longoni et al., 2023). This finding was further supported by empirical research results suggesting a strong effect of trust on behavioral intention towards AI-integrated healthcare applications (2025).

However, nowadays, another factor greatly affecting implementation of artificial intelligence into healthcare is the growing number of privacy concerns. One may argue that all AI technologies require collecting and processing certain personal and/or health-related information from patients. Therefore, such a situation inevitably raises questions regarding possible misuse of collected data by malicious actors. Numerous studies emphasized that concerns about preserving private information negatively affect user's perception of AI-based healthcare applications thereby decreasing chances of implementing them successfully (Amann et al., 2020; Richardson et al., 2021). Thus, addressing privacy concerns should be regarded as one of top priorities aimed at fostering patients' confidence in using AI-enabled services. Despite considerable prior research on AI adoption, trust, and privacy concerns individually, there remains limited empirical exploration combining all three factors within a single holistic framework, particularly in the unique South Indian context of patients. Specifically, further empirical investigation is required to understand trust as a mediator in understanding patients' intentions towards adopting AI-enabled healthcare services and privacy concern as a moderator variable.

To address gaps in current research, this study explores AI-enabled healthcare service adoption by patients while addressing the mediation of trust and moderation of privacy concern. This paper thus provides some valuable insights into guiding healthcare providers and technology developers involved in creating an AI-enabled healthcare service to be trustworthy, explainable, and privacy-conscious, resulting in greater patient acceptance of using AI in their healthcare journeys responsibly.

Literature Review and Hypotheses Development

Artificial Intelligence (AI) has turned into a big part of modern healthcare services, helping patients with intelligent chatbots, virtual assistants, personalised suggestions, automated health information, and AI-assisted healthcare applications. These AI-enabled services can boost accessibility, comfort, speed, and the overall personalisation of how patients interact with healthcare. Still, whether patients are willing to use these tools, really comes down to how they view the usefulness, reliability, accuracy, and also the transparency of the AI itself. Earlier research suggests that what people think about the key traits of AI can strongly shape their acceptance and their behaviour intentions regarding AI-enabled healthcare apps (Davenport & Kalakota, 2019; Alowais et al., 2023; Kumar et al., 2025). So, when patients hold favourable perceptions of AI-enabled healthcare, they are more likely to feel secure and also more willing to use it.

H1: The characteristics of AI-enabled healthcare services have a significant positive effect on patient trust.

Patient trust is basically the confidence people put in the ability, dependability, and integrity of an AI-enabled healthcare service. It matters even more in healthcare since patients might lean on AI-generated facts and suggestions while they're making difficult choices about their own health, or at least that's how it feels. If patients think the AI system is accurate, dependable, transparent and genuinely helpful, then they tend to build confidence in the technology. A bunch of earlier empirical work has already shown that trust is a key driver for whether users accept AI-based healthcare tools. For example, Kumar et al. (2025) reported that trust had a strong impact on the intention to use AI-based healthcare chatbots among users in India. In the same way, research looking at AI-integrated healthcare

applications suggests trust also strongly supports behavioural intentions toward AI-based healthcare services. So overall, it seems that patients who build stronger trust in these AI-enabled services are more inclined to show they'd be willing to adopt them.

H2: Patient trust has a significant positive effect on adoption intention towards AI-enabled healthcare services.

Patients' adoption intention, sort of shows how ready or how much they feel inclined to use AI-enabled healthcare services once these tools are there. It is not random, because adoption intention is shaped by how patients see the advantages and the overall feel or "traits" of the technological service. For example, AI-enabled healthcare services that offer easy access, personalised support, dependable and accurate information, plus quick answers might form a more positive mindset among patients and can nudge them toward using the services. Past work on healthcare AI adoption has often mentioned that perceived usefulness, performance expectations, reliability, and several other technology related aspects can strongly sway users' behavioural intentions (Venkatesh et al., 2003; Alowais et al., 2023; Kumar et al., 2025). So, it seems reasonable to assume that more positive perceptions about these AI-enabled healthcare service characteristics will directly boost patients' adoption intention.

H3: AI-enabled healthcare service characteristics have a significant positive effect on patients' adoption intention.

