E-ISSN: 2986-0326, P-ISSN: 2986-089X
DOI: https://doi.org/10.38035/gijes.v1i4
Received: December 06th, 2023, **Revised**: December 17th, 2023, **Published**: January 21th, 2024
https://creativecommons.org/licenses/by/4.0/

Optimization Techniques in Real Estate Investment Portfolios: A Quantitative Approach

Tarang Patel[1], Pushpendra Singh[2], Deepak Dhaakad[3], Sidhraj Vaghela[4], Rahul Chauhan[5], Andino Maseleno[6], R. Rizal Isnanto[7]
[1]Unitedworld Institute of Management, Karnavati University, Gandhinagar, India, tarangpatel2021@gmail.com
[2]Unitedworld Institute of Management, Karnavati University, Gandhinagar, India
[3]Unitedworld Institute of Management, Karnavati University, Gandhinagar, India
[4]Unitedworld Institute of Management, Karnavati University, Gandhinagar, India
[5]Unitedworld Institute of Management, Karnavati University, Gandhinagar, India
[6]Department of Information Systems, Institut Bakti Nusantara, Lampung, Indonesia, andino.maseleno@ibnus.ac.id
[7]Department of Computer Engineering, Diponegoro University, Semarang, Indonesia, rizal@ce.undip.ac.id

Corresponding Author: andino.maseleno@ibnus.ac.id[6]

Abstract: This study explores optimization techniques in real estate investment portfolios, focusing on balancing risk and return through diversification, sustainability, and technology integration. By analyzing responses from 104 participants across different demographic groups, the research examines how factors such as age, gender, education, and occupation influence the adoption of strategies like AI-driven decision-making, ESG considerations, and corporate governance. The findings reveal that while traditional optimization techniques remain essential, there is growing acceptance of advanced tools and sustainable practices. The study emphasizes the importance of a holistic approach to portfolio management, combining financial performance with ethical and environmental considerations. Future research can further investigate emerging technologies and global regulatory impacts on real estate investments.

Keywords: Real estate investment, portfolio optimization, sustainability, artificial intelligence

INTRODUCTION

Optimizing real estate investment portfolios is a crucial aspect of financial planning and wealth management, especially in dynamic market conditions. Portfolio optimization in real estate involves balancing risk and return by diversifying assets to maximize gains while minimizing potential losses. Traditional optimization techniques, such as Modern Portfolio Theory (MPT), have been widely adopted in real estate investment, but recent developments in artificial intelligence, sustainability, and corporate governance are shaping new strategies

for real estate portfolio management. This paper examines various optimization techniques in real estate investment portfolios through a quantitative approach, incorporating insights from corporate governance, sustainability, artificial intelligence, and asset allocation in emerging markets.

Artificial intelligence (AI) has emerged as a vital tool in enhancing decision-making in real estate investments. AI models enable investors to analyze historical data, identify patterns, and predict future market trends with improved accuracy. Adebiyi et al. (2022) developed an AI model that uses historical stock price data to optimize investment portfolios. Their approach allows investors to achieve an optimal mix of assets by minimizing risk and maximizing returns, which can be highly beneficial for real estate investors looking to diversify across multiple property types and regions. In a real estate context, AI can enhance forecasting models, enabling investors to make data-driven decisions about property acquisitions, leasing strategies, and market entry timing.

The role of sustainability in real estate investment has gained significant traction due to climate change concerns. Investors are increasingly considering environmental, social, and governance (ESG) factors when building portfolios (Prasetyani et al., 2023). Alam et al. (2024) explored how climate change-induced initiatives influence investor perceptions, especially in emerging markets such as Malaysia. Their research highlights that investors are becoming more attuned to the risks posed by climate change and are rewarding companies that implement sustainable practices. Real estate investments are not exempt from these concerns, as the energy efficiency and environmental impact of properties can influence both property values and long-term returns. Incorporating sustainability metrics into portfolio optimization can help investors align with global sustainability goals while reducing potential regulatory risks.

