Economic Sciences
https://economic-sciences.com
ES (2026) 22, 4(S), 157-165 ISSN:1505-4683

Cryptocurrency Investment Behavior: A Machine Learning Perspective

E.Revanjani[1], Dr.K.Nigama[2], Dr.R.Guhan[3], Dr.M.Karthik Ram[4]
[1]School of Management, SASTRA Deemed University, Thanjavur, India.
Email : 126071083@sastra.ac.in
[2]School of Management, SASTRA Deemed University
Thanjavur, India.,Email : nigama@mba.sastra.edu
[3]School of Management, SASTRA Deemed University, Thanjavur, India.
Email: guhan@mba.sastra.edu
[4]School of Management, SASTRA Deemed University, Thanjavur, India.
Email :karthikram@sastra.ac.in

Abstract
Cryptocurrency is a form of digital currency that is increasingly chosen by individuals as an investment option. It is based on blockchain technology, which removes the need for banks or other financial intermediaries in transactions. This study focuses on Millennials, defined as individuals aged 25 to 45, who manage their own finances and are familiar with digital technologies, making them more inclined to explore cryptocurrency investments.The research investigates the factors that influence Millennials' decisions to invest in or avoid cryptocurrencies by using the Technology Readiness Index (TRI) and the UTAUT model. Data was collected through an online survey using a five-point Likert scale to assess levels of optimism, innovativeness, discomfort, and insecurity toward technology.The findings indicate that optimism and innovativeness act as motivating factors encouraging investment, while discomfort and insecurity serve as barriers due to concerns about complexity, safety, and market volatility. Among the factors, performance expectancy emerges as the strongest predictor of investment intention, followed by effort expectancy and facilitating conditions. Social influence has only a minimal impact.To support these findings, machine learning techniques were applied, where both Logistic Regression and Support Vector Machine (SVM) models achieved a high accuracy rate of 96%. Based on the results, the study recommends simplifying cryptocurrency platforms, increasing transparency, strengthening user education, and enhancing technical support to encourage a safer and more informed approach to cryptocurrency investment among Millennials.

Keywords: *Cryptocurrency investment; Millennials; Technology Readiness Index (TRI); TRUTAUT; Behavioral intention; UTAUT constructs; Fintech adoption; Machine learning prediction.*

I. INTRODUCTION

Digital Finance is growing at a rapid rate and as a result, new type of investments is created that do not need centralized structures like traditional banks (Francisco, et al., 2022) (Khan, Ruby, Hakami, & Ali, 2022). Among the many investment opportunities available, cryptocurrency is considered a good option because of it has a decentralized structure, high security, transparency and gives high returns (Saputri, Yogi, Kurni, & Marlina, 2023). Initially Cryptocurrency was considered as highly risky but nowadays it was considered as new investment opportunity because it creates wealth, especially in the countries where digital financial services are emerging. Recent studies have identified that cryptocurrency investment among millennials was gradually increasing in particularly those who highly exposed to online financial information and people who are comfortable with the digital financial tool (Saputri, Yogi, Kurni, & Marlina, 2023). Many studies in cryptocurrency have observed that their investment choices are hugely influenced by the factors such as financial literacy, market information and risk taking propensity (Jha, Ritu, Awasthi, & Shikhar, 2022) (Sa'diyah, et al., 2024) (Yadav & Rai, 2024). Among any other generations millennials show a high interest in crypto investments, still the issues like price unpredictability, regulation issues and lack of clarity in the legal system have impacted their investment confidence (Jadhav, et al., 2024) (Hamedani, et al., 2025). Cryptocurrency as an investment choice not only driven by financial considerations but also by psychological and emotional aspects (Marikyan & Papagiannidis, 2021) (Sa'diyah, et al., 2024). Risk perceptions, Trust and overconfidence are the important decision-making factors that influence people's mindset towards investments in cryptocurrency notably in the extremely unpredictable market of cryptocurrencies

Economic Sciences
https://economic-sciences.com
ES (2026) 22, 4(S), 157-165 ISSN:1505-4683

(Yadav & Rai, 2024) (Marikyan, Papagiannidis, & Stewart, 2023). Many studies on the adoption of cryptocurrencies shown that trust and individual capabilities, such as technical knowledge and faith in oneself are the important factors in adoption. However, the complexity and technological intensity of cryptocurrencies often act as barriers to adoption (Andal & Aniruddh, 2023) (Puriwat & Tripopsakul, 2017). To overcome these challenges, technology adoption models used to study digital financial behavior (Xue, Rashid, & Ouyang, 2024).

