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The Impact of Night Markets Causing Congestion Case Study: At Gandu Village Square, Dawuan Subdistrict

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ABSTRACT

Traffic congestion is a major problem around the world. On a global level, the increase in the number of motorized vehicles has become a problem that causes congestion on roads. While there have been many studies on traffic congestion, there is little research on the specific impact of night markets on traffic congestion. This research aims to address the congestion problem by conducting a comprehensive literature review on the relationship between night markets and traffic congestion. In addition, this research also analyzed various related case studies to gain a deeper understanding of this issue. This research uses qualitative methods. Qualitative research understands social and natural phenomena by exploring the meaning and experiences of research subjects. Qualitative research emphasizes on understanding individual perspectives, contexts, and processes rather than quantitative research which focuses more on numbers and numerical data. The results show that a significant increase in the volume of motorized vehicles during peak hours is the main factor causing congestion in the Alun Alun Gandu area. Lack of road capacity, especially at four-way intersections and narrow roads, exacerbates congestion in the area. Unruly road user behavior, such as indiscriminate parking and traffic sign violations, also exacerbate congestion. Unexpected events such as traffic accidents or demonstrations can trigger widespread congestion and impact community mobility. This study found that the large number of private vehicles, lack of parking lots, and lack of public awareness of the importance of traffic order caused congestion around the Gandu night market on Tuesdays at 17.00-20.30 WIB. To overcome this, it is recommended to provide additional parking lots in vacant lots around the night market location and conduct socialization to visitors regarding good parking procedures. The conclusion obtained from the results of the vehicle speed test, at 17:35-18:25 WIB the lowest average vehicle speed reached 16.02 km / h, the speed of the vehicle appears to have decreased due to the increase in vehicle volume.

1. Introduction

Night markets are a very popular tradition in Indonesia and even internationally, this local culture has become a global problem. In many parts of the world, night markets often cause significant traffic congestion. Street activity clog can be a basic issue over metropolitan cities in most nations within the world [1]. Given increasing urbanization and increased social mobility, the analysis of this phenomenon has become increasingly important. Congestion caused by night markets not only affects transportation efficiency, but also impacts the quality of life of local people, the environment, and the local economy. Traffic congestion is a problem in major cities in Indonesia. In numerous nations, checking and oversee of activity in a city is major concern [2]. The growing number of motor vehicles on the road has caused significant traffic jams, reduced productivity, and environmental damage on a global scale [3]. One of the main causes of these traffic jams is the rise of night markets. This tradition does not only occur in big cities, but also in areas that previously tended to be quieter. In this manner, clog may be a

issue connected specifically to both land-use and transport frameworks and presents negative externalities such as natural or financial issues [4].

Congestion caused by night markets is becoming increasingly complex in many parts of Indonesia. While many people enjoy these nighttime activities, they often have a negative impact on people's quality of life. Activity clog has been examined at three levels over the past decades, to be specific, the territorial level, the street level, and the path level [5]. The severe congestion around the night market does not only affect the mobility of residents. It leads to misplaced time and efficiency, diminished discuss quality, and expanded working uses [6]. In addition, air and noise pollution due to heavy traffic is also a health issue that needs attention.

The limited road infrastructure in Gandu Village is one of the main causes of traffic congestion due to the night market. There is a mix of traffic from automated and non-automated cars, as well as other road users including cyclists and pedestrians, because of the metropolitan environment's complexity and varied infrastructure [7]. In reality little occurrences have small down to earth values as genuine world issues frequently are huge in estimate [8]. Narrow streets and a lack of proper parking further exacerbate the situation at the night market. As a result, traffic congestion extends to areas other than the night market, often disrupting the overall flow of traffic. The economics and population health of a nation are both directly and indirectly impacted by traffic congestion [9].

A lot of travel time is wasted in traffic bottlenecks [10]. While there have been many studies on traffic congestion, there are few studies on the specific impact of night markets on traffic congestion. This research aims to address the issue of congestion by conducting a comprehensive literature review on the relationship between night markets and traffic congestion. In addition, it also analyzes various related case studies to gain a deeper understanding of the issue. Many aspects of life, such as safety, social benefits, and economic progress, depend on traffic [11].

2. Literature Review

2.1 Congestion

Traffic jams occur when traffic is obstructed or stopped. Numerous triggering factors have been documented in the literature, including road capacity, traffic flow patterns, driver conduct, including cooperative merging, abrupt lane changes, and specific maneuvers [12]. Congestion has become a serious problem that disrupts activities throughout the world [13]. It occurs when the number of vehicles passing through the condition exceeds the available road capacity. Traffic congestion is common in densely populated and economically active urban areas. The impacts of congestion include longer travel times, increased fuel consumption, and increased air pollution.