Corporate governance plays a significant role in determining the cost of equity and the overall risk profile of real estate investments (Ferdiansyah et al., 2023). Ali et al. (2019) studied the impact of corporate governance on the cost of equity and found that strong governance mechanisms reduce information asymmetry and lower the cost of capital. This finding is particularly relevant for real estate investment trusts (REITs) and large-scale real estate developments that rely heavily on equity financing. Barros et al. (2021) further argued that effective corporate governance mechanisms create value for companies by mitigating agency problems and ensuring better management of investor funds. In the context of real estate, corporate governance practices can enhance investor confidence and improve portfolio performance by fostering transparency and accountability in real estate firms.

Real estate development is inherently uncertain, and flexibility in decision-making is essential for optimizing outcomes. Ayodele and Olaleye (2021) investigated how flexibility in decision pathways can help manage uncertainties in property development, particularly in emerging markets. Their research emphasizes the importance of adaptive strategies that allow developers to respond to market fluctuations, regulatory changes, and unforeseen economic conditions. In a portfolio optimization framework, flexibility can be incorporated by selecting assets that offer options for redevelopment or sale, thus reducing the overall risk exposure of the portfolio.

Asset allocation is another critical factor in optimizing real estate investment portfolios. Ekemode and Olaleye (2020) analyzed asset allocation practices of institutional investors in developing economies and found that a diversified approach across property types and regions can enhance portfolio performance. Their study underscores the importance of geographical diversification, which helps mitigate region-specific risks such as regulatory changes or economic downturns. For institutional investors managing large portfolios, such as pension funds or insurance companies, allocating assets across different property sectors (e.g., residential, commercial, industrial) can balance risk and return more effectively.

Technological advancements are reshaping the landscape of real estate valuation and investment. Despotovic et al. (2023) demonstrated how deep learning techniques can be leveraged to improve automated real estate valuations. Their research introduced comparative judgments and deep learning models to enhance the accuracy of property valuations, which is crucial for making informed investment decisions. In the context of portfolio optimization, more accurate valuations can lead to better asset selection and risk management, allowing investors to adjust their portfolios in response to changing market conditions.

METHOD

The methodology for this research aims to examine the optimization techniques used in real estate investment portfolios, focusing on key factors such as sustainability practices, corporate governance, and the integration of technology. This study utilizes a quantitative research approach to analyze the significance of these factors across various demographic groups, including income, age, gender, education, and occupation. The data was collected through structured surveys administered to a sample of 104 respondents involved in real estate investments. The survey included questions designed to gauge the respondents' perceptions, strategies, and practices related to portfolio optimization, specifically in the context of risk management, diversification, and the adoption of advanced tools such as artificial intelligence (AI) and sustainable investment principles.

The survey responses were analyzed using descriptive statistics to understand the demographic distribution and inferential statistics, including ANOVA (Analysis of Variance), to examine whether there are significant differences in perceptions and practices based on demographic factors. The ANOVA test helped identify variations across different groups, allowing for a deeper understanding of how education, occupation, and other factors influence the integration of sustainability, governance, and technology in real estate portfolio optimization.

Research Objectives

- To analyze the effectiveness of various real estate investment portfolio optimization techniques in balancing risk and return.
- To examine the role of diversification and AI tools in enhancing decision-making in real estate investments.
- To investigate the importance of Environmental, Social, and Governance (ESG) factors in real estate investment decisions.
- To explore the impact of demographic factors, such as income, age, education, and occupation, on the adoption of optimization strategies in real estate portfolios.
- To understand the perception of corporate governance in influencing investment decisions related to real estate.
- To assess the role of technology in shaping investment strategies and decision-making processes in real estate.

Research Hypotheses

H1: There is a significant difference in the perception of the effectiveness of real estate optimization techniques across different age groups.
H2: Diversification as a portfolio optimization strategy is significantly influenced by the gender of the investor.
H3: The use of AI tools for decision-making in real estate investments varies significantly based on the educational background of the respondents.
H4: There is a significant difference in the adoption of sustainability practices across different occupations.

