The Bioscan AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES 19(2): 177-181, 2024 www.thebioscan.com

Does Facilitating Conditions have an Effect on AI Adoption in Financial Services? Exploring Further Impact on Digital Financial Inclusion

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DOI: https://doi.org/10.63001/tbs.2024.v19.i02.pp177-181

KEYWORDS
Artificial intelligence, performance expectancy, effort expectancy, facilitating conditions, digital financial inclusion.
Received on:

10-09-2024

Accepted on:

05-10-2024

Published on:

11-11-2024

ABSTRACT

Objectives: This paper studies the impact of the role of facilitating conditions on the adoption of artificial intelligence in financial services, further exploring the impact on digital financial inclusion.

Methods: The research model used is the modified Unified Theory of Acceptance and Use of Technology (UTAUT) model. Independent variables likely, performance expectancy, effort expectancy and facilitating conditions and their effect on adoption of AI in financial services has been researched using questionnaire method. Further the impact of adoption of AI in financial services impact on digital financial inclusion is studied. Judgemental sampling technique was used and the data was analysed using SPSS and AMOS software.

Findings: Results reveal that performance expectancy, effort expectancy and facilitating conditions have a positive influence on the adoption of artificial intelligence on financial services. Also, it was found out that the adoption of artificial intelligence on financial services has a significant positive impact on digital financial inclusion. These findings shall be helpful in policy and strategy formulation of the government and corporate and fintech firms in accordance to the use and adoption of artificial intelligence in the financial services industry and increase the financial inclusion of a population using digital methods.

INTRODUCTION

Artificial intelligence primarily refers to the science and engineering of making intelligent machines, especially intelligent computers. It is aimed to the task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable.[1] AI has its origin as the product of human contrivance and ingenuity rather than as a result of natural influence. Things that are artificially intelligent differ from those that are naturally intelligent as artifacts that possess special properties ordinarily possessed by non-artifacts.[2] AI has been revolutionized banking and the financial sector and has created a major influence on human labour along with other stakeholders. The concept of "industry 4.0" dramatically changed how organizations operate today.[3] Artificial intelligence in finance aims to provide a research forum to discuss solutions that efficiently automatize both fintech compliance (RegTech) and supervisory monitoring (SupTech).[4] Due to their strong predictive performance, AI-based systems are becoming increasingly crucial for decision-making and offer a range of opportunities for corporations and firms to exploit the economic potential of augmentation.[5] The financial industry increasingly relies on computational methods, using the adoption of AI and ML with high-power computation backed by sophisticated hardware and software advances empowering machines to develop high-dimensional complex models leading to robust evaluation of new information transforming trading and investment decisions.[6]

AI enables predictive analytics, which allows financial institutions to make educated choices with precision and efficiency by evaluating real-time data streams and earlier trends. Intelligent algorithms speed up the processes and enhance individuals and organization's financial well-being, which raises awareness of AI's banking potential.[7] Understanding the fundamental challenges faced by the financial services industry, the motivations for the use of AI are increased.[8] Artificial intelligence has proved to be a major tool to increase financial inclusion. According to world bank financial inclusion is the attempt to provide "individuals and businesses access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way." The Financial Inclusion Index by the RBI considers 'Access', 'Usage' and 'Quality' as the three dimensions of financial inclusion. Digital financial inclusion allows the country's financial system to serve the community of the poor and financially excluded people.

THEORETICAL BACKGROUND & HYPOTHESES FORMULATION

Earlier studies have revealed that UTAUT model (Unified theory of acceptance and use of technology) can partially predict the likelihood of AI and related technologies adoption among its users. UTAUT has two major independent variables performance expectancy and effort expectancy. The performance expectancy refers to "the degree to which a person believes that using a particular system would enhance his or her job performance," while the effort expectancy is defined as "the degree of ease associated with the use of the system,". Added to these

facilitating conditions can be considered an independent variable where facilitating conditions refers to "the degree to which an individual believes that an organisation and technical infrastructure exists to support the use of the system".[9] In a study, on use of artificial intelligence in higher education, it was found that, facilitating conditions could positively predict behavioural intention.[10] Another study on the proposed eight-factor AI chatbots adoption model holds substantial potential in understanding the influence of performance expectancy, effort expectancy, social influence, trust, perceived risk, and facilitating conditions on behavioural intention to AI chatbots adoption. It revealed that performance expectancy, effort expectancy and facilitating conditions have a significant positive effect on technology adoption.[11] The findings of a study on teachers well-being in the post Covid era and use of AI revealed that there was a significant positive relationship between occupational well-being and teaching self-efficacy and performance expectancy, effort expectancy , and facilitating conditions, indicating that faculty members are influenced in the adoption of AI. It also revealed that users tend to accept AI and it shall help to improve their performance at work.[12]

