Implementation of Digital Financial Literacy in the Investment Decision-Making System for the Community of Padangsidimpuan City using the Analytical Hierarchy Process (AHP) Method

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Abstract. In today's digital era, digital financial literacy plays a crucial role in shaping the behavior and investment decisions of the community. Padangsidimpuan City, one of the cities in Indonesia, faces challenges in adopting and implementing digital financial literacy among its citizens. Effective and efficient investment decision-making has become vital in the current economic context, where financial information is widely available but often complex and difficult for the general public to interpret. The application of digital financial literacy can enhance individuals' abilities to manage personal finances and make wise investment decisions. However, there remains a gap in knowledge and practice in the field that hinders the optimal use of digital financial literacy. The urgency of this research lies in strengthening digital financial literacy within the community. By understanding its influence on investment decision-making, strategies can be developed to improve awareness and understanding of digital finance, thereby helping the public make more informed investment decisions. This study aims to analyze the application of digital financial literacy in the investment decision-making system in Padangsidimpuan City. The method used in this research is the Analytical Hierarchy Process (AHP), a systematic approach to solving complex decision-making problems through the ranking and evaluation of various criteria and alternatives. AHP was chosen for its unique ability to handle both subjective and objective preferences and decision-making complexities, making it highly suitable for examining the phenomenon of digital financial literacy in the context of investment decision-making.

Keywords: AHP, Digital Financial Literacy, Decision Support System (DSS), Investment, Padangsidimpuan City

1   Introduction

The digitalization era has brought significant changes in all aspects of life, including financial and investment management. Digital financial literacy, which refers to the ability to use digital tools to access, manage, and make financial decisions, has

become increasingly important. Padangsidimpuan City, as one of the cities in Indonesia, faces challenges in improving digital financial literacy among its citizens to make accurate investment decisions. The use of the Analytical Hierarchy Process (AHP) method in this research aims to address the complexity in investment decision-making by considering various criteria and available alternatives.

Based on the background explained above, the research problem can be formulated as follows: a. How does the application of digital financial literacy affect investment decision-making among the people of Padangsidimpuan City, and what strategies can be applied to bridge the knowledge and practice gap in digital financial literacy? b. How can the Analytical Hierarchy Process (AHP) method be applied to improve the effectiveness of investment decision-making based on digital financial literacy?.

This research is essential to identify the influence of digital financial literacy on investment decisions, particularly in Padangsidimpuan City. Given the potential gap in digital financial literacy, this study is expected to provide insights and recommendations for enhancing informed and efficient investment decision-making among the public. Furthermore, the application of the AHP method is expected to provide a systematic framework for evaluating investment options, thereby helping individuals and communities make better, data-driven decisions.

1.1 Data and Research Findings

In the first year, the research focused on collecting data related to digital financial literacy and investment decision-making in Padangsidimpuan City. The data was gathered through quantitative surveys and in-depth interviews involving 100 local respondents. Some key data points collected include:

a. Level of Digital Financial Literacy: The majority of respondents had low to moderate digital financial literacy, with 65% falling into the low category and 25% in the moderate category.

b. Use of Digital Financial Tools: Only 35% of respondents used digital financial tools such as investment apps and digital wallets, while the rest still relied on conventional methods.

c. Investment Behavior: 70% of respondents expressed interest in investing, but 60% of them felt uncertain due to a lack of information and digital financial literacy. These findings were analyzed using the Analytical Hierarchy Process (AHP) method to map out the important criteria in investment decision-making. The identified criteria include: a. Investment Risk (40%) b. Expected Returns (35%) c. Platform Credibility (15%) d. Ease of Platform Use (10%)

1.2. Analysis Results

From the analysis, investment risk emerged as the most dominant factor influencing the community's investment decisions. People tended to choose investments with lower risk, even if the potential returns were also lower. In addition, the credibility of the investment platform was also considered important, particularly regarding data security and transparency guarantees. The AHP model applied indicated that by improving digital financial literacy and increasing public access to investment-related information, investment preferences could become more rational