H5: Corporate governance factors have a significant influence on investment decisions in real estate portfolios.
H6: Technology adoption in real estate investment decision-making does not significantly differ across various demographic factors.

This methodology aims to provide a structured and data-driven approach to understanding the various factors that contribute to the optimization of real estate investment portfolios. The use of ANOVA enables the identification of patterns and differences across groups, which can help investors, advisors, and policymakers develop more targeted strategies that cater to diverse investor needs and market conditions.

RESULT AND DISCUSSION

The demographic profile of respondents, as outlined in Table 1, provides insight into the characteristics of participants involved in the study on real estate investment portfolio optimization. A total of 104 respondents were surveyed, with the distribution segmented across various demographic parameters such as income, age, gender, education, and occupation.

In terms of income, the majority of respondents (41.3%) reported earning between 50,000 and 1 lakh, followed by 22.1% earning more than 10 lakh. A smaller percentage (19.2%) reported earnings between 1 lakh and 5 lakh, while 17.3% fell within the 5 lakh to 10 lakh range. This income distribution suggests that the sample encompasses individuals from diverse economic backgrounds, which may influence their investment decisions and risk tolerance in real estate portfolios.

Table 1: Demographic profile of responded

		Frequency	*Percentage*
Income	50K -1 lakh	43	41.3
	1 lakh – 5 lakh	20	19.2
	5 lakh – 10 LAKH	18	17.3
	4More than 10 lakh	23	22.1
	Total	104	100.0
Age	18-25	87	83.7
	25-30	12	11.5
	30-40	1	1.0
	40-50	4	3.8
	Total	104	100.0
Gender	Male	78	75.0
	Female	26	25.0
	Total	104	100.0
Education	SSC	7	6.7
	HSC	15	14.4
	UG	60	57.7
	PG	13	12.5
	Others	9	8.7
	Total	104	100.0
Occupation	Farmer	11	10.6
	Business Man	37	35.6
	Employee	18	17.3
	Others	38	36.5
	Total	104	100.0

The age distribution indicates that a significant portion of respondents (83.7%) were young adults aged between 18 and 25, with fewer participants in the 25-30 (11.5%), 30-40 (1.0%), and 40-50 (3.8%) age brackets. This age skew towards younger individuals might reflect a demographic group that is in the early stages of investment planning or building financial literacy in real estate. Regarding gender, the sample consisted of 75% male and 25% female participants, highlighting a predominant male representation. This gender imbalance could be indicative of greater male participation or interest in real estate investment, although it also raises questions about the need for more inclusive engagement across genders.

Educationally, the majority of respondents (57.7%) had completed undergraduate (UG) studies, while a smaller percentage had postgraduate (PG) degrees (12.5%). Respondents with secondary school certificates (SSC) and higher secondary certificates (HSC) accounted for 6.7% and 14.4%, respectively, with 8.7% classified under "Others." This educational background suggests that most participants are well-educated, which might correlate with a better understanding of investment concepts.

Finally, in terms of occupation, there was a diverse mix, with 35.6% identifying as business owners, 36.5% categorized under "Others," 17.3% as employees, and 10.6% as farmers. The variety in occupations reflects the different perspectives and investment strategies that respondents may bring to real estate investment, further enriching the analysis of optimization techniques across varied backgrounds.

Table 2 ANOVA Age and Factors

		Sum of Squares	df	Mean Square	F	Sig.
Effectiveness	Between Groups	1.846	1	1.846	2.140	.147
	Within Groups	88.000	102	.863		
	Total	89.846	103			
Diversification	Between Groups	.462	1	.462	2.354	.128
	Within Groups	20.000	102	.196		
	Total	20.462	103			
Decision Support	Between Groups	.205	1	.205	.857	.357
	Within Groups	24.410	102	.239		
	Total	24.615	103			
Responsible Investing	Between Groups	.080	1	.080	.490	.486
	Within Groups	16.679	102	.164		
	Total	16.760	103			

