

## **Understanding users' behavioral intention to use artificial intelligence for personal financial management: an innovation diffusion theory approach**

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**Abstract.** *The purpose of this study is to investigate the factors that influence users' behavioral intentions to adopt Artificial Intelligence for personal financial management using an Innovation Diffusion Theory (IDT) framework. An analysis of empirical data collected from 246 users is conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM). Findings reveal that users' intentions to embrace AI in financial management are influenced by a variety of factors, including relative advantage, compatibility, and observability. As a result of this study, we offer insights into the intricate interplay of factors affecting the adoption of artificial intelligence in personal finance.*

**Keywords:** Artificial Intelligence, Fintech, Personal Financial Management, Innovation Diffusion Theory.

**JEL Classification:** O16, O33, N75.

## 1. Introduction

In the contemporary technological landscape, Artificial Intelligence (AI) has ushered in transformative changes, particularly in the area of personal financial management (PFM) (Anshari et al., 2022). AI-driven applications for personal financial management represent an important departure from conventional financial tools. Using advanced algorithms, machine learning, and predictive analytics, these applications provide users with personalized insights, real-time data analysis, and proactive recommendations (Chang & Wang, 2023). By enabling individuals to gain a deeper understanding of financial matters and make informed decisions, these tools aim to redefine how individuals approach and navigate their financial landscapes (Nain & Rajan, 2023).

An important aspect of AI-PFM applications is their potential to democratize access to sophisticated financial advice. The applications cater to a diverse range of individuals regardless of their level of financial literacy, providing tailored solutions that adapt to changing economic conditions (Lin-Jiang et al., 2023). Increasing financial complexity and uncertainty have made AI-PFM tools a crucial tool for creating wealth, reducing risk, and reaching goals.

The literature regarding the factors that influence users' intentions to adopt AI-PFM applications in India is noticeably lacking, despite the increasing importance of AI-PFM applications. Studying the Indian market as a case study, this study examines the nuanced sociocultural and economic factors that influence user perceptions. In this study, the primary objective is to understand the behavioral intentions of users in regards to AI-PFM adoption, in line with the need to understand the unique dynamics in the Indian financial market.

The purpose of this study is to provide a deeper understanding of the adoption dynamics of AI-driven PFM applications in India based on the aforementioned gaps in the literature. As a conceptual framework for the research, the Innovation Diffusion Theory (IDT) is employed, which was first proposed by Rogers (1962). The theory provides a framework for analyzing the adoption and diffusion of innovations within social systems, providing a holistic understanding of the complexities involved in the adoption of AI. Using IDT in the context of AI-PFM in India, this study provides insight and practical recommendations for financial institutions, policymakers, and developers to enhance the adoption and effectiveness of AI-driven financial management solutions in the Indian market.

## 2. Literature Review and Theoretical Framework

Rogers' Innovation Diffusion Theory (IDT), first introduced in 1962 and refined in subsequent editions, provides a fundamental framework for understanding how innovations are spread within social networks. IDT's relevance in diverse fields is evident, with intrinsic attributes such as relative advantage, compatibility, complexity, trialability, and observability influencing adoption of innovations (Rogers, 1962). IDT has been applied to a number of contexts, ranging from healthcare and technology to agriculture and education, as it has evolved (Alyoussef, 2023).

Literature on Artificial Intelligence (AI) applications for Personal Financial Management (PFM) has illustrated the transformative potential of these innovations in the area of technology. AI-driven PFM applications, leveraging machine learning and predictive analytics, offer personalized insights and real-time analysis, reshaping traditional financial tools (Anshari et al., 2022). In spite of their potential benefits, little is known about the factors that influence the adoption of these technologies in contexts such as India.

It is in this context that the predictive power of IDT is crucial in anticipating adoption intentions. IDT's framework enables a systematic analysis of AI-driven PFM innovations based on their perceived attributes. Relative advantage, reflecting the perceived improvement over existing financial tools, compatibility with user values and practices, trialability, and observability of benefits, all play a pivotal role in shaping users' intentions to adopt these innovations (Rogers, 1962). Additionally, communication channels and social systems influence how information about AI-PFM applications is disseminated and how adoption behavior is influenced by social networks.