Earlier work on adoption of AI in healthcare systems indicated that when individuals perceive that using AI-based healthcare systems will provide benefits such as increased productivity and effectiveness, they are more likely to intend to use these systems. The finding showed that performance expectancy, effort expectancy and facilitating conditions have a major positive influence on the behavioural intention to use AI-based healthcare systems. [13] In a research, on Canadian radiation oncologists and their adoption of AI technology in their field of work, performance expectancy, effort expectancy and facilitating conditions were high and positively influenced AI technology, as they believed that the AI technology could improve their work performance and efficiency.[14] The findings of a study on medical practitioners on the use of artificial intelligence based robots confirmed that the facilitating conditions, effort expectancy and performance expectancy have a positive impact its adoption.[15] Similarly, another study on the role of AI adoption in recruitment revealed that perceived expectancy, effort expectancy, and facilitating conditions, significantly impact the intention to adopt AI for recruitment.[16] Also, earlier several studies have proved that performance expectancy, effort expectancy, social influence, and facilitating conditions have positive effects on use behaviour of AI based technologies.[17] [18] There have several earlier research works that clearly indicate that performance expectancy, effort expectancy and facilitating conditions have a positive influence on the adoption of AI based technological solutions and users have expressed a positive intention to use the said technology, especially in the field of AI acceptance among HR professionals in Indian IT industries, e-banking adoption, and chatbot adoption. The facilitating conditions are essential, and this finding highlights the importance of creating a supportive environment for AI integration.[19]

Some studies have also revealed that artificial intelligence-based solutions have helped in improving the digital financial inclusion of a population. A study revealed that AI led solutioning helps in reducing costs of digital financial inclusion delivery systems.[20] It has been found out that financial institutions can harness the potential of AI to improve efficiency and reduce various risks, which can lead to low-income people's increased access to financial services.[21] Another study concluded that artificial intelligence and its implementation in finance enables people to take part in the formal financial sector and thus, enhances economic growth and reduces poverty.[22] According to a study, AI based approach can help financial service providers to think and to re-think about how AI can assist humans to build stronger relationships with their prospective customers, especially, those who are not yet served by the traditional banking sector will benefit from new technologies such as AI-driven innovations and investments to boost productivity, increase living standards, unleash entrepreneurial capacity, and reduce economic inequalities.[23] The study on the role of Ai in financial inclusion provided theoretical insights on the role of Artificial Intelligence (AI) in promoting financial inclusion. The paper expressed that AI implementation for promoting financial inclusion can be made possible by supporting regulatory framework and infrastructure.[24] A research work concluded that the development of digital infrastructure should be one of the foundations of the economic and social development plans which will make it easy for those excluded to be able to participate fully.[25] Another research recommended that financial institutions such as banks and credit lending institutions invest more in artificial intelligence and machine learning to ensure that financially excluded households can obtain credit.[26]

Basis the above understanding and study of existing literature the below two-step research model was suggested and hypotheses has been formulated. Expanded UTAUT has been considered the basic research model including facilitating conditions as an added independent variable and digital financial inclusion as the final dependent variable.