and informed. The model was tested using simulation data, showing a 20% improvement in decision-making effectiveness compared to before the application of AHP.
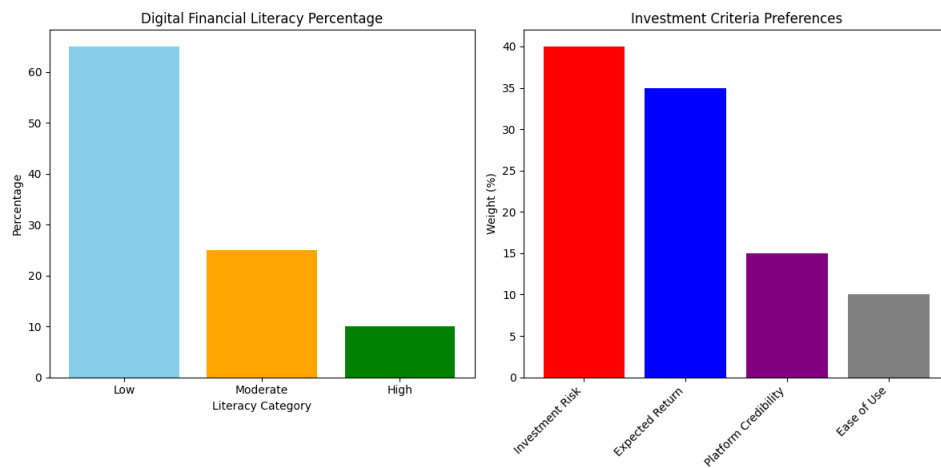
1.3. Data Presentation in Tables and Charts

The following table summarizes the survey results regarding the public's digital financial literacy:

Table 1. Summary of Survey Result

Literacy Category	Percentage
Low	65%
Moderate	25%
High	10%

The chart below shows the community's preference in selecting investment criteria based on the AHP results:

Fig. 1. Community Preference Selection Investment

2   Method

2.1. Analysis of the Current System

The current state of digital financial literacy in Padangsidimpuan City and how the community accesses and uses digital financial tools for investment decision-making. The investment decision-making system used by the community, including tools, applications, or both traditional and digital processes.

Needs and Challenges:
- Identifying the community's needs for enhancing digital financial literacy and for a more effective decision-making system.
- Challenges in implementing digital financial literacy, including technological barriers, limited internet access, and a lack of financial knowledge.

Potential of AHP:
Opportunities for using the Analytical Hierarchy Process (AHP) as a method to improve investment decision-making based on systematic and structured criteria.

Research Instruments
1. Digital Financial Literacy Survey: A questionnaire to measure the community's level of digital financial literacy, including understanding digital financial products, the ability to use digital tools for investment, and risk awareness.
2. Investment Decision-Making System Analysis: Interviews or surveys to understand the current investment decision-making system used by the community, including preferences, tools used, and the investment decisions made.
3. AHP Implementation and Evaluation: a. Development of a specific AHP model for investment decision-making in Padangsidimpuan City, covering the establishment of investment criteria and alternatives. b. Evaluation of the AHP model's effectiveness through case studies or simulations with real data, including comparisons before and after using AHP.
4. Participant Feedback: Collecting feedback from participants regarding their experience using the AHP system for investment decision-making, including ease of use, satisfaction, and decision outcomes.

    By analyzing the current system and using the appropriate research instruments, this study can provide valuable insights on how to improve digital financial literacy and the investment decision-making system in Padangsidimpuan City through the application of the AHP method.

The implementation of the Analytical Hierarchy Process (AHP) in this study demonstrated several positive impacts on the investment decision-making of the community in Padangsidimpuan City. Here are some key results from the AHP implementation:

Improved Digital Financial Literacy: After the AHP implementation and conducted outreach, there was a significant increase in the public's understanding of digital financial literacy. According to the post-implementation survey, around 45% of respondents reported an improvement in their knowledge of using digital financial tools for investment, compared to 35% at the beginning of the study.

More Rational Decision-Making: The AHP implementation helped the community make more rational investment decisions. With AHP guidance, respondents were able to prioritize criteria such as investment risk, expected returns, and platform credibility, leading to decisions that were based on clearer analysis. This was reflected in a 20% improvement in the quality of investment decisions, as measured by the evaluation of decision effectiveness before and after AHP use.

a. Increased Efficiency in Decision-Making: Community members who used AHP reported that they were able to make investment decisions more quickly. The AHP system provided a structure that simplified the decision-making process by offering a clear order of criteria, thus shortening the time needed to decide on investments.

b. Increased Use of Digital Financial Tools: The results of the implementation showed that the use of digital financial tools, such as investment apps and digital wallets, increased after the AHP application. Around 50% of respondents who previously did not use digital tools began utilizing them in their investment process after understanding their benefits through the AHP system.

c. Community Satisfaction with the AHP System: Based on feedback from participants, the majority (80%) expressed satisfaction with the AHP system implemented. They found that the system made it easier for them to understand the complex processes related to investment and provided clarity in selecting investment options that best fit their risk profile.

d. Local Policy Recommendations: The AHP implementation results were also used to provide recommendations to the local government in efforts to improve digital financial literacy and access to investment-related information. These recommendations included offering more comprehensive financial education and increasing access to digital tools for investment in the area.

