

Project Delays and Project Property Investment Decisions in Apartments: A Literature Review

(Keterlambatan Proyek dan Keputusan Investasi Properti di Proyek Apartemen: Tinjauan Literatur)

Blima Oktaviastuti^{1*}, Arinda Leliana², Isnani Arifin³

¹ Teknik Sipil, Fakultas Teknik, Universitas Tribhuwana Tungadewi/Malang

² Manajemen Transportasi Perkeretaapian, Politeknik Perkeretaapian Indonesia/Madiun

³ Manajemen Teknologi, Sekolah Interdisiplin Manajemen Teknologi, Institut Teknologi Sepuluh Nopember/Surabaya

ARTICLE INFO

Article history

Received : 30 October 2023

Revised : 27 January 2023

Accepted : 08 February 2023

Available Online : 09 February 2023

Published Regularly : September 2023

DOI :

<https://doi.org/10.33366/rekabuana.v8i2.5289>

Keywords : *apartments; delays in projects; investments*

***e-mail corresponding author :**

blima.oktaviastuti@unitri.ac.id

ABSTRAK

Hunian apartemen menjadi salah satu pilihan di Kawasan kota besar terlebih lahan yang semakin berkurang dan mahal. Investasi apartemen menjadi pilihan investor di kala kebutuhan yang semakin tinggi tiap tahunnya seiring bertumbuhnya perekonomian di perkotaan. Proyek konstruksi apartemen memulai pembangunan yang didasarkan pada perencanaan tepat guna untuk menghasilkan bangunan yang tepat mutu, biaya dan waktu dengan meminimalkan salah satu aspek risiko yaitu faktor keterlambatan proyek. Artikel ini bertujuan memaparkan kajian terkait: faktor keterlambatan proyek konstruksi; bangunan apartemen; analisa investasi; dampak keterlambatan proyek terhadap minat investasi. Hasil didapatkan bahwa keterlambatan konstruksi berdampak terhadap biaya dan waktu konstruksi dan diperlukan penelitian lebih lanjut efek terhadap minat investasi investor.

PENERBIT

UNITRI PRESS

Jl. Telagawarna, Tlogomas-
Malang, 65144, Telp/Fax:
0341-565500



This is an open access article under the **Creative Commons Attribution-ShareAlike 4.0 International License**. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI. CC-BY-SA

ABSTRACT

Apartment housing has become an option in big city areas, especially as land is becoming increasingly scarce and expensive. Apartment investment is an investor's choice at a time when demand is increasing every year along with the growth of the urban economy. Apartment construction projects begin construction based on appropriate planning to produce buildings of the right quality, cost, and time by minimizing one aspect of risk, namely the project delay factor. This article aims to present studies related to construction project delay factors; apartment buildings; investment analysis; and the impact of project delays on investment interest. The results show that construction delays have an impact on construction costs and time and further research is needed on the effects on investors' investment interest..

Cara Mengutip : Oktaviastuti, B., Leliana, A., Arifin, I. (2023). Project Delays and Project Property Investment Decisions in Apartments: A Literature Review. *Reka Buana : Jurnal Ilmiah Teknik Sipil dan Teknik Kimia*, 8(2), 199-208. doi:<https://doi.org/10.33366/rekabuana.v8i2.5289>

1. INTRODUCTION

Construction work begins with an idea or notion to start construction which is based on appropriate planning to produce buildings of appropriate quality, cost, and time. One of the important factors underlying risk management in construction work is project delays. Delay is an undesirable condition because it will be very detrimental to both parties in terms of time and costs. Delays can occur caused by the employer (owner) or implementing contractor. Slow licensing processes, problems with the surrounding environment, increasing material prices, inaccuracy in ordering times, slow labor supply, and low labor productivity are factors that influence project delays [1].

