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Table of contents

Volume 1263

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[◀ Previous issue](#) [Next issue ▶](#)**6th International Symposium on Sustainable Urban Development 2023 02/08/2023 - 03/08/2023
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Institutional resilience of tourism villages against the Covid-19 pandemic in the Special Region of Yogyakarta

S P Putri and M Permana

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Evaluation of sanitation hygiene implementation at refill drinking water depot in Lembursitu Sub-District, Sukabumi City

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Unveiling *Ceratocystis* wilt disease: a review of cocoa's unforgiving foe

R Lloren

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012009

The presence of signage in the control of visual pollution in urban areas: A case study in the M.T Haryono street corridor, Kendari City, Indonesia

Halim, S Ramadan, A Al-Ikhsan, A J Ladianto, A Faslih and A M Firdausah

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Local characters of Chinese ethnic settlements in Chinatown area of Malang and Kembang Jepun area of Surabaya

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F A Alfarizi, H W Wiranegara and Y Supriyatna

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Comprehensive assets-based approach for neighborhoods that are under-resourced in Jakarta (case study: Keagungan Sub-district in West Jakarta, Indonesia)

M Ischak, W Sejati, E R Kridarso, D Rosnarti and L H Purwaningsih

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Rural-to-urban reclassification and its impact on urbanization in Indonesia: a case study of West Java Province

L K Katherina

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The impact of the operation of the Jatiasih toll gate on economic activities in the Jatiasih Sub-district

W Yahya and A Sitawati

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E-administration for collaborative governance body of green tourism villages in realizing smart villages in Bali

D K Halim, D S Pramesti and D N C Permatasari

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Quaternary Urban Geology and the Foundation of Heritage Building: Notable Historical Cases in Sawahlunto, Indonesia

Mohamad Sapari Dwi Hadian, Bombom Rachmat Suganda, Moch Nursiyam Barkah, Ute Lies Siti Khadijah, Ayu Krishna Yulawati, Suherman Dwi Nuryana and Dewandra Bagus Ekaputra

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The 6th INTERNATIONAL SYMPOSIUM
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The International Symposium on Sustainable Urban Development (ISoSUD) is a series of international activities organized by the Faculty of Landscape Architecture and Environmental Technology, Universitas Trisakti, Jakarta. The event is held once every 3 (three) years with themes related to current issues regarding sustainable urban development, in particular related to urban environmental management and environmental technologies. The activity aims to facilitate academics to publish their research results in order to enhance their scientific expertise as researchers.

The 6th ISoSUD in 2023 carried the theme **"From Recovery To Resilience: Building A Sustainable Future For A Better Life"** which means this symposium will focus on how we can recover from the difficult times caused by the COVID-19 pandemic and build a better future and sustainable. This theme also shows the importance of building resilience in facing future challenges, whether related to climate change, economic policies, or other social problems.

The COVID-19 pandemic that swept the world in the last four years has had a significant impact on human health, the global economy, and the daily lives of people around the world. It will take the concerted efforts of all countries and peoples to overcome this pandemic and rebuild the world after it. This pandemic underscores the need for global efforts to strengthen health systems, enhance societal resilience, strengthen international cooperation, and accelerate action to achieve sustainable development goals and combat climate change. This crisis provides an opportunity to make significant changes in the way we view and manage our economic and social activities and to create a world that is more sustainable and fairer for all people and our planet. Now is the time to make a difference, to make a profound systemic shift towards a more sustainable economy for the benefit of our people and our planet. In other words, now is the right time to undertake significant transformations in existing economic and social systems, which can help sustainably achieve the SDGs and fight climate change to ensure a better future for people and our planet. Overall, post-pandemic recovery must be based on the principles of sustainable development contained in the SDGs. By integrating the SDG goals into our recovery policies and actions, we can create a more sustainable, inclusive, and resilient future for our people and the world.

The 6th ISoSUD was held in the hybrid conference:

- a. Day 1, on Wednesday, August 2nd, 2023, at Building M, 12th floor, Universitas Trisakti, Jakarta, Indonesia. There were 130 participants offline and 170 participants on the Zoom platform in the plenary session.



- b. On day 2, on Thursday, August 3rd, 2023, using the Zoom meeting facility, 270 participants attended virtually on Day 2.

In this two-day International Symposium, experts, researchers, and academician shared their valuable insights and research findings. These esteemed presenters hail from 58 universities and institutions in Filipina, India, Indonesia, Iraq, Japan, Malaysia, Netherlands, Singapura, and Taiwan, reflecting the symposium's diverse and inclusive nature. The call paper system that has been used since the first ISoSUD in 2008 succeeded in inviting 165 manuscripts (more than 400 authors) that were presented offline and virtually. Then, 136 from 165 papers were selected further to be published in IOP Proceedings Indexed by Scopus. After another review process, 106 manuscripts were published in IOP EES. To improve the quality of the manuscripts, the organizing committee held a Coaching Clinic for Scientific Paper Writing on June 24th, 2023. Prof. Mohamad Ali Fulazzaky, Ph.D, delivered the coaching clinic.

