

The Adoption of Artificial Intelligence for Financial Investment Service

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Abstract— Rapid technological advancement has significantly changed the way financial institutions operate and has caused continuing disruption. Artificial Intelligence (AI) provides an opportunity for financial sectors to transform their business processes and to offer innovative services to their customers. This paper aims to study the adoption of AI for financial investment service in Thailand. Data of 400 samples were collected and analysed using multiple linear regression. According to the analysis, factors influencing the use of AI for financial investment service are trust, perceived usefulness, knowledge of using application, and social norm (with $p < 0.01$).

Keywords— Artificial Intelligence; AI; FinTech; Financial Investment Service; Technology Adoption

I. INTRODUCTION

Artificial Intelligence (AI) has obtained a lot of interest from both academics and professionals over the past years, and has become a significant element of people daily life. AI applications has been applied to gain better business performance and improve human experience in various industries such as healthcare, manufacturing, education, tourism, retail and service provision [1-5].

Financial Industry has also been greatly changed by the AI and Big data since banking business process is extensively based on data processing [6]. For financial industry, financial technology (FinTech) which illustrates technologies adopted by the financial service institutions, is being shown as a key component for banks and financial start-up companies. The combination of AI with FinTech has become a development trend in the financial industry [7]. Data analytics and AI are strongly applied in FinTech to obtain values from improving financial applications or creating new services [8].

AI offers an opportunity to develop the transformation of financial industry by providing users with better value, enhancing decision-making, increasing firms' revenues, improving analytical capabilities, and automating business processes such as fraud detection, compliance and policies, customer experience, lending, insurance, and risk management [5, 9].

For financial investment services, AI provides financial services and investment advisory for users by applying algorithms with ease-of-use and low costs, giving the ability

to offer customers accessibility to investment companies' data analytics [6, 10].

Globally, the adoption rate of FinTech in both China and India, is 87%, following by Russia and South Africa, both with 82% adoption. Among developed countries, the Netherlands, the UK and Ireland lead in adoption [11].

In Thailand, according to the survey from [12], the technology applied for FinTech is illustrated in Figure 1, which are advance analytics, and AI, cloud and quantum computing, distributed ledger technology, and automation and robotics. Fintech startups provide customers with more personalized services than traditional financial organizations, so financial services are negatively affecting traditional banks [6]. In this paper, the adoption of AI for financial investment service is studied to discover the factors influencing the intention to use AI for financial investment service and proposed the approach to increase the adoption of this service.

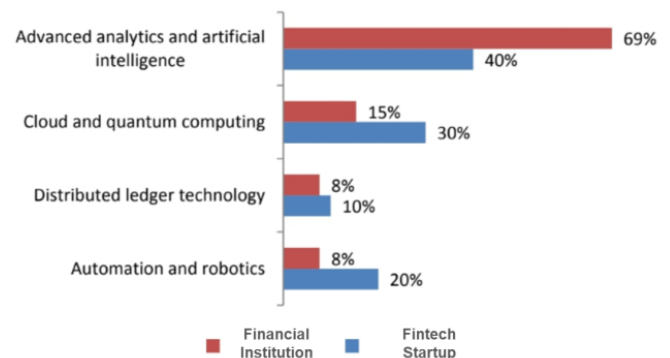


Figure 1. Technology applied for FinTech in Thailand (From [12])

The rest of this paper is organized as follows. Section 2 describes the literature review of FinTech, AI for Financial Technology, and Technology Adoption. Section 3 shows research methodology. Section 4 presents data analysis results of the research. Finally, Section 5 concludes the paper.

II. THEORETICAL BACKGROUND

A. FinTech

In recent years, financial technology (FinTech) has received significant attention from research communities [7]. The term FinTech is a combination of information and financial technology. This term covers a large scope of techniques, from financial service deliveries to data security [8, 13].

FinTech integrates more effective IT technologies providing flexibility, convenience, high speed, low cost, and more personalized service to the customers [13].

B. AI for Financial technology

The development and employment of artificially intelligent (AI) has been established during the last few years having a critical impact on the economic, social and workforce domains. AI technology and application have become a critical element of doing business in several industries such as healthcare service, autonomous manufacturing, driving vehicles, human language processing, face recognition, big data analytics [5, 14].

For financial technology (FinTech), big data and artificial intelligence can be applied for a digital platform which provides financial services and investment advisory for investors called robo-advisor. Robo-advisor starts to make specific recommendations or actions about investment or portfolio rebalancing, as a human financial advisor, but it does autonomously and based on AI [5]. Robo-advisors has changed the method of providing financial management services and pushing traditional advisory to develop new business model [10].