Congestion has a wide and complex impact on many aspects of life. Traffic activity obstructions that cause delays, burdens and financial losses for drivers, as well as polluting the surrounding environment [14]. From environmental impacts such as increased emissions and air pollution, to social impacts such as increased stress and decreased productivity. Concerns over the natural impacts of activity clog were progressively talked about [15]. In addition, congestion also negatively impacts the economy by increasing vehicle operating costs and decreasing transportation efficiency.

The increasing growth of motor vehicles, both in terms of number and load capacity, which causes traffic congestion [16]. Some areas have experienced road congestion as a result of the rise in traffic, which lowers local residents' quality of life and makes commuting difficult [17]. Additionally, traffic accidents can happen to a variety of road users worldwide [18] Traffic congestion is a multifactorial phenomenon that is influenced by various interrelated factors. Apart from population growth and inadequate infrastructure, factors such as traffic accidents, high economic activity, and special events such as concerts and sporting events can also cause traffic congestion.

2.2 Traffic

Traffic is when people or goods move from one place to another. It involves complex interactions between road users, vehicles and road infrastructure. Since traffic is a means of transportation for work and other activities, people currently have a strong need for it [19]. Traffic includes not only cars, but also pedestrians, bicycles, and various other modes of transportation. Spatial planning, traffic management, and efforts to reduce congestion require a deep understanding of transportation. Traffic congestion is a condition where traffic exceeds available capacity [20].

Traffic in the alun alun of Gandu village is obstructed due to the night market. Thus, in many areas, high traffic volumes can cause traffic problems including congestion and accidents [21]. The presence of a volunteer to oversee the streets and maintain traffic order helped to partially resolve this issue [22]. Not only does it hamper the smooth flow of traffic but it also has a negative impact on the village community. Longer travel times, increased fuel consumption, and air pollution are some of the impacts that residents must endure. In addition, the noise and activities of the night market that lasts until late at night can also disturb the comfort and tranquility of residents.

Addressing the traffic problems caused by the Gandu Village Square Night Market requires careful planning and effective preventive measures. Because it includes both physical and relative dimensions, traffic congestion is an inherently difficult notion to define [23]. Limiting the opening hours of the night market, identifying the location, and providing adequate parking can be the initial solution. In addition, good coordination between the village government, traders, and the community is needed to reach a mutual agreement.

2.3 Night Market

Night markets are an integral part of Indonesian culture, especially in rural areas. For the community, the night market's existence is comparable to hate mixed with longing [24]. The event not only serves as a hub for local economic activity, but also as a platform for community interaction. The night market provides an opportunity for small and medium-sized businesses to sell their goods, helping to maintain local traditions and skills. During difficult economic times, night markets have also been recognized as possible sources of employment and business growth [25].

At night markets, a variety of interactions take place between vendors, patrons, and even tourists [26]. Night markets are not only entertainment venues, but also contribute to the growth of the local economy. For all startups, this may be the perfect location [27]. Small and medium-sized traders derive income from these businesses and also create jobs for local people. Night markets also have the potential to boost the economy of an area and increase people's purchasing power. On the other hand, it will negatively affect drivers and result in unintended events like traffic bottlenecks and accidents [28].

From the perspective of life values, the Night Market's existence as a place for people to unwind and enjoy themselves greatly contributes to reducing the stress of work and enhancing people's quality of life [29]. But night market organizers also face challenges in dealing with traffic issues. We need to work with the local government and police to control traffic around the night market. In addition, market managers must provide adequate facilities for visitors, such as parking lots and toilets, and ensure the cleanliness and safety of the market area. The village is the focal point of all state and national development initiatives [30]

3. Method

3.1 Jenis Penelitian

This study applies qualitative methodology. By exploring the meanings and experiences of research subjects, qualitative research helps to understand social and natural phenomena. Qualitative

research emphasizes understanding individual perspectives, contexts, and processes rather than quantitative research, which focuses more on numbers and numerical data.

3.2 Lokasi Penelitian

This research was conducted in Gandu Village, right at the square, which includes Jalan Perikanan, Jalan Siliwangi, and Jalan Protokol.