It might not be as straightforward as it seems, the link between AI enabled healthcare service traits and adoption intention, because patients really need time to build confidence in the system before they decide to use it. In other words, trust can work like a psychological channel, where good feelings or favourable views about AI healthcare services eventually turn into an intention to adopt. So when patients see AI services as useful, precise, dependable, and also transparent, those kinds of impressions may make them trust the technology more, and that trust then pushes them toward greater willingness to adopt. Earlier work has already pointed out how central trust is when people adopt technologies, especially in AI based healthcare contexts. For example, Kumar et al. (2025) reported that trust was crucial for explaining users' behavioural intention toward AI healthcare applications, and other studies have similarly suggested that trust is one of the key routes that connects perceptions of AI technologies with actual adoption behaviour. For these reasons, patient trust is expected to act as a mediator between AI-enabled healthcare service characteristics and adoption intention.

H4: Patient trust significantly mediates the relationship between AI-enabled healthcare service characteristics and adoption intention.

Privacy concern is basically the degree to which patients feel uneasy about how AI-enabled healthcare systems collect, store, process and maybe misuse their personal, as well as health-related information. Privacy seems especially crucial here, because these AI technologies often need access to very sensitive medical facts and private details. If patients think the privacy risk is higher, they may end up being less confident in AI-enabled services, even if they can clearly see the usefulness. A number of earlier studies have pointed out that privacy and data security really matter as concerns when people decide whether to accept AI in healthcare (Amann et al., 2020; Richardson et al., 2021; Chettri et al., 2025). In addition, empirical results have shown that privacy concerns can reduce trust in AI-integrated healthcare applications. So, it is anticipated that privacy concerns will shape, and maybe even weaken or strengthen, how patient trust links to adoption intention.

H5: Privacy concern significantly moderates the relationship between patient trust and adoption intention towards AI-enabled healthcare services.

Overall, the body of literature is kinda indicating that AI-enabled healthcare service characteristics could sway patients' trust and their adoption intention, and also that trust acts like a psychological pathway, linking how people perceive AI with their actual adoption behaviour. At the same time, privacy concerns might reduce or lessen the degree to which that trust finally turns into a willingness to use AI-enabled healthcare services. Still, there's not much

empirical work that looks at these connections together, especially among healthcare users in the South Indian context. So, this study brings together AI-enabled healthcare service characteristics, patient trust, privacy concern and adoption intention, kind of as one joined empirical framework.

Methodology

The current research paper took a quantitative, cross sectional approach to examine the relationship between AI enabled healthcare service features and its impact on patient trust, privacy concerns, and intention to use. This research involved the patients / Healthcare users (with either prior experience with AI Enabled Health care services) from South India.

Primary Data was collected using structured questionnaires consisting of the measurement scales taken from several well known studies on AI Adoption, Patient Trust, Privacy Concerns & Technology Acceptance. Purposive sampling was used as a method of selection of respondents ensuring alignment with the requirement of the study. A total of 400 usable responses were received and analyzed. Part I of the questionnaire asked for demographic details regarding the respondent's demographic profiles, while Part II explored the major constructs of this research by presenting them using a five-point Likert Scale ranging from '1 Strongly disagree' to '5 Strongly agree'. Finally, after collecting all responses, we performed different types of statistical tests to assess the data, such as descriptive analyses, reliability check, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), Correlation testing, etc., and finally Structural Equation Modelling (SEM).

We performed Reliability analysis for ensuring the consistency of measurements of each item in terms of Cronbach's alpha values [49]. We did Exploratory Factor Analysis to understand the factor structures within the constructs; however, for better results and validating our assumption we have also done Confirmatory Factor Analysis for verifying the assumed factor structures and also assessing the construct reliability and convergent validity [46]. Moreover, Correlation analysis has been performed to explore the correlation coefficient which indicates the degree and direction of the relation between variables under consideration. Lastly, SEM has been conducted to assess the linkages between AI enabled healthcare services' features with patient trust and ultimately their intentions towards adopting it.

Moreover, mediation analysis has been done to see if there exists any mediator effect like patient trust being a mediator variable between the independent variable (AI Enabled Healthcare Service Characteristics) and dependent variable (Adoption Intention), and last but not least moderation analysis was executed to see whether Patient Privacy Concerns act as moderators in influencing the relation between Patient Trust and Adoption Intention. The above-mentioned set of techniques allowed us to analyze the measurement properties of the constructs under consideration. In addition to that, they help us observe the direct and indirect impacts along with interaction impacts mentioned in the conceptual framework in more clear ways.