The Unified Theory of Acceptance and Use of Technology (UTAUT) model is been widely adopted because it has identified important factors for technology adoption, which are performance expectancy, effort expectancy, social influence and facilitating conditions. Various studies have validated the effectiveness of UTAUT models in many fields such as banking, health-care, e-commerce and digital payment applications. However, the UTAUT model fails to take into account the individual differences in technology readiness. To overcome this problem, there has been an attempt to combine the Technology Readiness Index (TRI), which includes optimism, innovativeness, discomfort, and insecurity, to create the TRUTAUT model (Kiruba DR, R DR, N DR, & others, 2023) (Xue, Rashid, & Ouyang, 2024). This research paper fills the existing gaps in the literature by cryptocurrency as an alternative option among millennials using the TRUTAUT model (Puriwat & Tripopsakul, 2017). The data was collected by using an online survey, and the descriptive statistics, correlation analysis, and visualization were done to investigate the relationship among the variables of TRUTAUT model. The findings shows that optimism and innovativeness positively influence crypto adoption, while discomfort and insecurity act as strong barriers. The result of the model suggest that performance expectancy is the most important factor of investment intention., followed by effort expectancy and facilitating conditions, whereas social influence has a positive but also has less impact in investments. The validity of the model is further confirmed by technology acceptance testing, where the accuracy of the logistic regression and support vector machine (SVM) models reaches 96% with high ROC-AUC values. These findings confirm the recommendations for improving user experience, transparency, financial and technical literacy, infrastructure, and trust-building to promote responsible cryptocurrency use among Millennials. The objective of the study are 1.To examine the factors influencing Millennials' behavioural intention to invest in cryptocurrency,2.To analyzes the role of individual technological readiness factors—optimism, innovativeness, discomfort, and insecurity, 3.To evaluate the impact of UTAUT variables, 4.To validate the predictive capability of machine learning models.

II. THEORATICAL FRAMEWORK

2.1 Optimism

Optimism is Having a positive attitude towards technology as a whole, which tends to improve people's capacity to control things, remain flexible, and accomplish more in their daily activities (Parasuraman & Ananthanarayanan, 2000).Millennials who are optimistic are more likely to engage with fintech and invest in cryptocurrencies (Khan, Ruby, Hakami, & Ali, 2022).

2.2 Innovativeness

Innovativeness is having a tendency to be at the forefront of technology, wanting to be among the first to adopt new technology, and wanting to be a resource for others in terms of knowledge. (Parasuraman & Ananthanarayanan, 2000). Fintech and mobile banking studies show that innovativeness strengthens intention to adopt by increasing confidence and risk tolerance, which in turn drives cryptocurrencies investment decisions (Marikyan, Papagiannidis, & Stewart, 2023) (Puriwat & Tripopsakul, 2017) (Xue, Rashid, & Ouyang, 2024).

2.3 Discomfort

Discomfort is feeling a lack of control over technology, thinking systems are too complicated, not friendly enough for the average person, or not well-maintained. (Parasuraman & Ananthanarayanan, 2000). Individuals who experience discomfort are less inclined to use cryptocurrencies, regardless of its potential benefits (Adnan & Kumari, 2022) (Marikyan & Papagiannidis, 2021).

Economic Sciences
https://economic-sciences.com
ES (2026) 22, 4(S), 157-165 ISSN:1505-4683

2.4 Insecurity

Insecurity is not trusting technology due to concerns for its reliability and fear of adverse consequences such as fraud, hacking, or loss of personal information. (Parasuraman & Ananthanarayanan, 2000). Studies show that perceived risk reduces trust and adoption intentions of cryptocurrency, especially in financial technologies where trust is paramount (Saputri, Yogi, Kurni, & Marlina, 2023) (Yadav & Rai, 2024) (Marikyan & Papagiannidis, 2021). Addressing security concerns is crucial for promoting greater adoption of cryptocurrencies (Sa'diyah, et al., 2024).