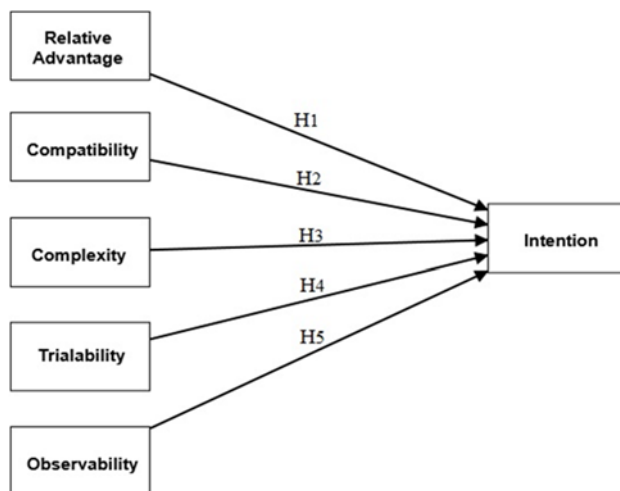
The application of IDT to the adoption dynamics of AI-driven PFM applications in India becomes an essential avenue for exploration as scholars and practitioners continue to draw upon IDT. Through the use of IDT, this study aims to gain insight into the factors that influence users' intentions in order to inform the development, implementation, and diffusion of AI-PFM technologies in the dynamic socio-economic landscape of India. The integration of AI into personal financial management represents a significant innovation, and IDT offers a structured lens to understand and predict the adoption patterns of these transformative technologies.

### 3. Hypothesis Development

In the context of Artificial Intelligence-driven Personal Financial Management (AI-PFM) applications, several key variables derived from the Innovation Diffusion Theory (IDT) influence users' intentions to adopt these innovations. The concept of "Relative Advantage" speaks to users' perceptions of the superiority of AI-PFM applications over traditional financial tools, emphasizing efficiency, accuracy, and overall utility. The variable "Compatibility" delves into the alignment between AI-PFM applications and users' existing financial practices and preferences. Perceived "Complexity" focuses on the ease of use and user interface, highlighting that a less complex system enhances adoption likelihood. "Trialability" reflects the opportunity for users to experiment with AI-PFM applications before full commitment, reducing perceived risk. Lastly, "Observability" centres on the visibility of benefits, emphasizing tangible and observable improvements in financial management. Previous studies have consistently found positive relationships between these variables and adoption intention in various technological contexts, reinforcing the theoretical underpinnings of IDT and highlighting their significance in shaping users' attitudes toward the adoption of AI-PFM applications (Al-Bashayreh et al., 2022; Jeong et al., 2021; Ntsiful et al., 2022). These variables collectively provide a robust framework for understanding the multifaceted dynamics influencing the adoption of innovative financial technologies.

- H1: Relative advantage positively affecting Adoption Intention.  
 H2: Compatibility positively affecting Adoption Intention  
 H3: Complexity positively affecting Adoption Intention  
 H4: Trialability positively affecting Adoption Intention  
 H5: Observability positively affecting Adoption Intention

**Figure 1. Research Model**



#### 4. Research Design and Methods

A quantitative research design is used in this study in order to investigate the factors that influence the adoption of Artificial Intelligence-driven Personal Financial Management (AI-PFM) applications. The primary aim is to gather empirical data on users' perceptions and behavioral intentions. A structured survey instrument is administered through Google Forms in a cross-sectional study, allowing data to be collected at a single point in time. Participants in this study are those who actively use AI-PFM applications in the state of Tamil Nadu, India. The convenience sampling method is employed due to practical constraints, targeting users who are able to access online platforms. In total, 253 respondents are included in the sample, representing a diverse cross-section of AI-PFM users in the region. The questionnaire is structured with a five-point Likert-scale items. There were a total of 253 samples obtained at the end of the survey, which met the minimum sample size requirement of 200 for the SEM analysis (Kline, 2011).

