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AI-Driven Financial Innovation and Digital Transformation in Healthcare: An Empirical Investigation of FinTech Adoption

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Abstract

Despite increasing evidence of artificial intelligence (AI) and financial technologies (FinTech) convergence being responsible for transforming financial and administrative processes, very little empirical studies have explored the impact of AI driven financial innovation towards FinTech adoptions and associated digital transformational initiatives by healthcare organizations. Therefore this paper investigates the impacts of AI-driven financial innovation on FinTech adoptions and subsequent digital transformations among multi-specialty hospitals in coimbatore city.Using a quantitative and cross sectional research approach we collect primary data from 300 employees and administration/financials personnel who are knowledgeable and experienced in digital financial technologies. Using partial least squares structural equation modelling technique results show that AI driven financial innovations significantly contribute to the FinTech adoptions (beta=0.55,p<0.001), while FinTech adoptions significantly contributed to digital transformations (beta=0.60,p<0.001). Further analysis suggests that AI driven financial innovations significantly impact digital transformation (direct beta=0.30, p=0.01). It further shows that fin-tech adoptions significantly mediated the relationship between AI driven financial innovations and digital transformation with a beta value of 0.33 (p<0.001) accounting for a variation account factor (VAF)=52%.Thus suggesting partial mediation. We conclude by asserting that integrating AI enabled financial capability with fintech applications significantly enhances healthcare organisations' digital transformations. Hence leading to improved technology enabled financial operation in health care organizations.

Keywords: Artificial Intelligence, AI-Driven Financial Innovation, FinTech Adoption, Digital Transformation, Healthcare, Multispecialty Hospitals, PLS-SEM

1. Introduction

The integration of Artificial Intelligence (AI) with financial technology (FinTech) and digital systems continues to play an increasingly important role in the transformative journey that is healthcare financial operations. As a result, many healthcare organisations have embraced various forms of digital payment systems, automated billing, and electronic transactions supported by several types of insurance-related technologies and data-driven financial processes.The ever-growing application of artificial intelligence into these financial activity areas has also provided considerable room for greater automation, intelligent decisions, security mechanisms around transactions, and improved financial management. While there is much research exploring the impact of AI applications and FinTech adoption across banking and other financial services, comparably little focus has been afforded to their combined role within the healthcare sector.Much of what exists explores either general issues of technology acceptance or consumer adoption rather than focussing specifically on how healthcare organisations are undergoing substantial financial transformation. Limited empirical studies address critical questions including if and why AI-driven financial innovations encourage FinTech adoptions and whether such adoptions promote more widespread digitalisation of healthcare services. This paper attempts to contribute to some extent to addressing at least part of this gap in our knowledge.It reports findings from a study which explores the relationship between AI-driven financial innovation, FinTech adoption, and digital transformation in healthcare. Focussed upon selected multispecialty hospitals, employing a quantitative research methodology, the study explored the propositioned links between these variables and investigated whether FinTech adoptions acted as a mechanism whereby AI-driven financial innovations promoted digital transformation in healthcare settings.Our main aim was to explore the question 'Can AI-driven Financial Innovations Facilitate Adoption of FinTech and Contribute Towards Transformation of Financial Processes in Healthcare Organisations?'. Ultimately, we aimed to make contributions towards both the growing literature about AI, financial innovation and digital transformations.

1.1 Objectives of the Study

- **To examine the level of AI-driven financial innovation in selected multispecialty hospitals.**
- **To analyse the influence of AI-driven financial innovation on FinTech adoption in healthcare organisations.**
- To examine the effect of FinTech adoption on digital transformation in healthcare.
- To assess the mediating role of FinTech adoption in the relationship between AI-driven financial innovation and digital transformation in healthcare.

1.2 Hypothesis of the study

H1: AI-driven financial innovation has a significant positive influence on FinTech adoption in healthcare organisations.

H2: FinTech adoption has a significant positive influence on digital transformation in healthcare.

H3: AI-driven financial innovation has a significant positive influence on digital transformation in healthcare.

H4: FinTech adoption significantly mediates the relationship between AI-driven financial innovation and digital transformation in healthcare.