Table 2 presents the results of an ANOVA (Analysis of Variance) test examining the relationship between respondents' age and several factors related to real estate investment portfolio optimization. The analysis explores whether age significantly affects how respondents perceive and use different investment techniques, including risk management, diversification, AI tools, and ESG (Environmental, Social, and Governance) factors. The first row analyzes the effectiveness of techniques in balancing risk and return across different age groups. The ANOVA results show an F-value of 2.140 and a significance level (p-value) of 0.147. Since the p-value is greater than the common threshold of 0.05, there is no statistically significant difference between age groups regarding their perception of how effective these techniques are in balancing risk and return.

The second row examines the use of diversification as a strategy in portfolio optimization. The F-value is 2.354, and the p-value is 0.128. Similar to the first factor, the p-value exceeds 0.05, indicating that there is no significant variation between age groups in terms of their use of diversification as an investment strategy. This suggests that

diversification is a strategy consistently applied across different age demographics. For the use of AI tools in real estate investment decision-making, the ANOVA results show an F-value of 0.857 and a p-value of 0.357. Again, the p-value is above 0.05, suggesting that age does not significantly influence whether respondents use AI tools to enhance their investment decisions. This implies that the adoption of AI in real estate investment is not limited to a specific age group, indicating a broad acceptance or awareness of AI tools across different demographics.

The final factor assesses the consideration of ESG factors in investment decisions. The F-value is 0.490, with a p-value of 0.486, which is also above 0.05. This result indicates no significant difference between age groups regarding the integration of ESG factors into their investment decisions. This could suggest a general recognition of the importance of sustainability and ethical considerations across all age groups in real estate investing.

Overall, the results of Table 2 indicate that age does not significantly impact how respondents view or utilize these key strategies in real estate portfolio optimization. This lack of variation across age groups may suggest that these techniques and considerations are broadly accepted and applied by investors, regardless of their age, reflecting a universal approach to optimizing real estate portfolios.

Table 3 ANOVA Gender and Factors

		Sum of Squares	df	Mean Square	F	Sig.
Effectiveness	Between Groups	11.329	3	3.776	4.810	.004
	Within Groups	78.517	100	.785		
	Total	89.846	103			
Diversification	Between Groups	2.809	3	.936	5.305	.002
	Within Groups	17.652	100	.177		
	Total	20.462	103			
Decision Support	Between Groups	.466	3	.155	.643	.589
	Within Groups	24.149	100	.241		
	Total	24.615	103			
Responsible Investing	Between Groups	2.012	3	.671	4.549	.005
	Within Groups	14.747	100	.147		
	Total	16.760	103			

Table 3 presents the results of an ANOVA (Analysis of Variance) test analyzing the relationship between gender and key factors related to real estate investment portfolio optimization. The table evaluates whether there are significant differences in how male and female respondents perceive and apply various investment strategies, including risk management, diversification, the use of AI tools, and the consideration of Environmental, Social, and Governance (ESG) factors.

The first row examines the effectiveness of techniques in balancing risk and return across gender groups. The ANOVA results show an F-value of 4.810 and a significance level (p-value) of 0.004. Since the p-value is less than 0.05, it indicates a statistically significant difference between male and female respondents regarding how they perceive the effectiveness of risk management and return-balancing techniques. This suggests that gender plays a role in how these strategies are viewed, with potential differences in risk tolerance or investment preferences between men and women.

The second row investigates the use of diversification as a strategy in portfolio optimization. The F-value is 5.305, and the p-value is 0.002, which is also below 0.05. This result indicates a significant difference between genders in their use of diversification strategies. This could imply that male and female investors might prioritize diversification

differently or have varying approaches to spreading risk across multiple assets in their real estate portfolios.

For the use of AI tools in real estate investment decision-making, the ANOVA results show an F-value of 0.643 and a p-value of 0.589. The p-value is greater than 0.05, suggesting that there is no significant variation between genders in terms of adopting AI tools for investment decision-making. This result implies that both male and female respondents are equally likely (or unlikely) to use AI in their real estate investments, reflecting a consistent level of technological adoption across genders.

