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Exploring Soundscape Perception in the Historical Catur Gatra Tunggal Area, Kotagede, through the Soundwalk

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ABSTRACT

Kotagede Yogyakarta is a historical area left behind by the Islamic Mataram Kingdom. Now that district developing into a residential area. This area has a legacy of Javanese spatial structure and spatial pattern known as the concept of "Catur Gatra Tunggal". However, the condition of this area has experienced physical and functional degradation, which affects the character of the space, including the quality of the sound environment (soundscape). This study aims to identify the current soundscape conditions in the Catur Gatra Tunggal Kotagede area through the soundwalk method to explore the types of sounds that exist in the current location and how humans perceive these sounds. Data collection was carried out on weekday dan weekend in three time spans. This study contributes to soundscape research by applying perception-based methods to culturally significant urban heritage areas, revealing spatial-temporal variations in auditory experience. The main conclusion of this study shows that there are differences in the dominance of soundscape formation at each location and the perception of these sounds. The activities at the location also determine the type of sound heard and how participants feel it according to their respective locations.

Keywords: Acoustic environment, Heritage urban space, Kotagede, Perceived affective quality, Soundscape, Soundwalk methode

ABSTRAK

Kotagede Yogyakarta merupakan kawasan bersejarah peninggalan Kerajaan Mataram Islam. Saat ini kawasan tersebut berkembang menjadi permukiman penduduk. Kawasan ini memiliki peninggalan struktur ruang dan pola ruang Jawa yang dikenal dengan konsep "Catur Gatra Tunggal". Namun kondisi kawasan ini mengalami degradasi fisik dan fungsional sehingga memengaruhi karakter ruang, termasuk kualitas lingkungan akustik (soundscape). Penelitian ini bertujuan untuk mengidentifikasi kondisi soundscape di kawasan Catur Gatra Tunggal Kotagede saat ini melalui metode soundwalk untuk mengeksplorasi jenis – jenis suara yang ada di lokasi saat ini dan bagaimana persepsi manusia terhadap suara – suara tersebut. Pengumpulan data dilakukan pada hari kerja dan libur di tiga rentang waktu. Penelitian ini memberikan kontribusi terhadap penelitian lanskap suara dengan menerapkan metode berbasis persepsi pada kawasan warisan budaya perkotaan yang signifikan, mengungkap variasi spasial-temporal dalam pengalaman pendengaran. Kesimpulan utama penelitian ini menunjukkan adanya perbedaan dominasi pembentuk soundscape pada setiap lokasi dan persepsi terhadap suara – suara tersebut. Aktivitas yang ada di lokasi juga menentukan jenis suara yang terdengar dan bagaimana peserta merasakannya sesuai lokasi masing – masing.

Keywords: Bentang suara, Kawasan bersejarah, Kualitas afektif rasa, Kotagede, Lingkungan akustik,, Metode soundwalk

1. INTRODUCTION

Kotagede is a historical area left over from the Islamic Mataram Kingdom which is now developing into a residential area. It is also stated on the official website of the Department of Culture (Kudha Kabudayan) that Kotagede is an old city located in Yogyakarta. Kotagede is evidence of the existence of life during the Islamic Mataram Kingdom which was established in 1532 AD until finally being moved to Kerta by Sultan Agung in 1618. In the RTRW 2010-2029, government of Yogyakarta designated Kotagede as a Cultural Heritage Area, trade, tourism, settlements, and as a Cultural Heritage Area (KCB) of Provincial Rank (has been ratified in the Keputusan Gubernur Daerah Istimewa Yogyakarta No. 131/Kep/2023). As the city center during the kingdom, Kotagede area has a spatial structure and spatial pattern known as the concept of "Catur Gatra Tunggal". This concept is the basis for spatial planning in Javanese society and the formation of the city core. Catur Gatra is the main foundation of life in Kotagede. These four components are the identity of the city. The Catur Gatra Tunggal concept views that government cannot be separated from economic, religious, and social aspects (Balai Pelestarian Cagar Budaya Provinsi D.I. Yogyakarta, 2019).