2.5 Performance expectancy

Performance Expectancy means to which an individual believes that using a system or technology will improve their performance and achievement of key outcomes (Venkatesh, et al., 2003). This variable considers the following factors such as profit, portfolio diversification and financial growth (Saputri, Yogi, Kurni, & Marlina, 2023). Many studies observed that higher performance benefits will notably increase the cryptocurrency investments among the millennials (Kiruba DR, R DR, N DR, & others, 2023). These findings underline the importance of this construct in this model.

2.6 Effort Expectancy

Effort Expectancy means which an individual believes that using a system or technology will be easy to learn and use (Venkatesh, et al., 2003).The adoption of cryptocurrency is made easier by user-friendly apps, simple payment options, and clear processes. According to research studies (Jadhav, et al., 2024) (Hamedani, et al., 2025) (Puriwat & Tripopsakul, 2017) (Marikyan, Papagiannidis, & Stewart, 2023) (Xue, Rashid, & Ouyang, 2024) simple systems like these increase the consumers' willingness to engage with cryptocurrency at the initial stages.

2.7 Social Influence

Social Influence means an individual believes that important others such as classmates, family, colleagues, or supervisors are viewing them as using a particular technology or system (Venkatesh, et al., 2003). Social influence from friends, social media, online communities, and celebrities is essential for cryptocurrency. When assessing the risks associated with new investments, millennials are particularly concerned about these factors in this studies (Saputri, Yogi, Kurni, & Marlina, 2023) (Jadhav, et al., 2024) (Yadav & Rai, 2024) (Hamedani, et al., 2025) (Marikyan & Papagiannidis, 2021).

2.8 Facilitating Conditions

Facilitating Conditions refer to which an individual believes that they have the necessary tools and information to use a system or technology (Venkatesh, et al., 2003). Research shows that favorable conditions increase investor confidence and reduce perceived risk. Therefore, this further strengthens the intention to invest in cryptocurrency (Jadhav, et al., 2024) (Adnan & Kumari, 2022) (Hamedani, et al., 2025) (Sa'diyah, et al., 2024).

2.9 Behavioural Intention

Behavioural Intention is which an individual is willing to use a system or technology in the future, and to which they are likely to adopt and continue to use it. In cryptocurrency adoption, technological readiness, expected rewards, trust, and social influence are important factors. Research that used the TRI-UTAUT model has found that these factors have a strong influence on online financial service use (Saputri, Yogi, Kurni, & Marlina, 2023) (Marikyan, Papagiannidis, & Stewart, 2023) (Hamedani, et al., 2025) (Jadhav, et al., 2024) (Xue, Rashid, & Ouyang, 2024).

III . METHODOLOGY

This study used a survey to check why Millennials (aged 25–45 who handle money matters) want to invest in cryptocurrency as a new option. People joined on their own through easy online survey. Researchers shared a simple online form on social media and email. It had two parts: basic info (like age, income, job, and how they learned about crypto) and questions on key factors from TRI and UTAUT models optimism, innovativeness, discomfort, insecurity, performance expectancy, effort expectancy, social influence, facilitating conditions, and behavioural intention. The answers were rated on a scale of (1 – Strongly Disagree, 2-Disagree, 3 – Neutral, 4- Agree, 5-Strongly Agree). The data received from the responders were

Economic Sciences
https://economic-sciences.com
ES (2026) 22, 4(S), 157-165 ISSN:1505-4683

transformed into excel and the data is been checked before it was used for the statistical analysis. During the part of analysis, the link between various factors is checked and the following charts was created box plots, histograms, heatmaps and correlation tables. To test the predications, the following machine learning models were used Support vector machine (SVM), logistic regression and decision tree and the subsequent results of these models like accuracy, recall, precision, F1-Score and ROC Curves shown a excellent predication.