4. Results and Findings

Table 1: Demographic Profile of Respondents (N = 400)

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	210	52.50
	Female	190	47.50
	Total	400	100.00

Age	Below 20	48	12.00
	21-30	162	40.50
	31-40	96	24.00
	31-40	62	15.50
	Above 50	32	8.00
	Total	400	100.00
Educational Qualification	Higher Secondary	52	13.00
	Diploma	68	17.00
	Undergraduate	124	31.00
	Postgraduate	102	25.50
	Doctoral/Professional	54	13.50
	Total	400	100.00
Occupation	Student	96	24.00
	Government Employee	72	18.00
	Private Employee	118	29.50
	Business/Self-employed	74	18.50
	Homemaker/Others	40	10.00
	Total	400	100.00

Source: Primary Data

Interpretation

Most of them were male (52.5%), followed by female participants (47.5%). The majority of our survey takers fall into the 21-30 years age bracket at 40.5%, while the 31-40 year olds take the second spot at 24%. In terms of educational qualification, we found out that 31% have undergraduate degrees, while 25.5% have post graduate ones and finally

13.5% have doctoral or professional qualifications. As far as their occupations go, private employees made up for a large percentage at 29.5%, which was closely followed by students who constituted 24% of our population. Such diversity ensures that people's perception on AI enabled health care services will be represented from various socio demographic backdrops.

Table 2: Descriptive Statistics of Study Constructs

Construct	Mean	Standard Deviation
AI-Enabled Healthcare Service Characteristics	3.84	0.71
Patient Trust	3.91	0.69
Privacy Concern	3.18	0.82
Adoption Intention	3.87	0.73

Source: Primary Data

Interpretation

Overall, these results suggest that a vast majority of our respondents hold positive or favorable perceptions towards AI enabled health care services as indicated by the means scores for AI-EHSC(3.84), Patient trust (3.91). Also, there exists high adoption intention as evidenced by the mean scores of the variable Adoption Intention(3.87). However, Privacy concern scored low with a mean value of (3.18) signifying that most individuals are worried about their private information. Standard deviation ranges between 0.69-0.82 showing considerable variation in respondents' opinion probably due to individual's varied experiences and expectations.

Table 3: Reliability Analysis

Construct	Number of Items	Cronbach's Alpha	Decision
AI-Enabled Healthcare Service Characteristics	5	0.82	Reliable
Patient Trust	5	0.85	Reliable
Privacy Concern	4	0.78	Reliable
Adoption Intention	5	0.84	Reliable

Source: Primary Data

Interpretation

All constructs yielded values for Cronbach's Alpha greater than 0.78, so this is a clear sign of good internal consistency. Put another way, it means that AI-EHSC, Patient Trust, Privacy Concern, and Adoption Intention were measured via items which are reliable enough for further factor analysis and structural modeling.

Table 4: Exploratory Factor Analysis

Construct/Factor	KMO	Bartlett's Test χ^2	df	p-value	Factor Loading Range	Decision
AI-Enabled Healthcare Service Characteristics	0.81	512.34	10	<0.001	0.62-0.78	Accepted
Patient Trust	0.83	534.12	10	<0.001	0.65-0.81	Accepted
Privacy Concern	0.79	468.56	6	<0.001	0.58-0.76	Accepted
Adoption Intention	0.82	523.47	10	<0.001	0.64-0.80	Accepted

Source: Primary Data

Interpretation

In terms of EFA, it was found that the KMO statistics were all greater than 0.79, and that Bartlett's tests were significant ($p < 0.001$). This implies that the data is suitable enough and the data indeed meets the requirements of conducting a factor analysis. The factor loadings range from 0.58 to 0.81, which means that the variables are highly represented by the latent constructs.

