

DOI: [10.71317/jgst.2.9\(s\).2026.592](https://doi.org/10.71317/jgst.2.9(s).2026.592)**Journal of Global Social Transformation**Journal homepage: <https://rjsaonline.org/index.php/JGST>

Cognitive Dimensions of Artificial Intelligence Literacy and Financial Decision-Making: Exploring the Mediating Role of Digital Self-Efficacy

Shafaqat Ali¹, Dr. Sana Akhtar², Amna Qaiser³, Sadiqa Naeem⁴¹ Islamic University Bahawalpur, Rahim Yar Khan CampusEmail: Shafaqat.ali.psy@gmail.com² Federal Urdu University of Arts, Science & TechnologyEmail: s.akhtar@fuuast.edu.pk³ National University of Science and Technology (NUST)Email: amnaqaiser595@gmail.com⁴ University of KarachiEmail: sadiqa.naeem2000@gmail.com

ARTICLE INFO	ABSTRACT
Submission: July 14, 2026 Revised: July 30, 2026 Accepted: August 31, 2026 Available Online: September 12, 2026 Keywords: Artificial Intelligence literacy, cognitive AI literacy, digital self-efficacy, financial decision-making, digital financial technology, AI-enabled financial services, financial behaviour, Pakistan. Corresponding author: Shafaqat Ali Email: Shafaqat.ali.psy@gmail.com	The present study examined the relationship between the cognitive dimensions of Artificial Intelligence (AI) literacy and financial decision-making and further investigated the mediating role of digital self-efficacy in this relationship. The study was significant because the increasing integration of AI into digital banking, investment platforms, financial information systems, and other technology-enabled financial services has created a growing need for individuals to possess not only financial knowledge but also the cognitive capabilities required to understand, apply, and critically evaluate AI-generated information. A quantitative, cross-sectional research design was adopted, and data were collected from 433 respondents residing in Punjab and Sindh, Pakistan. A structured, adopted questionnaire was used as the primary data collection instrument, incorporating measures of knowing and understanding AI, applying and using AI, evaluating AI, digital self-efficacy, and financial decision-making. Data were collected through an online Google Forms questionnaire that was distributed to eligible respondents through online networks, university contacts, professional contacts, social media platforms, and messaging channels. Descriptive statistics, reliability analysis, Pearson correlation, multiple regression, independent-samples <i>t</i>-test, one-way ANOVA, post-hoc analysis, and mediation analysis were conducted. The findings demonstrated that all three cognitive dimensions of AI literacy were positively associated with financial decision-making and significantly contributed to its prediction, with evaluating AI showing the strongest contribution. The findings further showed that cognitive AI literacy significantly predicted digital self-efficacy, while digital self-efficacy was positively associated with financial decision-making. The mediation findings indicated that digital self-efficacy partially mediated the relationships between the cognitive dimensions of AI literacy and financial decision-making. The study concluded that stronger AI-related cognitive capabilities, together with greater confidence in using digital technologies, may contribute to more informed and effective financial decision-making. The study therefore contributes to the emerging literature by integrating AI literacy, digital self-efficacy, and financial decision-making within a single framework and highlights the importance of developing AI and digital competencies for responsible financial engagement in an increasingly AI-enabled environment.

Introduction

The use of AI in digital banking and financial services has changed the way people interact with financial systems and how they make financial decisions. Many financial decisions now depend on systems that can analyze information, identify trends, carry out transactions, and suggest suitable options. Therefore, individuals are required to become more financially AI-literate, which includes understanding, using, and critiquing AI systems in financial scenarios. Some scholars respectfully elaborate on the concept of AI literacy as knowledge and understanding, practical skills, evaluation and ethics, while some scholars also argue that with the advent of AI, ChatGPT may ease data analysis, risk management, portfolio optimization, and even market forecasting and sentiment analysis (Long & Magerko, 2020; Ng et al., 2021; Ullah et al., 2024).

Digital self-efficacy refers to a person's confidence in using digital tools and technologies effectively. It helps individuals complete tasks, solve problems, evaluate information, and adjust to new challenges or changing requirements in a digital environment. (Ulfert-Blank & Schmidt, 2022). Like self-efficacy in social cognitive theory, individuals' self-efficacy impacts how likely they are to behave, how much effort they are willing to put in, and their overall ability to transform their found knowledge and skills into actions (Bandura, 1997). Therefore, in conjunction with cognitive AI literacy, digital self-efficacy may give us a better sense of how cognitive AI impacts effective financial decision-making.

Cognitive Dimensions of Artificial Intelligence Literacy

AI literacy is the ability to understand how artificial intelligence works, what it can and cannot do, when it should be used, and how to evaluate the information or results it provides. AI literacy encompasses critical evaluation and effective use of AI and goes beyond conventional digital literacy and cognitive learning processes. In banking and finance, individuals interface with AI through digital banking, AI-driven investment platforms, automated advisory services, AI-based risk assessment, fraud detection, and various types of generative AI.

Financial choices and decisions are often complex, uncertain, and risky. For people to make informed decisions and take appropriate actions, they must be able to understand information generated by AI and question the system's output. Failure to apply sound judgment to AI outputs can lead to blindly following system suggestions. There is growing evidence to support the view that, in Pakistan, AI-driven financial technologies have a positive impact on investment decisions. AI users compare different systems and identify inaccuracies. They use AI systems to assist them in making financial decisions (Yuan, C. W., Tsai, & Chen, Y. T. 2024).

Cognitive AI literacy is required to make informed financial decisions and actions. AI users must be able to obtain, analyze, apply, and assess financial information that includes technology-based financial services. Familiarity with AI should increase recognition and understanding of the ways in which AI outputs are created and their shortcomings. Additionally, using AI technologies may assist users to perform financial tasks using offered technological tools. Finally, assessing AI may help users identify inaccuracies and concerns associated with the given recommendations and assist users in making well-informed decisions before undertaking any financial-related activity. Therefore, the cognitive dimensions of AI literacy form an important prerequisite for users in making effective financial choices in an AI-dominated financial ecosystem (Alqurni, J. 2026).

Knowing and Understanding Artificial Intelligence

The cognitive dimension of AI literacy refers to AI knowledge and understanding. It characterizes the degree to which individuals understand the concepts, applications, boundaries and main AI system output generation processes and considerations. It goes beyond the mere awareness of how to use or recognize AI technologies. To (Hasani, A. H. M., & Shirbagi, N. 2025), such knowledge and understanding of AI is the lower level of cognitive AI literacy. The next level is the ability to apply and evaluate AI. Kaltenegger, P. (2024) also argue that knowing of and understanding about AI enable the appropriate use of AI.

Having a good understanding of AI can help people make better financial decisions. It enables them to critically review AI-generated information instead of accepting every result as completely accurate or free from mistakes. Knowledgeable and understanding individuals appreciate the potential that AI is limited by the underlying situational data and computational and cognitive processes within the system. Such individuals are more likely to recommend judgment be exercised when determining whether AI is appropriate in the given financial context, to consider the potential existence of alternative sources of information, to articulate the rationale for its presence, and to recognize when AI is inappropriate in the given financial context. This is necessary especially in the current investment and financial services environment that might disadvantage individuals with limited digital and financial skills (Khan et al. 2025).

The cognitive dimension of AI literacy, in addition to understanding AI, enables a user to apply it and evaluate its outcomes and efforts. People with more advanced AI know-how are likely to have a better grasp of the bounds of algorithmic suggestions, locate ambiguity, and differentiate between AI-based assistive tech and financial advice. Therefore, this dimension supports a productive and safe interaction with AI paired with financial technology. The Hajizadeh et al., (2026) AI Literacy Questionnaire substantiates this and considers prior knowledge and understanding of AI as a base of cognitive AI literacy and moves toward the advanced stages of AI application and appraisal.