#### 5. Data Analysis and Results

The data collected for this study is analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) through the software SmartPLS4. PLS-SEM is particularly well-suited for complex models and exploratory research, making it an appropriate choice for investigating the relationships between variables in the context of AI-driven Personal Financial Management (AI-PFM) adoption.

## 6. Assessment of Measurement Model

The assessment of the measurement model in this study ensures the reliability and validity of latent constructs derived from Innovation Diffusion Theory as shown in Table 1. High Cronbach's alpha coefficients (ranging from .892 to .902) indicate strong internal consistency, affirming the reliability of items within each construct (Henseler et al., 2009). Additionally, composite reliability values ranging from .825 to .831 reinforce the stability of the measurement model, indicating high internal consistency and reliability across latent constructs (Henseler et al., 2009). The examination of Average Variance Extracted (AVE) values, all exceeding .7, underscores the convergent validity of the measurement model, indicating that the latent constructs effectively represent the measured variables (Hair et al., 2022). These results collectively affirm the robustness of the measurement model, establishing a solid foundation for subsequent analyses exploring relationships between variables in the context of AI-driven Personal Financial Management adoption. Further, Using the Fornell-Larcker criterion, discriminant validity was confirmed. Table 2 showing that the square root of the Average Variance Extracted (AVE) for each construct exceeded its correlation with other constructs (Fornell & Larcker, 1981). This robustly establishes the distinctiveness of each construct, ensuring confidence in the measurement model's ability to capture unique facets of the theoretical framework.

**Table 1.** Construct validity and reliability

Construct	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
Compatibility (COMP)	0.901	0.831	0.771
Complexity	0.902	0.832	0.773
Intention (INT)	0.899	0.830	0.767
Observability (OB)	0.892	0.825	0.755
Relative Advantage (RA)	0.894	0.827	0.760
Trialability (TR)	0.893	0.825	0.756

Source: Primary Data.

**Table 2.** Discriminant validity - Fornell-larcker criterion

	COMP	CPX	INT	OB	RA	TR
COMP	0.878					
CPX	0.812	0.879				
INT	0.814	0.807	0.876			
OB	0.831	0.807	0.825	0.869		
RA	0.821	0.760	0.768	0.786	0.872	
TR	0.868	0.791	0.778	0.822	0.786	0.870

Source: Primary Data.

## 7. Assessment of Structural Model

The structural model analysis reveals significant positive effects for Compatibility ( $\beta = .208$ ,  $p < 0.1$ ), Relative Advantage ( $\beta = .265$ ,  $p < 0.01$ ), and Observability ( $\beta = .317$ ,  $p < 0.01$ ) on Adoption Intention in the context of AI-driven Personal Financial Management applications. However, the relationship between Relative Complexity and Adoption Intention is not statistically significant ( $\beta = .122$ ,  $p = 0.116$ ), nor is there a significant relationship between Trialability and Adoption Intention ( $\beta = .030$ ,  $p = 0.759$ ). These nuanced findings emphasize the critical impact of compatibility, relative advantage, and observability in influencing positive adoption intentions, while highlighting areas where perceived complexity and trialability may have less pronounced effects.

**Table 3.** *Hypotheses Testing Results*

Hypotheses	Path	$\beta$	T statistics	P values	Decision
H1	RA-> INT	0.265	2.921	0.004	Supported
H2	COMP -> INT	0.208	2.206	0.027	Supported
H3	CPX-> INT	0.122	1.573	0.116	Not Supported
H4	TR-> INT	0.030	0.307	0.759	Not Supported
H5	OB-> INT	0.317	2.983	0.003	Supported

Source: Primary Data.

## 8. Discussions

The findings of the study shedding light on the factors influencing the adoption of Artificial Intelligence-driven Personal Financial Management (AI-PFM) applications. In line with the findings of extant research studies (Almaiah et al., 2022; Lin, 2011; Liu et al., 2022; Sudarsono et al., 2022), the present study observed positive and significant effects for Compatibility, Relative Advantage, and Observability on Adoption Intention substantiate the primary objective of understanding the drivers of AI-PFM adoption.