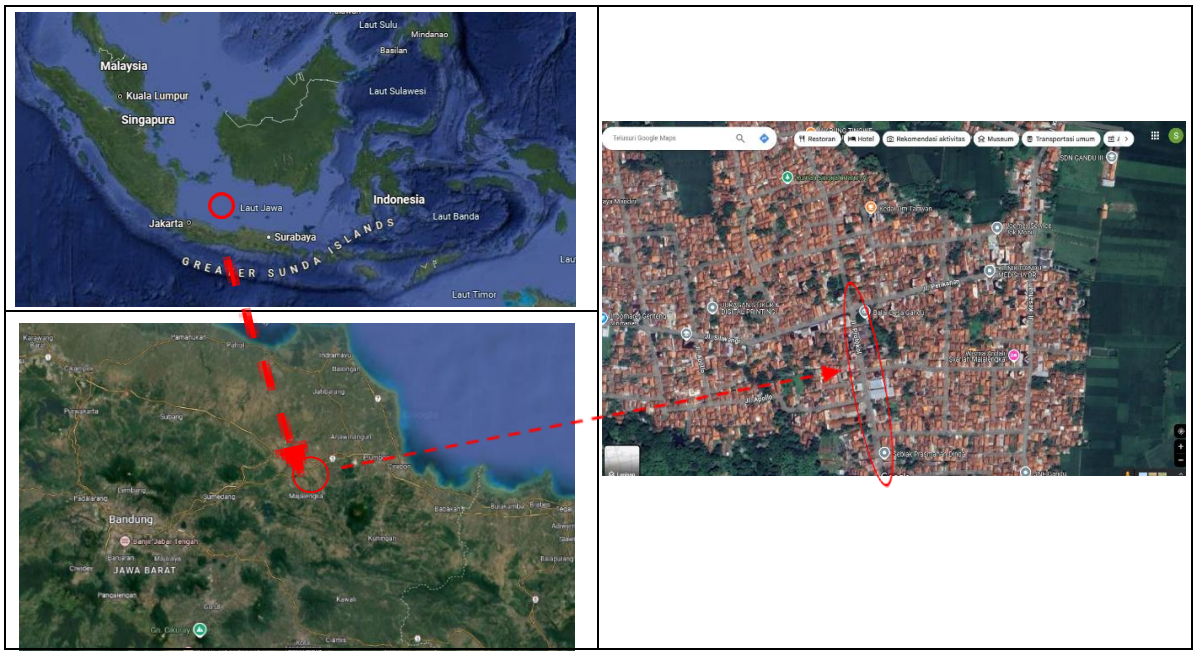

Figure 1. Location of study

3.3 Pengumpulan Data

Primary and secondary data were included in the data collected. A direct survey of the research site was used to gain an understanding of the actual conditions and situation. Secondary data included the study location, vehicle travel time, and road situation maps.

4. Result and Discussion

4.1 Road Segment Data

The road around the Gandu village hall is a rural road, the road is often passed by pedestrians, motorbikes, private cars or trucks loaded with roof tiles. Data and road conditions around the village hall are as follows:

1. Two-way street with two lanes (2/2 UD)
2. Road is only 4 meters wide
3. The road around the village hall does not have road markings 4.

Figure. 2 Road conditions during the night market.

4.2 Road Volume Analysis Result

To understand the traffic flow at a particular location, vehicle volume assessment refers to the number of vehicles crossing a particular road section or part of the road during a given time, usually measured in vehicles per hour (PCU/hour). Data on the number of vehicles is essential for transportation planning and management. Road capacity analysis can be done by knowing how many vehicles pass through the examined road section. Table 1 shows the results of the vehicle volume measurements.

Tabel. 1 Volume Density Test Results

No	Tuesday	Number of Vehicles (ken/hr)					Number of vehicles (Smp/hr)				
	Time	LV	HV	MC	UM	Total	LV	HV	MC	UM	Total
1	06.00-07.00	32	15	212	56	315	32	19,5	106	56	213,5
2	11.00-12.00	11	9	238	63	321	11	11,7	119	63	204,7
3	17.35-18.25	23	12	324	88	447	23	15,6	164	88	290,6

Many cars passed through the road between 5:35 pm and 6:25 pm, when the highest vehicle volume reached 290.6 vehicle units per hour (smp/h). This time may be due to people returning from work in the city where they live having to pass through the road at that time, in addition to night market visitors on motorcycles and on foot.

4.3 Vehicle Speed Analysis Result

It is important to understand how traffic flows by looking at vehicle speed patterns at various times of the day. To determine peak times and possible congestion, as well as to improve safety and smoothness, these speed patterns can be used to create more effective traffic control strategies. Speed measurement results are used in traffic management and transportation planning. Table 2 shows the results of the speed test.