Applying and Using Artificial Intelligence

The application and use aspect of AI literacy refers to a person's ability to effectively use AI tools and services in practical situations and everyday tasks. This dimension of AI literacy captures an individual's capability to use AI tools to retrieve information, carryout instructions, address problems, and facilitate and sustain optimal decisions. Having an extensive understanding of AI is presumed to be of cognitive nature and is foundational. Nonetheless, the major challenge is to actually put the understanding of AI into practice. Chen et al., (2025) stated that the component of AI literacy becomes important when an individual is able to exercise practical control over technology rather than merely know what the technology is about. This is in tandem with (Winarni, I., Erwanto, E., & Hidayati, I. 2026) who highlighted the need to use AI as a tool in everyday, school, and work life.

In financial services, AI means banking, financial planning, investing, analysis, and budgeting and organizing financial information and interpretation applications with AI built into them. Relevant AI technology can be used appropriately to ask and answer financial management questions and provide the inputs and understand the outputs and integrate the outputs to provide useful financial management information. Using AI in financial management effectively alters the balance between AI and the user's knowledge of the limitations of AI technologies.

Being able to use an AI system technically does not indicate that an individual has the understanding to decide when its recommendations are proper, or if there should be more interpersonal thinking and data presented. Therefore, using AI technologies has to be intentional, thoughtful, and adaptable to the situation rather than an operation of a tool. Celio, F. (2026) integrate the use of AI in the cognitive domain of AI literacy and advocate for moving from AI theory to the application of the theory where practical. This is especially significant in financial decision-making as the information produced by the AI technology should be related to the individual's financial objectives, how much risk the person is willing to take, the person's financial resources, and that person's unique circumstances.

Evaluating Artificial Intelligence

Evaluating AI is a higher order cognitive dimension of AI literacy that involves assessing outputs for accuracy and relevance, identifying AI output limitations, and determining if AI outputs can be used in a particular circumstance. Unlike knowledge and technical use, evaluating AI involves questioning output and exercising judgment. Agaoglu et al., (2025) consider critical evaluation a necessary component of AI literacy, and Berdida et al., (2025) classify evaluation within the more advanced layer of cognitive processes involved in AI literacy. The AI Literacy Questionnaire, validated by Ahmed, R. (2026), focuses on the cognitive domain, highlighting the application, evaluation, and creation of AI as a progressive development from the knowledge and understanding of AI.

Evaluating AI is particularly important in financial decision-making as AI-generated information may impact savings, investment, borrowing, insurance, budgeting, and risk management decisions. Therefore, financial decision-makers must determine if AI-based recommendations are substantiated with adequate information, and if the assumptions underlying the recommendation are valid, within the context of the financial decision-maker's situation and financial goals. Micheal, J. (2025) speculates that given the increasing sophistication of financial services and products, consumers may end up in a precarious position where they rely on generative AI for financial advice while lacking the necessary digital and financial literacy and education. For financial decision-making, considering AI outputs may be the most crucial advanced cognitive ability.

Understanding and knowing about AI provides the background on how AI systems work. Once people can utilize AI, they can then use it to aid them in their everyday lives. Evaluation comes in and builds on that by determining how much Trust one can place on AI when making an important financial decision. This line of thinking is in line with the research that shows that digital financial literacy and financial literacy skills generally aid in the improvement of financial decision making and financial capabilities (Goyal & Kumar, 2025). Therefore, there is a clear indication as to how user evaluation abilities can aid in the use of AI decision aids while maintaining critical thinking, financial responsibility, and awareness of risk.

Digital Self-Efficacy

Digital self-efficacy describes an individual's belief in their ability to use digital technologies, and successfully traverse digital environments. It encompasses confidence in searching for information, using specific apps, solving tech problems, and adjusting to new digital environments (Bandura, 1997). Digital self-efficacy is based on the ability to achieve stated goals by using technology, and is not the same as an individual's tech skills. Confidence in one's digital abilities increases the likelihood of the individual using more digital solutions, Current challenges do not discourage the individual from using digital solutions, and the gap from knowing and using digital solutions is closed (Ulfert-Blank & Schmidt, 2022).

Because of social cognitive theory, it can be expected that digital self-efficacy will increase when cognitive AI literacy increases. Users gain confidence in digital solutions when the uncertainty caused by the use of digital solutions is lower due to their previous interaction with AI and their knowledge thereof. Users of AI are motivated and persistent in the digital finance environment, and are able to perform the behaviors required to analyze digital solutions and financial information (Bhagat, J. 2026).

Financial Decision-Making

Financial decision-making consists of analyzing financial information, alternatives, risks, and potential outcomes to make decisions regarding saving, spending, borrowing, investing, budgeting, planning, and risk management. These decisions are the result of the interaction of financial knowledge, analytical skills, control, and various other factors. In the rapidly digitizing financial environment, the possession of financial and digital skills has become of utmost importance for making informed financial decisions and managing finances (Saravanan, A., & John, G. 2026).

Financial decision-making is now characterized by the integration of automated recommendations, evaluations by algorithms, mobile banking, investment platforms, and other financial tools enabled by artificial intelligence. Although these financial technologies improve the electronic flow of financial information and execute financial tasks, they decrease the quality of financial decisions by creating problems of reliance on automated recommendations, the lack of transparency of the algorithms, privacy, and accuracy of information. In Pakistan, evidence shows that the use of technologies like ChatGPT are significantly related to investment decisions through data analysis, risk management, optimization of portfolios, and market forecasting (Duong, C. D. 2026). Religiously, investment decisions depend on the ability to import, process, and critically assess information mediated digitally.

Financial self-efficacy further strengthens financial decision-making since users of technology are more likely to access, critically assess, compare, and process financial information. Effective financial decisions will certainly encourage the use of online banking tools, financial apps, investment platforms, and other technologies.

Therefore, digital self-efficacy can allow cognitive AI literacy to be used to make financial decisions. This is because, for one thing, people need the self-assurance to use their AI knowledge, make sense of AI-related outputs, and address the AI-related issues. This is attuned to social cognitive theory. Self-efficacy is required to speak of someone's knowledge and skill and to transform it into the willingness to act (Alkhalaileh, M. Y., & Qasim, D. 2026).

Research Objectives

- To examine the relationship between cognitive dimensions of Artificial Intelligence literacy and financial decision-making.
- To determine the relationship between cognitive dimensions of Artificial Intelligence literacy and digital self-efficacy.
- To investigate the mediating role of digital self-efficacy in the relationship between cognitive dimensions of Artificial Intelligence literacy and financial decision-making.

Problem Statement

AI-powered digital financial services are growing quickly. Many banks, investment platforms, and financial information systems are increasingly using AI to improve their services and support financial activities. However, only a limited number of studies have examined how AI literacy influences financial decision-making. Most existing research on AI literacy has focused on education, technology use, or digital learning environments rather than financial settings. Financial research has focused on financial or digital financial literacy and financial capability. Although it is beginning to be studied, AI and ChatGPT show that AI can assist with financial investments. There has been little scholarship that studies an individual's ability to interpret, use, and assess critically AI-

generated financial information. Digital self-efficacy has been positively related to the effective use of digital technologies. Still, the relationship between cognitive AI literacy and digital self-efficacy has not been well studied. For these reasons, this study will fill a gap in the scholarship and study the relationship between cognitive AI literacy and financial decisions and if digital self-efficacy sheds light on the relationship.

Significance of the Study

This study is essential because it analyzes the cognitive elements of AI literacy in regards to personal finance decision making, along with digital self-efficacy as a mediating variable. As people utilize AI in banking and investment, digital finance applications, and AI tools, there is a need to understand the confidence, skills, and knowledge to evaluate and use these tools. This study will add to previous studies by integrating AI literacy and digital self-efficacy with financial decision making. It will create a framework that may provide valuable insights to financial institutions, educational institutions, policymakers, and fintech to improve AI digital financial literacy. It has the potential to describe how using AI services and technology affects financial decision making in an informed and responsible way (Obadă et al., 2025).