The 6th ISoSUD 2023 involved co-host universities consisting of five from within the country and four from abroad: Universitas Jember (UNEJ), Jember, Indonesia; Universitas Islam Indonesia (UII), Yogyakarta, Indonesia; Universitas Pasundan (UNPAS), Bandung, Indonesia; Institut Teknologi Sepuluh November (ITS), Surabaya, Indonesia; Universitas Indonesia (UI), Jakarta, Indonesia; Universiti Teknologi Malaysia (UTM), Malaysia; Universiti Tun Hussein Onn Malaysia (UTHM), Malaysia; The University of Kitakyushu, Japan; Chung Yuan Christian University (CYCU), Taiwan. During the class presentation session, a presentation from the participants representing the 6th ISoSUD co-host was carried out. Besides that, The 6th ISoSUD 2023 was supported as well by the Indonesian Society of Sanitary and Environment Engineers (IATPI), which has continuously supported our symposium since 2008. And sponsored by PT Enviro Cipta Lestari.

In the plenary session, some main speakers delivered more focused seminar themes; they were:

Welcoming Speech:

Prof. Dr. Kadarsah Suryadi DEA – Rector of Universitas Trisakti

Opening Speech:

Ir. Diana Kusumastuti, MT. - Director General of Human Settlements, Ministry of Public Works and Public Housing Indonesia

Plenary Speakers:

Day-1

1. Prof. Lin Chi Wang - Chung Yuan Christian University (CYCU), Taiwan
2. Prof. Ir. Joni Hermana M.Sc.ES., Ph.D – Institut Teknologi Sepuluh November (ITS), Indonesia

Day 2

3. Prof. Ts. Dr. Azmi Bin Aris - Universiti Teknologi Malaysia (UTM), Malaysia
4. Prof. Dr. Eng. Toru Matsumoto - University of Kitakyushu, Japan
5. Associate Prof. Victor R Savage – Nanyang Technological University (NTU), Singapore

We believe that this event will be able to facilitate good networking among researchers, scientists, engineers, and practitioners with common interests, especially in sharing the latest research results, ideas, development, and applications in Sustainable Urban Development. Hopefully, all participants enjoyed the seminar and found this experience inspiring and helpful in their professional field. Thank you for choosing the 6th ISoSUD as your symposium reference. Let us embrace the spirit of collaboration and innovation as we strive towards a sustainable future for a better life. We hope to have your pleasant support and participation in the next three years on The 7th ISoSUD 2026.

Sincerely,

Assoc. Prof. Ariani Dwi Astuti, ST., MT., PhD

Chairperson of The 6th International Symposium on Sustainable Urban Development (ISoSUD) 2023

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1. Type of peer review: Double anonymous
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3. Number of submissions received: 137
4. Number of submissions sent for review: 106 (by IOP Publisher)
5. Number of submissions accepted: 71
6. Acceptance Rate (Submissions Accepted / Submissions Received × 100): 66.98%
7. Average number of reviews per paper: 2.00
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The impact of the operation of the Jatiasih toll gate on economic activities in the Jatiasih Sub-district

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The banner features a collage of images showing people at a conference, including a woman in a black jacket and a man in a white shirt.

The impact of the operation of the Jatiasih toll gate on economic activities in the Jatiasih Sub-district

W Yahya and A Sitawati*

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Abstract. The JORR E1 (Cikunir-Jatiasih) toll road was built with the primary goal of improving connectivity between the southern part of Bekasi City and neighboring regions. The construction and opening of the toll gate could yield a range of effects on the community, spanning from positive to negative impacts. This research aims to assess the impact of the Jatiasih toll gate's operation on economic activities and their externalities based on public perception. Data were collected through questionnaires distributed to 102 residents of the Jatiasih and Jatimekar urban villages. A quantitative descriptive method with scoring analysis was employed for the analysis. The results indicated that the operation of the Jatiasih toll gate has significantly affected the economic condition of both the Jatiasih and Jatimekar urban villages. In the economic aspect, the operation of the toll gate has led to a considerable transformation of residential functions, with business activities being incorporated into residential properties. This integration has resulted in increased economic activities within a 1 km radius. However, it is important to note that the development of economic activities within this radius has generated negative externalities in the surrounding area. This research emphasizes the importance of monitoring economic activities to better understand economic situations and to facilitate policymaking geared toward sustainable development and management.