Tabel. 2 Vehicle Speed Test Results

No	Tuesday	Travel Distance (m)	Totalobservation data	Travel Time (Seconds)	Space Mean Spade	
	Time				(m/sec)	(km/h)
1	06.00-07.00	70	12	13,77	6,45	23,22
2	11.00-12.00	70	12	13,12	6,13	22,068
3	17.35-18.25	70	12	18,75	4,45	16,02

Observations showed that on Tuesday, between 6:00 am and 7:00 am, vehicles reached the highest average speed of 23.22 km/h, when traffic appeared to be smoother and vehicles could move at relatively high speeds. Between 17:35 and 18:25 hours, vehicles reached the lowest average speed of 16.02 km/h, when the volume of vehicles appeared to be increasing.

4.4 Vehicle Density Result

Knowing the number of vehicles crossing a particular road section in a given period of time is very important. The average spatial speed (Us) and volume (Q) of vehicles per hour (smp/h), flow rate, and density are measured in kilometers per hour to measure traffic density. The volume (Q) indicates the number of vehicles passing through the road section within one hour, which reflects the traffic level on the tested road. Table 3 shows the results of the track density test.

Tabel. 3 Traffic Density Test Results

No	Tuesday	Space Mean Speed (Us) (Km/h)	Volume (Q) (smp/h)	Rate Of Flow (smp/h)	Density (D) (smp/h)
	Time				
1	06.00-07.00	23,22	213,5	854	36,7
2	11.00-12.00	22,068	204,7	818,8	37,1
3	17.35-18.25	16,02	290,6	1162,4	72,5

The test results show that on Tuesday, from 5:35 pm to 6:25 pm, vehicles reached the highest density of 72.5 smp/hour. At times when traffic tends to be more congested, vehicles also reach relatively low speeds. Between 6:00 am and 7:00 am, vehicle density decreased, reaching 36.7 smp/h.

5. Conclusion

Based on the tested data analysis and discussion, the number of vehicles peaked at 17.35 to 18.25 pm, with 290.6 vehicle units per hour, indicating hours of heavy traffic. In addition, the results of the vehicle speed analysis showed that at 06.00-07.00 hours the traffic was relatively smooth, with an average speed of 23.22 km/h.

References

[1] T. T. Dinh, "Managing traffic congestion in a city: A study of Singapore's experiences," *Research gate,* p. 1., 2019.

[2] G. M. &. K. E. Kumar, " Smart Traffic Junction Using Raspberry Pi.," *In IOP Conference Series: Materials Science and Engineering,* pp. (Vol. 981, No. 3, p. 032048). IOP Publishing., 2020.

[3] M. N. F. A. Rachman, " ANALYSIS OF SPEED AND TRAFFIC DENSITY OF JALAN RAJAGALUH-MAJALENGKA.," *LEADER: Civil Engineering and Architecture Journal, 2(2),,* pp. 745-753., 2024.

[4] W. E. &. D. E. Marshall, "Revisiting the relationship between traffic congestion and the economy: a longitudinal examination of US metropolitan areas," *Transportation, 47(1),,* pp. 275-314., 2020.

[5] Z. T. L. K. M. P. R. C. L. D. &. L. Q. Kan, " Traffic congestion analysis at the turn level using Taxis' GPS trajectory data.," *Computers, Environment and Urban Systems, ,* pp. 74, 229-243., 2019.

[6] G. Sharon, "Alleviating Road Traffic Congestion with Artificial Intelligence.," *In IJCAI,* pp. (pp. 4965-4969)., 2021.

[7] Y. M. M. R. G. O. G.-M. L. M. G. F. C. .. &. M. N. Lee, "Road users rarely use explicit communication when interacting in today's traffic: implications for automated vehicles.," *Cognition, Technology & Work,,* p. 23, 2021.

[8] N. R. B. A. C. E. T. A. &. S. A. Sabar, "A self-adaptive evolutionary algorithm for dynamic vehicle routing problems with traffic congestion.," *Swarm and evolutionary computation,,* pp. 44, 1018-1027., 2019.

[9] M. &. M. S. Akhtar, "A review of traffic congestion prediction using artificial intelligence.," *Journal of Advanced Transportation,,* p. 8878011., 2021.

[10] A. A. S. K. M. A. A. G. &. F. Atta, "An adaptive approach: Smart traffic congestion control system.," *Journal of King Saud University-Computer and Information Sciences,,* pp. 32(9), 1012-1019., 2020.

[11] V. P. C. &. D. T. Pham, "Road damage detection and classification with detectron2 and faster r-cnn.," *In 2020 IEEE International Conference on Big Data (Big Data),* pp. (pp. 5592-5601). IEEE., 2020.

