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Clustering Analysis on Financial Literacy, Digital Literacy, and Digital Financial Literacy of Emerging Adults (Gen Z) Investors in Rural East Java

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ABSTRACT

Financial literacy, digital information literacy, and digital financial literacy are essential competencies for young adults in rural Jawa to navigate dynamic economic and technological challenges. This study aims to explore literacy profiles among young adults using cluster analysis. A quantitative method was employed through a survey of 135 respondents from rural areas, followed by cluster analysis to identify distinctive literacy patterns The results reveal five distinct literacy profile classes with unique characteristics. The "Tech Savvy" group demonstrates high digital literacy but low financial literacy, while the "Financial Ace" group excels in financial literacy but requires improvement in digital literacy, along with three other groups exhibiting various combinations of strengths and weaknesses. These findings indicate the need for comprehensive and age-appropriate literacy programs to address the specific needs of each group. The study concludes by emphasizing the importance of targeted educational approaches to enhance financial and digital literacy among young adults in rural Java.
Keywords: *Financial literacy, digital information literacy, digital finansial literacy, cluster analysis, generation Z.*

INTRODUCTION

Rapid technological innovation and the increasing integration of digital tools in various sectors of life including in financial activities have transformed how individuals manage their finances in recent years. This transformation is significant for emerging (young) adults, also known as Generation Z (Gen Z), who growing up from youth to adulthood in a digital environment (digital natives, this shift presents opportunities and challenges). While urban populations tend to benefit from better access to education and technology, rural populations face significant barriers, including limited access to digital infrastructure and financial resources. Understanding the levels of financial literacy, digital literacy, and digital financial literacy among emerging people, particularly in rural regions, is critical for policymakers and financial institutions attempting to implement targeted interventions and educational programs.

In the Indonesian capital market context, the significant increase in Single Investor Identifications (SIDs) to 11.75 million by October 2023 indicates a growing investment interest, as reported by the OJK (OJK, 2023). Notably, 58.39% of these investors are below 30 years old, showcasing substantial involvement from the younger generation. Based on their highest education level, the majority, accounting for 64.51%, have completed at least high school education (potentially pursuing higher education). Investors with a bachelor's degree (S1) follow closely at 26.16% (KSEI, 2023). However, despite their active participation, their total assets stand at approximately IDR 52.73 trillion, revealing interesting dynamics in investment profiles and financial strategies, as highlighted by the KSEI.

This data provides insights into the dominance of male employees under 30, holding a high school degree, with annual incomes ranging from 10 million to 100 million IDR. These facts prompt questions about the financial literacy of these young investors. Do these young investors possess adequate financial literacy?

Financial literacy is understood as knowledge and competence to apply that knowledge in financial decisions (Goyal & Kumar, 2021). Financial literacy (A. M. Zakiyyah et al., 2023), defined as the ability to understand and use various financial skills, is crucial for making informed financial

decisions. Perry (Perry, 2011) and Setiawan (Setiawan et al., 2020) state that millennials tend to have limited financial literacy, leading to struggles with self-control in spending. Setiawan (Setiawan et al., 2020) also found that millennials in Indonesia have good knowledge of digital loan products but still have limited knowledge of digital investment and savings products. Lusardi (LUSARDI et al., 2010) similarly found that financial literacy is notably lacking among young adults; only 27% are knowledgeable about inflation and risk diversification and can perform simple interest rate calculations.

Simultaneously, digital literacy (A. M. Zakiyyah et al., 2023) has become essential to daily life, encompassing the skills and knowledge necessary to use digital devices and online resources effectively. There is empirical evidence that internet usage can enhance financial literacy among its users. Bavafa (Bavafa et al., 2019) demonstrated that seeking information online can improve literacy behaviors. Similarly, Morgan and Trinh (Morgan & Trinh, 2019) found that individuals with internet access and smartphone usage had higher financial literacy scores than those without internet access and smartphones. But Zakiyyah (A. Zakiyyah et al., 2021; A. M. Zakiyyah, 2022) found that the level of financial literacy among students is not a determinant in the use of mobile payments. The next question is, what about the digital literacy of these young investors?

The technological advances that have permeated the financial domain have given rise to what is now known as digital finance, encompassing digital financial services (DFS). This shift compels a transition in the transaction patterns of financial actors toward digital methods. To support this shift, there is a need for the capability and knowledge to use DFS effectively, safely, and wisely. This capability and knowledge are known as digital financial literacy. Digital financial literacy (A. M. Zakiyyah et al., 2023) extends this understanding to encompass proficiency in digital tools and platforms for financial management and transactions. Good digital financial literacy is crucial in the contemporary investment landscape, where investors often utilize investment apps integral to DFS. What about the digital financial literacy of stock investors, especially novice investors?