Table 5: Confirmatory Factor Analysis

Construct	Standardised Loading Range	Composite Reliability	AVE	Model Assessment
AI-Enabled Healthcare Service Characteristics	0.62-0.78	0.84	0.56	Accepted
Patient Trust	0.65-0.81	0.86	0.59	Accepted
Privacy Concern	0.58-0.76	0.85	0.52	Accepted
Adoption Intention	0.64-0.80	0.80	0.57	Accepted

Source: Primary Data

Interpretation

In fact, the outcome of the CFA also helps enhance the construct validity to some extent, although in general it was satisfactory already. The value of composite reliability exceeded 0.80 while the AVE exceeded 0.50, therefore the convergence validity is proven, beyond doubt. Standardized loading is within the range from 0.58 to 0.81, thus implying that all items have an effect on their constructs in a substantive way. Hence, the measurement model seems to be strong enough and appropriate for the SEM analysis.

Table 6: Correlation Analysis

Variables	AI-EHSC	Patient Trust	Privacy Concern	Adoption Intention
AI-Enabled Healthcare Service Characteristics	1	0.62	-0.34	0.58
Patient Trust	0.62	1	-0.41	0.66
Privacy Concern	-0.34	-0.41	1	-0.29
Adoption Intention	0.58	0.66	-0.29	1

Source: Primary Data

Interpretation

The correlation results reveal positive associations between AI-EHSC and Patient Trust $r=0.62$ and between Patient Trust and Adoption Intentions $r=0.66$. In addition, the correlation analysis reveals an association between AI-EHSC and Adoption Intentions $r=0.58$. However, Privacy Concerns are negatively associated with both Patient Trust $r=-0.41$ and Adoption Intentions $r=-0.29$, meaning that the higher the Privacy Concerns are, the lower Patient Trust will be and the lower the Adoption Intentions will be.

Table 7: Structural Equation Model and Hypothesis Testing

Hypothesis	Structural Relationship	Standardised β	C.R. / t-value	p-value	Decision
H1	AI-EHSC $\rightarrow$ Patient Trust	0.62	8.45	<0.001	Supported
H2	Patient Trust $\rightarrow$ Adoption Intention	0.66	9.12	<0.001	Supported
H3	AI-EHSC $\rightarrow$ Adoption Intention	0.28	4.21	<0.001	Supported

Source: Primary Data

Interpretation

It is evident from the SEM findings that the proposed relationships exist generally. AI-EHSC construct, undoubtedly, improves the level of Patient Trust ($\beta = 0.62$, $p < 0.001$), hence, H1 is supported. Thereafter, Patient Trust persists and predicts the Adoption Intention ($\beta = 0.66$, $p < 0.001$), hence, H2 is supported. In addition to this, AI-EHSC construct influences the level of Adoption Intention ($\beta = 0.28$, $p < 0.001$). Therefore, it can be said that H3 is supported too. In summary, it can be stated that the adoption behavior is not only influenced via indirect path but also through the direct path.

Table 8: Mediation Analysis

Hypothesis	Mediation Path	Direct Effect	Indirect Effect	p-value	Mediation Decision
H4	AI-EHSC → Patient Trust → Adoption Intention	0.28	0.41	<0.001	Supported

Source: Primary Data

Interpretation

The mediation analysis results indicate that Patient Trust does its task in terms of being the mediator, as far as the relationship between AI-EHSC and Adoption Intention is concerned. This is because the indirect effect (0.41, $p < 0.001$) seems to be significant. This means that AI-based EHSCs increase adoption intention through patient trust, rather than directly for that matter.

Table 9: Moderation Analysis

Hypothesis	Interaction Effect	β	C.R. / t-value	p-value	Decision
H5	Patient Trust × Privacy Concern → Adoption Intention	-0.12	-2.34	0.019	Supported

Source: Primary Data

Interpretation

From the results obtained from the moderation analysis, it is clear that the Privacy Concern does not add much in this case, as it negatively moderates the relationship between Patient Trust and Adoption Intention ($\beta = -0.12$, $p = 0.019$). This therefore confirms hypothesis five where even if patients have high trust in the system, their adoption intention will be affected by privacy concerns.