The final factor explores the consideration of ESG factors in investment decisions. The F-value is 4.549, with a p-value of 0.005, which is below the 0.05 threshold. This indicates a significant difference between male and female respondents regarding the incorporation of ESG factors into their investment strategies. This finding suggests that there may be gender-specific attitudes towards sustainability and ethical considerations, with one gender potentially placing more emphasis on ESG criteria than the other.

Overall, the results of Table 3 highlight that gender significantly influences perceptions of risk management effectiveness, the use of diversification strategies, and the importance of ESG factors in real estate investment. However, there is no significant gender difference in the use of AI tools for decision-making. These insights can help real estate firms and financial planners develop more tailored approaches to portfolio optimization that address the varying preferences and behaviours of male and female investors.

Table 4 ANOVA Education and Factors

		Sum of Squares	df	Mean Square	F	Sig.
Green Practices	Between Groups	7.284	3	2.428	2.543	.061
	Within Groups	93.588	98	.955		
	Total	100.873	101			
Governance Evaluation	Between Groups	1.299	3	.433	1.864	.141
	Within Groups	23.230	100	.232		
	Total	24.529	103			
Investment Impact	Between Groups	1.492	3	.497	.900	.444
	Within Groups	55.267	100	.553		
	Total	56.760	103			
investment decisions	Between Groups	1.293	3	.431	.528	.664
	Within Groups	81.621	100	.816		
	Total	82.913	103			

Table 4 presents the results of an ANOVA (Analysis of Variance) test exploring the relationship between respondents' educational backgrounds and their engagement with various aspects of real estate investment, including sustainability practices, corporate governance considerations, and the impact of technology on investment decisions. The analysis aims to determine if education level significantly influences how respondents incorporate these factors into their real estate investment strategies.

The first row examines the incorporation of sustainability practices in real estate investments across different educational backgrounds. The F-value is 2.543, with a significance level (p-value) of 0.061. Although the p-value is slightly above the common threshold of 0.05, it suggests a marginally significant difference, indicating that education may have a moderate influence on the adoption of sustainability practices. This implies that individuals with different educational backgrounds might approach sustainability in real estate investment differently, potentially reflecting variations in awareness or emphasis on environmental and social considerations.

The second row analyzes whether respondents assess corporate governance factors when investing in real estate-related companies such as REITs or developers. The ANOVA

results show an F-value of 1.864 and a p-value of 0.141, which is greater than 0.05. This indicates that there is no statistically significant difference across educational levels in considering corporate governance factors. This result suggests that investors, regardless of their education, might uniformly recognize the importance of corporate governance in making informed investment decisions.

The third row assesses how corporate governance influences respondents' investment decisions. The F-value is 0.900, with a p-value of 0.444, indicating no significant differences across educational backgrounds. This consistency suggests that education does not play a significant role in how investors perceive the impact of corporate governance on their investment strategies, highlighting a general consensus on the importance of governance practices across various education levels.

The final row evaluates how technologies have impacted investment decisions across educational levels. The ANOVA results show an F-value of 0.528 and a p-value of 0.664, indicating no significant differences. This finding implies that the impact of technological advancements on real estate investment decision-making is perceived similarly across respondents, regardless of their education. This may suggest widespread adoption and awareness of technology-driven tools in the real estate sector, cutting across different educational backgrounds.

Overall, the results from Table 4 indicate that education level does not significantly influence respondents' engagement with corporate governance and technology in real estate investment. However, there is a marginally significant difference in the adoption of sustainability practices, suggesting that educational background may play a role in shaping attitudes towards sustainable investment strategies. These insights can help real estate firms and educators identify areas where additional training or awareness might be beneficial, particularly in promoting sustainable investment practices.