Robo-advisor is a financial advisor that can use statistical analysis and AI to automatically provide portfolio recommendations and analyze financial product risk using data analysis, machine learning, and personalized recommendation [15]. By gathering customers' data, robo-advisors allocate funds into assets and balance the portfolio based on algorithms, and providing an analytic report for users to review the performance of their investment [10]. Robo-advisors can be categorized into two types: independent start-ups and robo-advisory platforms of established investment companies [16].

C. Technology Adoption

For technology adoption, the technology acceptance model (TAM) has been widely used to understand users' reactions toward technological innovations because it is able to explain consumer adoption of many innovations [5, 17]. In this paper, factors influencing the adoption of artificial intelligence for financial investment service are obtained from TAM and other papers related to FinTech and online services.

1) Perceived Ease of Use

Perceived ease of use (PE) is defined as "the degree to which a person believes that using a particular system would be free of effort" [17]. For the use of the FinTech Service, PE means customer confidence that the use of the FinTech service is easy and does not require too much effort to learn [13].

2) Perceived Usefulness

Perceived usefulness (PU) is defined as "the degree to which a person believes that using a particular system would enhance his or her performance" [17]. For FinTech, the perceived benefits of Fintech are categorized into three attributes: 1) economic benefit; 2) convenience, and 3) transaction process.

Economic benefit is the most comprehensible and ordinary motivation that researchers have identified for Fintech. Convenience refers to flexibility in time and location such as convenience through using mobile devices. For Transaction process, Fintech implies a lower transaction compared with traditional financial service. Fintech offers benefits which cuts the middleman by permitting customers to manage their financial transactions on the platforms [18].

3) Social Norm

The influence of social norms refers to customers facing a disruptive change with limited information. If the customer's social groups have positive opinions about the AI platform by considering that it is easy to use, then users are less likely to perceive the platform as difficult to use [14].

4) Trust

Trust and trust-building processes are significant factors for customers in their intention to use an innovation [19]. Trust is an idea of belief, reliability, dependability, integrity, self-reliance to symbolize an entity. A user-possessed trust is essential to the use of the FinTech service [17]. Moreover, many studies have also considered trust as an important element for customers in adopting FinTech services [13, 17].

5) Knowledge

Rogers' Diffusion Theory describes that in order to make a decision on using a system, the process starts with knowledge about the system. [20]. For online shopping, Internet knowledge, which refers to the knowledge of users on the computer and the internet, and internet usage are positively related to purchase intention [21].

III. RESEARCH METHODOLOGY

Research process comprises four steps which are literature study, research model development, data collection and analysis, and conclusion as illustrated in Figure 2.

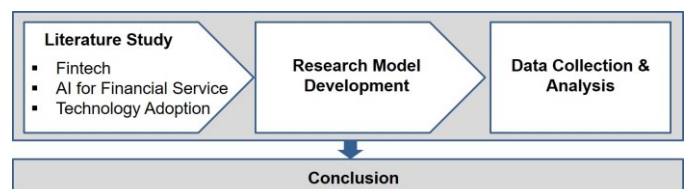


Figure 2. Research Process

In Literature review, FinTech, AI for Financial Service and Technology adoption are studied. For research model development, the framework for research is developed. In data collection and analysis stage, an online survey is performed to collect the data of 400 samples that applied five-point Likert-type response formats, from 1 ("strongly disagree") to 5 ("strongly agree"). Data are analyzed using linear multiple regression. Finally, the conclusion is conducted to summarize the results.

IV. RESULTS

The demographic characteristics of samples of 400 participants are gender (43 percent of participants are female), age (20-40 years 68.8 percent and 41-60 years 31.3 percent),

education (Lower than Bachelor Degree 9.3 percent Bachelor Degree 60.5 Master Degree/PhD 30.2), income (< 30,000 Baht 26.5 percent 30,001 – 60,000 Baht 34.5 percent and > 6,0000 Baht 39 percent), occupation (Business Owner 29.5 percent, Employee 42.5 percent Government Officer 28 percent), and investment experience (yes 42 percent, no 58 percent) as shown in Table 1.