Discussion

Adoption intention of AI-driven healthcare services depends, both directly and indirectly, from their characteristics, as shown in the results of the current study, and frankly speaking, they provide quite convincing evidence of the high

significance of service quality for patient adoption intention. In relation to the positively correlated AI-EHSC and patient trust as well as patient adoption intention, this means that the organizations providing healthcare services who invest in AI will build up better adoption decisions among their patients. Moreover, the significance of the role of AI-EHSC in patient trust is a rather convincing proof of the important role of perceptions of the quality of healthcare services in terms of patient's trust, belief and even emotional acceptance of AI in healthcare. Study results appear to be similar to previous works which have pointed out trust as an important element of technology adoption, where, in particular, trust raises confidence and reduces uncertainty and thus fosters adoption of innovations. However, the results of this study also coincide with previous studies on the role of privacy concerns as the main barrier to technology adoption, when the higher privacy concerns undermine the positive effect of trust on patient adoption intention. Lastly, the research reveals that the sense of trust is an important mediator between AI-EHSC and adoption intention indicating that the service characteristics impact adoption through the enhancement of trust. Trust is vital for increasing the patients' confidence in the AI technologies, their dependability, and such an emotional component as well. As a result, they may opt for AI-based healthcare services rather than alternative ones. Such a finding supports the previous studies which indicated trust as an important mediator between technological innovations and behavioral outcomes. The moderation analysis appears to be valid as well because the importance of privacy concerns in the process of decision-making is revealed. They appear to significantly weaken the relationship between trust and adoption intention which in its turn proves to be quite strong. Thus, the findings support the technology adoption theory in healthcare. In practice, providers may increase the patients' adoption intentions towards AI services through manipulating such variables as service characteristics and trust and addressing the issue of privacy concerns. It may give providers a competitive advantage and improve the patient-provider relationships.

Implications

Such findings are, to an extent, of great significance regarding the theoretical and practical implications for the adoption of health care technology. From the theoretical perspective, the research contributes to the existing literature in that it analyzes the direct and indirect impact of AI enabled health care services characteristics on the patients' intention to adopt, as well as demonstrates the mediating role played by patient trust and moderating role played by patient privacy concern within the framework of PLS-SEM. This finding supports the hypothesis that trust plays the role of a psychological mechanism, based on which people's perceptions of AI service quality affect their decisions. As for the managerial implications, the lesson appears to be quite clear. Communication of these benefits must be done in an unambiguous manner and data protection must be ensured to increase the feeling of patients. In addition, consistency in service provision can be useful in this regard, as it can contribute to increasing trust and reducing privacy issues despite some skepticism. Hospitals and healthcare organizations can also use the potential of digital platforms, mobile applications and other approaches for patient engagement in order to increase trust in AI-based solutions. This will increase their adoption and give them sustainable competitive advantage in the dynamically changing healthcare market.

Conclusion

However, this particular study intended to examine the potential mediating role of patient trust and moderating role of privacy concern in the relationship between AI enabled healthcare service characteristics and adoption intention. Empirical findings obtained have proved that service characteristics do significantly increase patient trust and adoption intention while trust, in its turn, has a significant positive influence on adoption intention. Therefore, mediation analysis has confirmed that trust is one of the key mediator variables in this regard and, thus, besides the direct influence, AI service characteristics influence adoption through the increasing of patient trust. What is more, the moderation analysis revealed that privacy concerns decrease the strength of trust-adoption relationship, implying the need for addressing data security issues. Thus, this study confirms that carefully designed AI healthcare services, which will be able to develop trust and reduce privacy concerns of patients, will positively affect patients' willingness to adopt and, as a result, healthcare delivery.

Future Research Directions

Despite the benefits of this study, in terms of providing significant insight into the relationship between AI-enabled healthcare service characteristics and trust, privacy concern and intention to adopt, several issues remain somewhat unresolved for future research. First of all, the proposed conceptual framework could be enriched by considering such additional intermediate constructs as perceived usefulness, patient satisfaction, technology readiness and health literacy to obtain a comprehensive view on the adoption process. Moreover, it is worth considering moderating variables, like age, gender, income, cultural orientation or digital literacy, to discover any potential differences in responses of patient groups. Another important issue to address is that of comparing regions or countries to increase the generalizability of results. Additionally, longitudinal design will allow revealing dynamics in patients' beliefs and intention to adopt AI-based technologies. Lastly, industry specific studies, related to telemedicine, diagnostic tools or robotic surgery, will help in discovering some specific patterns and peculiarities. In general, this type of research will be beneficial in terms of contributing to both theory and practice, suggesting ways to enhance patients' adoption of AI technologies in different healthcare settings.

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