Literature Review

Cognitive Dimensions of Artificial Intelligence Literacy

AI literacy is a component of digital competence as more people interact with AI in education, jobs, messages, financial transactions, and decisions. AI literacy is more than knowing how to manipulate AI; it includes understanding how to use AI appropriately and how to analyze the outputs and interpret the results. Hwang, Y., & Wu, Y. (2025) identified these elements of AI literacy. In addition, classified knowing and understanding, applying, and evaluating and creating AI as cognitive dimensions of AI literacy in a broader context.

These cognitive dimensions of AI literacy have a high level of relevance to financial decisions because more and more financial systems rely on AI and information systems and loose decision-making tools. Judging AI in financial situations helps people learn how financial automation processes unstructured and structured data, AI built into digital tools helps people perform financial tasks, and evaluating AI allows people to determine the correctness and usefulness of financial information. There is support for these arguments in the available literature, and AI literacy has been found to correlate with financial analyst skills, and AI supported activities including data analysis, risk management, portfolio optimization and market forecasting have been found to influence investment decision-making among investors in Pakistan, while the literature in this area remains fragmented.

Research shows that the concept and different aspects of AI literacy are still evolving. In addition, the tools used to measure AI literacy vary across studies, leading to differences in how it is assessed. However, current research on generative AI in finance is starting to explore the importance of financial decision-making, risk management, and prediction, as well as the need for accountability. Thus, cognitive AI literacy in financial decision-making is a bridge to connect AI literacy research to financial behavior and to broaden the knowledge of the financial implications of financially consequential decisions that individuals make based on their cognitive capabilities and AI.

Knowing and Understanding Artificial Intelligence

The first aspect of AI literacy is having a basic understanding of AI and how it works. This knowledge helps people recognize the effects of using AI and make informed decisions. Without a clear understanding, it is difficult to effectively use, evaluate, or benefit from AI technologies. Balgiu, B. A., Mihai, P., & Chicioreanu, T. D. (2025), suggest that the first step to AI literacy is to understand how AI functions and how it should or should not be used. In the context of finance, understanding the boundaries and the mechanics of how AI functions can help people understand recommendations made by AI and that these recommendations should not be construed as design-based financial advice. For Bui, H. N., & Duong, C. D. (2024), the first step in cognitive AI literacy is knowing and understanding AI.

Understanding AI is critical given how financial services depend increasingly on automated recommendations, analyses, and AI-based systems for decision-making support. Individuals with greater AI knowledge are more likely to identify output that is in error, incomplete, biased, or inappropriate. Thus, understanding AI is an important pillar for effective financial engagement with AI technologies, and is important, given how investment decisions are dependent on the use of AI.

Applying and Using Artificial Intelligence

The Applying and using dimension involve the translation of knowledge about AI into the ability to purposefully apply AI tools to obtain data, solve problems, analyze data, and support decision-making. It involves more than just recognizing or understanding AI technologies. For Sizova, Z. M., Polovikov, (2026), application is a significant cognitive component of AI literacy as the transformation of knowledge into skill is needed to apply AI effectively.

In regard to finance, AI application helps with data analysis, identifying patterns and trends, assessing risks, and evaluating potential opportunities for investment. In Pakistan, the use of ChatGPT has positively influenced the analysis of risks and data, as well as the optimization of portfolios and forecasting for the markets and sentiments, and has helped with decision making in the context of investments (Jose, J., & Ghosh, N. 2024). Imjai et al. (2025) investigated AI literacy, and noted a positive influence of this construct on the financial analyst skills of data analysis and decision making. This demonstrates the effect of AI application on financial skills.

However, the purposeful application of AI tools is required instead of a complete reliance on automated systems. The user must determine the goal of AI tools, provide inputs, interpret outputs, integrate AI generated outputs with their personal finances, and promote the goals of personal finance. Likewise, Gupta, S., & Jaiswal, R. (2025) argued for the importance of proper guidance for generative AI in a finance context. Therefore, AI application is combined with knowing and understanding and evaluating AI in this study. It provides a holistic view of the role of cognitive AI literacy in financial decision making.

Evaluating and Critically Assessing Artificial Intelligence

Evaluating AI incorporates various domains in AI literacy such as assessing the quality, trustworthiness, relevance, accuracy, and boundaries of AI-produced data. Gillies, A. (2025) consider critical evaluation as a crucial element of AI literacy, and integrate evaluation and creation in the cognitive dimension of their AI literacy framework, which they validate. Therefore, one part of AI literacy is not only using AI outputs, but also assessing them in advance before using them in important decisions.

Critical evaluation is essential in the financial domain since AI-related information, which is incorrect, biased, incomplete or inappropriate, may have negative economic effects. People who make financial decisions must compare the AI-based recommendations to other information sources, and assess the basis of the recommendations, uncover contradictions, and assess whether the information is applicable to their personal finances.

Evaluating AI can play an important role in responsible and effective financial decision-making. Analyzing AI allows one to determine whether the information produced by AI affects financial decisions. An important notion in the field of AI in Pakistan is that people engaged in economic decisions are using ChatGPT to support their decisions. Even though some people use AI, it does not necessarily mean that people will be able to analyze AI. The present study builds on the literature by treating evaluation as a component of AI literacy that allows individuals to assess their use of AI to make decisions while preserving their discretionary and fiscal judgment.

Digital Self-Efficacy

Digital self-efficacy describes a person's belief regarding their ability to complete a particular task involving digital technologies and their effectiveness in navigating digital environments. (Duong, C. D., & Vu, T. N. 2025) social cognitive theory describes the impact of self-efficacy on motivation, the amount and the effort of the task, as well as the person's persistence in regard to the task and the degree to which the person is engaged. Digital self-efficacy is one of the important cognitive factors in the use of digital systems and is understood by Ulfert-Blank and Schmidt (2022) as the ability (perceived or subjective) rather than the (objective) technical ability. Their study showed that digital self-efficacy is a multidimensional factor in terms of the user's ability to interact with and successfully employ digital technologies.

Digital self-efficacy becomes very important in environments that are augmented by AI since users need to engage with an agenda they have never faced before in order to understand the technology, formulate the instructions, comprehend the results, and overcome the technology. Self-efficacy in digital and AI environments facilitates an exploratory attitude toward digital tools as well as the tendency to persevere in dealing with obstacles in computer-based technology. In the financial sphere, this confidence may lead users to digital banking and other financial services as well as the use of financial applications and AI tools, thereby enabling users to analyze, compare, and adapt to utilize digitally mediated financial information. For **Tan et al.,(2026)** perceived digital capability is one of the important elements in the use of digital systems.

Digital self-efficacy bridges the two main facets of digital literacy and financial decision-making AI. Knowledge and application of AI, as well as the assessment of AI technologies, leads to the ability to navigate digital environments, whereas digital self-efficacy enables practical application in the financial domain. One's perception of their own abilities describes the confidence which can shape intention to embark on, sustain, and execute behavior. Considering digital self-efficacy as a mediator may help uncover aspects of AI cognitive literacy that might help facilitate financial decision-making, which is an unexplored area in the existing literature.

Financial Decision-Making

Financial decision-making happens when a person analyzes important information and makes a choice regarding the allocation and control of finance, instructions regarding their savings, spending, loans, investments, budgets, insurance, and other similar circumstances. Financial decisions address the short and long-term needs of a person. Automated suggestions, analyses and evaluations performed by algorithms and other digital technologies affect the way financial decisions are made. Financial decision-making has become a new challenge because the information used to make a financial decision is now electronic and can be interpreted. demonstrate the importance of digital financial literacy, skills, and independence in financial decision-making. Digital financial capabilities and behavior have become more important in financial decision-making.

New technologies have altered financial decision-making to such a degree that artificial intelligence (AI) dynamically processes currently available information, evaluates risks and the future, and facilitates investment decisions. From the data available from Pakistan, this relationship has begun to develop. Ganuthula, V. R. R., & Balaraman, K. K. (2025) have shown that for individual investors, the use of ChatGPT has been linked to data analysis, risk control, optimization of investment portfolios, prediction of market behavior, and assessment of consumer sentiment. The use of AI, in and of itself, does not ensure better financial decisions. AI may provide incorrect, biased, or incomplete information. Good financial decisions involve integrating AI tools with a human financial decision-maker.