In the midst of these developments, this study intends to do a clustering analysis on the degrees of financial literacy, digital literacy, and digital financial literacy among Generation Z investors in rural East Java. As a result, this study aims to fill knowledge gaps about how these factors interact and influence investment decisions among the younger generation, particularly in environments that may have limited access to financial resources and education.

The importance of this research revolves around the potential development of specialized financial education programs based on the individual demands and features of rural Generation Z investors. The clustering analysis results are expected to provide deeper insights into investor patterns and traits, assisting in creating more successful financial literacy programs and helping policymakers develop an inclusive and sustainable investing environment. By addressing aspects of financial literacy, digital literacy, and digital financial literacy, this research contributes to academic understanding. It forms a robust foundation for practical efforts to strengthen financial resilience and risk management among the younger generation in rural areas.

METHODS

The study utilized a cross-sectional research design to explore financial, digital, and digital financial literacy among Generation Z investors in the Jember Regency region. The population comprised investors with Single Investor Identification (SID) or Investment ID Numbers living in the Jember Regency. Convenience sampling was employed to select willing participants through financial institutions and investment platforms. Before K-Means Analysis Clustering, a Hierarchical Analysis Clustering approach with a dendrogram helped identify potential clusters (Hair et al., 2022). Data collection involved a structured questionnaire assessing financial literacy (basic and advanced sections), digital information literacy (operational skills, information navigation, social engagement, creativity, and mobile proficiency), and digital financial literacy (awareness, technical skills, awareness of digital risks, ability to manage risks, and knowledge of compensation procedures) (A. M. Zakiyyah et al., 2023). Normalization processes and arithmetic mean methods were applied to calculate indices. Results indicated satisfactory digital information literacy levels among

respondents. Digital financial literacy dimensions were awareness, technical skills, awareness of digital risks, ability to manage risks, and knowledge of compensation procedures.

RESULT AND DISCUSSION

Descriptive Analysis Results

Table 1. Description of Respondent's Age

Age Class	Amount	
Late Teenagers (18 - 21)	23	17.04%
Early Adulthood (22 - 26)	98	72.59%
Adult (>26)	14	10.37%
	135	100%

The results of the descriptive analysis (Table 1) provide information regarding the age distribution of respondents categories into three age groups based on the age categories defined by the Indonesian Ministry of Health in 2009. The table indicates that most respondents fall into the early adulthood age group, consisting of 98 individuals (72.59%). The remaining respondents were distributed among the late adolescence (17.04%) and adulthood (10.37%) age groups.

Table 2 presents information regarding the frequency of financial literacy index scores for each category among respondents. It is noted that eight respondents (5.93%) are classified as non-literate, indicating a lack of understanding and trust in financial institutions, as well as financial products and services. These individuals also lack the skills to use financial products and services. In the less literate category, 38 respondents (28.15%) understand financial institutions, products, and services but lack confidence and skills in using financial products and services.

Table 2. Financial Literacy Index Frequency

Category	Frequency	Percentage
illiterate	8	5.93%
Less Literate	38	28.15%
Sufficient Literate	43	31.85%
Well Literate	46	34.07%
Amount	135	100%

The moderately literate category, consisting of 43 respondents (31.85%), indicates that these individuals understand and are confident in financial institutions, products, and services, including related features, benefits, risks, rights, and responsibilities. Lastly, the well-literate category is the most prevalent, with 46 respondents (34.07%). This category signifies their comprehensive understanding and trust in financial institutions, products, and services. They also possess the skills to use financial products and services effectively, including understanding features, benefits, risks, and associated rights and responsibilities (Andarsari & Ningtyas, 2019; A. Zakiyyah et al., 2021).

Table 3. Digital Information Literacy Index Frequency

Lower limit	Upper limit	Frequency	Percentage
50.00	58.33	3	2.22%
60.00	69.33	22	16.30%
70.00	79.33	44	32.59%
80.00	89.00	40	29.63%
90.00	100.00	26	19.26%
Amount		135	100%

Table 3 presents data on the digital information literacy index of respondents. The table reveals five index classes, ranging from a minimum index of 50.00 to a maximum of 100.00. Most respondents exhibit a good level of digital literacy with an index range of 70.00 to 89.00, consisting

of 84 respondents or 62.22% (32.59% plus 29.63%). Additionally, 19.26% of respondents have a higher index, while the remaining 18.52% have an index below this range. Consequently, it can be concluded that respondents who are natives of the digital era possess a commendable level of digital information literacy.