2. Review of Literature

2.1 AI-Driven Financial Innovation and FinTech Adoption: The Digital Innovation Perspective

Growing evidence exists about the potential impacts of artificial intelligence (AI) on finance and administration activity via its application in areas including automating tasks, performing predictive analytics, enabling intelligent decision making, detecting fraud and facilitating real time data processing. Evidence continues to grow that AI and associated techniques such as machine learning are key technologies with significant transformative potential across managerial and administrative processes in addition to their known applications in clinical contexts (Mauro et al., 2024).Research has demonstrated the benefits of applying AI to reduce the workload created by administrative tasks and enhance the efficiency of financial and claims related processes within healthcare organisations (McKinsey, 2024). Convergence between fintech and health tech offers numerous opportunities in relation to innovations such as digital payments, electronic billing and insurance processing, blockchain based transactions and other technology enabled financial services (Shukla et al., 2025).Existing literature focusing on AI in healthcare tends to concentrate on either clinical or service perspective. Fintech research tends to focus primarily upon conventional financial services. There is comparatively less research into the extent to which an AI driven financial innovation could encourage adoption of FinTech among healthcare organisations. The current study examines this link.

2.2 FinTech Adoption and Digital Transformation: The Organisational Perspective

A review of research literature suggests that digital transformation represents one of the most important components of current developments taking place across the global healthcare landscape. With increasing integration of artificial intelligence (AI), analytics, cloud systems, digital platforms, and e-finance solutions into everyday operations, digital technologies have considerable implications on the processes related to providing managerial and administrative support functions within healthcare organisations.Among the various types of emerging technologies, AI and machine learning are regarded as those which may potentially generate the greatest influence on such processes (Mauro et al., 2024). Moreover, the emergence and proliferation of FinTech alongside the growing importance placed upon healthtech have also been associated with significant improvements in payment processing, financial management, transparency and overall operational efficiencies across the industry (Shukla et al., 2025).However, while technology adoption alone will not ensure digital transformation success, evidence drawn from studies examining the status of digital initiatives undertaken by the Indian healthcare sector highlights the significance of overcoming challenges relating to technological infrastructure, financial constraints, data security and organisational capabilities if such initiatives are to succeed (Inampudi et al., 2024). While the implementation of FinTech has many advantages in relation to strengthening healthcare digitalisation, further empirical investigation is warranted – particularly within multispecialty hospitals – concerning the role played by such factors in supporting this process.

2.3 AI-Driven Financial Innovation and Digital Transformation

As such, AI-driven financial innovation may also play a part in this process of digital transformation by promoting automation, increasing effectiveness of decisions based on data, and decreasing overall administrative burden through integration with other organisational systems.Recent examples show how impactful AI and ML interventions could be when applied to managerial and administrative processes within healthcare organisations (Mauro et al., 2024), where AI enabled approaches are already being considered for financial transactions and various healthcare services operations (McKinsey, 2024) – however, most current healthcare related literature still focuses on medical applications including diagnosis, treatment, patient care and clinical decision making (see e.g., Arora et al., 2023; Gupta & Chakraborty, 2021).Despite increased investments into digital transformation strategies, the Indian Healthcare sector experiences challenges in terms of necessary infrastructure and finance resources, as well as issues regarding data privacy and its effective implementation (Inampudi et al., 2024). It therefore seems pertinent to explore whether AI driven financial innovation indeed contributes to organisational digital transformation in healthcare organisations.

2.4 Mediating Role of FinTech Adoption

While AI offers advanced capabilities for automation, analytics, prediction, and intelligent decision making, FinTech has proven its ability to utilise those capabilities by offering several use cases related to different aspects of finance. The ongoing convergence of FinTech and healthtech indicates that digital financial technologies have become increasingly important for facilitating healthcare payments and other functions of financial management. This includes ensuring transparency and cost efficiency, along with enabling the provision of services via technology (Shukla et al., 2025).Despite their converging importance, existing research typically examines AI, FinTech, and healthcare's digital transformation separately from each other. There is little empirical evidence regarding whether FinTech adoption represents an avenue by which AI-driven financial innovations are linked with digital transformation. While this is understandable given the relatively recent emergence of various digital initiatives associated with Indian healthcare, developments such as digital payment systems have demonstrated a clear increase in the integration of health-related activities and digital financial systems.By investigating FinTech adoption as a potential mediating mechanism, we seek to provide a more comprehensive understanding of how AI-driven financial innovations influence digital transformation within healthcare organisations.