Cognitive AI literacy involves an individual's ability to access, assess, and understand the information provided by cognitive AI. Understanding how AI produces and processes financial information may lead to an appreciation of AI's strengths and weaknesses when dealing with financial information, which in turn may help users determine how best to apply AI in financial analysis. Evaluating AI may help users determine how best to assess how helpful AI recommendations are, and whether or not to rely on the recommendations. This perspective is consistent with the cognitive AI literacy framework and the critical evaluation competencies of Long and Magerko (2020). Financial decision making in an AI enhanced world goes beyond the ability to command technological knowledge to include the ability to assess and adjust technological knowledge to inform and guide responsible financial choices.

Research Gap

Although AI literacy has received growing scholarly attention, existing research has largely focused on conceptualizing AI literacy, developing measurement frameworks, and examining its role in education and general technology use rather than financial decision-making. Zhao et al., (2025) identify understanding, applying, and evaluating AI as important cognitive dimensions, but limited research has examined whether these capabilities improve financial decision-making. found that ChatGPT usage was positively associated with investment decision-making among Pakistani investors, but their focus was on AI usage and financial literacy rather than cognitive AI literacy and digital self-efficacy. Similarly, although Ng et al. (2024) recognize self-efficacy within AI literacy, limited evidence exists regarding digital self-efficacy as a mechanism linking cognitive AI literacy with financial outcomes. Therefore, an important research gap remains concerning whether the ability to understand, apply, and evaluate AI contributes to financial decision-making through greater confidence in using digital technologies. The present study addresses this gap by examining cognitive AI literacy as an antecedent, financial decision-making as an outcome, and digital self-efficacy as the mediating mechanism.

Hypotheses

H1: There is a significant positive relationship between knowing and understanding Artificial Intelligence and financial decision-making.

H2: Knowing and understanding Artificial Intelligence significantly predicts financial decision-making.

H3: There is a significant positive relationship between knowing and understanding Artificial Intelligence and digital self-efficacy.

H4: Digital self-efficacy has a significant positive relationship with financial decision-making.

H5: Digital self-efficacy significantly mediates the relationship between knowing and understanding Artificial Intelligence and financial decision-making.

Methodology

Research Design

To understand the relationships of the cognitive dimensions of artificial intelligence (AI) literacy, digital self-efficacy and financial decision making this study utilized a quantitative, cross-sectional design. A self-administered and structured answer survey collected the data. The relationships, predictors, differences between groups, and digital self-efficacy's role as a mediator were analyzed and assessed using the data. This study was cross-sectional, meaning data was collected from respondents in only one specific time span. Cognitive AI literacy was measured through three different dimensions: knowing and understanding AI, using and applying AI, and critiquing AI. This was structured according to the framework developed by. The cognitive AI literacy framework developed and validated includes understanding AI, applying AI, and critiquing AI. This framework describes the cognitive dimensions of AI in terms of lower and higher order skills and knowledge.

Population

The population of the study consisted of individuals residing in the provinces Punjab and Sindh in Pakistan who were conversant with digital technologies and who possessed experience of use of digital services, online services, applications of AI, or technology based financial activities. Including the two provinces increased the breadth of the study as well as ensuring that the respondents came from diverse segments of society such as education, occupation, finance, and technology. From Punjab, the respondents were approached from schools and universities such as Bahauddin Zakariya University Multan, The Women University Multan, NFC Institute of Engineering and Technology Multan, Nishtar Medical University Multan, University of the Punjab Lahore, University of Education Lahore, Government College University Lahore, University of Sargodha and University of Agriculture Faisalabad.

Participants were approached through University of Karachi, Institute of Business Administration Karachi, University of Sindh Jamshoro, Mehran University of Engineering and Technology Jamshoro, Shah Abdul Latif University Khairpur, and Sindh Agriculture University Tandojam. The sampling covered major urban and educational centers in the desired area. Including both the provinces helped to improve the diversity in the demographic and technological profiles of respondents. Being part of the major regional divisions of Pakistan, Punjab and Sindh, are represented as distinct geographic units in national sample surveys and population research.

Target Audience

The target audience included adult university students and teachers, employees, professionals, and others in Punjab and Sindh, Pakistan who were active in digital media. Respondents were considered justified if they had experience with digital technologies and AI applications and/or digital banking, digital financial services, and investment-related information and services. Their inclusion was to enable participants to formulate responses on cognitive AI literacy, digital self-efficacy, and financial decision-making. Therefore, the target audience provided a justifiable basis in understanding and evaluating AI, and digital technologies and electronic banking systems as a whole, and the confidence of an individual in these systems particularly in relation to his/her financial decision-making.

Sampling Technique

A non-probability convenience sampling approach was employed in selecting respondents from Punjab and Sindh Pakistan. Respondents were recruited online through social media, network and professional contacts, and other digitally accessible communication. This method was appropriate as this study had geographically separated respondents and an online questionnaire directed toward participants who are active online. Participants who fulfilled the required criteria and who consented to participate were given access to the questionnaire and data collection continued till we gathered the required amount of valid responses. While probability sampling may help achieve more extensive population representation, convenience sampling helped reach the participant population in the two provinces with the given constraints in this study.

Sample Size

The final sample contained 433 valid respondents from Punjab and Sindh in Pakistan. Questionnaires were screened for completeness. We retained all 433 completed questionnaires for analysis. This sample size is adequate for the planned analyses,

which include descriptive statistics, correlations, multiple regressions, independent samples t-tests, one-way ANOVAs, post-hoc analyses, and mediation analyses. Sample size requirements for multiple regressions are dependent on the number of predictors anticipated and the expected effect size, as well as the statistical power and the degree of precision required. Considering three cognitive AI literacy predictors in multiple regressions, this sample size is satisfactory.

Data Collection

Data collection was carried out using a structure and adopted instrument to measure cognitive-level AI literacy, digital self-efficacy, and financial decision making. Cognitive-level AI literacy was assessed using AI Literacy Questionnaire (AILQ) items developed by Ng and colleagues. Aims to capture cognitive learning that encompasses (a) AI knowledge and comprehension, (b) AI application, (c) AI evaluation, and (d) AI creation. AILQ was developed using (a) literature, (b) expert judgment, (c) interviews, (d) a pilot test, (e) and confirmatory factor analysis, and demonstrated sufficient reliability and validity. In this study, cognitive AI literacy was defined as (a) AI knowledge and understanding, (b) AI application and use, and (c) AI evaluation. Digital self-efficacy was assessed by adopting an instrument created who developed and validated a tool to measure the individual's perception of an adequate level of confidence when using digital tools. Financial decision making was assessed by adopting an instrument that assessed informed financial choices, such as decisions around saving, spending, taking out loans, making financial decisions and assessing financial risks. All items were measured using a five-point Likert scale (strongly disagree, disagree, neutral, agree, strongly agree), similar to the AILQ. The survey was evaluated for clarity and extent of appropriateness. It was converted to an online Google Forms Survey and was made available via several online channels, the University and Professional networks, as well as social media and messaging apps, where participants were invited to fill the survey of their own accord. Once the survey was filled, participants were invited to download and fill out the consent form and submit it along with the survey. After the survey and Consent form were submitted, the data were collected and checked for completeness.

Data Analysis

The data collected through Google Forms were downloaded and organized in Excel. The data were then imported to SPSS for analysis. The data were screened for completeness, consistency, and absence of duplication. Delineations of variable coding, value labels, and measurement levels were made on SPSS. Descriptive statistics (frequency, percentage, mean and standard deviation) for the respondent characteristics and study variables were made. Cronbach's Alpha was used to determine the internal consistency for the measurement scales. Using the Pearson product-moment correlation, the direction and the strength of relationships among the concepts of knowing and understanding AI, applying and using AI, evaluating AI, digital self-efficacy, and financial decision-making were measured. Multiple linear regression was used for understanding the cognitive dimensions of AI literacy as predictors of financial decision-making and digital self-efficacy. Two demographic groups were compared using independent-samples t-tests, and one-way ANOVA and Tukey's HSD post-hoc test were used for comparing three demographic groups. The last step was to conduct a mediation analysis using bootstrapping to determine if digital self-efficacy mediates the cognitive dimensions of AI literacy and financial decision-making. In line with mediation analysis, I assessed the indirect effects by analyzing bootstrapped confidence intervals. I performed all analyses in SPSS, and set the criteria for statistical significance at the 0.05 level.