Delays in construction project work, especially apartment buildings, will affect the handover of the project to the owner with various compensation considerations and fine calculations. From the perspective of the project owner, delays in handing over buildings have an impact on consumer investment interest which results in a decline in hot prospects for purchasing property. In line with this, the company's brand value was also affected by delays in handing over housing to loyal customers and new buyers. Service quality, marketing promotions, and consumer satisfaction have a significant influence on home purchasing decisions [2]. Perceptions and investment decision-making among millennials based on research [3] showed that the yield on deposits was 35%, property 30%, mutual funds 20%, and shares 15%. Based on the literature review obtained by the author, delays in the development of investment objects allow investors to review their investments. Various factors in investment decisions in the property sector need to be studied in depth about risk factors, one of which is delays in construction projects.

Based on this background description, this paper aims to present studies related to (1) factors of construction project delays; (2) apartment buildings; (3) investment analysis; and (4) the impact of project delays on investment interest.

2. TOPICS AND DISCUSSION

2.1. Factors of Construction Project Delays

Delays in construction project work are common in Indonesia. Other project delay factors such as work environment factors, project financial factors[4][5], human resource expertise [4][6][7], weather conditions [8], delays in material supply by suppliers [9], error factors service users who change contracts during construction [10], technical implementation factors and material quality that are not in accordance with planning [11], financing factors for unplanned work, resource readiness factors [12], unclear design and scope of work, problems project monitoring and control system [13], design errors [14]. These various conditions adapt each type of construction project work to various ongoing project conditions. The adjustments in question can be in the form of location aspects, project type, payment methods and various complex technical aspects of the project.

Keppres No.61 Tahun 2004 [15] states that financial sanctions can be imposed on service providers if they are unable to carry out the project according to the time available in the contract. According to Romadhon et al (2020) [16], labor aspects, material aspects, equipment aspects, project location aspects, managerial aspects, financial aspects, and external factors influence delays in the construction of high-rise buildings in Indonesia by 84%. Various obstacles that have been taken into account and obstacles that have not been calculated by planners can occur, such as the main causes of delays in completing concrete road projects in Pontianak City are social and cultural factors, materials, and weather [17]. According to Amalia et al (2012) [18], delays occurred due to changes in design and permits by the owner for the construction of Sidoarjo Town Square. Project delays caused by the owner in other studies also occurred in the construction of the Joyoboyo Bridge with an interest index of 80.91%, and late handover of land to the contractor [19]. According to Rani et al (2021) [20], analysis of risk factors in construction projects with dominant risk mitigation such as more coordination with related parties, more detailed scheduling and planning preparation, more attention to fieldwork administration documents, and increasing the accuracy of work implementation by a set schedule.

According to Listanto et al (2018) [21], project delays were also caused by disputes between contractors and subcontractors regarding the contractor's minimal financial aspects and subcontractors regarding defective work results. Time delay analysis was used in the research of Buya, et al (2022) [22] on construction implementation using the Analytic Hierarchy Process method to identify factors that caused delays in the Taliabu Island Regent's Office project and three main factors were obtained, namely material availability, low work productivity and large overhead costs. expected. The implementation of risk management based on PMBOK to prevent delays is applied in research studies by determining priority risks and carrying out mitigation efforts to prevent and anticipate project delays [23].

Effective supply chain management plays a role in preventing delays in material delivery, especially in high-rise building construction projects. Research by Hatmoko et al (2017) [24] built a risk simulation model for the supply chain of materials such as reinforcing steel, profile steel, formwork and precast concrete which was reviewed from the supply, control, process, and demand side using the Monte Carlo method and sensitivity analysis showed the risk of material delays. due to a sudden design change by the owner, it was ranked highest. Time and cost analysis can also be an important point with the Crash Duration method in delays in the Sei Hanyu Bridge construction project resulting in a work duration of 1,082 calendar days that can be accelerated by 44 days to 1,038 calendar days with the addition of a cost slope [25].

Various aspects of project delays with each type of problem object become complex if they are not immediately handled carefully and objectively through discussion mechanisms, meetings, Focus Group Discussions (FGD), and consideration of risk analysis and mitigation. For this reason, the aspect of delay is the author's focus in discussing the

subsequent effects in realizing investment objects that provide positive results for relevant stakeholders.