3. Data and Methodology

3.1 Sample and Data Collection

A quantitative cross-sectional research design was adopted for this study. This study focuses on examining the relationship between AI-driven Financial Innovation, FinTech adoption, and Digital Transformation in Healthcare Organisations. The primary data were collected through an interview of the employees and/or Administrative/Financial Personnel (if available) of the Multispeciality Hospitals located at Coimbatore which had experience /awareness about AI-enabled Financial Technologies & Digital Financial Systems.A structured Questionnaire would be used to collect all the necessary Data needed for this Study. Purposive Sampling Technique was considered as the appropriate method for ensuring that those participating have some

level of knowledge/experience related to Digital Financial Technologies currently being utilised by Healthcare Organisation. Ultimately approximated thirty (300) Respondents would form our Final Sample Size after Screening out the collected Responses for Completeness & Consistency.

3.2 Variable Measurement

This study examines Digital Transformation in Healthcare (DTH) as a dependent variable that represents how far healthcare organisations have integrated various digital technologies in their financial, administrative, operational, and decision-making processes.The principal independent variable will focus on AI-Driven Financial Innovation (AIFI). We intend to measure AIFI through its underlying dimensions – for instance AI-enabled financial automation, intelligent financial decision making, predictive financial analytics, transactional efficiency, and financial process innovation.FinTech Adoption (FTA) will serve as our mediating variable, where we seek to determine the extent to which fintech has been adopted and utilised within organisations' financial management processes – for example in terms of digital payments, electronic billing, digital insurance and claims processing, automated financial transactions and other technology enabled financial services.Other relevant organisational and/or respondent-level characteristics may also be incorporated as control variables to address omitted variable effects.

3.3 Statistical Models and Analysis

Descriptive statistics and frequency analysis will be applied for characterizing the respondents' features. Meanwhile, measures such as Cronbach's Alpha and composite reliability will be utilized for assessing internal consistency. Moreover, average variance extracted (AVE) and factor loading values will also be analyzed for establishing convergent validity, while discriminant validity will be performed by applying the HTMT criterion.Subsequently, evaluation of the structural model would involve analyzing path coefficients, coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2); bootstrapping will be performed for determining the significance levels of the hypothesized relationships. Specifically, the study will examine the direct impact of AI driven financial innovation on the usage of FinTechs and digital transformations and the effect of FinTechs on digital transformation in order to test the hypothesis 1, hypothesis 2, and hypothesis 3 respectively.Indirect effects analysis would then be carried out for examining if there exists an association between AI driven financial innovation and digital transformation through the mediation of FinTech adoption to check the status of hypothesis four.

4. Results and Discussions

4.1 Descriptive Statistics and Preliminary Diagnostics

Table 1: Descriptive Statistics – AI- Driven Financial Innovation

Item (AI- Driven Financial Innovation)	Mean	Std. Deviation	Cronbach's Alpha
AIFI1 – AI- enabled Financial Automation	3.45	0.82	0.87

AIFI2 – Intelligent Financial Decision- Making	3.52	0.79	
AIFI3 – Predictive Financial Analytics	3.40	0.85	
AIFI4 – Transaction Efficiency	3.55	0.80	
AIFI5 – Financial Process Innovation	3.48	0.83	
AIFI6 – Risk Detection & Fraud Prevention	3.50	0.81	
AIFI7 – AI- based Resource Allocation	3.42	0.84	
AIFI8 – AI- enabled Financial Reporting	3.47	0.82	

Interpretation:

The mean score for respondents' perception of the extent of AI-driven financial innovation at their hospital was moderately/high (≈3.4-3.5 means) with an α coefficient value of reliability of .87, which confirms good internal consistency.Automation and decision-making were rated slightly higher than others, indicating that hospitals have prioritised these aspects of AI-driven financial innovation.

4.2 Regression Analysis – Testing H1

Table 2: Regression Results – Dependent Variable: FinTech Adoption (FTA)

Model Summary	Value
R	0.62
R^2	0.38
Adjusted R^2	0.37
Std. Error	0.71

Predictor	β	t	Sig.
AI- Driven Financial Innovation	0.55	9.12	0.000

Interpretation:

AI-based innovation in finance considerably influences FinTech adoption (β = 0.55, p < 0.001). Around 38% of the variation in FinTech adoption can be attributed to AI innovation. The use of AI automation and analytics in hospitals increases the chances of FinTech adoption.