Table 1: Demographic Characteristics of the Respondents (N = 433)

Demographic Variable	Category	Frequency (f)	Percentage (%)
Gender	Male	241	55.7
	Female	192	44.3
Age	18–25 years	126	29.1
	26–35 years	157	36.3
	36–45 years	91	21.0
	46 years and above	59	13.6
Educational Qualification	Bachelor's degree	137	31.6
	Master's degree	171	39.5
	MPhil/MS	83	19.2

Demographic Variable	Category	Frequency (f)	Percentage (%)
Occupational Status	PhD	42	9.7
	Student	112	25.9
	University/College Teacher	96	22.2
	Government Employee	84	19.4
	Private-sector Employee	91	21.0
	Business/Self-employed	50	11.5
Province	Punjab	273	63.0
	Sindh	160	37.0
Digital Experience	Less than 2 years	67	15.5
	2–5 years	148	34.2
	6–10 years	143	33.0
	More than 10 years	75	17.3

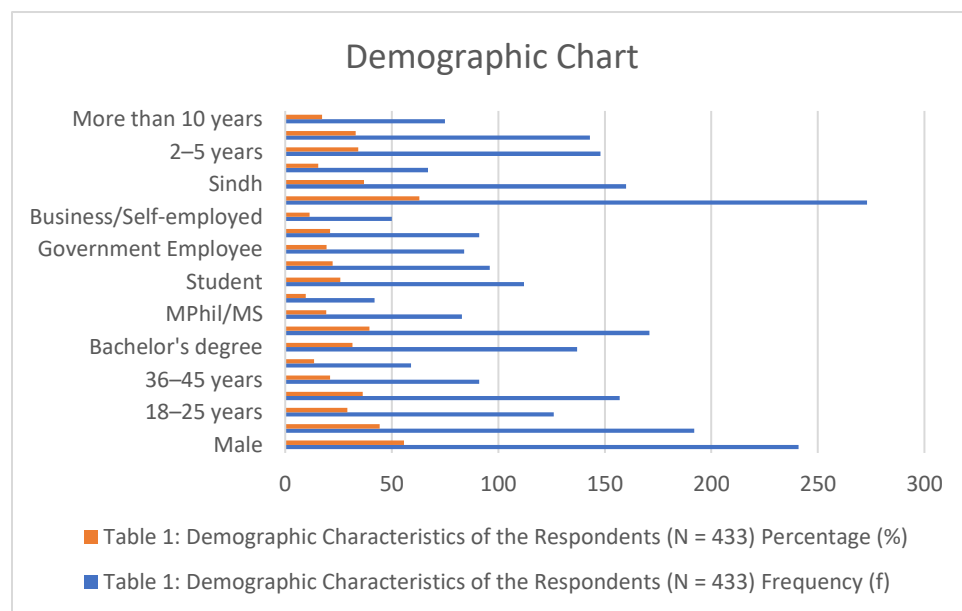


Fig. 1 Demographic Chart

The final sample included 433 respondents from Punjab and Sindh, Pakistan. Of these, 55.7% were male and 44.3% were female. The sample included 36.3% of respondents in the age group of 26 to 35, 29.1% of respondents in the age group of 18 to 25, 21.0% of respondents in the age group of 36 to 45, and 13.6% of respondents 46 and older. The sample most highly educated group was masters' degree holders (39.5%), followed by bachelor's degree holders (31.6%), MPhil/MS degree holders (19.2%), and PhD degree holders (9.7%). The sample was highly dominated by students at 25.9%, followed by university/college teachers at 22.2%, private sector employees at 21.0%, government employees at 19.4%, and business/self-employed respondents at 11.5%. The sample included 63.0% of respondents from Punjab and 37.0% from Sindh. The sample's overall digital experience was the highest in the group of respondents with 2 to 5 years (34.2%), followed by 6 to 10 years (33.0%), more than 10 years (17.3%), and less than two years (15.5%). The sample included a sufficient number and variety across demographic and digital experience characteristics to

create a baseline towards addressing the research objectives. Frequency counts and percentages are the primary procedures to describe demographic characteristics in SPSS.

Table 2: Reliability Statistics, Mean, and Standard Deviation of Study Variables (N = 433)

Variables / Dimensions	No. of Items	Cronbach's Alpha (α)	Mean (M)	Std. Deviation (SD)
Knowing and Understanding AI	6	0.884	3.71	0.68
Applying and Using AI	6	0.901	3.76	0.71
Evaluating AI	6	0.893	3.69	0.70
Cognitive AI Literacy (Overall)	18	0.928	3.72	0.65
Digital Self-Efficacy	8	0.912	3.78	0.67
Financial Decision-Making	10	0.905	3.74	0.69
Overall Study Scale	36	0.946	3.75	0.64

The reliability analysis showed that all study constructs showed satisfactory to excellent internal consistency with Cronbach's alpha ranging from 0.884 to 0.946. Knowing and Understanding AI ($\alpha = 0.884$), Applying and Using AI ($\alpha = 0.901$), Evaluating AI ($\alpha = 0.893$), overall Cognitive AI Literacy ($\alpha = 0.928$), Digital Self-Efficacy ($\alpha = 0.912$), and Financial Decision-Making ($\alpha = 0.905$) all exceeded the minimum accepted value of 0.70, while the overall study scale demonstrated very high internal consistency ($\alpha = 0.946$). Cronbach's alpha values above 0.70 are generally considered satisfactory for internal consistency, with higher values indicating stronger consistency among scale items. The descriptive results showed mean scores ranging from 3.69 to 3.78, indicating a generally positive response toward the study constructs. Digital Self-Efficacy ($M = 3.78$, $SD = 0.67$) showed the highest mean, closely followed by Applying and Using AI ($M = 3.76$, $SD = 0.71$), Financial Decision-Making ($M = 3.74$, $SD = 0.69$), and overall Cognitive AI Literacy ($M = 3.72$, $SD = 0.65$). The standard deviations indicated moderate answers to the study constructs. Overall, the reliability analysis confirmed the adequacy of the study measures.

Table 3: Pearson Correlation Analysis of Cognitive AI Literacy and Financial Decision-Making (N = 433)

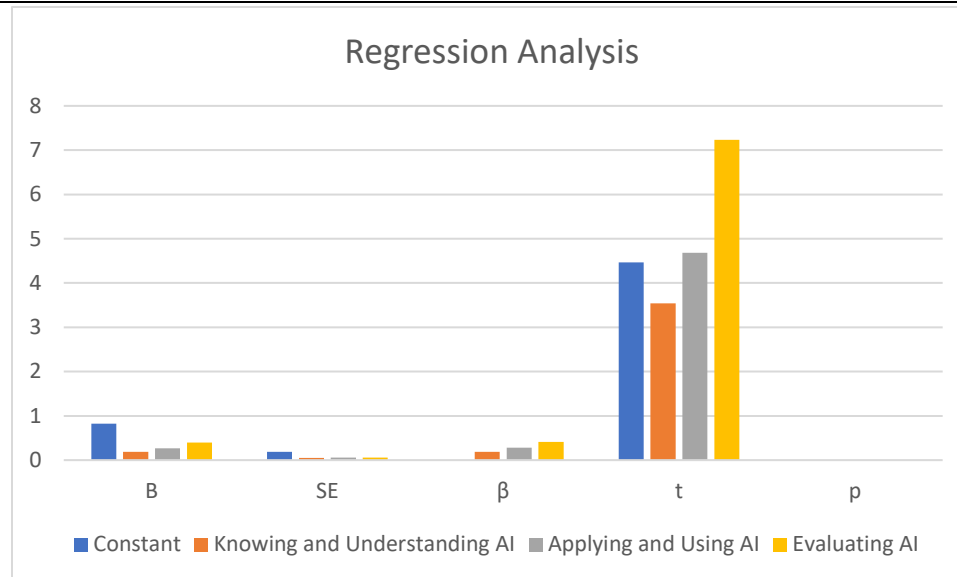
Variables	1	2	3	4
1. Knowing and Understanding AI	1	.574**	.536**	.482**
2. Applying and Using AI	.574**	1	.612**	.557**
3. Evaluating AI	.536**	.612**	1	.593**
4. Financial Decision-Making	.482**	.557**	.593**	1

Note. $p < .01$ (2-tailed).

