

PalArch's Journal of Archaeology
of Egypt / Egyptology

GREEN BUILDING ASSET MANAGEMENT TOWARD THE END OF USEFULNESS: A CASE OF THE RELOCATION OF JAKARTA TO NEW JAKARTA

Fuad HIDAYAT¹, Budi SETIYONO², Ika Riswanti PUTRANTI³, Ida Hayu
DWIMAWANTI⁴, and M. Elfan KAUKAB^{5*}

^{1,2,3,4}*Faculty of Social and Political Science, Universitas Diponegoro, Semarang,
Indonesia*

⁵*Faculty of Economics and Business, Universitas Sains Al-Qur'an, Wonosobo,
Indonesia*

(*Corresponding author's e-mail: elfan@unsig.ac.id)

Fuad HIDAYAT, Budi SETIYONO, Ika Riswanti PUTRANTI, Ida Hayu
DWIMAWANTI, and M. Elfan KAUKAB, Green Building Asset Management
toward the End of Usefulness: A Case of the Relocation of Jakarta to New Jakarta-
Palarch's Journal Of Archaeology Of Egypt/Egyptology 17(7),ISSN 1567-214x

Abstract

Previous studies have emphasized the longevity nature of green buildings (buildings fulfilling the principles of sustainable development) and suggested that green buildings have higher rentability than other buildings. This research reviews the rentability of government buildings in Indonesia by measuring the buildings' green parameters and traditional parameters known to predict rentability. Thirty-nine government buildings in Jakarta are evaluated using the secondary data. We found that four buildings scored 12 out of the possible 15. We recommend that the government increases buildings' rentability factors so that when Indonesia's capital is relocated from Jakarta to Kalimantan, the buildings left can maximally bring income from other than high rent tax.

Keywords: Green buildings, rentability, capital relocation, building renovation, government building

Introduction

On August 26th, 2019, the Indonesian government announced that it will relocate the nation's capital from Java to Kalimantan (Borneo) [1]. The plan is generally positively welcomed by the public [2]. The reasons are nationalism and security from disaster

risks [3]. However, there are issues that arise from this relocation plan one of which involves the government buildings in Jakarta. The government has decided to rent those buildings to private companies because Jakarta will always be the main business center in Indonesia. Nevertheless, the central government buildings are generally old and monotonously designed [4]. Some buildings have also been in a fire several times. Therefore, it is less likely that the government gets high non-tax income from renting their buildings when Jakarta is no longer the capital city. This article attempts to assess the rentability of government buildings in Jakarta and give the government suggestion on how to make people interested in renting those building. Thus, the government can get bigger and sustainable income.

Review of Literature

Rent is a tenant's payment for the use of something such as land, offices, or buildings in a certain period of time. Rentability is the asset's ability to attract the public's interest in renting it. This research has determined the factors influencing an office or building's rentability. Studies conducted by several authors [5]–[7] found that conformity to sustainable development increases buildings' rentability, lengthens the renting period, and renews renting contract. This means that 'green' buildings rent more easily than those unfulfilling sustainable criteria. An arid polluted environment makes the buildings there are less salable [8]. Other factors found in literature include the mileage from the building to public transportation and public facilities such as atrium, gymnasium, cafe, age (including the age after the renovation), the number of the floor, the land width, the local economy (GPD, unemployment), aesthetics, and brand (the building name and its significance to the public) [9].

Method

This research employs a qualitative approach involving secondary data analysis. It begins with a literature review to build relevant background knowledge and provide a conceptual framework that allows the identification of factors influencing office buildings' rentability. Referring to Table 1, all the identified factors are considered during the secondary data collection in 39 ministries/central government institution buildings in Jakarta. A survey was conducted in the available secondary data on building specifications.