1. Introduction

The E1 Section IV (Cikunir-Jatiasih) of the Jakarta Outer Ring Road was built with the primary goal of improving connectivity between the southern part of Bekasi City and neighboring regions [1]. The Jatiasih toll gate became operational in 2007 [2]. As a transportation hub connecting Bekasi City to its surroundings, the toll gate's presence may have various effects on the nearby areas. Previous studies have documented changes in land use both before the Jatiasih toll gate started operating in 2006 and in 2017 within a 1 km radius [3].

The alteration in land use within urban areas have notable impact on human life, such as the enhancement of economic activities that result from toll road construction [4]. The expansion of transportation infrastructure is closely tied to the advancement of land use and economic activities [3, 5-7]. Toll road construction is expected to improve the welfare of the people, particularly those residing near the exit tolls [8]. Furthermore, retail development tends to thrive in proximity to the toll road exit gates [9]. The establishment of toll roads, particularly near exit tolls, paves the way for the emergence of new small and medium enterprises [10-12].

The growth of economic activities often leads to conflicts in land use. Zoning has been employed as a method to enforce land use regulations aimed at mitigating the adverse impacts of external factors [13]. Conventional zoning systems typically entail the segregation of residential land use from



commercial or industrial land use, as commercial establishments are viewed as potential generators of disturbances that may draw crowds and result in congestion issues [13]. This study posits that the impacts of toll road construction and toll gate operations on the surrounding area and community may vary, resulting in both positive and negative outcomes. While several studies have explored changes in land use and economic activity around toll gates due to toll road operation, research on the effects of toll gate operations on economic activity and the externalities of rapid economic activity remains limited. Therefore, this research aims to assess the impact of the Jatiasih toll gate's operation on economic activities and their externalities based on public perception.

2. Methods

2.1. Research area

The study was carried out in the Jatiasih Sub-district, located in Bekasi City, West Java, with coordinates around 106.55 E longitude and 6.7 – 6.15 S latitude, and an elevation ranging from 11 to 29 meters above sea level [14]. This region encompasses approximately 2,427 hectares and includes six urban villages. In particular, the study concentrated on the Jatiasih and Jatimekar Urban Villages, both located within a 1-kilometer radius of the Jatiasih toll gate (Figure 1). This 1 km radius was selected to evaluate the influence of the toll gate's operation on the surrounding land use related to economic activities, as supported by previous research [3, 6, 8].

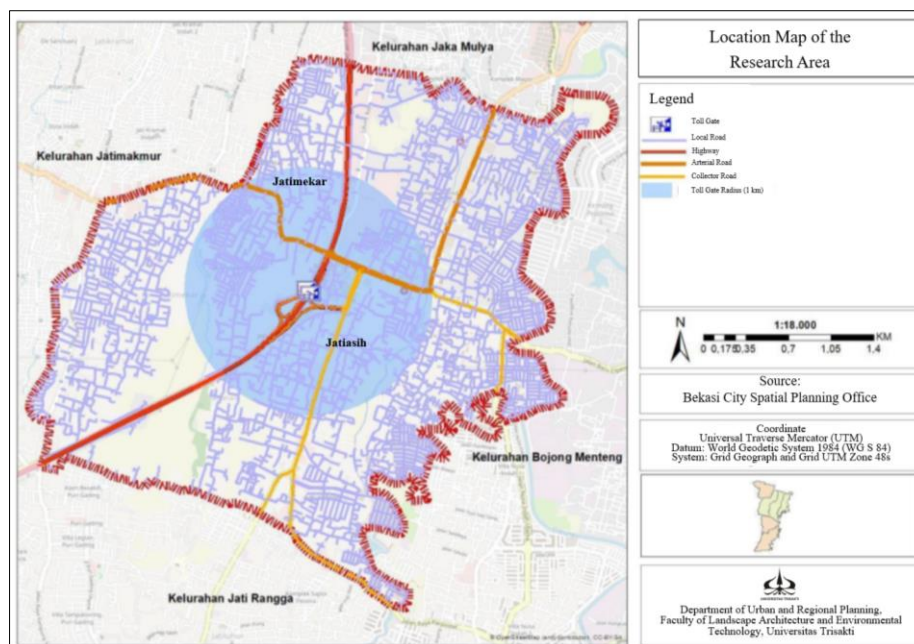


Figure 1. Location map of the research area.