The calculated indices range from 23.167 to 92.917. As observed in Table 4, these indices are relatively evenly distributed across each class. However, the class with the highest index has the fewest respondents, accounting for only seven individuals (5.19%). Conversely, the lowest class contains three respondents (2.22%). The calculated indices range from 23.167 to 92.917. As seen in Table 4.9, these indices are pretty evenly spread across each class. However, the class with the highest index has the fewest respondents, totalling only four individuals (2.70%). Conversely, the lowest class has the same number of respondents as the class just below the highest class, with ten individuals (6.76%).

Table 4. Digital Financial Literacy Index Frequency

Lower limit	Upper limit	Frequency	Percentage
23	37	3	2.22%
38	52	32	23.70%
53	67	49	36.30%
68	82	44	32.59%
83	93	7	5.19%
Amount		135	100%

The table reveals that although Generation Z respondents are limited in excellent digital financial literacy, as seen in the low frequency at the top of the class, most fall into well-literate categories for digital information and financial literacy. This finding suggests that digital financial literacy is a relatively new concept. Being digital natives, these respondents possess solid digital information literacy and can quickly adopt technology. It is anticipated that they can rapidly embrace and learn to master digital financial services, quickly enhancing their digital financial literacy.

Inferential Analysis Results

Before conducting cluster analysis, a multicollinearity test is performed to ensure the robustness and interpretability of the clustering results. This precaution is taken because multicollinearity can impact the stability and reliability of cluster formation. High correlations between variables may result in clusters based on similar information, potentially distorting the interpretation of results.

Table 5. Multicollinearity Test's Result

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2,637	0.099		26,719	<0.001		
	Zscore(FL)	-0.686	0.103	-0.474	-6,649	<0.001	0.922	1,085
	Zscore(DIL)	-0.521	0.113	-0.360	-4,606	<0.001	0.765	1,306
	Zscore(DFL)	0.152	0.113	0.105	1,343	0.182	0.765	1,306

a. Dependent Variable: Average Linkage (Between Groups)

Table 6. Clustering Result

	FL	DIL	DFL	Members	Classes' Name
Mean Class 1	0.840	0.822	0.624	34	Versatile
Mean Class 2	0.425	0.677	0.495	21	Empowered
Mean Class 3	0.809	0.880	0.771	32	Champions
Mean Class 4	0.473	0.829	0.660	26	Tech Savvy
Mean Class 5	0.767	0.686	0.498	22	Financial Ace
Mean	0.686	0.792	0.625	135	

The results of the multicollinearity test (on Table 5) are shown as VIF values (1.085, 1.306, and 1.306), suggesting a generally low to moderate level of multicollinearity, which is favourable for clustering analysis.

As seen in the table above, distinct classes have emerged in analyzing emerging adults' literacy profiles through clustering analysis, shedding light on their proficiency in financial, information, and digital financial domains. Among these classes, each possesses unique attributes that reveal both strengths and areas for improvement. Members of class 1, whom we call "Versatile," exhibit above-average proficiency in financial and information literacy, demonstrating a solid foundation in traditional literacy domains. However, while their financial literacy may be on par with the average, their proficiency in using digital technologies, especially in finance, lags behind. It indicates a need for focused initiatives to enhance skills in navigating digital financial landscapes. This class may benefit from interventions to improve digital skills to align with the evolving digital financial landscape.

Individuals in Class 2 present below-average literacy levels across financial, information, and digital financial domains, highlighting a group that requires additional support and attention. This class is a testament to the importance of adaptive learning strategies and dedicated support to empower individuals in their literacy development journey. That's why we named it an "Empowered" class. Class 3 stands out as a group showcasing excellence in all literacy areas, boasting above-average financial, information, and digital financial literacy competency. These individuals serve as "Champions," embodying a well-rounded understanding and proficiency in traditional and digital literacy, positioning them as leaders within the emerging adult demographic. Recognizing and leveraging Class 3 as mentors or peer educators could contribute to a collaborative learning environment.