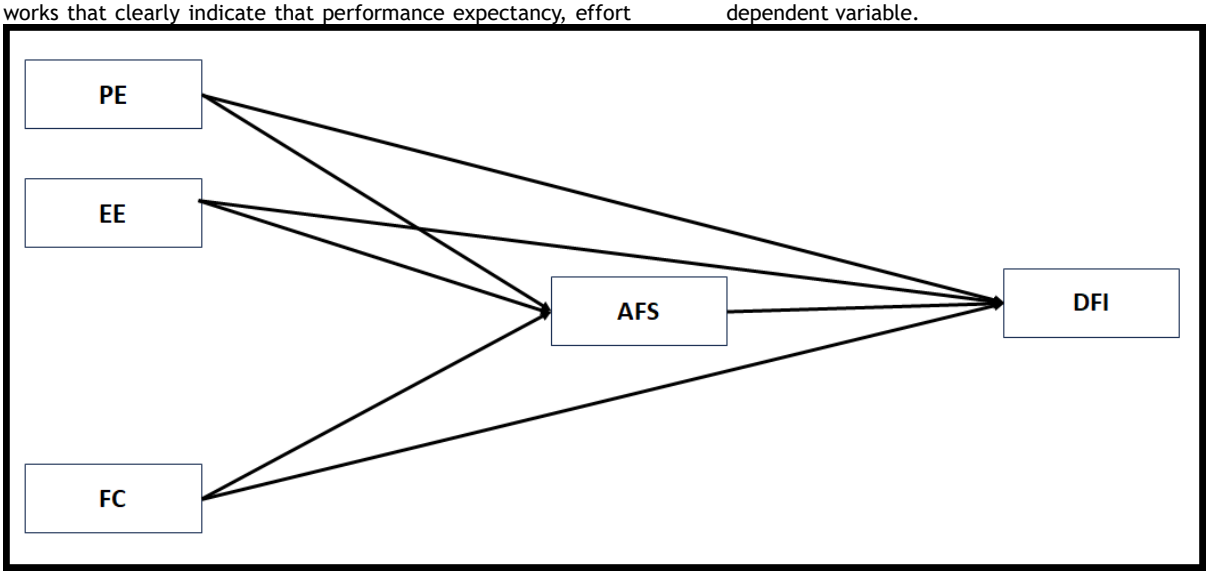

Figure 1. Proposed hypothesised model

H1: Performance Expectancy (PE) has a positive impact on Adoption of Artificial Intelligence in Financial Services (AFS)

H2: Effort Expectancy (EE) has a positive impact on Adoption of Artificial Intelligence in Financial Services (AFS)

H3: Facilitating Conditions (FC) has a positive impact on Adoption of Artificial Intelligence in Financial Services (AFS)

H3: Performance Expectancy (PE) has a positive impact on Digital Financial Inclusion (DFI)

H4: Effort Expectancy (EE) has a positive impact on Digital Financial Inclusion (DFI)

H6: Facilitating Conditions (FC) has a positive impact on Digital Financial Inclusion (DFI)

H7: Adoption of Artificial Intelligence in Financial Services (AFS) has a positive impact on Digital Financial Inclusion (DFI)

DATA COLLECTION & DATA ANALYSIS

A structured questionnaire having two sections, was designed to collect data. The first section recorded demographic details while the second recorded measurement items (on Likert scale) and responses were collected for the constructs of the hypothesized model. In order to avoid discrepancies and to ensure content validity, a pilot study was conducted on 40 respondents from industry and academia. The questionnaire was finalized after making relevant modifications as suggested in the pilot study. Judgmental sampling was used where the majority of respondents were from fields related to fintech, sustainability and financial inclusion. A total of 500 respondents were interviewed and a total of 454 valid responses were accepted. Most of respondents were working professionals with 57% were from urban areas and the remaining 43% from rural parts of the country.

The data was analysed on SPSS and AMOS software. SPSS was used to check for multi collinearity and common method bias. The multicollinearity of all independent variables was tested using VIF (variance inflation factor) and tolerance. The values for VIF and tolerance for PE were 1.806 and 0.554, respectively. The VIF for EE was 1.884, and the tolerance was 0.531. The VIF and tolerance for FC were 1.789 and 0.559 respectively. Finally, the VIF for AFS was 2.197, and the tolerance was 0.455. Further, Harman's single-factor test was used to determine if the total variance extracted by one factor was less than 50% and this was found to be 29.646%, which is considerably less than the 50% criterion hence, the study has no method bias. These findings are in line with standard benchmark and has been earlier suggested and used by various researchers.[27] [28]

The present hypothesized framework was examined using two-step structural equation modelling (SEM). At first, the reliability and validity of constructs were examined using confirmatory factor analysis (CFA). The outcomes of CFA indicate the goodness of fit (GOF) of the data. The reliability and validity of questionnaire items are reported in Table 1. Cronbach alpha scores for PE, EE, FC, AFS and DFI were 0.898, 0.896, 0.899, 0.899 and 0.895 respectively. The Cronbach alpha score of all items range between 0.895 and 0.899, which is higher than the recommended value of 0.7, indicating acceptable internal consistency.[29] [30] For establishing convergent validity, three components, namely, factor loading, composite reliability (CR), and average variance explained (AVE). Factor loadings and CR values of PE, EE, FC, and AFS meet the suggested level of 0.6 or higher. The values of AVE for all the constructs also lie within the range of the acceptance criterion of convergent validity.[31] All these important observations are reported in Table 1. The AVE and squared correlation between the constructs were used to determine discriminant validity and are reported in Table 1. As reported in Table 2, the squared root of AVE for all constructs range between 0.865 to 0.879, which was greater than the squared correlation between the constructs, suggesting that the constructs used in the analysis met an agreed-upon criterion for discriminant validity.[32]