Table 1 Secondary Data Source

No	Variable	Definition	Data Source
1	Green building certificate	Has a Green Building Certificate	National mass media
2	Social and environmental responsibility	Shows social and environmental care	Each ministry's/ institution's websites
3	Outdoor Greenery	Has horizontal or vertical gardens	Satellite images and front view of the building
4	Named building	Has a unique building's name	Building address
5	Office park	Located in office area	Assumed as 'yes'
6	Has an atrium	Has a large room inside the building	Assumed as 'yes'
7	Has a gym	Has a gymnasium inside the building	Assumed as 'does not have'
8	Has a cafeteria service	Has a food service inside the building	Assumed as 'yes'
9	Close to bus stop or commuter station	Busway stop can be reached on foot	Google Map
10	Age	The year the building was built (even before it was occupied by the ministry/institution)	Setiapgedung.web.id
11	Years since refurbished	The last year of the renovation	Setiapgedung.web.id
12	Number of stories	The number of the building's floor	Setiapgedung.web.id
13	Land area	Building land area	Satellite image
14	GDP	PDB of the cities where the buildings are located (West Jakarta, North Jakarta, Central Jakarta, East Jakarta, and South Jakarta)	Badan Pusat Statistik (Statistics Indonesia)
15	Unemployment rate	The rate of unemployment in cities where the buildings are located	Badan Pusat Statistik (Statistics Indonesia)
16	Aesthetic	The beauty of the building	Setiapgedung.web.id
17	Significance	Well-known for the buildings' functions, structures, or beauty (Vitruvius triad)	Setiapgedung.web.id

The data collected were then coded according to the factors compiled in the literature review (Table 1). The result reveals the rentability value of each building. The significant advantages and disadvantages were then reported for recommendations and suggestions. We value each variable in binary number 1 or 0. It is 1 when the building has a green certificate and 0 if it does not. The review on each ministry/institution's website aims to disclose the social responsibility and sample environment promotions. It is assumed that all ministries/institutions are socially responsible since they are public institutions. Therefore, an assessment was carried out in environmental responsibility [10]. We scored the sample website one if it showed environmental responsibility news or promotion like renewable energy, ecosystem health, or waste management. The Ministry of Environment and Forestry scored 1.

The outdoor green variable exhibits vegetation environment around the building. We do not consider tree-lanes as gardens because their basic function is as decorations and shading. We assess a building as green if it has two or more lines of trees without any non-grass separator. Vertical gardens are scored 1 because they reflect tangible efforts to green the building. Building's name is a variable showing that the name the building has is not the name of any ministry or institution. The different names ease others to rent those buildings with no impressions that they rent them. The criteria consisting of gym, cafeteria, and atrium are the building's indoor components. We assume that all of the buildings fulfill these criteria, cafeteria, atrium, and office park, to run maximum government's functions. On the other hand, we assume that neither building has a gym as this facility is deemed unnecessary for the government's building. The facility's total score is 2 (cafeteria 1, atrium 1, and gym 0). Closeness to a bus stop and commuter line station is defined as the one-block farthest distance. When the bus stop and station are farther than one block, the building is scored 0.

A building is scored 1 if it was last refurbished in less than 20 years. This number, which is the maximum limit of an engineer's responsibility on a certain building, is taken to comply with the structure regulation in Indonesia. The number of the floor is scored 1 if it has more than 8 floors. The 8-floor topmost limit was taken because in the New Order time governments' buildings should not have more than 8 floors. It is assumed that the buildings will be used for no commercial purposes and were handed completely for the sake of the government's need.

We scored 1 for an area at least 1000 hectares (10.000 m²) where the building stand. It is regarded that a 1-ha space is adequate to move around the building. GDP is scored 1 for cities with the highest GDP and the lowest unemployment rate, and it is scored 0 for cities with the lowest GDP and the highest unemployment rate. Central Jakarta and South Jakarta are the cities where the government offices are

located. It is revealed that Central Jakarta is a city with the highest GDP as well as the unemployment rate. Thus, the total score of Central Jakarta is 1, similar to the South Jakarta's score. There is no different rentability found in both cities.

Aesthetic is scored 1 if the expert assessing the building made no remarks or he/she complimented the building. It is scored 0 if the expert explicitly disliked the building. Significance is a parameter given by the Setiap Gedung site that highlights its prominent meaning in society. It is scored 1 if the building has a certain meaning to the society and 0 if it does not.

Both the literature review and secondary data collection of government's office buildings aid in providing relevant background knowledge. They also help in establishing the research's conceptual framework and they act as an anchor in data analysis.

Results

The result shows that 40 central government buildings scored from 6-12. The maximum score available is 15 as there are two indicators (GDP versus unemployment rate) diminishing each other among 17 indicators. The minimum score is 3 because two indicators are assumed to score 1 (atrium, cafeteria) and either GDP or unemployment rate scores 1.