IV. FINDINGS

A. Exploratory Data Visualization

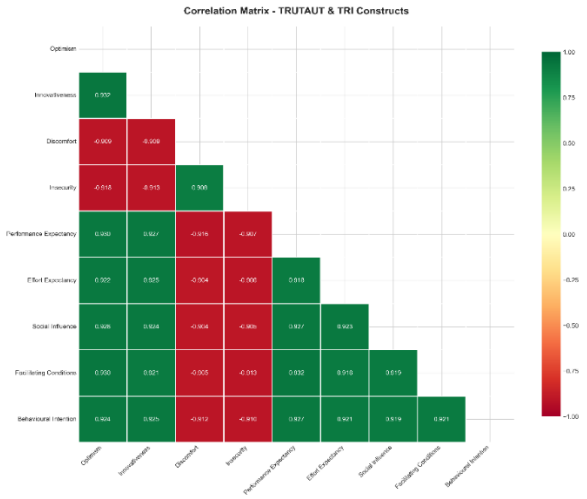

Figure 1 Correlation Analysis of TRUTAUT Constructs

The correlation matrix lays out how different factors connect from TRI traits like optimism, innovativeness, discomfort, and insecurity, to UTAUT elements such as performance expectancy, effort expectancy, social influence, and facilitating conditions, all tying into behavioural intention. Optimism and innovativeness link strongly and positively with each other and the TRUTAUT drivers, showing that upbeat, forward-thinking mindsets go hand-in-hand with seeing crypto as useful, easy, socially backed, and resource-supported for investing. On the other hand, discomfort and insecurity tie in negatively with those drivers and intention overall, meaning tech anxiety, uncertainty, risks, and trust issues tend to dampen people's desire to dive into cryptocurrency. Behavioural intention links positively to performance expectancy, effort expectancy, social influence, and facilitating conditions, which backs up the TRUTAUT framework and sets a solid foundation for deeper predictive work later on.

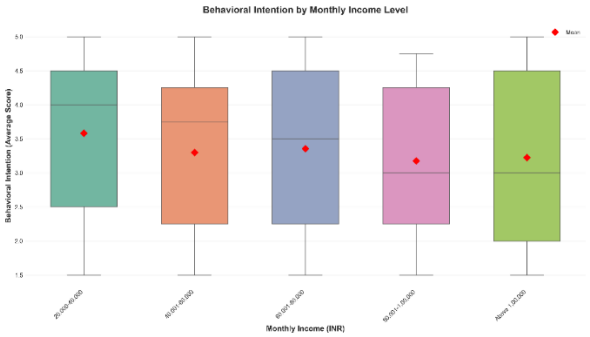

Figure 2 Box Plot using Behavioral Intention by Monthly Income Level

The box plot reveals how behavioural intention to invest in cryptocurrency differs by income level. Lower- and middle-income Millennials show moderate to fairly high interest, with more consistent

Economic Sciences
https://economic-sciences.com
ES (2026) 22, 4(S), 157-165 ISSN:1505-4683

views, while higher-income groups display wider spread in their attitudes, reflecting mixed feelings. This could stem from higher earners having greater risk tolerance and other investment choices like stocks, mutual funds, or property, whereas lower- and middle-income folks often see crypto as a more reachable option. Still, the averages don't form a straight line, showing income isn't the only factor personal behaviours and tech views play a big role too. Overall, crypto interest spans all income levels among Millennials, pointing to wider appeal beyond just the wealthy.

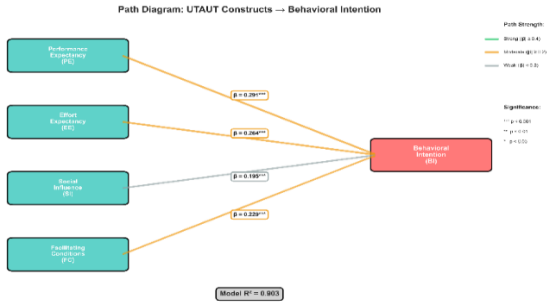

Figure 3 Pair Plot for finding Relationships among Key UTAUT Constructs

The path model reveals that all four UTAUT factors Performance Expectancy, Effort Expectancy, Facilitating Conditions, and Social Influence—positively and significantly boost Millennials' intention to invest in cryptocurrency (all $p < 0.001$). Performance Expectancy stands out as the top driver ($\beta = 0.291$), meaning people are much more likely to invest when they see crypto as truly useful and rewarding, like with good returns. Effort Expectancy follows closely ($\beta = 0.264$), showing that easy-to-use platforms and simple learning curves really encourage people to invest. Facilitating Conditions play a solid supporting role ($\beta = 0.229$), as things like secure setups, reliable internet, helpful resources, and clear rules build confidence. Social Influence has the smallest but still positive impact ($\beta = 0.195$), suggesting friends and networks nudge intentions along, though not as much as usefulness or ease.