2.2. Data collection

The primary data were collected using questionnaires distributed in person from June 22nd to July 17th, 2023. These questionnaires encompassed inquiries about the respondents' profiles and their viewpoints regarding the economic impact of the Jatiasih toll gate's operation. Simple random sampling was employed, ensuring that each member of the population had an equal opportunity to be chosen as a participant [15]. The population consisted of households in the Jatiasih and Jatirasa urban villages, all situated within a 1 km radius of the Jatiasih toll gate. Employing the Slovin formula [16] as defined in Equation 1 and with an error margin of 8.5%, the analysis incorporated a total of 102 respondents, as detailed in Table 1.

$$n = N / (1 + Ne^2) \quad (1)$$

Table 1. Determination of the sample distribution.

Urban Village	Community Unit	Neighborhood Unit	Number of Household	Number of Respondents
Jatiasih	No. 05	No. 01, 05, 06	105	27
	No.06	No.04	35	9
	No.08	No.06	35	9
	No.09	No.01,02	80	21
	No.10	No.01	35	9
Jatimekar	No.09	No.01,03	70	18
	No.10	No.11	35	9
Total	7 Community Units	11 Neighborhood Units	395	102

2.3. Data analysis

A quantitative approach was utilized in the study to gauge residents' perceptions regarding the effects of the Jatiasih toll gate's operation on economic aspects and its external consequences (as indicated in Table 2). Information was gathered in the form of responses on a Likert scale, with ratings ranging from "1 = Strongly Disagree" to "5 = Strongly Agree".

Table 2. Variables and measurement indicators.

Objectives	Variables	Indicators/Statements
Identification of the impact on economic conditions following the operation of the Jatiasih toll gate	Economic Activities	1. The Jatiasih toll gate's operation has led to an increase in economic activities within a 1 km radius.
		2. The operation of the Jatiasih toll gate has become a main factor in choosing business locations.
		3. The operation of the Jatiasih toll gate has resulted in a transformation of residential areas by integrating commercial activities into residential properties.
	Income	4. The operation of the Jatiasih toll gate has boosted residents' income through business activities.
Identification of externalities associated with economic activities that have emerged following the operation of the Jatiasih toll gate	Environmental Condition	1. The upsurge in economic activities following the toll gate's operation affects the volume of generated waste.
	Congestion	2. The increase in economic activities after the toll gate's operation impacts a decline in water and air quality.
		3. The growth in economic activities subsequent to the toll gate's operation contributes to traffic congestion.

The research employed a scoring table (Table 3) to assess community perceptions of the economic impact stemming from the Jatiasih toll gate's operation in the vicinity. Furthermore, the interval range was established using Equation 2.

$$\text{Interval} = \text{Range (highest score - lowest score)} / \text{Number of classes} \quad (2)$$

Table 3. Range and category.

Aspect	Range	Category
Economic Conditions	4.0 – 7.2	Very Insignificant Impact
	7.21 – 10.4	Insignificant Impact
	10.41 – 13.6	Moderate Impact
	13.61 - 16.8	Significant Impact
	16.81 - 20	Very Significant Impact
Externalities of Economic Activities	3.0 – 5.4	Very Insignificant Impact
	5.41 – 7.8	Insignificant Impact
	7.81 – 10.20	Moderate Impact
	10.21 - 12.6	Significant Impact
	12.61 – 15.0	Very Significant Impact

3. Results and Discussions

3.1. Identification of the impact on economic conditions following the operation of the Jatiasih toll gate

The survey results showed that 78% of the respondents had a favorable perception of the Jatiasih toll gate's operation. These respondents stated that it has significantly contributed to an increase in economic activities, particularly in trade and services, within their respective domicile areas, including the Jatiasih and Jatimekar urban villages. Based on public perceptions, the operation of the Jatiasih toll gate has a significant impact on promoting economic activities within a 1 km radius, as evidenced by an average score of 4.22. However, the operation of toll gate was not the sole determining factor in selecting a business location, as indicated by an average score of 2.31. This particular indicator was deemed to have an insignificant impact because the majority of respondents (71%) had been living in the Jatiasih and Jatimekar urban villages for over 16 years, which was before the Jatiasih toll gate's operation. These results were consistent with the answers of the respondents, where only 21% agreed or strongly agreed that the operation of toll gate influenced their business location choice, while 69% of respondents stated their business location was not influenced by the Jatiasih toll gate.

The research showed that a considerable proportion (92%) of the respondents had converted a small or large portion of their residence for business activities. The area of residential conversion into business activities ranged from 5 m² to 125 m², with an average conversion size of 20.5 m². Various business activities were observed within the residential zones, including grocery stores, eateries/cafes, workshops, car dealerships, and other services (laundry services and digital printing). Specific examples of business activities in residential areas were illustrated in Figure 2. Based on public perception, the operation of the Jatiasih toll gate has a significant impact on transforming residential functions by integrating business activities into residential properties, as evidenced by an average score of 4.56. The community also perceived that the operation of toll gate moderately impacted the increase of the income of the people from business activities, with an average score of 3.16 on this particular indicator.