2.2. Apartment Building

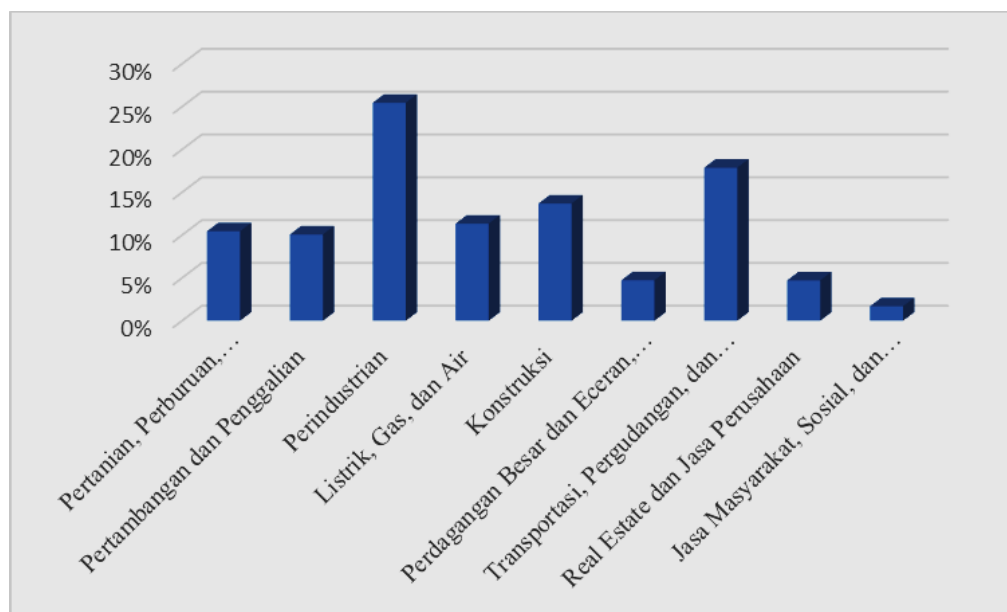
Apartment buildings are vertical residential facilities used for permanent or temporary residence purposes which are generally located in urban areas. The increase in population has an impact on the amount of land for residential use which will affect green land, especially in big cities. The minimal availability and high cost of empty land along with the emergence of environmental problems such as increasing waste, the greenhouse effect, and flooding are the basis for the emergence of the concept of urban green building, namely a network created to overcome urban problems and climate change by involving nature[26]. According to Prasetyo et al (2019) [27], environmentally friendly apartment design refers to the aspect of lighting and ventilation that meets ecological principles and can make users comfortable. Healthy residential proportions such as maximum air exchange, optimal sunlight, vertical plant ornaments, dynamic progressive rhythm, dark-light-green color combinations, and the use of environmentally friendly materials such as aluminum as frames, Low-E glass as walls, glass podiums, walls with layers of double can fulfill ecological elements which will have an impact on aesthetic value, energy efficiency, and environmental friendliness [28]. Various apartment building concepts, such as environmentally friendly concepts, seem to be in line with the government's program to minimize carbon emissions in industry and buildings, but this has sparked polemics at a time when the prices of environmentally friendly building materials and implementation methods are higher than building materials in general. Environmentally friendly buildings themselves are becoming more expensive to construct.

Apartments are usually equipped with various supporting facilities that can be used simultaneously by apartment residents. Facilities can include swimming pools, jogging tracks, fitness gyms, ATMs, cafes, shopping centers and other retail outlets. Location factors and attention to the external appearance of the building are important aspects of occupant interest [29]. The location of the apartment with supporting facilities such as hospitals and shopping centers significantly influences the value of the apartment [30]. Apartment buildings must comply with applicable standards and regulations, whether the building is habitable or not. Periodic inspections of various equipment and environmental effects are carried out with the relevant agencies to meet the criteria for functional suitability [31]. Apartment buildings must comply with applicable standards and regulations, whether the building is habitable or not. Periodic inspections of various equipment and environmental effects are carried out with the relevant agencies to meet the criteria for functional suitability.