Table 5 ANOVA Occupation and Factors

		Sum of Squares	df	Mean Square	F	Sig.
Green Initiatives	Between Groups	2.558	1	2.558	2.602	.110
	Within Groups	98.315	100	.983		
	Total	100.873	101			
Governance Review	Between Groups	.080	1	.080	.334	.564
	Within Groups	24.449	102	.240		
	Total	24.529	103			
Decision Impact	Between Groups	.080	1	.080	.144	.705
	Within Groups	56.679	102	.556		
	Total	56.760	103			
Tech Adoption	Between Groups	.029	1	.029	.035	.851
	Within Groups	82.885	102	.813		
	Total	82.913	103			

Table 5 presents the results of an ANOVA (Analysis of Variance) test to determine whether occupation influences respondents' engagement with various factors in real estate investment, including sustainability practices, corporate governance, and the impact of technology on investment decisions. This analysis explores whether there are significant differences in how people from different occupational backgrounds approach these aspects of real estate investment.

The first row assesses the incorporation of sustainability practices in real estate investments based on occupation. The ANOVA results show an F-value of 2.602 and a p-value of 0.110, which is above the threshold of 0.05. This indicates that there is no statistically significant difference in the adoption of sustainability practices across different

occupations. Thus, regardless of whether respondents are farmers, businesspeople, employees, or from other occupations, their engagement with sustainability in real estate investment appears to be similar. This result suggests a general awareness and consideration of sustainability practices across various occupational groups.

The second row examines the assessment of corporate governance factors when investing in real estate-related companies, such as REITs or developers, across different occupations. The F-value is 0.334, and the p-value is 0.564, which is significantly higher than 0.05. This indicates no significant difference between occupational groups regarding the importance of corporate governance in their investment decisions. This result suggests that recognizing the role of corporate governance in investment decisions is a common practice among respondents, irrespective of their job roles.

The third row analyzes how corporate governance influences respondents' investment decisions across different occupations. The F-value of 0.144 and a p-value of 0.705 indicate no significant differences between occupational groups. This consistency across occupations suggests a shared understanding of the importance of corporate governance practices, reinforcing its value as a standard consideration in real estate investments.

The final row assesses the impact of technology on investment decisions across various occupational backgrounds. The ANOVA results reveal an F-value of 0.035 and a p-value of 0.851, showing no statistically significant differences between groups. This implies that respondents, regardless of occupation, perceive the role of technology in investment decision-making similarly. The widespread adoption of technology-driven tools across different job roles may reflect a common trend in the real estate sector.

Overall, the results from Table 5 indicate that occupation does not significantly influence respondents' engagement with sustainability practices, corporate governance, or technology in real estate investment. These findings suggest a broad consensus across different occupational backgrounds regarding these factors, highlighting their universal relevance in real estate investment strategies. This uniformity can help real estate companies and advisors develop strategies that cater to a diverse range of clients, knowing that key aspects such as sustainability, governance, and technology are widely acknowledged across different job sectors.

CONCLUSION

The research highlights the critical role of various optimization techniques in enhancing real estate investment portfolios. The findings suggest that traditional strategies, such as diversification and risk management, remain fundamental, while the integration of advanced tools like artificial intelligence (AI) and sustainability metrics are gaining traction. The analysis showed that demographic factors, including age, gender, education, and occupation, influence the adoption and perception of these strategies, though some factors, such as the use of technology, exhibit a more universal acceptance across groups. This indicates a broad acknowledgment of the importance of data-driven and tech-enhanced approaches in modern real estate investment.

Corporate governance emerged as a vital consideration, particularly in real estate investment trusts (REITs) and large-scale developments, where transparency and accountability can significantly affect investor confidence and portfolio performance. Furthermore, the emphasis on Environmental, Social, and Governance (ESG) factors reflects a growing awareness of sustainability and its impact on long-term investment returns. The study underscores the need for a holistic approach to real estate portfolio optimization, which balances financial performance with ethical, environmental, and governance considerations.