Figure 2. Economic activities in the Jatiasih and Jatimekar urban villages.

In this section, four statements were used to explain the effects of the Jatiasih toll gate's operation on the economic aspect, as presented in Table 4. The cumulative average score of these indicators was 14.25, signifying that the operation of toll gate since 2007 has had a significant impact on economic condition of both Jatiasih and Jatimekar urban villages.

Table 4. Public perception regarding impact on economic conditions following the operation of the Jatiasih toll gate.

No.	Indicators	Frequency					Score	Average
		1	2	3	4	5		
1	The Jatiasih toll gate's operation has led to an increase in economic activities within a 1 km radius.	5	36	2	9	5	430	4.22
2	The operation of the Jatiasih toll gate has become a main factor in choosing business locations.	0	30	2	18	0	236	2.31
3	The operation of the Jatiasih toll gate has resulted in a transformation of residential areas by integrating commercial activities into residential properties.	17	15	4	41	17	465	4.56
4	The operation of the Jatiasih toll gate has boosted residents' income through business activities.	26	10	23	16	26	322	3.16
Total								14.25

3.2. Identification of externalities associated with economic activities that have emerged following the operation of the Jatiasih toll gate

This analysis showed externalities resulting from the rapid development of economic activities in the research area. The increase in economic activities after the operation of toll gate has a significant impact on the increase of generated waste, as indicated by an average score of 3.74. The respondents stated that the surge in economic activities after the operation of the Jatiasih toll gate has a significant impact on decreasing water and air quality, with an average score of 4.30. Based on public perception, the increase in economic activities after the operation of toll gate significantly contributed to the congestion in the area (Figure 3), with an average score of 3.83.



Figure 3. Congestion in the Jatiasih urban village.

This section presented three indicators/statements that explain externalities resulting from economic activities developed after the operation of the Jatiasih toll gate (Table 5). The cumulative average score of these indicators was 11.87, indicating that the development of economic activities within a 1 km radius of toll gate generated negative externalities with significant impact in the surrounding area.

Table 5. Public perception regarding externalities associated with economic activities.

No.	Indicators	Frequency					Score	Average
		1	2	3	4	5		
1	The upsurge in economic activities following the toll gate's operation affects the volume of generated waste (solid and liquid waste).	3	10	35	17	37	381	3.74
2	The increase in economic activities after the toll gate's operation impacts a decline in water and air quality.	1	3	14	30	54	439	4.30
3	The growth in economic activities subsequent to the toll gate's operation contributes to traffic congestion.	18	2	8	25	49	391	3.83
Total								11.87

3.3. Discussions

The construction of the JORR E1 (Cikunir-Jatiasih) toll road in 2007 had significant consequences for changing the land use patterns in the Jatiasih District of Bekasi City [3]. When analyzing the period between 2006 and 2017 within a 1 km radius of the toll gate, it became evident that there was a conspicuous reduction in the size and distribution of plantations, vacant land, and dry fields, accompanied by a marked expansion of residential and commercial areas [3]. This shift in land use was closely intertwined with the economic conditions of the study area, influenced by the toll gate's operation. Within the residential zone, a variety of activities emerged, including grocery stores, eateries/cafes, workshops, car dealerships, and various services such as laundry and digital printing. These results aligned with previous reviews, which indicated the potential viability of businesses in the food and transportation sectors [8]. However, the development of economic activities resulting from changes in built-up areas after the operation of the Jatiasih toll gate has contributed to negative environmental impact. The rise in commercial activities in proximity to residential areas could, to some extent, result in increased residential property values [13]. However, once a certain threshold is surpassed, land values might start to decline due to congestion or excessive noise, potentially outweighing the convenience factor [13]. This research emphasized the importance of monitoring economic activities to better understand economic situations and facilitate policymaking geared toward sustainable development and management. Further investigations were necessary to address planning, design, and zoning regulations to anticipate and mitigate potential negative externalities [13].

4. Conclusion

The operation of the Jatiasih toll gate has undeniably exerted a significant impact on economic condition of the Jatiasih and Jatimekar urban villages, as indicated by an average score of 14.25. Among economic indicators, the third indicator stood out with the highest score, signifying that the operation of toll gate has a significant impact on transforming residential functions by integrating business activities into residential properties, with an average score of 4.56 for this indicator. However, it is important to acknowledge that the increase in economic activities after the operation of toll gate has had an adverse effect on the environmental conditions. As public perception indicated, the development of economic activities within a 1 km radius of toll gate generated negative externalities in the surrounding area, resulting in an overall average score of 11.87. The respondents emphasized that the surge in economic activities had a very significant impact on decreasing water and air quality, with an average score of 4.30.