Table 2 The Rentability of Government’s Buildings in Jakarta

No	Ministry/Institution	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total
1	KKP (Ministry of Marine and Fisheries)	√	√		√	√		√	√	√	√		√	√	√		√		12
2	Kemenuh (Ministry of Transportation)		√		√	√		√	√	√	√		√	√	√		√	√	12
3	Kemendag (Ministry of Tourism)			√	√	√		√	√	√	√		√	√	√		√	√	12
4	Kemendikbud (Ministry of Environment and Forestry)		√	√	√	√			√	√	√		√	√	√		√	√	12
5	Kementan (Ministry of Agriculture)			√		√		√	√	√	√		√	√		√	√	√	11
6	Kemendagri (Ministry of Foreign Affairs)			√		√		√	√	√	√		√	√	√		√	√	11
7	Kemendikbud (Ministry of Law and Human Rights)		√		√			√	√	√	√		√	√		√	√	√	11
8	Kemendag (Ministry of Trade)			√		√		√	√	√	√		√	√	√		√		10
9	Kemen PUPR (Ministry of Public Work and Public Housing)	√		√		√			√	√	√		√	√		√	√		10
10	Kemen Agraria dan TR (Ministry of Agrarian Affairs and Spatial Planning)			√	√	√		√		√	√		√	√		√	√		10
11	Sekneg (State Secretary)			√	√	√		√		√	√		√	√	√		√		10
12	Kemendikbud (Ministry of Education and Culture)					√		√	√	√	√		√	√	√		√		9

No	Ministry/Institution	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Tota l
	Education and Culture)																		
13	Kemenperin (Ministry of Industry)		√			√			√	√	√		√	√		√	√		9
14	Kementerian BUMN (Ministry of State-owned Enterprises)		√			√		√	√		√		√	√	√			√	9
15	MA (Supreme Court)					√			√	√	√		√	√	√		√	√	9
16	Kemen ESDM (Ministry of Energy and Mineral Resources)		√		√	√			√		√		√	√	√		√		9
17	Kemenristekdikti dan Kememarves (Ministry of Research, Technology, and Higher Education and Coordinating Ministry of Maritime and Investment)		√		√			√	√		√		√	√	√		√		9
18	Kementerian Keuangan (Ministry of Finance)			√	√				√	√	√		√	√	√		√		9
19	Kemenag (Ministry of Religious Affairs)					√		√	√		√		√	√	√		√		8
20	Kemensos (Ministry of Social Affairs)			√				√			√		√	√	√		√	√	8
21	Kemenpora (Ministry of Youth and Sport)							√	√	√	√		√	√	√		√		8
22	Dirjen EBTKE Kementerian ESDM (General Director of EBTKE of		√		√	√					√		√	√	√		√		8

No	Ministry/Institution	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total
	ESDM Ministry)																		
23	Kemenpar, LSF, Kemendikbud (Ministry of Tourism, LSF, Ministry of Education and Culture)				√	√					√		√	√		√	√	√	8
24	MK (Constitutional Court)						√		√		√		√	√	√		√	√	8
25	Bulog (Logistic Affairs Agency)							√	√		√		√	√	√		√	√	8
26	Kemen PAN RB (Ministry of State Apparatus Empowerment and Bureaucratic Reformation)		√	√						√	√		√	√	√		√		8
27	Kemen PPN (Ministry of National Development Planning)		√		√	√					√		√	√		√	√		8
28	Kemenko Ekuin (Coordinating Ministry of Economic Affairs)			√	√			√			√		√	√	√		√		8
29	Kemenko PMK (Ministry of Human and Culture Development)		√					√		√	√		√	√	√		√		8
30	Dirjen Mineral Kementerian ESDM (Director General of Mineral of Ministry of Energy and Mineral Resources)		√		√	√					√		√	√		√	√		8
31	Kemendagri (Ministry of Home Affairs)						√		√	√	√		√	√	√		√		8
32	Kemenaker (Ministry of Manpower)				√		√		√	√	√		√	√		√			7