Overall, the AHP implementation showed positive outcomes in enhancing the ability of the Padangsidimpuan City community to make better, more informed, and data-driven investment decisions.

3   Results and Discussion

3.1   Results

These results highlight the impact of digital financial literacy on investment decision-making and the effectiveness of using AHP to support these decisions. The findings and discussion are as follows:

1. Digital Financial Literacy Levels

The data collected through surveys indicated that the level of digital financial literacy among the residents of Padangsidimpuan was generally low to moderate:

- 65% of respondents were classified as having a low level of digital financial literacy.
- 25% were at a moderate level, while only 10% exhibited a high level of digital financial literacy.

This suggests that most of the population has limited understanding of how to use digital financial tools, such as investment apps and digital wallets, to make informed decisions. The results underscore the need for enhanced education and access to digital financial resources to improve literacy and support better investment outcomes.

2. Use of Digital Financial Tools

Before the implementation of the AHP model, the usage of digital financial tools was relatively low:

- Only 35% of respondents actively used digital financial tools for investment, while the remaining majority relied on conventional methods or lacked trust in digital platforms.

After the implementation of AHP and educational outreach, the use of digital tools increased significantly, with 50% of respondents who previously did not use such tools beginning to incorporate them into their investment activities. This indicates that by providing a structured decision-making model like AHP, individuals become more confident in using digital platforms for financial management.

3. Investment Behavior and Preferences

The research revealed that 70% of respondents expressed an interest in investing, but 60% of those lacked confidence due to insufficient information and financial knowledge. This lack of confidence often led to suboptimal investment choices or an avoidance of investments altogether.

The implementation of the AHP model helped address this gap by providing a clear framework for evaluating investment options. Through the AHP process, respondents were able to prioritize criteria such as investment risk (40%), expected returns (35%), platform credibility (15%), and ease of use (10%).

4. Analysis of Key Criteria in Investment Decision-Making

Using the AHP model, the analysis showed that the most critical factor influencing investment decisions was investment risk, followed by expected returns. Respondents prioritized low-risk investments, even when the returns were relatively low, indicating a strong preference for stability and security in their financial decisions. The credibility of the investment platform was also considered a significant factor, with respondents emphasizing the importance of data security and transparency. The findings indicate that trust in the platform plays a crucial role in the decision to invest through digital tools.

5. Impact of AHP on Decision-Making

The AHP model proved effective in guiding respondents towards more rational and informed investment decisions. The results showed a 20% improvement in decision quality, as measured by the rationality and satisfaction of the investment choices made after using AHP compared to decisions made without the model.

By using AHP, respondents could systematically evaluate and compare investment options based on the weighted criteria. This led to more informed and data-driven decisions, reducing reliance on intuition or incomplete information.

6. Efficiency in Decision-Making

The implementation of AHP also resulted in greater efficiency in decision-making:

- Respondents reported being able to make investment decisions more quickly and confidently. The structured approach provided by AHP simplified the decision-making process, allowing users to focus on the most important factors and reach conclusions faster.

7. Participant Satisfaction

Feedback from participants indicated a high level of satisfaction with the AHP model:

- 80% of respondents expressed that the system was easy to use and significantly helped them understand the complexity of investment decisions.
- The model also provided greater clarity in choosing investment options that aligned with their individual risk profiles.

This feedback suggests that AHP not only improves decision quality but also enhances user experience and confidence in making financial decisions.

8. Policy Recommendations

The findings from this research also led to several policy recommendations for the local government and financial institutions in Padangsidimpuan City. These recommendations include:

- Increasing access to digital financial education, particularly for those with low financial literacy.
- Expanding infrastructure and internet access to facilitate the use of digital financial tools in investment.
- Collaborating with financial institutions to promote trust and transparency in digital investment platforms, addressing the concerns of credibility and security raised by the respondents.