2.3. Investment Analysis

Project planning begins with a market review when investors intend to decide on investment options. This type of market study often takes the form of a memo or short report with supporting data analyzing the advantages and disadvantages of the location,

suggesting appropriate types of investment, and providing general guidelines regarding prices taking into account current market conditions. From this data, the selected property options develop, traffic conditions, and further studies regarding the surrounding environment and permits. Furthermore, the results of market analysis will later be used by property developers in analyzing the financial feasibility of a project, starting from rental prices, prices that can be achieved, potential additional income from facilities, forecast absorption levels as well as cash flow projections, and return on investment [32]. Investment opportunities in the property market utilize real options theory, not only the best time to start property development but also determine the optimal market. For example, property market case analysis was developed by verifying the compatibility of the theoretical model developed with market conditions and producing significant empirical theory regarding market reality [33].



Picture 1. Investment Realization of Domestic Investment According to Economic Sector in 2018 [34]

Based on Figure 1, investment in the real estate aspect, including apartments, almost reached 5% in 2018, while the construction aspect reached 13% overall. Even though it is low compared to other investment aspects, real estate, in this case apartments, is worth considering. Investment analysis is more inclined towards project financial analysis to find out the extent to which the project can generate profits in a certain period by carrying out analyses such as need analysis, investment analysis, revenue estimation, operational and maintenance cost estimation, trend analysis, weight average cost of capital (WACC), net cash flow (NCF), depreciation and taxation, discounted cash flow (DCF), financial feasibility indicators and sensitivity analysis. Investments are not necessarily located in strategic areas to be used as a reference for investors, but with the market continuing to develop and transportation networks that reach various areas outside the city in particular,

aspects of locations that have not yet developed in the market can be opened up as access and sustainable development such as public facilities opens up. and support becomes the desired location. According to literature studies [35], the use of ex-limestone mining land as a housing product analyzed using PP, NPV, and IRR can be said to be feasible, consisting of 117 type 36 houses with a total of 65 units and type 54 with a total of 56 units, main road facilities, neighborhood roads. mosques, parks, futsal fields, drainage channels, and rubbish dumps with feasibility limits still achieved if the annual investment expenditure is no more than Rp. 13,766,650,361.00. An investment analysis calculation takes into account the cash-out limit for a certain period to balance the cash flow and profit and loss balance on the investment's financial performance.

2.4. Impact of Project Delays on Investment Interest

Project delays are something that will happen if the project does not have preventive efforts to overcome risks in terms of the dominant aspects that cause delays. Many parties starting from internal projects such as the Project Manager, Site Operations Manager, Site Engineering Manager, Site Finance Manager, and Human Resources, as well as subordinate staff as well as external project parties such as main contractors, subcontractors, subspecialists, suppliers, vendors/suppliers, daily workers, and The community environment must be committed to uniting the vision and mission to achieve the project target of completion on the planned time with the quality required. Financially, of course, it has been calculated to support the achievement of time and quality, which requires adequate costs, but the absorption of profits at the end of the project must be in surplus condition.

Regarding the condition of the project, if the results obtained at the end of the work meet the target and are by the agreement with the owner, the contractor will certainly benefit from smooth term payments and/or retention from the owner and will potentially gain more trust from the owner for the next project. From the owner's side, the timely completion of projects, especially apartments, has a significant impact on loyal customers and new customers in purchasing residential units to invest in or use as a place to live. Another advantage is the creation of brand value, image value, and brand awareness for the project development company. The value obtained from customer trust and the value of the company itself has the potential to increase revenue if the company intends to expand to other locations or develop similar businesses with different concepts.

Aspects of the availability of parking space, the presence of security facilities, certainty of the legal status of apartment land, the potential for investment development, and the big name of the property developer are the reasons why someone decides to buy an apartment [36]. Attitudes, subjective norms, and behavioral control also influence the intention to buy an apartment [37]. If we look at the prospective interest in lower-middle-class apartments, especially in Surabaya, the dominant factor influencing the interest of potential buyers is the price factor, followed by the location factor [38].