No	Ministry/Institution	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total
33	Kemenko Polhukam (Coordinating Ministry of Political, Legal, and Security Affairs)			√		√					√		√	√		√	√		7
34	Kemenkominfo (Coordinating Ministry of Communication and Information Technology)		√			√					√		√	√	√		√		7
35	Kemendes PDRT (Ministry of Villages, Development of Disadvantaged Regions, and Transmigration)							√	√		√		√	√	√		√		7
36	Kemenkes (Ministry of Health)				√						√		√	√		√	√		6
37	Kemenkop UKM (Ministry of Cooperative and Small and Medium-sized Enterprises)							√		√	√		√	√		√			6
38	Kemenhan (Ministry of Defense)									√	√		√	√	√		√		6
39	KPPPA (Ministry of Women's Empowerment and Children Protection)							√			√		√	√	√		√		6

Note: top column: 1 = green building certificate, 2 = environmental responsibility, 3 = outdoor scenery, 4 = named building, 5 = close to bus stop less than 2 blocks, 6 = age less than 20 years, 7 = years since refurbished less than 20 years, 8 = number of stories more than 8, 9 = land area more than 10.000 m², 10 = presence of office park, 11 = gym inside the building, 12 = cafeteria service in

the building, 13 = atrium in the building, 14 = GDP of the city, 15 = unemployment rate of the city, 16 = aesthetics of the building, 17 = significance of the building

Buildings with the Highest and Lowest Rentability

Four buildings scored 12 namely the building of the Ministry of Transportation, Ministry of Marines and Fisheries, Ministry of Tourism, and Ministry of Environment and Forestry. Ministry of Transportation has Building Cipta, Karya, and Karsa. It does not have a green certificate but is committed to sustainable development. Building Mina Bahari has a green certificate and the ministry has supported sustainable development, one of which by encouraging the preservation of coral reefs. The Ministry of Marine and Fisheries building is also well-branded, "Mina Bahari," reflecting the economic benefit of the sea. Its latest building (Mina Bahari IV) is also designed in the shape of a sailboat in accordance with the ministry's tasks and functions. Ministry of Tourism has vertical gardens and is uniquely designed. The Ministry of Environment and Forestry has a wide-open green space.

On the other hand, four ministries have the lowest rentability, 6. These four ministries are the Ministry of Health, the Ministry of Cooperatives and Medium Small-sized Enterprises, the Ministry of Defense, and the Ministry of Women's Empowerment and Children Protection (KPPPA). All their buildings have no green certificates, show no environmental responsibility, have no adequate vegetation, far from bus stop/railway station, old, small-sized, have no gym, and have no significances.

Evaluation of Each Indicator

The results of each indicator's evaluation are:

- (1) There are only two ministries' buildings that have green certificates.
- (2) There are more ministries without environmental responsibilities compared to those having them (26 vs 14). The environmental responsibilities are shown in the support of renewable energy, the ecosystem health of coral reefs, waste treatment, climate change mitigation, ecology pesantren, and sustainable development.
- (3) There are more dry buildings (26) than green buildings (13). The Ministry of Environment and Forestry has a spacious garden. Some other buildings barely have big plants.
- (4) Sixteen buildings are named after some prominent figures (Chairul Saleh, Poesponegoro, BJ Habibie, Widjojo Nitisastro, Ali Wardhana, Muhammad Sadlli), Sanskrit terms (Dhanapala, Manggala Wana Bhakti), job characteristics (Graha Pengayoman, Cipta Karya Karsa), and Dutch words (Harmonie, Vrijmetselaarsloge). Twenty-three buildings are named after the related ministries/institutions.
- (5) Twenty-three buildings are located near the busway stops/railway stations. The other 16 buildings are in places far from public transportations.
- (6) One building namely Constitutional Court is less than 20 years old, which was built in 2007. The rests are old buildings. Two buildings are over 100 years old. They are the Widjojo Nitisastro Building (Vrijmetselaarslodge) which was built in 1880 as the office of the Ministry

of National Development Planning (PPN) and Building Harmonie which was built in 1810 and be used as the office of the Ministry of State Secretary.

(7) Twenty-three buildings have been refurbished in the past 20 years. Some refurbishments were made due to fire (Harmonie, KPPPA, Karya, and the Ministry of Village, Development of Disadvantaged Regions, and Transmigration). In 2020, two buildings are planned to undergo refurbishment namely the office the Ministry of State-owned Enterprises and the building of the Ministry of National Development Planning. The building of the latter ministry is quite old and will be refurbished completely. Meanwhile, the office of the Ministry of State-owned Enterprises has actually been refurbished but it received severe criticism as being ugly and was made without careful planning that caused the hallway collapsed.