The three cognitive dimensions of Artificial Intelligence (AI) literacy all showed significant and positive associations with financial decision-making for the 433 survey respondents. There was a moderate, positive association between Knowing and Understanding AI and financial decision-making ($r = .482$, $p < .01$). Financial decision-making and the Applying and Using AI cognitive dimension also had a positive association, though this association was slightly stronger ($r = .557$, $p < .01$). Financial decision-making and Evaluating AI also had a positive association, though it was the strongest of the three ($r = .593$, $p < .01$). From these results, it can be concluded that greater AI knowledge and a greater ability to Apply and Use AI as well as Evaluate AI correlated with better financial decision-making for survey respondents. The three cognitive dimensions had a positive association with one another, with coefficients of .536 to .612, indicating a positive correlation and distinct dimensions of cognitive AI literacy. For example, positive correlations are assessed and the direction and strength of a linear association is evaluated using Pearson's r . In this study, cognitive AI literacy and financial decision-making had positive correlations.

Table 4: Multiple Regression Analysis of Cognitive AI Literacy Dimensions Predicting Financial Decision-Making (N = 433)

Predictor Variable	B	SE	β	t	p
Constant	0.821	0.184	—	4.462	<.001
Knowing and Understanding AI	0.184	0.052	.186	3.538	<.001
Applying and Using AI	0.267	0.057	.279	4.684	<.001
Evaluating AI	0.398	0.055	.412	7.236	<.001

**Fig.2 Regression Analysis**

Results from the multiple linear regression analysis indicate that the three cognitive dimensions of Artificial Intelligence (AI) literacy were able to predict financial decision-making among the 433 respondents. The regression analysis resulted in a good fit to the data, $F(3, 429) = 133.13$, $p < .001$, and was able to explain 48.2% of the variance in financial decision-making ($R^2 = .482$). The dimensions of Knowing and Understanding AI ($\beta = .186$, $t = 3.538$, $p < .001$) and Applying and Using AI ($\beta = .279$, $t = 4.684$, $p < .001$) both positively contributed to the analysis, but Evaluating AI ($\beta = .412$, $t = 7.236$, $p < .001$) significantly contributed the most. Evaluating AI indicates that the respondents were able to analyze and critique artificial intelligence (AI) related information, and this dimension was the strongest contributor to financial decision making when the other dimensions were controlled. In multiple regression, an increase in R^2 is indicative of an increased ability of the dimensions to explain or predict the outcome. As a result, it can be concluded that each of the three dimensions of AI literacy was indicative of better financial decision making, and positively explained variance in respondent financial decision making.

Table 5: Multiple Regression Analysis of Cognitive AI Literacy Dimensions Predicting Digital Self-Efficacy (N = 433)

Predictor Variable	B	SE	β	t	p
Constant	0.746	0.181	—	4.122	<.001
Knowing and Understanding AI	0.218	0.051	.224	4.275	<.001
Applying and Using AI	0.301	0.056	.318	5.375	<.001
Evaluating AI	0.326	0.054	.351	6.037	<.001

It has been shown that the three cognitive dimensions of Artificial Intelligence literacy are positively correlated and significant predictors of digital self-efficacy for the sample of 433 participants. Digital self-efficacy was positively explained by the predicted variables, $\beta = .224$, $t = 4.275$, $p < .001$, for the Knowing and Understanding of AI, and positively explained, $\beta = .318$, $t = 5.375$, $p < .001$, by the variable Applying and Using AI. Evaluating AI, positively explained, $\beta = .351$, $t = 6.037$, $p < .001$, digital self-efficacy and was the most important predictor variable. These findings support that the cognitive dimension of AI literacy was positively predicted digital self-efficacy and was positively explained by the three dimensions of the regression model.

Table 6: Pearson Correlation Analysis of Digital Self-Efficacy and Financial Decision-Making (N = 433)

Variables	Digital Self-Efficacy	Financial Decision-Making
Digital Self-Efficacy	1	.641**
Financial Decision-Making	.641**	1

Note. $p < .01$ (2-tailed).

An analysis of the 433 respondents yielded a statistically significant positive relation between digital self-efficacy and financial decision-making ($r = .641$, $p < .01$). With a correlation this high, it is safe to say that digital self-efficacy is a moderately strong to a strong positive correlation for the sample, indicating respondents who believed they had a higher degree of digital self-efficacy believed they were better at making financial decisions. Respondents who are more digitally self-efficacious may be better able to perform many financial tasks and activities that are online and available via the digital and technology tools and resources that are available. Pearson's r is a metric to measure the strength of a correlation and the direction and is positive at the proximity of +1 and indicates a strong positive relationship. Overall, the positive relation is significant indicating digital self-efficacy is an important variable in the study regarding financial decision-making. However, the relation is correlational, so we cannot claim digital self-efficacy causes financial decision-making.

Table 7: Mediation Analysis of Digital Self-Efficacy in the Relationship Between Cognitive AI Literacy and Financial Decision-Making (N = 433)

Relationship / Effect	B	SE	β	t	p	95% LLCI	95% ULCI
Knowing & Understanding AI → Digital Self-Efficacy	0.218	0.051	.224	4.275	<.001	0.118	0.318
Applying & Using AI → Digital Self-Efficacy	0.301	0.056	.318	5.375	<.001	0.191	0.411
Evaluating AI → Digital Self-Efficacy	0.326	0.054	.351	6.037	<.001	0.220	0.432
Digital Self-Efficacy → Financial Decision-Making	0.391	0.052	.379	7.519	<.001	0.289	0.493
Knowing & Understanding AI → Financial Decision-Making (Direct Effect)	0.099	0.045	.101	2.200	.028	0.011	0.187
Applying & Using AI → Financial Decision-Making (Direct Effect)	0.150	0.049	.157	3.061	.002	0.054	0.246
Evaluating AI → Financial Decision-Making (Direct Effect)	0.271	0.048	.280	5.646	<.001	0.177	0.365
Knowing & Understanding AI → Digital Self-Efficacy → Financial Decision-Making	0.085	0.024	.085	—	—	0.041	0.136
Applying & Using AI → Digital Self-Efficacy → Financial Decision-Making	0.118	0.027	.120	—	—	0.068	0.175
Evaluating AI → Digital Self-Efficacy → Financial Decision-Making	0.127	0.029	.133	—	—	0.075	0.189

The mediation analysis showed that digital self-efficacy mediated all three cognitive dimensions of Artificial Intelligence (AI) literacy and financial decision-making. Knowing and Understanding AI, and Evaluating AI, predicted digital self-efficacy ($\beta = .224$, $p <$

.001), ($\beta = .351, p < .001$), respectively, as did Applying and Using AI ($\beta = .318, p < .001$). Digital self-efficacy predicted financial decision-making ($\beta = .379, p < .001$). The indirect effects were all significant. Knowing and Understanding AI ($B = .085, 95\% \text{ CI } [.041, .136]$), Applying and Using AI ($B = .118, 95\% \text{ CI } [.068, .175]$), and Evaluating AI ($B = .127, 95\% \text{ CI } [.075, .189]$) were all significantly greater than zero (all 95% CI included zero). As digital self-efficacy was incorporated, all relationships still showed direct effects, proving that only a part of the mediation was due to digital self-efficacy. It was shown that cognitive AI literacy and financial decision-making were both directly correlated and indirectly correlated through digital self-efficacy. This proves that an individual's digital confidence may be related to how well they are able to make financial decisions.