3. CONCLUSION

Based on the description in the discussion section, it can be concluded that:

1. Factors that influence delays in construction projects cause losses in terms of overall time and costs.
2. Apartment buildings are effectively built in urban areas with minimal land but large residential needs. To fulfill the ecological concept, the apartment was built with efficient and optimal air and lighting and meets green building principles without compromising the architectural concept and identity of the building form. If viewed from the building structure, where Indonesia is an area with a high level of earthquake vulnerability, the building structure must accommodate safety according to the required regulations.
3. Investment analysis is important for making investment decisions for investors in terms of location, finances, market conditions, market targets, and aspects of investment sustainability. If the investment climate is conditional on business opportunities, it is truly studied and taken into account comprehensively and relevant stakeholders fully support sustainable investment efforts.
4. Achieving timely completion of apartment building projects by contractors can increase buyer confidence and opportunities for repeat purchases by loyal customers. The property developer's name can increase along with the quality and proof of commitment to the delivery of residential units according to the sale and purchase agreement.
5. If the project delay factor is analyzed from investors' investment interest, it will certainly create a gap between reviewing the investment and canceling the investment. This requires further research regarding the factors and consequences that arise in apartment construction projects. Factors that influence delays in construction projects cause losses in terms of overall time and costs.

4. REFERENCES

- [1] Indra Khaidir, "Faktor Penyebab Keterlambatan Pelaksanaan Proyek Konstruksi Di Sumatera Barat," *J. Rekayasa*, vol. 8, no. 1, pp. 32–49, 2019.
- [2] H. Girsang and P. Tiurniari, "Pengaruh Kualitas Pelayanan, Promosi Pemasaran Dan Kepuasan Konsumen Terhadap Keputusan Pembelian Rumah Di Perumahan Bukit Barelang Piayu," *Sci. J.*, vol. 3, no. 4, pp. 1–11, 2021.
- [3] D. R. Rahadi and Y. Stevanus, "Persepsi Dan Pengambilan Keputusan Milenial Terhadap Instrumen Investasi Masa Depan : Studi Literatur," *INOBIJIS J. Inov. Bisnis dan Manaj. Indones.*, vol. 3, no. 2, pp. 162–177, 2020.
- [4] A. O. Daoud, M. El Hefnawy, and H. Wefki, "Investigation of critical factors affecting cost overruns and delays in Egyptian megaconstruction projects," *Alexandria Eng. J.*, vol. 83, no. November, pp. 326–334, 2023.