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The Impact of the Operation of the Jatiasih Toll Gate on Economic Activities in the Jatiasih Sub-district

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Abstract. The JORR E1 (Cikunir-Jatiasih) toll road was constructed with the primary goal of enhancing connectivity between the southern area of Bekasi City and other regions. The construction and opening of the toll gate could yield a range of effects on the community, spanning from positive to negative impacts. This research aims to identify the impact on economic activities and their externalities after the operation of the Jatiasih toll gate based on public perception. Data were collected through questionnaires distributed to 102 residents of the Jatiasih and Jatimekar urban villages. A quantitative descriptive method with scoring analysis was employed for the analysis. The results indicated that the operation of the Jatiasih toll gate has significantly affected the economic condition of both the Jatiasih and Jatimekar urban villages. In the economic aspect, the operation of the toll gate has led to a considerable transformation of residential functions, with business activities being incorporated into residential properties. This integration has resulted in increased economic activities within a 1 km radius. However, it is important to note that the development of economic activities within this radius has generated negative externalities in the surrounding area. This research emphasizes the importance of monitoring economic activities to better understand economic situations and to facilitate policymaking geared toward sustainable development and management.

Keywords: Impact, Jatiasih Toll Gate, Economic Activities, Externalities

1. Introduction

The E1 Section IV (Cikunir-Jatiasih) of the Jakarta Outer Ring Road was constructed with the primary objective of enhancing connectivity between the southern area of Bekasi City and other regions [1], and the Jatiasih toll gate commenced operations in 2007 [2]. As a transportation node linking Bekasi City with its external areas, the presence of toll gate may lead to various implications for changes in the surrounding areas. Previous research has shown changes in land use before the operation of the Jatiasih toll gate in 2006 and land use in 2017 within a 1 km radius [3]. There was a decrease in the area and distribution of plantation land use, paddy fields, dry fields, and vacant land, but the use of residential land and places of activity experienced an increase in both area and distribution [3].

The alteration in land use within urban areas have notable impact on human life, such as the enhancement of economic activities that result from toll road construction [4]. The expansion of transportation infrastructure is closely tied to the advancement of land use and economic activities [3][5][6][7]. Toll road construction is anticipated to improve the welfare of the people, particularly those residing near the exit tolls [8]. Furthermore, retail development tends to thrive in proximity to the toll road exit gates [9]. The establishment of toll roads, particularly near exit tolls, paves the way for the emergence of new small and medium enterprises [10][11][12].

The growth of economic activities often brings about conflicts in spatial use. Zoning has been employed as a mechanism for implementing land use controls to address the adverse impact of negative externalities [13]. Traditional zoning systems operate under the premise of segregating residential land use from commercial or industrial land use, as commercial facilities are perceived as potential nuisances that attract crowds and lead to congestion [13]. This study assumes that the effects of toll road construction and toll gate openings on the surrounding area and community may vary, resulting in positive or negative outcomes. Several studies have discussed changes in land use and changes in economic activity around toll gates due to the operation of a toll road. However, research on the impact of the operation of toll gates on economic activity and the externalities of the rapid economic activity is still limited. Therefore, this research aims to identify impact on economic activities and its externalities after the operation of the Jatiasih toll gate based on public perception.

2. Methods

2.1. Research Area

This research was conducted in the Jatiasih Sub-district, Bekasi City, West Java, situated at 106.55 E and 6.7 – 6.15 S and has an evaluation ranging from 11 to 29 m above sea level [14]. Covering an approximate area of 2,427 hectares, the Jatiasih Sub-district comprised six urban villages. The research area consisted of the Jatiasih and Jatimekar Urban Villages, both located within a 1 km radius from the Jatiasih toll gate. This 1 km radius was chosen to assess impact of toll gate operation on the surrounding land use associated with economic activities [3][6][8].