Future Scope and Global Impact

Future research can expand on this study by exploring the impact of emerging technologies, such as blockchain and the Internet of Things (IoT), on real estate investment

strategies. Additionally, longitudinal studies that track changes in investor behavior over time, especially in response to global economic shifts, can provide deeper insights into how portfolios can be optimized under varying market conditions. Investigating the influence of government regulations and incentives for sustainable practices across different countries can also offer a more comprehensive understanding of the global real estate market.

The global impact of effective real estate investment portfolio optimization is substantial. With the increasing focus on sustainable and responsible investing, there is potential for real estate markets worldwide to align with broader sustainability goals, reducing carbon footprints and promoting energy-efficient developments. Moreover, the integration of advanced technologies can foster greater efficiency, transparency, and accuracy in real estate transactions, benefitting investors, developers, and stakeholders globally. As these trends continue to evolve, adopting a more adaptive and tech-savvy approach to real estate investment will likely be a key driver of success across international markets.

Acknowledgement

This research project is supported by **World Class University Program, Indonesia Endowment Fund for Education**, Diponegoro University, Indonesia. We gratefully appreciated this support.

REFERENCES

Ferdiansyah, D., Iratihsnanto, R. R., & Suseno, J. E. (2023). Strategy Indicators for Secure Software Development Lifecycle in Software Startups Based on Information Security Governance. *Journal of Internet Services and Information Security*, *13*(3), 104-113.

Palmieri, E., & Ferilli, G. B. (2024). Innovating the bank-firm relationship: a spherical fuzzy approach to SME funding. *European Journal of Innovation Management*, *27*(9), 487–515. https://doi.org/10.1108/EJIM-02-2024-0102

Panova, Y., & Hilletofth, P. (2018). Managing supply chain risks and delays in construction project. *Industrial Management & Data Systems*, *118*(7), 1413–1431. https://doi.org/10.1108/IMDS-09-2017-0422

Park, C., Kim, D.-S., & Lee, K. Y. (2022). Asset allocation efficiency from dynamic and static strategies in underfunded pension funds. *Journal of Derivatives and Quantitative Studies: 선물연구*, *30*(1), 2–22. https://doi.org/10.1108/JDQS-10-2021-0025

Pigatto, G., Cinquini, L., Tenucci, A., & Dumay, J. (2023). Disclosing value creation in integrated reports according to the six capitals: a holistic approach for a holistic instrument. *Sustainability Accounting, Management and Policy Journal*, *14*(7), 90–123. https://doi.org/10.1108/SAMPJ-11-2021-0493

Prasetyani, M., Isnanto, R. R., & Rosyida, I. (2023). Determining The Location Detection on Several Sectors to Support The Business Center: Literature Review. In *E3S Web of Conferences* (Vol. 448, p. 02050). EDP Sciences.

Rampini, L., & Re Cecconi, F. (2022). Artificial intelligence algorithms to predict Italian real estate market prices. *Journal of Property Investment & Finance*, *40*(6), 588–611. https://doi.org/10.1108/JPIF-08-2021-0073

Real estate investment decision making – a review. (2012). *Journal of Property Investment & Finance*, *30*(5). https://doi.org/10.1108/jpif.2012.11230eaa.002

Reddy, W., Higgins, D., Wist, M., & Garimort, J. (2013). Australian industry superannuation funds. *Journal of Property Investment & Finance*, *31*(5), 462–480. https://doi.org/10.1108/JPIF-02-2013-0009

Reza Tavakoli Baghdadabad, M., & Glabadanidis, P. (2013). Evaluation of Malaysian mutual funds in the maximum drawdown risk measure framework. *International Journal of Managerial Finance*, *9*(3), 247–270. https://doi.org/10.1108/IJMF-07-2011-0056

Reza Tavakoli Baghdadabad, M., Matnor, F., & Ibrahim, I. (2012). Optimized drawdown risk in evaluating the performance of Malaysian mutual funds. *Journal of Islamic Accounting and Business Research*, *3*(2), 138–162. https://doi.org/10.1108/17590811211265957

Rivera, L., Gligor, D., & Sheffi, Y. (2016). The benefits of logistics clustering. *International Journal of Physical Distribution & Logistics Management*, *46*(3), 242–268. https://doi.org/10.1108/IJPDLM-10-2014-0243