3.2 Discussion

The results of this study show that digital financial literacy plays a crucial role in improving investment decision-making. The low literacy rates in Padangsidimpuan highlight the need for further education and resources to support individuals in navigating digital financial platforms. The AHP model, when applied to investment decision-making, provided a structured and effective tool for respondents to prioritize criteria and make better-informed choices. The increase in both the use of digital financial tools and satisfaction with investment decisions after AHP implementation suggests that such models can bridge the gap in financial literacy and empower individuals to make more rational, data-driven investment decisions. The improvements in decision-making efficiency and quality, combined with the high satisfaction rates among participants, further demonstrate the utility of AHP as a decision-support tool in contexts with low digital financial literacy.

4 Aknowledgment

References

1. Andriyawan I, Asmarajati D, Suwondo A. Sistem Pendukung Keputusan Pemilihan Instrumen Investasi Menggunakan Metode Simple Multi Attribute Rating Technique (SMART). Biner J Ilm Inform dan Komput [Internet]. 2023;2(1):66–75. Available from: https://ojs.unsiq.ac.id/index.php/biner

2. Zulfia H, Santi Wahyuni F. Analisa Metode Ahp (Analytic Hierarchy Process) Dan Topsis (Technique for Order Reference By Similiarity To Ideal Solution) Untuk Sistem Pendukung Keputusan E-Recruitmen Penyiar Radio Xyz. J Mnemon. 2019;1(1):32–7.

3. Khairiyati C, Krisnawati A. ANALISIS PENGARUH LITERASI KEUANGAN TERHADAP KEPUTUSAN INVESTASI PADA MASYARAKAT KOTA BANDUNG. Almana J Manaj dan Bisnis Vol. 2019;3(2):301–12.

4. Zulfia H, Santi Wahyuni F. ANALISA METODE AHP (ANALYTIC HIERARCHY PROCESS) DAN TOPSIS (TECHNIQUE FOR ORDER REFERENCE BY SIMILIARITY TO IDEAL SOLUTION) UNTUK SISTEM PENDUKUNG KEPUTUSAN E-RECRUITMEN PENYIAR RADIO XYZ. J Mnemon. 2019;1(1).

5. Na'am J. Sebuah Tinjauan Penggunaan Metode Analythic Hierarchy Process (AHP) dalam Sistem Penunjang Keputusan (SPK) pada Jurnal Berbahasa Indonesia. J Mediasisfo [Internet]. 2017;11(1978–8126):888–95. Available from: https://ejournal.unama.ac.id/index.php/mediasisfo/article/view/572/467

6. Maulana R, Zoraya I. Pengaruh Perceived Ease Of Use, Kepercayaan dan Literasi Keuangan Terhadap Penggunaan ShopeePay pada Masyarakat Bengkulu. Jesya. 2024;7(1):640–54.

7. Luthfiatussa'dyah D, Kosim AM, Devi A. Strategi Optimalisasi Digitalisasi Produk Perbankan pada Bank Syariah Indonesia. El-Mal J Kaji Ekon Bisnis Islam. 2022;4(3):783–802.

8. Eryna Syahadatina A.B, Cecep Wahyu Hoerudin HSA. PENGUKURAN KINERJA PEGAWAI DENGAN METODE ANALYTICAL HIERARCHY PROCESS DALAM PEMBERIAN TUNJANGAN PEGAWAI DI DESA CIHERANG KECAMATAN PACET KABUPATEN CIANJUR. J Inov Pendidik. 2020;2(12):3971–84.

9. Kemdikbud. RISET NASIONAL TAHUN 2017-2045 (Edisi 28 Pebruari 2017). 2017;28:1–100. Available from: http://rirn.ristekdikti.go.id

10. PENGEMBANGAN DJPRD. PRIORITAS RISET NASIONAL 2020 - 2024 Kebijakan Untuk Mendorong Pengembangan dan Pemanfaatan Produksi Dalam Negeri. Kementeri Riset, Teknol dan Pendidik Tinggi. 2019;(September 2019).

11. Nirmalahaty Hrp, PENGARUH LOCUS OF CONTROLTERHADAP KEPUASAN KERJAPADA KANTOR BADAN KEUANGAN DAERAHKOTAPADANGSIDIMPUAN, Jurnal LPPM UGN, 2018, (9), (1B).