The positive relationship between Compatibility and Adoption Intention ( $\beta = .208$ ,  $p < 0.1$ ) underscores the importance of aligning AI-PFM applications with users' existing financial practices, validating the findings of extant research on adoption intentions. Similarly, in line with the extant research, the positive effect of Relative Advantage on Adoption Intention ( $\beta = .265$ ,  $p < 0.01$ ) supports the hypothesis that users perceiving superior advantages in AI-PFM are more likely to express positive adoption intentions. Furthermore, the significant positive effect of Observability on Adoption Intention ( $\beta = .317$ ,  $p < 0.01$ ) reinforces the findings of previous studies, that users who can visibly observe the benefits of technological applications are more inclined to adopt. This finding underscores the practical significance of making the advantages of AI-PFM technologies tangible and visible to users.

However, the non-significant relationship between Relative Complexity and Adoption Intention ( $\beta = .122$ ,  $p = 0.116$ ) suggests that, in this context, perceived complexity may not be a decisive factor in users' adoption intentions. This nuanced result challenges the hypothesis, emphasising the need to consider other factors that may weigh more heavily in users' decision-making processes. Similarly, the lack of a significant relationship between Trialability and Adoption Intention ( $\beta = .030$ ,  $p = 0.759$ ) indicates that the ease of experimentation with AI-PFM applications before full adoption may not strongly influence users' intentions. This result prompts a reevaluation of the hypothesized impact of trialability in the AI-PFM context.

In summary, the discussion based on the proposed research model underscores the critical role of Compatibility, Relative Advantage, and Observability in shaping positive AI-PFM adoption intentions. The non-significant relationships with Relative Complexity and Trialability highlight areas where user perceptions may deviate from conventional expectations, offering avenues for future research and refining strategies to enhance AI-PFM adoption.

## 9. Theoretical and Practical Implications

By enhancing the understanding of technology adoption, this study emphasizes the relevance of Compatibility, Relative Advantage, and Observability in the context of Artificial Intelligence-driven Personal Financial Management (AI-PFM). It is noteworthy that there are no significant relationships between Relative Complexity and Trialability, which challenges conventional assumptions, prompting a reconsideration of factors influencing user decisions. Stakeholders, including developers, financial institutions, policymakers, and users, can benefit from these insights. By prioritizing user-centric design, emphasizing the relative advantage, and promoting observable benefits, developers can generate greater value. By educating their users, financial institutions can address complexity concerns, while policymakers may encourage the implementation of AI-PFM solutions that are user-friendly. Increased awareness and familiarity among users contribute to the successful integration of AI-PFM technologies into everyday financial practices.

## 10. Conclusion

In conclusion, this study has delved into the intricacies of Artificial Intelligence-driven Personal Financial Management (AI-PFM) adoption in Tamil Nadu, India. The purpose of this study was to identify the factors that shape users' intentions to adopt AI-PFM technologies, and the results were closely aligned with the proposed research model. A key influencer was compatibility, emphasizing the importance of aligning AI-PFM applications with the existing financial practices of users. Additionally, Relative Advantage demonstrated that users gravitate towards AI-PFM technologies when they perceive superior benefits. Observability played a crucial role, indicating that users are more likely to adopt when they can visibly observe the benefits of AI-PFM applications.

However, the study concluded that Relative Complexity and Trialability did not significantly influence adoption intentions, indicating that users may consider other factors as part of their decision-making process. Even though this study offers valuable insights, it acknowledges limitations, such as potential selection bias caused by convenience sampling and the cross-sectional nature of the study. Research on AI-PFM adoption could be conducted using a variety of sampling methods and longitudinal designs in the future.

In summary, this research offers practical implications for developers, financial institutions, and policymakers navigating the landscape of AI-PFM adoption. Understanding the nuanced dynamics revealed in this study may enable stakeholders to refine strategies to enhance the acceptance and effectiveness of AI-PFM technologies. This can contribute to the evolving field of personal financial management in the age of artificial intelligence.

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