Despite below-average financial literacy, Class 4 excels in information and digital financial literacy. Termed "Tech Savvy," this class demonstrates proficiency in navigating digital landscapes. There is a potential for them to leverage technology even more effectively with targeted interventions to enhance financial literacy. Interventions for this class should focus on reinforcing traditional financial literacy while capitalizing on their existing digital financial skills. Targeted interventions are recommended to improve financial literacy while building on existing strengths in digital domains, focusing on practical applications of financial knowledge in digital scenarios.

Class 5 represents individuals with above-average financial literacy but indicates a need for information and digital financial literacy improvement. Coined as "Financial Ace," these individuals demonstrate commendable traditional literacy skills, and there is a recognized need for targeted initiatives to enhance their ability to navigate digital financial landscapes. Educational recommendations for this class include implementing programs that bridge the gap between high traditional literacy levels and limited digital financial experience, incorporating workshops, simulations, and real-world scenarios to enhance practical experience with digital financial tools.

CONCLUSION

The clustering analysis highlights the diversity in literacy profiles among emerging adults in rural Java, emphasizing financial literacy, digital information literacy, and digital financial literacy. The study identifies five distinct classes, each exhibiting unique strengths and areas for improvement. For example, the "Tech Savvy" class demonstrates strong digital competencies but requires support in financial literacy, while the "Financial Ace" class excels in financial literacy yet shows gaps in

digital proficiency. These findings underscore the necessity for tailored educational approaches that build on existing strengths while addressing specific literacy gaps.

The address these gaps, integrating digital tools and applications into educational programs can provide practical, real-world experiences, particularly for classes with lower financial literacy. Additionally, fostering continuous learning through peer networks, mentorship programs, and age-appropriate literacy initiatives can create a dynamic and supportive environment. By recognizing and responding to the diverse literacy needs of this population, stakeholders can design inclusive and impactful programs to enhance overall literacy competencies.

REFERENCES

Andarsari, P. R., & Ningtyas, M. N. (2019). The Role of Financial Literacy on Financial Behavior. *JABE (JOURNAL OF ACCOUNTING AND BUSINESS EDUCATION)*, *4*(1), 24. https://doi.org/10.26675/jabe.v4i1.8524

Bavafa, H., Liu, J., & Mukherjee, A. (2019). Building Financial and Health Literacy at Older Ages: The Role of Online Information. *Journal of Consumer Affairs*, *53*(3), 877–916. https://doi.org/10.1111/joca.12238

Goyal, K., & Kumar, S. (2021). Financial literacy: A systematic review and bibliometric analysis. *International Journal of Consumer Studies*, *45*(1), 80–105. https://doi.org/10.1111/ijcs.12605

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM) Third Edition* (Third). Sage Publications.

KSEI. (2023). *Statistik Pasar Modal Indonesia*. www.ksei.co.id

LUSARDI, A., MITCHELL, O. S., & CURTO, V. (2010). Financial Literacy among the Young. *Journal of Consumer Affairs*, *44*(2), 358–380. https://doi.org/10.1111/j.1745-6606.2010.01173.x

Morgan, P., & Trinh, L. Q. (2019). Fintech and Financial Literacy in the Lao PDR. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3398235

OJK. (2023). *STATISTIK PASAR MODAL SEMESTER I-2023*.

Perry, V. G. (2011). Charging Ahead: An Exploratory Study of Financial Decision-Making among Millennial Consumers. In *Consumer Knowledge and Financial Decisions* (pp. 129–144). Springer, New York, NY. https://doi.org/10.1007/978-1-4614-0475-0_9

Setiawan, M., Effendi, N., Santoso, T., Dewi, V. I., & Sapulette, M. S. (2020). Digital financial literacy, current behavior of saving and spending and its future foresight. *Economics of Innovation and New Technology*. https://doi.org/10.1080/10438599.2020.1799142

Zakiyyah, A., Gunasti, A., & Fadah, I. (2021, May 19). Does Financial Literacy Influencing the University Student's Decision to Use M-Payment? *International Conference on Sustainable Management and Innovation (ICoSMI) 2020*. https://doi.org/10.4108/eai.14-9-2020.2304489

Zakiyyah, A. M. (2022). Analisis Penerimaan Terhadap Mobile-Payment Dengan Mempertimbangkan Financial Literacy Pada Mahasiswa Di Jember. *Jurnal Ilmiah Akuntansi Indonesia) ISSN*, *7*(2), 2528–6501. https://doi.org/10.32528/jiai.v7i2.8721

Zakiyyah, A. M., Fadah, I., Paramu, H., & Awwaliyah, I. N. (2023). *Literasi (Keuangan, Informasi Digital dan Keuangan Digital)*. UM Jember Press.