(8) The buildings of the New Order government were limited to be eight-story high except for those that were built prior to this policy. Therefore, 17 buildings have eight floors. Some newer buildings are more than 20-story high like the building of the Ministry of Industry (22-story high), the Ministry of Tourism (25-story high), the Ministry of State-owned Enterprises (22-story high), the Ministry of Marine and Fisheries (21-story high), and the Ministry of Finance (22-story high).

(9) Twenty-two buildings stand in an area of more than 1 hectare. The Ministry of Agriculture and the Ministry of Environment and Forestry stand in the vastest area as wide as 299.116 m² and 104.572 m² respectively. The smallest area is found in the Mineral General Director of the Ministry of Energy and Mineral Resources location, spread only 979 m².

(10) Most of the buildings have good aesthetics. Three are criticized for their poorly-designed architecture: the building of the Ministry of Manpower, the building of the Minister of Cooperatives and Mediums Small-sized Enterprises, and the building of the Ministry of State-owned Enterprises.

(11) Twelve buildings have high significance according to Setiapgedung.web.id. The significances are among other: wedding place (the Ministry of Social Affairs, Gedung Film, Bulog (the Indonesian Bureau of Logistics)), sophisticate structure (the Ministry of Foreign Affairs), socio-politics meaning (the Constitutional Court, the Supreme Court, and the Ministry of Law and Human Rights), pop culture (the Ministry of Tourism), public controversy (the Ministry of State-owned Enterprises), and beautiful architectural design (the Ministry of Agriculture, the Ministry of Environment and Forestry, and the Ministry of Transportation).

Discussion

In the asset management context, a higher building rentability might associate with large refurbishment expenses while the rentability is not guaranteed to yield a break-even point in a rational timeline [11], [12]. However, studies on green buildings suggest that energy-conservation efforts and cheap cost-reducing green space addition elevate buildings' rentability [13]. This study shows that many government buildings can afford to boost their green performance by adding green space, getting a green certificate, and promoting sustainable development. These increase their rentability.

Conclusion

Issues on the central government's building rentability in DKI Jakarta encourage the government to take the right step to increase each buildings' rentability. A green certificated building is highly rentable. Unfortunately, there are only two buildings with green certificates among the 40 buildings studied. They are the building of the Ministry of Village, Development of Disadvantaged Regions, and Transmigration and Mina Bahari building in the Ministry of Marine and Fisheries. It is crucial that other buildings assess their environmental performance. The assessment will not only provide a foundation to evaluate their performance and support the public's perception related to the building's sustainability, but it will also provide supporting information on the building's operational, which eventually increases the building's rentability [14].

The government's ministries and institutions should also demonstrate their responsibility to the environment and society. It creates a positive image of the ministry/institution and in turn the central building of the ministry/institution. A positive image of social-environmental responsibility in a society boosts the building's rentability [15], [16].

Although being in the center of economic activities might reduce a building's rentability due to pollution, being in the center also increases the rentability because of transportation ease. Closeness to the bus lane and the short walking time to public transportation adds the building's rentability [9]. They are only possible when the building is located in the center of the economy or at least it is close to the busway station, MRT, LRT, city train, and bus station.

It is necessary that the building situated in the middle of a densely populated area, which usually is polluted, plant big trees that can prevent pollution. If it is difficult to have big trees due to the limited space, the building might equip itself with vertical gardens to make it greener [17]. Aridness and pollution negatively affect a building's rentability [8].

The building age as well as the last refurbishment is another determining factor [18]. The government's building in Jakarta can be grouped into five time periods: the 1970s, the 1980s, the 1990s, the 2000s, and the 2010s. Better refurbishments are essential for older buildings. They need to be emphasized as some buildings' renovations resulted in worse appearance due to unimportant, unprofessional, and ugly additions as well as due to the poor design [4]. These can be seen in the buildings owned by the Ministry of Cooperatives and Medium and Small-sized Enterprises and the Ministry of Manpower. In spite of aesthetics or *venustas* subjective nature, this

subjectivity is one of the tenant's considerations in deciding whether or not to rent the building once the capital has been relocated to East Kalimantan (Borneo). Thus, careful attention should be given in designing the renovation to avoid counter productivity[19]. It will also lead to increased rentability and eventually, PNB (non-tax state income) for the government.