Construct	Items	Factor Loading	Squired Multiple Correlation	Composite Reliability (CR)	Cronbach Alpha	Average Variance Explained
PE	PE3	0.824	0.68	0.19	0.898	0.772
	PE2	0.822	0.676			
	PE1	0.98	0.96			
EE	EE3	0.839	0.703	0.898	0.896	0.747
	EE2	0.932	0.869			
	EE1	0.818	0.669			
FC	FC3	0.875	0.766	0.899	0.899	0.748
	FC2	0.883	0.779			
	FC1	0.837	0.7			
AFS	AFS3	0.768	0.589	0.908	0.899	0.767
	AFS2	0.929	0.863			
	AFS1	0.922	0.85			
DFI	DFI3	0.803	0.645	0.902	0.895	0.756
	DFI2	0.845	0.714			
	DFI1	0.952	0.907			

Table 1. Measurement Model Analysis: Reliability and Validity

	CR	AVE	MSV	MaxR(H)	PE	EE	FC	AFS	DFI
PE	0.910	0.772	0.278	0.966	**0.879**				
EE	0.898	0.747	0.278	0.917	0.527***	**0.864**			
FC	0.899	0.748	0.242	0.901	0.397***	0.447***	**0.865**		
AFS	0.908	0.767	0.242	0.931	0.488***	0.438***	0.492***	**0.876**	
DFI	0.902	0.756	0.072	0.934	0.231***	0.253***	0.211***	0.269***	**0.869**

Table 2. Discriminant Validity

The GOF statistics were analysed to assess the overall predicting power of the model (x2 = 409.095, x2/df = 1.826, Goodness-of-Fit Index = 0.929, Normed Fit Index = 0.949, Tucker Lewis Index = 0.971, Comparative Fit Index = 0.976, and Incremental Fit Index =

0.976, Relative Fit Index = 0.937) which showed a reasonably fit data set. Furthermore, the RMSEA value (0.043) and SRMR value (0.048) are less than the recommended guideline of 0.06 and 0.08 respectively. The PClose value of 0.968 is more than the recommended value of 0.05. The hypothesized model was further analysed in SPSS AMOS and the results are depicted in Table 3. The observations indicate that PE (β = 0.254, p = .00, and t = 5.795) and EE (β = 0.171, p = .00, and t = 3.793) positively influences the AFS. Also, it is observed that FC (β = 0.159, p = .00, and t = 5.292), positively affects the AFS. Thus, the hypotheses H1, H2, H3 stands supported. The observations also indicate that the AFS positively influences the DFI (β = 0.193, p = .004, and t = 2.804). Thus, hypothesis H7 stands supported. These are in line with previous studies in this sector.[33] [34] [35] [36]

On further investigation is has been found out that, PE (β = 0.025, p = .711, and t = 0.370), EE (β = 0.101, p = .132, and t = 1.507), FC (β = 0.072, p = .114, and t = 1.581) do not have any significant effect on DFI. Hence, hypotheses H4, H5 and H6 stands rejected.

Hypotheses	Path			Estimate	S.E.	C.R.	P	Results
H1	AFS	<---	PE	0.254	0.044	5.795	***	Supported
H2	AFS	<---	EE	0.171	0.045	3.793	***	Supported
H3	AFS	<---	FC	0.159	0.03	5.292	***	Supported
H4	DFI	<---	PE	0.025	0.066	0.37	0.711	Rejected
H5	DFI	<---	EE	0.101	0.067	1.507	0.132	Rejected
H6	DFI	<---	FC	0.072	0.045	1.581	0.114	Rejected
H7	DFI	<---	AFS	0.193	0.069	2.804	0.005	Supported

Table 3: Structural Model: Hypotheses Result Note: *** = p

CONCLUSION

The study investigated the role of facilitating conditions on the adoption of artificial intelligence (AI) in financial services and its further effect on digital financial inclusion using extended UTAUT model. The finding revealed that performance expectancy, effort expectancy and facilitating conditions significant positive impact on the adoption of artificial intelligence in financial services. It can be concluded that the adoption of artificial intelligence in financial services performance has a significant positive impact on the digital financial inclusion of a population. It has also been concluded that the facilitating conditions supporting the spread of AI based solutions help in increasing its adaptability and usage. Also, government agencies, market conditions that facilitate the spread of AI based solutioning helps in its adaptability. The above findings could contribute to the research in the area of adaptability of artificial intelligence in financial services. Also, these may add to the literature on the UTAUT model and confirm its applicability in this context. The findings have significant contribution in formulating strategies to increase the adoption of Artificial intelligence in financial services by corporates, fintech firms and government agencies. These findings shall help technology firms to develop their artificial intelligence platforms suitable for better and faster adoption in the field of finance.

The major limitation of the study is that its global generalization cannot be assumed. The findings must be confirmed by similar studies undertaken on different populations and geographies to gain a global perspective. Also, effects of other demographic characteristics like gender, income level, literacy rate, living conditions, could be further investigated to have a more holistic understanding of the subject researched.

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