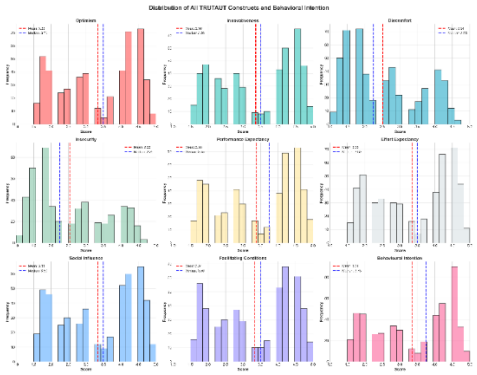

Figure 4 Distribution of TRUTAUT Constructs, and Behavioral Intention using Histogram

The histograms reveal that Millennials show high levels of Optimism and Innovativeness, reflecting their openness to digital and fintech innovations. Discomfort and Insecurity tend to cluster at low-to-moderate levels, meaning concerns exist but aren't overwhelming. Most UTAUT factors like Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions along with Behavioural Intention, fall above the neutral midpoint. This suggests people generally see cryptocurrency as useful, easy to handle, socially endorsed, and supported by the right resources, pointing to a positive outlook on investing. The close alignment between means and medians across these factors shows steady response patterns without major skew, making the data reliable for deeper analysis.

Economic Sciences
https://economic-sciences.com
ES (2026) 22, 4(S), 157-165 ISSN:1505-4683

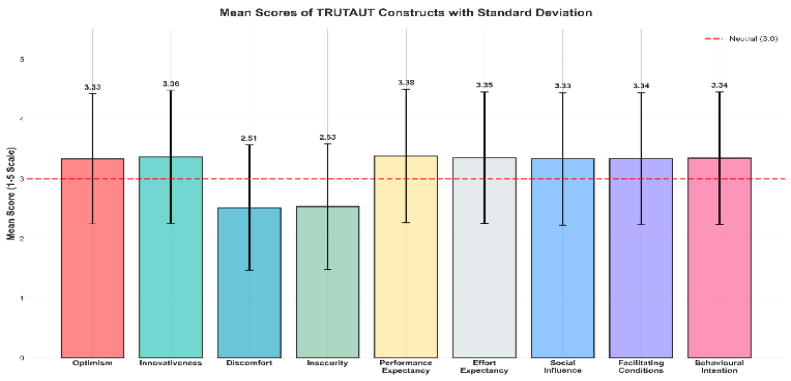

Figure 5 Mean Square Bar chart of TRUTAUT Constructs

The bar chart of average scores points out the main drivers of cryptocurrency adoption. Performance Expectancy comes out on top, as most people see crypto as a worthwhile investment. Effort Expectancy and Social Influence score above the middle ground too, showing that ease of use and friends' views encourage people to get on board. Meanwhile, Discomfort and Insecurity dip below average, serving as big hurdles because of tech-related stress and worries about safety. Behavioural Intention holds steady above neutral for Millennials, and the error bars reveal some differences in how comfortable folks are with risks and technology.

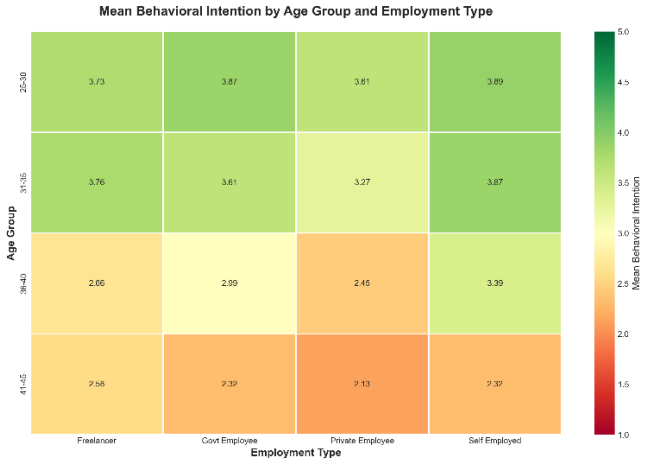

Figure 6 Heatmap Analysis: Age Group and Employment Type

The heatmap of mean Behavioural Intention across age groups and employment types offers a clear, combined view of how different demographic segments think about investing in cryptocurrency. It shows that younger self-employed and government-employed respondents display the strongest intention to invest, whereas older respondents working in the private sector tend to have lower investment intention. This pattern points to an interaction between age and employment status, suggesting that both a person's life stage and their work context play a meaningful role in shaping cryptocurrency investment behaviour.