References

- [1] H. N. Azhar, P. Fatima, and I. N. Tamas, "Preliminary study of Indonesia capital city relocation based on disaster mitigation principle with mental model approach," *E3S Web Conf.*, vol. 148, pp. 1–7, 2020.
- [2] M. Prahasya, M. Wijayanto, and T. Setyano, "The Concept of Capital City in Kakawin Nagarakertagama: Cultural Perspective towards the Indonesia Capital City Relocation Master Plan," *Int. Rev. Humanit. Stud.*, vol. 5, no. 1, pp. 184–191, 2020.
- [3] T. Shimamura and T. Mizunoya, "Sustainability Prediction Model for Capital City Relocation in Indonesia Based on Inclusive Wealth and System Dynamics," *Sustainability*, vol. 12, no. 4336, pp. 1–25, 2020.
- [4] Setiap Gedung, "Gedung-gedung Pemerintahan, Sebuah Garis Besar (Government Buildings, a General View)," *Setiap Gedung*, 2019. .
- [5] M. Virta, F. Hovorka, J. Kurniski, and A. Litiu, *HVAC in sustainable office building*. REHVA, 2012.
- [6] R. J. Cole, "Emerging trends in building environmental assessment methods," *Build. Res. Inf.*, vol. 26, no. 1, pp. 3–16, 1998.
- [7] P. Sanguinetti, "Integrated Performance Framework to Guide Facade Retrofit," Georgia Institute of Technology, 2012.
- [8] T. Lützkendorf, "Assessing the environmental performance of buildings : trends , lessons and tensions," *Build. Res. Inf.*, vol. 46, no. 5, pp. 594–614, 2018.
- [9] F. Fuerst, T. Gabrieli, and P. McAllister, "A Green Winner ' s Curse? Investor Behavior in the Market for Eco - Certified Office Buildings," *Econ. Model.*, vol. 61, pp. 137–146, 2017.
- [10] M. E. Kaukab, W. R. Adawiyah, R. P. Setyanto, and A. Suroso, "Accelerating Small Firms ' Production Process Improvement Through International Market Knowledge And Valuable , Rare , Inimitable , And Organized Resources And Capabilities," *Bus. Theory Pract.*, vol. 21, no. 1, pp. 322–328, 2020.
- [11] A. Bierwirth *et al.*, "Knowledge as transformative energy: On linking models and experiments in the energy transition in buildings," Munchen, 2017.
- [12] A. Greco *et al.*, "Business Case Study for the Zero Energy Refurbishment of Commercial Building," in *Sustainable Built Environment Regional Conference*, 2016.
- [13] M. Sivunen, R. Kosonen, and J.-K. Kajander, "Good indoor environment and energy efficiency increase monetary value of buildings," *REHVA J.*, pp. 6–9, 2014.
- [14] R. J. Cole, "Building Environmental Assessment Methods: A Measure of Success," *Futur. Sustain. Constr.*, pp. 1–8, 2003.
- [15] P. Eichholtz, N. Kok, and J. M. Quigley, "Doing Well by Doing Good? Green Office Buildings," *Am. Econ. Rev.*, vol. 100, no. December,

pp. 2492–2509, 2010.

[16] T. P. Runde and S. Thoyre, “Integrating Sustainability and Green Building into the Appraisal Process,” *J. Sustain. Real Estate*, vol. 2, no. 1, pp. 221–248, 2010.

[17] M. Y. L. Chew and S. Conejos, “Developing a green maintainability framework for green walls in Singapore,” *Struct. Surv.*, vol. 34, no. 4/5, pp. 379–406, 2016.

[18] J. Stanley and Y. Wang, “Energy Efficiency and Green Building Assessment,” in *Energy Efficiency and the Future of Real Estate*, N. Coulson, Y. Wang, and C. Lipscomb, Eds. New York: Palgrave Macmillan, 2017, pp. 37–54.

[19] T. Yuniarto, P. Hari Adi, R. P. Setyanto, and M. E. Kaukab, “Guerilla Marketing in the Context of Industry 4 . 0,” *Solid State Technol.*, vol. 63, no. 6, pp. 689–701, 2020.