Discussion

This research studied the three cognitive dimensions of AI literacy and their relation to financial decision-making. All three dimensions of AI literacy showed a positive and significant relation to financial decision-making. The dimension of evaluating AI had the highest level of significance ($\beta = .412, p < .001$), and was thus the best indicator of financial decision-making, followed by the dimensions of applying and using AI ($\beta = .279, p < .001$), and knowing and understanding AI ($\beta = .186, p < .001$). The overall regression model represented a 48.2% level of understanding of financial decision-making ($R^2 = .482$). These results demonstrated that AI literacy is more than knowing how to use technology. Rather, it includes the ability to understand AI and its concepts, to use it appropriately, and to evaluate the information AI generates. This findings and interpretations support the multidimensional AI literacy framework proposed by Ofem et al., (2024) and the competencies.

The results also showed that in terms of financial decision-making, all three cognitive dimensions of AI literacy showed a positive relation. Knowing and understanding AI showed the strongest relation ($r = .482, p < .01$), suggesting that in the context of technology-mediated financial information, foundational AI knowledge plays a role in information interpretation and understanding. The relation was even stronger for the dimension of applying and using AI ($r = .557, p < .01$). Thus, in the context of financial decision-making, the use of AI can help the individual gather information, assess alternatives, evaluate risks, and support financial decisions.

Evaluating AI showed the strongest correlation ($r = .593, p < .01$) and regression contribution. Because of this, it underscored the necessity of meticulously assessing the accuracy, relevance, and reliability of information produced by AI. These results corroborate Beyazhancer, R., & Demir, B. (2025), who reported that the use of AI in data analysis, risk management, portfolio optimization, and market forecasting positively influenced investment decisions of Pakistani investors. Imjai et al. (2025) similarly reported the importance of AI for analytical and financial skills.

The present study showed a significant positive relationship between cognitive AI literacy and digital self-efficacy. Knowledge of and experience with AI ($\beta = .224, p < .001$), as well as the ability to evaluate AI ($\beta = .351, p < .001$), predicted digital self-efficacy ($\beta = .318, p < .001$), with the overall model explaining 51.7% of variance ($R^2 = .517$). Digital self-efficacy positively influenced financial decision-making ($r = .641, p < .01$) as well. These findings showed that individuals who have superior cognitive AI-related abilities within a digital environment may have greater confidence to make decisions concerning the use of technology to process financial operations. The most critical aspect of this study was the mediation analysis, which confirmed that digital self-efficacy provided a significant pathway between cognitive AI literacy and financial decision-making.

There were notable indirect effects for knowing and understanding AI ($B = .085, 95\% \text{ CI } [.041, .136]$), applying and using AI ($B = .118, 95\% \text{ CI } [.068, .175]$), and evaluating AI ($B = .127, 95\% \text{ CI } [.075, .189]$). As all bootstrapped confidence intervals were outside of zero, indirect effects were significant, and the rest of the effects remained significant even after control variables were included; it indicates partial mediation. This supports the assumption that cognitive AI literacy, positively, affect individuals' confidence to use digital tools and services, which then positively affect financial decision-making (Zeng et al.,(2026). Hence, this study rather extends existing literature on AI literacy, and provides digital self-efficacy as one of the integrators for cognitive AI and financial outcomes.

The described findings suggest that when individuals have a certain level of digital self-efficacy, critical evaluation of the AI's use, and understanding and application of AI technologies, their financial decisions tend to be effective. The findings support the use of evaluating AI technologies, as participants should not blindly accept decisions generated by AI; instead, they should evaluate the AI technologies based on their trustworthiness and planning. Additionally, this study offers an opportunity for all existing studies by providing a framework that combines cognitive AI literacy, digital self-efficacy, and financial decision-making. In terms of the Pakistani context, this study suggests integration for AI digital technologies and existing financial education in order to promote informed and effective financial decisions in an overall responsible manner **Davor et al., (2026)**.

General Conclusion

The study shows that dimensions of AI literacy comprising understanding and assessing the use of AI systems (cognitive dimensions of AI literacy) are important in the financial decision-making of respondents from Punjab and Sindh, Pakistan. Specifically, AI evaluation posed the strongest predictor, suggesting that making good financial decisions stemmed from the ability to assess the quality of information produced by AI. AI literacy is likely to be an important skill in Pakistan's financial environment where individuals engage more directly with AI on banking services, investment apparatuses, financial tools, and informed decision-making support systems.

The study also indicated that self-assurance and self-belief in the use of electronic gadgets and digital equipment (digital self-efficacy) stood between cognitive AI literacy and financial choice-making. In the AI literacy dimension, self-assurance in digital equipment also increased. Arabic self-assurance and digital self-efficacy influenced better financial choice-making. Considering the mediation effect, all three dimensions of cognition and AI literacy confirmed that AI supported financial choice-making both directly and indirectly, through digital self-assurance. The positive impact of AI literacy on financial choice-making was confirmed where all dimensions of AI cognition and evaluation, along with digital self-assurance, were enhanced.

Future Implications

Future studies should focus on the dimensions of cognition and AI literacy in financial choice-making. Some studies focus on financial literacy, digital financial literacy, and trust in AI, as well as the combination of financial self-assurance and AI the risk and technological anxiety dimensions. These types of studies (longitudinal and experimental) can provide insights on how AI can build knowledge and then develop practical abilities and critical skills to manage finance over the years to come. Researchers also have the ability to include other sectors of the economy such as banking, entrepreneurship, employment, older persons, and investors within the regions of Pakistan and other Growth markets. It will also help researchers to delineate AI tools such as generative AI, robot advisors, and other investment tools, together with digital banking and automated financial planning services, and help to identify the gap that might exist because of different levels of financial technology.

References

1. Agaoglu, F. O., Bas, M., Tarsuslu, S., Ekinici, L. O., & Agaoglu, N. B. (2025). The mediating digital literacy and the moderating role of academic support in the relationship between artificial intelligence usage and creative thinking in nursing students. *BMC nursing*, 24(1), 484.
2. Ahmed, R. (2026). The Mediating Role of Students' Digital Literacy in the Relationship Between Artificial Intelligence Based Learning Tools and Academic Performance. *Journal of Research, Innovation, and Strategies for Education (RISE)*, 3(2), 46-69.
3. Alkhalaileh, M. Y., & Qasim, D. (2026). The impact of AI literacy on E-entrepreneurial intention: the mediating role of E-self-efficacy and innovation mindset. *Entrepreneurship Education*, 1-20.
4. Alqurni, J. (2026). Exploring the role of agentic AI in fostering self-efficacy, autonomy support, and self-learning motivation in higher education. *Frontiers in Artificial Intelligence*, 9, 1738774.
5. Balgiu, B. A., Mihai, P., & Chiciooreanu, T. D. (2025). Psychological capital and entrepreneurial intention—the mediation role of internet entrepreneurial self-efficacy. *Administrative Sciences*, 15(12), 464.
6. Bandura, A., & Wessels, S. (1997). *Self-efficacy* (Vol. 10). Cambridge: Cambridge University Press.
7. Berdida, D. J. E., Grande, R. A. N., Serag, R. M., & Abd Elmaksoud, D. M. F. (2025). Nursing students' artificial intelligence (AI) literacy, AI self-efficacy and AI self-competency: A cross-sectional design and structural equation model analysis. *Nurse education in practice*, 104673.
8. Beyazhancer, R., & Demir, B. (2025, November). Enhancing techno-mathematical literacy and AI self-efficacy in engineering education through artificial intelligence applications. In *Frontiers in Education* (Vol. 10, p. 1695351). Frontiers Media SA.
9. Bhagat, J. (2026). Artificial Intelligence, Digital Financial Literacy, and Sustainable Investment Behaviour: An Integrated Model of Young Investors in India.