- [5] D. Asmaroni, “Analisa Keterlambatan Waktu Pelaksanaan Proyek Pembangunan Gedung Pemerintah di Kabupaten Pamekasan,” *Univ. Madura*, vol. 1, no. 1, pp. 19–23, 2016.
- [6] D. Oktra, N. Yulius, and B. Anif, “Kajian Manajemen Sumber Daya Yang Mempengaruhi Keterlambatan Proyek (Studi Kasus: Proyek Konstruksi Gedung Di Kota Bukittinggi) Delfa,” *Ensiklopedia J.*, vol. 2, no. 1, pp. 103–108, 2019.
- [7] A. Maddeppungeng, D. E. Intari, and A. Oktafiani, “Studi Faktor Penyebab Keterlambatan Proyek Konstruksi Studi Kasus Proyek Pembangunan 6 Ruas Jalan Tol Dalam Kota Jakarta,” *Konstruksia*, vol. 11, no. 1, p. 89, 2020.
- [8] D. S. Nurhuda, W. Sutrisno, and D. L. C. Galuh, “Analisis Risiko Keterlambatan Waktu Pada Pelaksanaan Proyek Pembangunan SPBU (Studi Kasus di Kabupaten Bantul, Yogyakarta),” *Bangun Rekaprima*, vol. 05, pp. 19–28, 2019.
- [9] A. S. Ariyanto, K. A. P. Kamila, Supriyadi, M. B. Utomo, and Wildana Latif Mahmudi, “Pengaruh Keterlambatan Material Terhadap,” *Bangun Rekaprima*, vol. 05, no. 2, pp. 51–58, 2019.
- [10] Adriadi and A. riadhus Solihin, “Faktor-Faktor Penyebab Keterlambatan Proyek Konstruksi Gedung,” *Semin. Nas. Ketekniksipilan, Infrastruktur dan Ind. Jasa Konstr.* 2021, vol. 1, no. 1, pp. 451–461, 2021.
- [11] C. Triarman and J. Sekarsari, “Analisis Faktor Penyebab Keterlambatan Waktu Pada Pekerjaan Struktur Atas Proyek Konstruksi,” *J. Penelit. Dan Karya Ilm. Lemb. Penelit. Univ. Trisakti*, vol. 3, no. 2, pp. 1–9, 2018.
- [12] R. C. Intan, S., Sapulette, W., & Soukotta, “Analisa Keterlambatan Waktu Pelaksanaan Proyek Konstruksi Di Kota Ambon: Klasifikasi Dan Peringkat Dari Penyebab-Penyebabnya,” *Manumata J. Ilmu Tek.*, vol. 6, pp. 19–23, 2020.
- [13] B. Proboyo, “Keterlambatan Waktu Pelaksanaan Proyek : Klasifikasi dan Peringkat dari Penyebab-penyebabnya (Project Implementation Delay : Causes Classification and Ratings),” *Dimens. Tek. Sipil*, vol. 1, no. 1, pp. 49–58, 2019.
- [14] M. M. Sanaky, “Analisis Faktor-Faktor Keterlambatan Pada Proyek Pembangunan Gedung Asrama Man 1 Tulehu Maluku Tengah,” *J. Simetrik*, vol. 11, no. 1, pp. 432–439, 2021.
- [15] Sekretaris Kabinet RI, *Keputusan Presiden Republik Indonesia Nomor 61 Tahun 2004 Tentang Perubahan Atas Keputusan Presiden Nomor 80 Tahun 2003 Tentang Pedoman Pelaksanaan Pengadaan Barang/Jasa Pemerintah*. 2004, pp. 1–3.
- [16] A. F. Romadhon and A. T. Tenriajeng, “Analisis Faktor-Faktor Penyebab Keterlambatan Kerja Pada Proyek Pembangunan Gedung Bertingkat Di Indonesia,” *J. Proy. Tek. Sipil*, vol. 3, no. 1, pp. 18–27, 2020.
- [17] F. Kamaruzzaman, “Studi Keterlambatan Penyelesaian Proyek Konstruksi (Study Of

- Delay In The Completion Of Construction Projects),” *J. Tek. Sipil Untan*, vol. 12, no. 2, pp. 175–190, 2012.
- [18] R. Amalia, M. A. Rohman, and C. B. Nurcahyo, “Analisa Penyebab Keterlambatan Proyek Pembangunan Sidoarjo Town Square Menggunakan Metode Fault Tree Analysis (FTA),” *Inst. Teknol. Sepuluh Nopember, Surabaya*, vol. 1, no. 1, pp. D20–D23, 2012.
- [19] W. T. Anggi and P. H. W. Johan, “Analisa Faktor-Faktor Penyebab Keterlambatan Proyek Pembangunan Jembatan Joyoboyo,” *J. Rekayasa dan Manaj. Konstr.*, vol. 9, no. 2, pp. 71–078, 2021.
- [20] Ni Made Sintya Rani and Ni Kadek Sri Ebtha Yuni, “Analisis Faktor Risiko Terhadap Keterlambatan Proyek Konstruksi the Himana Condotel,” *Padur. J. Tek. Sipil Univ. Warmadewa*, vol. 10, no. 1, pp. 41–55, 2021.
- [21] N. Listanto and S. Hardjomuljadi, “Analisis Faktor Penyebab Keterlambatan Pembayaran Kontraktor kepada Subkontraktor pada Proyek Gedung Bertingkat,” *Konstruksia*, vol. 10, no. 1, pp. 59–69, 2018.
- [22] M. Buya, H. Ashad, and Watono, “Analisis Faktor Keterlambatan Waktu Pelaksanaan Konstruksi Pada Pembangunan Kantor Bupati Pulau Taliabu Dengan Metode Analytic Hierarchy Process,” *J. Konstr. Tek. Infrastruktur, dan Sains*, vol. 01, no. 01, pp. 1–10, 2022.
- [23] H. Pertiwi, “Implementasi Manajemen Risiko Berdasarkan PMBOK Untuk Mencegah Keterlambatan Proyek Area Jawa Timur (Studi Kasus: PT. Telkom),” *J. Stud. Manaj. dan Bisnis*, vol. 4, no. 2, pp. 96–108, 2017.
- [24] J. U. D. Hatmoko and F. Kistiani, “Model Simulasi Risiko Rantai Pasok Material Proyek Konstruksi Gedung,” *Media Komun. Tek. Sipil*, vol. 23, no. 1, p. 1, 2017.
- [25] W. Oetomo, Uhad, and Priyono, “Analisis Waktu Dan Biaya Dengan Metode Crash Duration Pada Keterlambatan Proyek Pembangunan Jembatan Sei Hanyu Kabupaten Kapuas,” *Media Ilm. Tek. Sipil*, vol. 6, no. 1, pp. 8–22, 2017.
- [26] A. Andiyana and A. Nurjaman, “Pendekatan Urban Green Building Pada Bangunan Apartemen,” *RADIAL J. Perad. Sains, Rekayasa dan Teknol.*, vol. 9, no. 1, pp. 39–52, 2021.
- [27] A. Septiano, A. Praseyo, and S. Hartono, “Apartemen di Surabaya,” *eDIMENSI Arsit.*, vol. VII, no. 2, pp. 1–8, 2019.
- [28] A. P. Lesmana, “Karakteristik Desain Fasad Ekologis Pada Bangunan Apartemen,” *Pros. Semin. Intelekt. Muda*, vol. 3, no. 1, pp. 330–337, 2021.
- [29] J. Td, P. No, and S. Utara, “Apartemen Cbd Polonia,” *J. Sains Teknol.*, vol. 12, no. 01, pp. 94–105, 2019.
- [30] N. Anastasia and S. C. Tandono, “Penilaian Apartemen di Surabaya,” *J. Stud.*