TABLE 1. DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLES

Variable (N=400)	Frequency	Percentage
Gender		
Male	228	57.0
Female	172	43.0
Age		
20-40	275	68.8
41-60	125	31.3
Education		
Lower than Bachelor Degree	37	9.3
Bachelor Degree	242	60.5
Master Degree/PhD	121	30.2
Income		
< 30,000 Baht	106	26.5
30,001 – 60,000 Baht	138	34.5
> 6,0000 Baht	156	39
Occupation		
Business Owner	118	29.5
Employee	170	42.5
Government Officer	112	28.0
Investment Experience		
Yes	168	42
No	232	58

According to literature review, the research model is conducted with dependent and independent variables. A multiple linear regression model is applied to explain the relationship between two or more explanatory variables and a response variable by fitting a linear equation to observed data. The value of the independent variable x is associated with a value of the dependent variable y , as shown by the formula:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + c \quad (1)$$

where a is a constant term; b_1 , b_2 , b_3 , b_4 and b_5 are correlation coefficients between variables and explanatory variables; c is a random error term [22].

In this model, variable X_1 to X_5 are perceived ease of use, perceived usefulness, social norm, trust, and knowledge of

using application respectively. The dependent variable Y is intention to use AI for financial investment service.

In this paper, perceived ease of use refers to the application feature that is easy and does not require too much effort to use. The perceive usefulness is that users can gain some benefits of using the service such as saving cost or obtaining high return on their investment. Social norm describes the use of this AI service among their group. Trust refers to the reliability of system provider, and knowledge are basic knowledge and skill of using mobile and internet application especially for financial application.

TABLE 2. DESCRIPTIVE STATISTICS

Descriptive Statistics					
Variable	N	Min	Max	Mean	Std. Dev.
Perceived Ease of Use	400	1.0	5.0	3.940	.7893
Perceived Usefulness	400	3.0	5.0	3.992	.7132
Social Norm	400	1.0	5.0	3.700	.7044
Trust	400	2.0	5.0	3.843	.7444
Knowledge	400	2.0	5.0	4.055	.7736
Intention to use	400	2.0	5.0	3.743	.6873

Table 2 shows descriptive statistics (which are Min, Max, Mean, and Standard Deviation) of independent variables: perceived ease of use, perceived usefulness, social norm, trust, and knowledge. The predicted or expected value of the dependent variable Y which is intention to use is also describe in the table. According to Table 2, knowledge of using application has the highest mean which is equal to 4.055, and social norm has the lowest mean which is equal to 3.700.

TABLE 3. MODEL SUMMARY

R	R Square	Adjusted R Square	Std. Error of the Estimate
.857 ^a	.735	.732	.3561

a. Predictors: (Constant), Perceived Ease of Use, Perceived Usefulness, Social Norm, Trust, Knowledge

Table 3 shows the summary of model's fitting degree; the adjusted R Square is 0.732. Therefore, independent variables explain 73.2% of the variability of the dependent variable.

The regression results are explained in Table 4. According to Table 4, the null hypotheses for the constant and perceived ease of use are not rejected. Therefore, there is not enough evidence to show that these variables have an effect on the use of AI for financial investment service.

On the other hand, the null hypothesis is rejected for perceived usefulness, social norm, trust, and knowledge (**Significant at $p < 0.01$), which means that statistically, there is a positive relationship between these variables and intention to use AI for financial investment service.

TABLE 4. REGRESSION RESULTS**Coefficients^a**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.160	.118		1.362	.174
Perceived Ease of Use	.048	.032	.055	1.488	.138
Perceived Usefulness	.239	.037	.245	6.548	.000**
Social Norm	.125	.039	.130	3.212	.001**
Trust	.395	.047	.427	8.335	.000**
Knowledge	.120	.036	.136	3.381	.001**

a: Dependent Variable: Intention to use ** Significant at the 0.01 level

The approach for increasing the adoption of AI for financial investment service focuses on the variables which have statistically significantly predicted the intention to use: trust, perceived usefulness, knowledge of using application, and social norm.

To develop user's trust, financial investment service providers should make good communication in order to maintain relationships [13]. Regarding perceived usefulness, benefit of using AI for financial investment service should be informed. For knowledge, users should be trained for basic knowledge and skill to use the system. Furthermore, digital technology training should be conducted and digital experience should be broadened. For social norm, positive opinions toward the service should be promoted among customer's social groups.

V. CONCLUSIONS

This paper presents the adoption of artificial intelligence (AI) for financial investment service. The data of 400 samples were collected from participants ages between 20-60 years in Thailand. A multiple regression was run to predict intention to use AI for financial investment service. According to the results, the variables statistically significantly predicted the intention to use are trust, perceived usefulness, knowledge of using application, and social norm. The approach for increasing the adoption of AI for financial service investment is proposed. Future research is to apply other methods for data analysis. Moreover, in-depth interviews and focus groups should be conducted for empirical results.

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