[12] C. S. G. P. K. C. P. &. K. S. S. Arti, "Urban traffic congestion: Its causes-consequences-mitigation.," *Res J Chem Environ, 26(12),,* pp. 164-176., 2022.

[13] S. R. K. P. G. S. J. C. &. S. M. Samal, " Analysis of traffic congestion impacts of urban road network under Indian condition.," *In IOP conference series: materials science and engineering,* pp. (Vol. 1006, No. 1, p. 012002), 2020.

[14] T. &. Y. N. Afrin, " A survey of road traffic congestion measures towards a sustainable and resilient transportation system.," *Sustainability, ,* pp. 12(11), 4660., 2020.

[15] Z. &. L. B. P. Huang, " Urban traffic congestion in twelve large metropolitan cities: A thematic analysis of local news contents, 2009–2018.," *International journal of sustainable transportation, ,* pp. . 17(6), 592-614., 2023.

[16] E. R. A. I. &. N. N. Purnama, "Analysis of Road Performance Used Indonesian Highway Capacity Manual 1997: A Case Jalan KH Abdul Halim Majalengka-Indonesia.," *Citizen: Jurnal Ilmiah Multidisiplin Indonesia, 2,,* pp. 888-895., 2022.

[17] P. A. R. M. A. &. P. C. A. Kesuma, "Risk analysis of traffic congestion due to problem in heavy vehicles: a concept.," *. In IOP Conference Series: Materials Science and Engineering (Vol. 650, No. 1, p. 012011).,* p. IOP Publishing., 2019.

[18] V. N. R. A. I. &. F. F. Sumantri, "Impact of inter-urban street lighting on users perception of road safety behavior: A Case of Jalan Majalengka-Rajagaluh.," *Citizen: Jurnal Ilmiah Multidisiplin Indonesia, 2,,* pp. 703-711., 2022.

[19] W. &. L. J. Jiang, " Graph neural network for traffic forecasting: A survey.," *Expert systems with applications,,* pp. 207, 117921., 2022.

[20] R. Fernando, "The impact of Planned Special Events (PSEs) on urban traffic congestion.," *EAI Endorsed Transactions on Scalable Information Systems,,* pp. . 6(23), e4-e4., 2019.

[21] G. T. N. &. R. A. I. Fatimah, " ANALYSIS OF UNSIGNALIZED INTERSECTIONS: CASE STUDY OF THE INTERSECTION OF JALAN SUKARAJA WETAN, MAJALENGKA.," *LEADER: Civil Engineering and Architecture Journal, 2(1), ,* pp. 612-620., 2024.

[22] I. R. A. I. I. M. &. P. J. Andika, ". A Traffic Management System for Minimization of Intersection Traffic Congestion: Case Bengkong Junction,," *IJEBD International Journal Of Entrepreneurship And Business Development,,* pp. 5(05), , 2022.

[23] D. Q. Y. W. C. G. &. D. G. C. Nguyen-Phuoc, ". Traffic congestion relief associated with public transport: state-of-the-art.12(2),," *Public Transport,,* pp. 455-481., 2020.

[24] C. G. Haryono, "The Night Market as A Contra Hegemony of Seller Against The Power of Capitalism and The Government.," *In 1st Annual Internatioal Conference on Social Sciences and Humanities (AICOSH 2019),* pp. (pp. 249-253). Atlantis Press., 2019.

[25] D. S. P. &. D. S. Bamrongpol, "Antecedents to Thai night market visitor revisit intention.," *Asia-Pacific Social Science Review,,* pp. . 20(3), 16., 2020.

[26] S. K. L. Chan, " The disappearance of Bangkok's Artbox: examining the challenges of sustaining a mobile night market during the COVID-19 pandemic.," *International Journal of Social Economics,,* pp. . 50(1), 20-33., 2023.

[27] K. A. Abitria, "The Rise of Night Market in Polangui, Albay: An Advantage to SMEs.," *Journal of Education, Management and Development Studies, 3(1),,* pp. 41-51., 2023.

[28] G. &. D. S. G. Cantisani, "Procedure for the identification of existing roads alignment from georeferenced points database.," *Infrastructures, ,* pp. 6(1), 2., 2020.

[29] R. W. X. &. W. Y. Li, "Night market cultural transformation and upgrading.," *Journal of Service Science and Management, ,* pp. . 14(4), 412-428., 2021.

[30] R. H. N. D. S. A. &. R. A. I. Agustian, "Performance analysis of the community meeting hall at Mountain Village: A case at Garawastu.," *Indonesian Journal of Multidisciplinary Science,,* p. 3(5)., 2024.