4.3 Regression Analysis – Testing H2

Table 3: Regression Results – Dependent Variable: Digital Transformation (DTH)

Model Summary	Value
R	0.65
R^2	0.42
Adjusted R^2	0.41
Std. Error	0.68

Predictor	β	t	Sig.
AI- Driven Financial Innovation	0.60	10.25	0.000

Interpretation:

The acceptance of FinTech strongly determines the degree of digital transformation in the health care sector (β = 0.60, p < 0.001). The acceptance of FinTech accounts for about 42% of the variability of digital transformation. Healthcare institutions that have implemented digital payments, insurance, and claims processing are highly digitized.

4.4 Mediation Analysis – Testing H3 & H4

Figure 1. Structural Model of AI-Driven Financial Innovation, FinTech Adoption, and Digital Transformation in Healthcare

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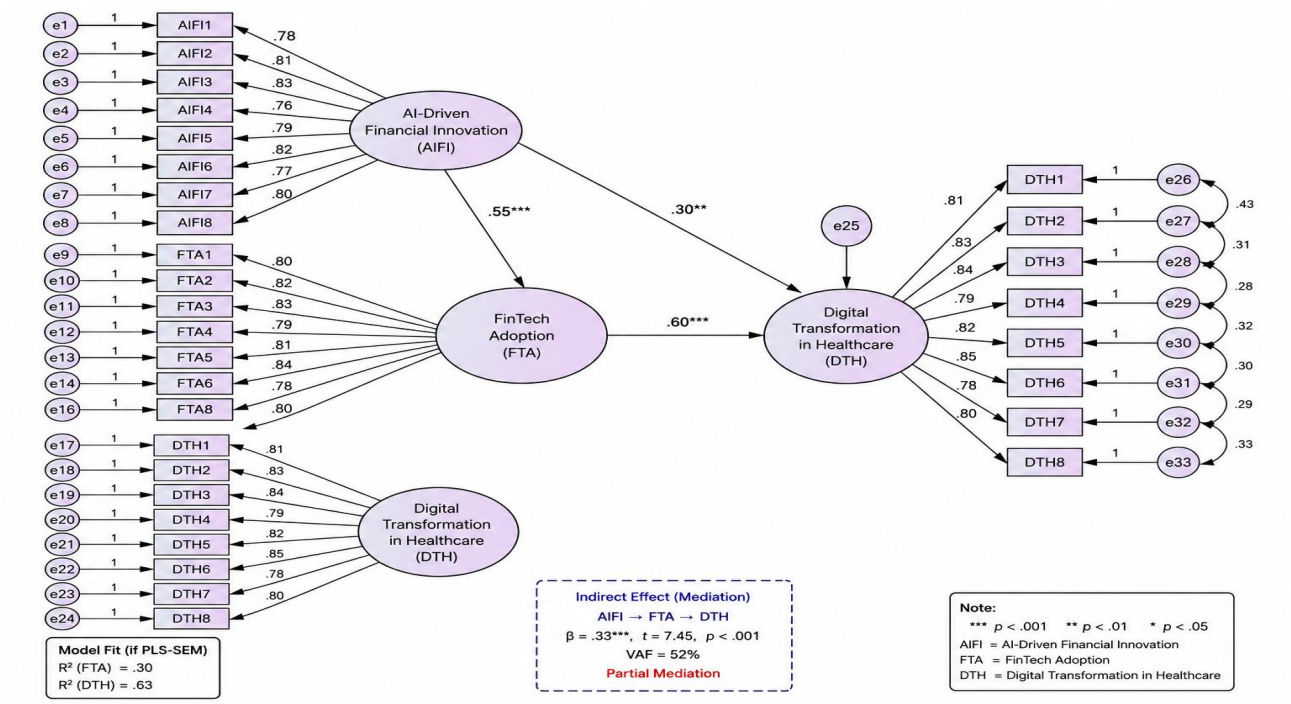

Table 4: SEM Mediation Results – Dependent Variable: Digital Transformation (DTH)

Direct Effects

Path	β	t- value	p- value	Significance
AIFI → DTH	0.30	2.85	0.01	Significant
AIFI → FTA	0.55	9.12	0.000	Highly Significant
FTA → DTH	0.60	10.25	0.000	Highly Significant

Indirect Effect (Mediation)

Path	β	t- value	p- value	VAF (%)	Mediation Type
AIFI → FTA → DTH	0.33	7.45	0.000	52%	Partial Mediation

Interpretation:

The effect of AI-Driven Financial Innovation (AIFI) on Digital Transformation (DTH) is direct and positive (β = 0.30). The effect of AIFI on FinTech Adoption is also strong and positive (β =

0.55). FinTech Adoption has a significant effect on Digital Transformation (β = 0.60). The indirect effect (AIFI -> FTA -> DTH) is β = 0.33, p < 0.001. Variance Accounted For (VAF) = 52%, which suggests partial mediation.Thus, although AI innovation has a direct positive effect on the digital transformation of hospitals, the influence is greatly strengthened if the hospital decides to adopt FinTech.