Economic Sciences
https://economic-sciences.com
ES (2026) 22, 4(S), 157-165 ISSN:1505-4683

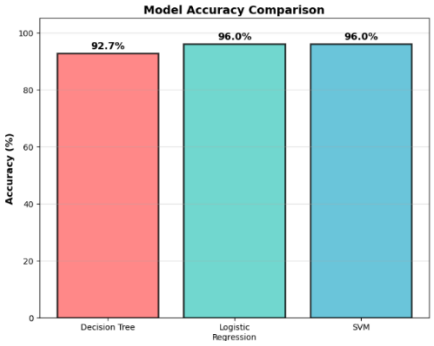

Figure 7 Predictive Model Performance Analysis

The performance of three machine learning models Decision Tree, Logistic Regression, and Support Vector Machine was evaluated to assess how well they could predict the TRUTAUT constructs. The results show that Logistic Regression and SVM both achieved an accuracy of 96%, outperforming the Decision Tree model, which recorded 92.67%. This suggests that linear and margin-based models like Logistic Regression and SVM are better at capturing the underlying patterns and relationships within the dataset.

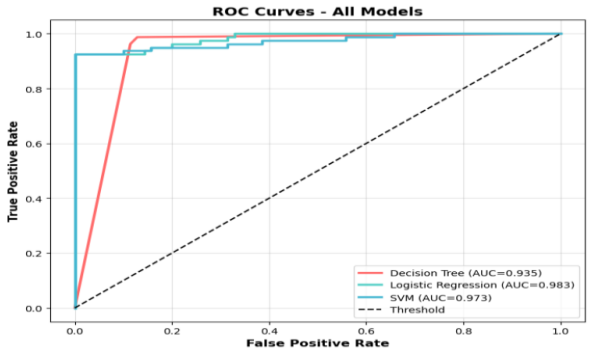

Figure 8 ROC Chart for Decision Tree, Logistic Regression and SVM

The ROC curve analysis further confirms these findings. Logistic Regression achieves the highest AUC value, followed closely by SVM, demonstrating excellent discriminative ability in distinguishing between investors and non-investors

Model	AUC	ACCURACY
Decision Tree	0.935	92.7
Logisitic Regression	0.983	96
SVM	0.973	96

Table 1 ML Models AUC & Accuracy Table

All models perform significantly better than random classification, validating the robustness of the predictive analysis

V. IMPLICATIONS

This study offers clear, practical ideas for everyone involved in cryptocurrency like policymakers, banks, app developers, and investment trainers. It shows that performance expectancy and effort expectancy are very important, which means cryptocurrency platforms should be easy to use, clear, and show real investment benefits. Simple interfaces, smooth steps for buying and selling, and easy learning materials can build confidence and reduce confusion, making it easier for more people to start using crypto. At the same time, discomfort

and insecurity highlight the need to build stronger trust. Clear rules, strong security systems, honest warnings about risks, and good investor protection can reduce fear and increase confidence among Millennials. Training programs that teach basic crypto concepts, risk management, and long-term planning can also help people make better decisions. In short, making cryptocurrency safer, simpler, and clearly valuable can strongly support responsible and long-term use of cryptocurrency as a serious investment option.