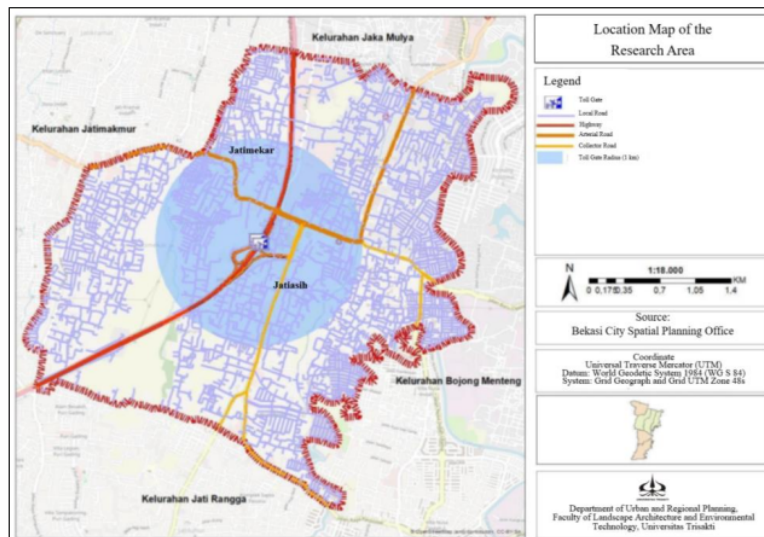


Figure 1. Location Map of the Research Area

2.2. Data Collection

The primary data were obtained through questionnaires that were distributed offline from June 22nd until July 17th, 2023. The questionnaire included inquiries about the profile of the respondents and their perceptions regarding the economic impact of the operation of the Jatiasih toll gate. Simple random sampling was employed, ensuring that each member of the population had an equal chance of being selected as a subject [15]. The population consisted of households in the Jatiasih and Jatirasa urban villages located within a 1 km radius from the Jatiasih toll gate. Using the Slovin formula ($n = N / (1 + Ne^2)$) [16] with an error margin of 8.5%, a total of 102 respondents were included in the analysis, as presented below.

Table 1. Sampling

Urban Village	Community Unit	Neighborhood Unit	Number of Household	Number of Respondents
Jatiasih	No. 05	No. 01,05,06	105	27
	No.06	No.04	35	9
	No.08	No.06	35	9
	No.09	No.01,02	80	21
	No.10	No.01	35	9
Jatimekar	No.09	No.01,03	70	18
	No.10	No.11	35	9
Total	7 Community Units	11 Neighborhood Units	395	102

2.3. Data Analysis

The research employed a quantitative method to assess the perception of residents regarding the influence of the operation of the Jatiasih toll gate on economic aspect. Data in the form of a Likert scale were collected from the answers of the respondents, with the scale ranging from "1 = Strongly Disagree" to "5 = Strongly Agree".

Table 2. Variables and Indicators

Objectives	Variables	Indicators/Statements
Identification of impact on economic conditions after the operation of the Jatiasih toll gate	Economic Activities	a. The operation of the Jatiasih toll gate has impact on increasing economic activities within a 1 km radius.
		b. The operation of the Jatiasih toll gate becomes a determining factor in selecting a business location.
		c. The operation of the Jatiasih toll gate has impact on transforming residential functions by incorporating business activities into residential properties.
	Income	d. The operation of the Jatiasih toll gate increases residents' income from business activities.
Identification of externalities related to economic activities that have developed after the operation of the Jatiasih toll gate	Environmental Condition	a. The increase in economic activities after the operation of toll gate affects the amount of waste generated.
	Congestion	b. The increase in economic activities after the operation of toll gate affects a decrease in water and air quality.
		c. The increase in economic activities after toll gate operation contributes to congestion.

The scoring table used in this research was presented below, and the average score was used to measure the perceptions of the community regarding economic impact resulting from the operation of the Jatiasih toll gate on the surrounding. Furthermore, the interval range was derived by calculating the class interval as $I = \text{Range (highest score - lowest score) / Number of classes}$.

Table 3. Range and Category

Aspect	Range	Category
Economic Conditions	4.0 – 7.2	Very Insignificant Impact
	7.21 – 10.4	Insignificant Impact
	10.41 – 13.6	Moderate Impact
	13.61 – 16.8	Significant Impact
	16.81 – 20	Very Significant Impact
Externalities of Economic Activities	3.0 – 5.4	Very Insignificant Impact
	5.41 – 7.8	Insignificant Impact
	7.81 – 10.20	Moderate Impact
	10.21 – 12.6	Significant Impact
	12.61 – 15.0	Very Significant Impact

11

3. Results and Discussion

3.1. Identification of Impact on Economic Conditions After the Operation of the Jatiasih Toll Gate

The results from the survey indicated that 78% of the respondents expressed a positive perception regarding the operation of the Jatiasih toll gate. These respondents stated that it has significantly contributed to an increase in economic activities, particularly in trade and services, within their respective domicile areas, including the Jatiasih and Jatimekar urban villages. Based on public perceptions, the operation of the Jatiasih toll gate has a significant impact on promoting economic activities within a 1 km radius, as evidenced by an average score of 4.22. However, the operation of toll gate was not the sole determining factor in selecting a business location, as indicated by an average score of 2.31. This indicator was considered to have no significant effect due to the fact that the majority of respondents (71%) had been residing in the Jatiasih and Jatimekar urban villages for more than 16 years (before the operation of the Jatiasih toll gate). These results were consistent with the answers of the respondents, where only 21% agreed or strongly agreed that the operation of toll gate influenced their business location choice, while 69% of respondents stated their business location was not influenced by the Jatiasih toll gate.