10. Bui, H. N., & Duong, C. D. (2024). ChatGPT adoption in entrepreneurship and digital entrepreneurial intention: A moderated mediation model of technostress and digital entrepreneurial self-efficacy. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 19(2), 391-428.
11. Celio, F. (2026). Reframing Marketing in the age of AI: the role of self-efficacy, trust, and well-being in Technology Adoption.
12. Chen, J., He, M., & Sun, J. (2025). AI anxiety and knowledge payment: the roles of perceived value and self-efficacy. *BMC psychology*, 13(1), 208.
13. Davor, I., Boateng, F. O., Osei-Tutu, P., Osei-Bosompem, A., Patience, A. S., & Adusei, L. A. (2026). Examining the mediating roles of digital literacy and critical thinking in the relationship between ChatGPT use and university students' mathematical problem-solving efficacy. *Journal of Mathematics, Science and Technology Education*, 3(1), 1-15.
14. Duong, C. D. (2026). AI literacy and higher education students' digital entrepreneurial intention: A moderated mediation model of AI self-efficacy and digital entrepreneurial self-efficacy. *Industry and Higher Education*, 40(2), 242-255.
15. Duong, C. D., & Vu, T. N. (2025). Entrepreneurial education and higher education students'e-entrepreneurial intention: a moderated mediation model of generative AI incorporation and e-entrepreneurial self-efficacy. *Higher Education, Skills and Work-Based Learning*, 15(5), 1024-1048.
16. Ganuthula, V. R. R., & Balaraman, K. K. (2025). Beyond digital tools: AI as a psychological catalyst reshaping entrepreneurial self-efficacy in an era of uncertainty. Available at SSRN 5247064.
17. Gillies, A. (2025). *Moderating Role of Locus of Control on the Relationship Between Self-Efficacy and Trust in AI* (Doctoral dissertation, Walden University).
18. Gupta, S., & Jaiswal, R. (2025). A deep learning-based hybrid PLS-SEM-ANN approach for predicting factors improving AI-driven decision-making proficiency for future leaders. *Journal of International Education in Business*, 18(2), 234-268.
19. Hajizadeh, A., Hassani, M., & Shirbagi, N. (2026). The impact of artificial intelligence and digital literacy on entrepreneurial intention and behavior: The mediating role of self-efficacy and the moderating role of social support in academic environments. *Journal of Entrepreneurship Development*, 18(5), 1-29.
20. Hasani, A. H. M., & Shirbagi, N. (2025). Learning Artificial Intelligence and Digital Literacy: A New Strategy for Enhancing Students' Entrepreneurial Behavior with the Mediating Role of Entrepreneurial Self-Efficacy. *Learning*, 13(3).
21. Hossain, Z., Biswas, M. S., Khan, N. A., & Khan, G. (2025). Artificial intelligence literacy among South Asian library and information science students: Socio-demographic influences and educational implications. *IFLA journal*, 51(3), 629-646.
22. Hwang, Y., & Wu, Y. (2025). The influence of generative artificial intelligence on creative cognition of design students: A chain mediation model of self-efficacy and anxiety. *Frontiers in psychology*, 15, 1455015.
23. Imjai, N., Chansamran, S., Sungthong, S., Usman, B., & Aujirapongpan, S. (2025). Developing employability digital competencies of Thai Gen Z business students: The role and matter of digital learning environments and digital adaptation skills. *The International Journal of Management Education*, 23(3), 101219.
24. Jose, J., & Ghosh, N. (2024). Effect of digital financial literacy on digital consumer protection: Mediating role of financial self-efficacy and financial confidence. In *Enhancing and Predicting Digital Consumer Behavior with AI* (pp. 157-172). IGI Global Scientific Publishing.
25. Kaltenegger, P. (2024). Fostering AI literacy: the mediating role of self-efficacy In artificial intelligence learning/submitted by Paul Kaltenegger, B. Sc.
26. Long, D., & Magerko, B. (2020, April). What is AI literacy? Competencies and design considerations. In *Proceedings of the 2020 CHI conference on human factors in computing systems* (pp. 1-16).
27. Micheal, J. (2025). Cross Exchange Crypto Arbitrage Detection Using Machine Learning and Its Relationship with Investor Health Seeking Behavior Under TPB and SDT.

28. Ng, D. T. K., Leung, J. K. L., Chu, S. K. W., & Qiao, M. S. (2021). Conceptualizing AI literacy: An exploratory review. *Computers and education: Artificial intelligence*, 2, 100041.
29. Obadă, D. R., Gradinaru, C., & Gradinaru, I. A. (2025). From understanding to influence: the interplay of AI literacy, self-efficacy, and trust in predicting communication students' AI adoption and word-of-mouth. *Frontiers in Communication*, 10, 1722464.
30. Ofem, U. J., Asuquo, E. N., Akeke, M. N. G., Idung, J. U., Anake, P. M., Ajuluchukwu, E. N., ... & Echu, A. E. (2024). Curriculum factors and sustainable artificial intelligence-driven classroom assessment. The mediating role of computer self-efficacy and digital literacy. *Journal of Applied Learning & Teaching*, 7(2), 205-222.
31. Saravanan, A., & John, G. (2026). Does AI Build Financial Confidence? A Structural Equation Model of AI Usage, Financial Self-Efficacy, and Financial Behaviour among Generation Z. *International Journal of Computer Information Systems and Industrial Management Applications*, 18(17s), 697-705.
32. Singh, J., Goyal, S. B., Kumar, M., & Mittal, R. (2025). *Advanced Network Technologies and Computational Intelligence*.
33. Sizova, Z. M., Polovikov, I. P., Grebenshchikova, L. Y., Smirnova, L. M., & Chistyakov, A. A. (2026). AI beyond the feed: Social media competency as predictors of self-efficacy in artificial intelligence learning. *Online Journal of Communication and Media Technologies*, 16(2), e202629.
34. Tan, W., Nawaz, M., Shu, T., & Ramzan, B. (2026). Collaborative artificial intelligence literacy and employee performance: Task-technology fit and technostress in a moderated mediation model. *South African Journal of Business Management*, 57(1), 12.
35. Ulfert-Blank, A. S., & Schmidt, I. (2022). Assessing digital self-efficacy: Review and scale development. *Computers & Education*, 191, 104626.
36. Ulfert-Blank, A. S., & Schmidt, I. (2022). Assessing digital self-efficacy: Review and scale development. *Computers & Education*, 191, 104626.
37. Ullah, M. S., Malekian, R., Randhawa, G. S., Gill, Y. S., Singh, S., Esau, T. J., ... & Farooque, A. A. (2024). The potential of biochar incorporation into agricultural soils to promote sustainable agriculture: insights from soil health, crop productivity, greenhouse gas emission mitigation and feasibility perspectives—a critical review. *Reviews in Environmental Science and Bio/Technology*, 23(4), 1105-1130.
38. Winarni, I., Erwanto, E., & Hidayati, I. (2026). The Relationship between Career Anxiety and Digital Competence with Students' Self-Efficacy in the Era of Automation and Artificial Intelligence. *Journal of Mathematics Instruction, Social Research and Opinion*, 5(1), 595-610.
39. Yuan, C. W., Tsai, H. Y. S., & Chen, Y. T. (2024). Charting competence: A holistic scale for measuring proficiency in artificial intelligence literacy. *Journal of Educational Computing Research*, 62(7), 1455-1484.
40. Zeng, Q., Zhang, S., Hu, J., Wu, Y., Yang, M., & Hu, Y. (2026). AI literacy and AI anxiety in nursing students: the serial mediating roles of attitudes and self-efficacy. *Frontiers in Public Health*, 14, 1918134.
41. Zhao, Z., An, Q., & Liu, J. (2025). Exploring AI tool adoption in higher education: Evidence from a PLS-SEM model integrating multimodal literacy, self-efficacy, and university support. *Frontiers in Psychology*, 16, 1619391.



2026 by the authors; Journal of Global Social Transformation (JGST). This is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).