- Manaj.*, vol. 8, no. 2003, 2014.
- [31] W. T. Wahyuningtyas, K. Krisnamurti, and I. Afrida, “Analisis Ketahanan Gedung Apartemen Surabaya dengan Menggunakan Metode Respon Spektrum,” *Berk. Sainstek*, vol. 8, no. 4, p. 132, 2020.
- [32] D. L. Brett and A. Schmitz, *Real Estate Market Analysis: Methods and Case Studies*. 2009.
- [33] P. Y. Medeiros, “Applications of Real Options in the Real Estate Market Focusing the City of Rio de Janeiro,” *Brazilian Rev. Financ.*, vol. 1, no. 1, pp. 45–87, 2003.
- [34] Badan Pusat Statistik Indonesia, “Realisasi Investasi Penanaman Modal Dalam Negeri Menurut Sektor Ekonomi.” [Online]. Available: <https://www.bps.go.id/id/statistics-table/2/MTg0MSMy/realisasi-investasi-penanaman-modal-dalam-negeri-menurut-sektor-ekonomi.html>. [Accessed: 25-Jan-2024].
- [35] S. Nofen and Suryanto, “Studi Kelayakan Investasi Pembangunan Pemanfaatan Bekas Lahan Tambang Batu Kapur Sebagai Permahan di Desa Bethiharjo Kecamatan Semanding kabupaten Tuban,” *Rekayasa Tek. Sipil Vol.*, vol. 1, no. 1, pp. 291–300, 2017.
- [36] Y. Onggo, A. Setiawan, R. V. Arifianthie, and S. Rizal, “Faktor Yang Menentukan Keputusan Membeli Apartemen,” *Indones. Bus. Rev.*, vol. 1, no. 1, pp. 94–103, 2018.
- [37] S. Pangestika and K. W. Prasastyo, “Pengaruh Sikap, Norma Subjektif, Kontrol Perilaku yang Dipersepsikan Terhadap Niat Untuk Membeli Apartemen di DKI Jakarta,” *J. Bisnis Dan Akunt.*, vol. 19, no. 1a-4, pp. 249–255, 2017.
- [38] T. Prayogo, T. Kwanda, and J. Rahardjo, “Faktor-Faktor Yang Mempengaruhi Minat Calon Pembeli Apartemen Menengah – Bawah Di Surabaya,” *Dimens. Utama Tek. Sipil*, vol. 5, no. 1, pp. 14–21, 2018.