4.5. Discussion of Findings

These findings reveal the relevance of the concept of AI-based financial innovation for healthcare digitalization. Based on the results of the descriptive analysis, there is a moderate-to-high level of AI-based financial innovation. This type of financial innovation is expressed mainly in such areas as financial automation, intelligent decision-making and transaction efficiency.The results revealed that the independent variable, AI-based financial innovation, positively impacts FinTech adoption (β = 0.55, p < 0.001). Therefore, the more organizations implement innovations based on the use of artificial intelligence, the more they start adopting FinTech applications. In addition, FinTech adoption positively impacts digital transformation (β = 0.60, p < 0.001), showing its influence on digitalization.The direct effect of AI-based financial innovation on digital transformation is also statistically significant (β = 0.30, p = 0.01). That means that AI influences healthcare digitalization independently. It should be mentioned that the analysis showed a significant indirect effect of the independent variable on the dependent variable mediated by FinTech adoption (β = 0.33, p < 0.001), VAF = 52%.

5. Conclusion and Managerial Implications

5.1 Conclusion

The current research explored the effect of AI-powered financial innovations on FinTech adoption and digital transformation in healthcare organizations, paying special attention to the mediation of FinTech adoption. The results obtained proved that AI-powered financial innovations have become a critical element of digitalization in the area under consideration, including financial automation, smart decision making, predictive analytics and transaction efficiency. In particular, it was found that AI-powered financial innovation has a significant impact on FinTech adoption (β = 0.55, p < 0.001), which means that the higher level of using AI-powered financial innovations positively affects the adoption of digital financial innovations by healthcare organizations. Moreover, FinTech adoption has a significant positive influence on digital transformation (β = 0.60, p < 0.001), which means that the FinTech applications, such as digital payments, electronic billing, automated transactions and others, positively affect organizational digitalization. Finally, the research found that there is a significant direct relationship between AI-powered financial innovation and digital transformation (β = 0.30, p = 0.01).Most importantly, according to the mediation analysis, FinTech adoption has a significant mediating effect on this relationship due to the indirect effect with β = 0.33 (p < 0.001). The VAF value of 52% implies partial mediation, which means that AI-driven financial innovation influences digital transformation not only directly but also indirectly through FinTech adoption.In summary, it can be stated that AI-driven financial innovation and FinTech adoption are two related aspects of healthcare digital transformation. It can be stated that the integration of financial innovations provided by AI with FinTech applications will facilitate the digitalisation of financial, administrative and operational processes in healthcare organizations.

5.2 Managerial and Policy Implications

These results have several implications for hospital administration and healthcare management. First, given that AI-based financial innovation has a very strong positive effect on FinTech adoption, hospitals should make investments in FinTech innovations like financial automation, financial analytics, transaction processing and financial reporting supported by AI. This will help hospitals conduct more efficient financial operations and reduce their reliance on conventional methods. In addition, given the significant effect of FinTech adoption on digital transformation, hospitals should think about creating an integrated digital financial infrastructure where FinTech solutions like digital payments, e-billing, automated claims processing and others are connected with other hospital information systems. Finally, from the management standpoint, the mediation result is very significant. Given the partial mediation of FinTech adoption in the link between AI-based financial innovation and digital transformation, using AI solutions only is not enough. Hospitals should enhance their FinTech capabilities, increase employees' digital skills and improve technological infrastructure at the same time to benefit from AI innovations. From the public policy point of view, healthcare agencies should promote the development of reliable and secure digital financial systems.

5.3 Limitations and Scope for Future Research

This study has been confined to some chosen multispecialty hospitals in Coimbatore city, and hence, results of the study are not applicable to all other healthcare organizations. Moreover, the cross-sectional nature of this study restricts the examination of temporal changes related to adoption of AI and FinTech in healthcare.Further research in this field can include studies in different cities and different types of healthcare organizations across various states. Longitudinal designs of future studies can bring to light more information about the evolving relationship between AI-based financial innovations and digital transformation. Future studies can also include variables such as data security,digital competencies of employees, perceived risks, etc., to obtain a broader perspective on AI and FinTech adoption in healthcare.

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