Roberts, C., & Henneberry, J. (2007). Exploring office investment decision-making in different European contexts. *Journal of Property Investment & Finance*, *25*(3), 289–305. https://doi.org/10.1108/14635780710746939

Robson, S., & Greenhalgh, P. (2023). Exploring the use of dual-processing in commercial property development decision-making under conditions of risk and uncertainty. *Property Management*, *41*(5), 601–617. https://doi.org/10.1108/PM-11-2022-0084

Shurrab, J., Hussain, M., & Khan, M. (2019). Green and sustainable practices in the construction industry. *Engineering, Construction and Architectural Management*, *26*(6), 1063–1086. https://doi.org/10.1108/ECAM-02-2018-0056

Socol, A., & Iuga, I. C. (2024). Addressing brain drain and strengthening governance for advancing government readiness in artificial intelligence (AI). *Kybernetes*, *53*(13), 47–71. https://doi.org/10.1108/K-03-2024-0629

Sweeney, F. M. (1993). Mapping a European Property Investment Strategy. *Journal of Property Valuation and Investment*, *11*(3), 259–267. https://doi.org/10.1108/EUM0000000003307

Taran, Y., Nielsen, C., Montemari, M., Thomsen, P., & Paolone, F. (2016). Business model configurations: a five-V framework to map out potential innovation routes. *European Journal of Innovation Management*, *19*(4), 492–527. https://doi.org/10.1108/EJIM-10-2015-0099

Tavakoli Baghdadabad, M. R. (2015). An empirical analysis of funds' alternative measures in the mean absolute deviation (MAD) framework. *International Journal of Emerging Markets*, *10*(4), 726–746. https://doi.org/10.1108/IJoEM-12-2011-0112

Tavakoli Baghdadabad, M. R., & Fooladi, M. (2015). Using downside risk in evaluating the performance of Malaysian mutual funds. *International Journal of Emerging Markets*, *10*(3), 427–447. https://doi.org/10.1108/IJoEM-08-2011-0071

Vasileiou, E., Hadad, E., & Melekos, G. (2024). What drives the real estate market? Could behavioral indicators be useful in house pricing models? *EconomiA*, *25*(1), 157–174. https://doi.org/10.1108/ECON-10-2023-0166

Voipio, V., Elfvengren, K., Korpela, J., & Vilko, J. (2023). Driving competitiveness with RFID-enabled digital twin: case study from a global manufacturing firm's supply chain. *Measuring Business Excellence*, *27*(1), 40–53. https://doi.org/10.1108/MBE-06-2021-0084

von Helfenstein, S. B. (2010). Real options "in" economic systems: Exploring systemic disturbance causes and cures. In J. W. Kensinger (Ed.), *Research in Finance* (Vol. 26, pp. 1–32). Emerald Group Publishing Limited. https://doi.org/10.1108/S0196-3821(2010)0000026004

Wirtz, J., So, K. K. F., Mody, M. A., Liu, S. Q., & Chun, H. H. (2019). Platforms in the peer-to-peer sharing economy. *Journal of Service Management*, *30*(4), 452–483. https://doi.org/10.1108/JOSM-11-2018-0369

Work Study Volume 16 Issue 12. (1967). *Work Study*, *16*(12), 5–64. https://doi.org/10.1108/eb048226

Yakub, A. A., Achu, K., Ali, H. M., & Abdul Jalil, R. (2022). An analysis of the determinants of office real estate price modelling in Nigeria: using a Delphi approach. *Property Management*, *40*(5), 758–779. https://doi.org/10.1108/PM-08-2021-0060

Zungu, L. T., & Greyling, L. (2023). Investigating the asymmetric effect of income inequality on financial fragility in South Africa and selected emerging markets: a Bayesian approach with hierarchical priors. *International Journal of Emerging Markets*, *ahead-of-print*(ahead-of-print). https://doi.org/10.1108/IJOEM-12-2022-1929