The research showed that a considerable proportion (92%) of the respondents had converted a small or large portion of their residence for business activities. The area of residential conversion into business activities ranged from 5 m² to 125 m², with an average conversion size of 20.5 m². Various business activities were observed within the residential zones, including grocery stores, eateries/cafes, workshops, car dealerships, and other services (laundry services and digital printing). Specific examples of business activities in residential areas were illustrated in Figure 2. Based on public perception, the operation of the Jatiasih toll gate has a significant impact on transforming residential functions by integrating business activities into residential properties, as evidenced by an average score of 4.56. The community also perceived that the operation of toll gate moderately impacted the increase of the income of the people from business activities, with an average score of 3.16 on this particular indicator.

3.2. Identification of Externalities Related to Economic Activities that Have Developed After the Operation of the Jatiasih Toll Gate

This analysis showed externalities resulting from the rapid development of economic activities in the research area. The increase in economic activities after the operation of toll gate has a significant impact on the increase of generated waste, as indicated by an average score of 3.74. The respondents stated that the surge in economic activities after the operation of the Jatiasih toll gate has a significant impact on decreasing water and air quality, with an average score of 4.30. Based on public perception, the increase in economic activities after the operation of toll gate significantly contributed to the congestion in the area, with an average score of 3.83.



Figure 3. Congestion in the Jatiasih Urban Village

This section presented three indicators/statements that explain externalities resulting from economic activities developed after the operation of the Jatiasih toll gate. The cumulative average score of these indicators was 11.87, indicating that the development of economic activities within a 1 km radius of toll gate generated negative externalities with significant impact in the surrounding area.

Table 5. Public Perception Regarding Externalities of Economic Activities

No.	Indicators	Frequency					Score	Average
		1	2	3	4	5		
1	The increase in economic activities after the operation of toll gate affects the amount of waste generated (solid and liquid waste).	3	10	35	17	37	381	3.74
2	The increase in economic activities after the operation of toll gate affects a decrease in water and air quality.	1	3	14	30	54	439	4.30
3	The increase in economic activities after toll gate operation contributes to congestion.	18	2	8	25	49	391	3.83
Total								11.87

3.3. Discussion

The construction of the JORR E1 (Cikunir-Jatiasih) toll road in 2007 had significant implications for land use changes within Jatiasih District, Bekasi City [3]. Over the period spanning from 2006 to 2017, an analysis conducted within a 1 km radius from toll gate exhibited a reduction in the size and dispersion of plantations, vacant land, and dry fields, accompanied by noticeable growth in residential and commercial areas [3]. This change in land use was interconnected with economic condition of the research area, impacted by the operation of toll gate. Within the residential zone, a spectrum of activities was observed, including grocery stores, eateries/cafes, workshops, car dealerships, and other services (laundry services and digital printing). These results aligned with previous reviews, which indicated the potential viability of businesses in the food and transportation sectors [8]. However, the development of economic activities resulting from changes in built-up areas after the operation of the Jatiasih toll gate has contributed to negative environmental impact. The increase in commercial activities around residential areas could lead to higher residential land values to some extent [13]. Beyond a certain threshold level, land values might decrease due to congestion or excessive noise, offsetting convenience [13]. This research emphasized the importance of monitoring economic activities to better understand economic situations and facilitate policymaking geared toward sustainable development and management. Further investigations were necessary to address planning, design, and zoning regulations to anticipate and mitigate potential negative externalities [13].

4. Conclusion

The operation of the Jatiasih toll gate has undeniably exerted a significant impact on economic condition of the Jatiasih and Jatimekar urban villages, as indicated by an average score of 14.25. Among economic indicators, the third indicator stood out with the highest score, signifying that the operation of toll gate has a significant impact on transforming residential functions by integrating business activities into residential properties, with an average score of 4.56 for this indicator. However, it is important to acknowledge that the increase in economic activities after the operation of toll gate has had an adverse effect on the environmental conditions. As public perception indicated, the development of economic activities within a 1 km radius of toll gate generated negative externalities in the surrounding area, resulting in an overall average score of 11.87. The respondents emphasized that the surge in economic activities had a very significant impact on decreasing water and air quality, with an average score of 4.30.

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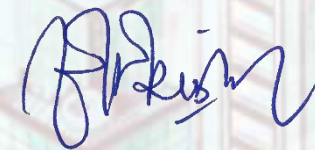


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