VI. Conclusion

This study looks at how millennials think about cryptocurrency as a new way of investing money. To understand their behaviour, the study combines two models such as the Technology Readiness Index (TRI) and the UTAUT model into one framework called TRUTAUT. Along with normal data analysis, machine learning methods were also used to check whether the results were reliable. The results show that millennials are more willing to invest in cryptocurrency when they believe it is useful, easy to understand, and supported by good technology. Factors like how helpful it feels, how easy it is to use, and whether proper support is available strongly influence their decision. Although friends, family, or society do have some influence, this effect is weaker. This means most millennials depend more on their own thinking rather than on social pressure when deciding to invest. The study shows that people who feel positive about technology are more open to investing in cryptocurrency. On the other hand, fear, confusion, and lack of trust reduce interest in cryptocurrency. Many people worry about safety, complexity, and the risk of losing money. The paper shows that trust is very important for encouraging adoption. The model used in the study explains investment behaviour well, as it captures both the positive and negative factors that affect decisions. The machine learning results also support the findings by accurately predicting investment intention. This study shows how modern analytical tools can improve financial behaviour studies. Overall, this study adds value by showing how technology-related thinking affects cryptocurrency investment among millennials. It helps explain why some people are willing to invest while others hesitate. The findings suggest that financial platforms, policymakers, and educators should focus on making cryptocurrency easier to adopt. This will help people make smarter and more informed decisions. Future studies can improve this work by using long-term data, studying people from different countries, or exploring other personal and behavioural factor.

References

1. Adnan, M., & Kumari, R. (2022). Adoption of cryptocurrency, a novel entrant to asset class: measuring the perception of millennials. *International Journal of Management (IJM)*.
2. Andal, V., & Aniruddh, G. (2023). A Study on Perception of Millennials on Fintech and Cryptocurrency. *J. Risk Financ. Manag*, 7153.
3. Francisco, Ryan, Rodelas, Nelson, Ubaldo, & Edison, J. (2022). The perception of Filipinos on the advent of cryptocurrency and non-fungible token (NFT) games. *arXiv preprint*.
4. Hamedani, Shahidi, S., Francis, Brian, P., Aslam, & Sarfraz. (2025). Regulation as a Game-Changer: Factors Driving Cryptocurrency Adoption among Millennials. *International Review of Management and Marketing*, 415.
5. Jadhav, M. S., Jarad, P. R., Bhavsar, P. D., Yadav, D. M., Suryavansh, D., & Moholkar, P. N. (2024). Cryptocurrency Adoption among Millennials: Trends, Drivers, and Implications. *International Journal of Research Publication and Reviews*.
6. Jha, Ritu, Awasthi, & Shikhar. (2022). Financial literacy of novice cryptocurrency investors.
7. Khan, Ruby, Hakami, & Ali, T. (2022). Cryptocurrency: usability perspective versus volatility threat. *Journal of Money and Business*, 16--28.
8. Kiruba DR, A. S., R DR, B., N DR, M., & others. (2023). Cryptocurrency Investing: Millennial Decision Making. *Indonesian Capital Market Review*, 2.
9. Marikyan, D., Papagiannidis, S., & Stewart, G. (2023). Technology acceptance research: Meta-analysis. *Journal of Information Science*, 01655515231191177.
10. Marikyan, M., & Papagiannidis, P. (2021). Unified theory of acceptance and use of technology. *TheoryHub book*.
11. Parasuraman, & Ananthanarayanan. (2000). Technology Readiness Index (TRI) a multiple-item scale to measure readiness to embrace new technologies. *Journal of service research*, 307--320.

12. Puriwat, W., & Tripopsakul, S. (2017). Mobile banking adoption in Thailand: An integration of technology acceptance model and mobile service quality.
13. Sa'diyah, Chalimatuz, Widagdo, Bambang, Fitriasari, & Fika. (2024). Cryptocurrency investment: Evidence of financial literacy, experience, and risk tolerance. *Investment Management and Financial Innovations*.
14. Saputri, Yogi, A., Kurni, & Marlina. (2023). Millennial Investor Analysis of Cryptocurrency Investments. *International Symposium on Humanities and Social Science*, 916--921.
15. Venkatesh, Viswanath, Morris, G, M., Davis, B, G., . . . D, F. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425--478.
16. Xue, L., Rashid, A. M., & Ouyang, S. (2024). The Unified Theory of Acceptance and Use of Technology (UTAUT) in Higher Education: A Systematic Review. *Sage Open*, 21582440241229570.
17. Yadav, J. A., & Rai, H. (2024). A Study on Behavioral Biases Influencing Investment Decision in Cryptocurrencies. *Journal of Emerging Technologies and Innovative Research (JETIR)*.