With urbanization, of course, there are changes in an area including Kotagede. The era of Kotagede as the center of the Mataram kingdom ended in 1613, since the center of the kingdom was moved to Karta by Sultan Agung (grandson of Panembahan Senapati) (Dinas Kebudayaan Daerah Istimewa Yogyakarta, 2023). From the research of the Morphological Study of the Kotagede Area (Litiloly, 2019), it can be seen that there has been an increase in population density in the Kotagede area. Initially, the density was centered on the Catur Gatra Tunggal area, but in the period >1920-1992, residential development spread further outside the Catur Gatra Tunggal area, until now, the concept of the distinctive city order is not clearly visible. This problem is also proven by the existence of a map of the distribution of important buildings that form the Catur Gatra Tunggal concept issued by (UNESCO, Pedoman pelestarian bagi pemilik rumah kawasan pusaka Kotagede Yogyakarta, 2007). The map shows the fading of the regional order according to its concept due to urbanization and modernization. In addition to the fading value of Catur Gatra Tunggal in the Kotagede area, in the research of Fanani & Kurniati (2018) it was found that the Kotagede Cultural Heritage Area had the lowest preservation value, namely 60% declared good compared to four other cultural heritage locations in Yogyakarta.

The changes that occur affect the atmosphere of the urban space in the Kotagede area. Likewise with the acoustic environment there because in the framework developed by Cain R., et al. (2008) it is stated that one of the factors that influences the perception of soundscape is the location and type of space where a person is (function of the space, function of the surrounding buildings, etc.). Currently, Kotagede is an attractive destination for tourists, inviting them with various kinds of heritage and domestic activities and cultural values. Narrow roads are starting to be crossed by motorized vehicles that produce noise. (World Health Organization, 2011) said that the existence of the urban phenomenon of urbanization encourages increased interest in the scientific field of environmental noise and its mitigation. This is also related to the research of Mediastika et al. (2024) which concluded that there were changes in sounds in the Kotagede area due to urbanization. Respondents from the FGD conducted also wanted the development of aural aspects so that tourists can connect with the heritage values of the area. This shows that what has changed in the Catur Gatra Tunggal Kotagede area is not only the tangible elements, but also the intangible elements. One of the intangible elements included in the protection of UNESCO's cultural heritage is the soundscape in the historic area. Historic areas have their own characteristics in the scope of tangible and intangible cultural heritage to create a unique cultural identity that can be attractive to tourists and important for local and global communities (UNESCO, Convention for the Safeguarding of Intangible Cultural Heritage, 2003).

This study aims to examine how sounds shape the acoustic environment and how individuals perceive and emotionally respond to those sounds. This study use soundwalk method and the Perceived Affective Quality (PAQ) framework. The research focuses on four distinct locations within the same historical and cultural context, namely the spatial structure of Catur Gatra Tunggal. In addition, the study seeks to identify how variations in sound sources correspond to differences in PAQ across the distinct spatial contexts within the Catur Gatra Tunggal structure.

Soundscapes have increasingly attracted attention in urban design research. However, limited studies have focused specifically on heritage areas, particularly those that compare multiple heritage locations. Bartalucci and Luzzi (2020) provide a valuable foundation for exploring soundscape analysis in cultural heritage, but their approach does not explicitly incorporate the Perceived Affective Quality (PAQ) framework. Similarly, Kaymaz et al. (2016) highlight the perceptual disconnect between visual restoration and acoustic character

in Hamamönü; however, their study does not apply a standardized affective model such as PAQ, nor does it differentiate affective soundscape responses across various spatial functions within a heritage context. To date, no study has investigated affective responses to similar sound source categories across functionally distinct heritage spaces such as those represented in the Catur Gatra Tunggal framework. This study addresses that gap by applying PAQ dimensions and the soundwalk methodology to four heritage locations in Kotagede, offering new insights into how spatial function and cultural context mediate affective soundscape perception.

2. METHOD

This study uses a qualitative descriptive approach to identify the soundscape conditions in the Catur Gatra Tunggal Kotagede area, Yogyakarta. The data collection method uses a soundwalk. In the exploration process, sound data collection is carried out. The sounds obtained will be grouped based on the sound source category. The exploration of the soundscape in this study is equipped with a questionnaire containing questions about human perception of the sounds recorded. The perception used as an indicator in this study is perceived affective quality. Responses were tabulated and analyzed using descriptive statistics and visualized in pie charts for each location. Triangulation was conducted through direct observation and cross-checking participant responses.

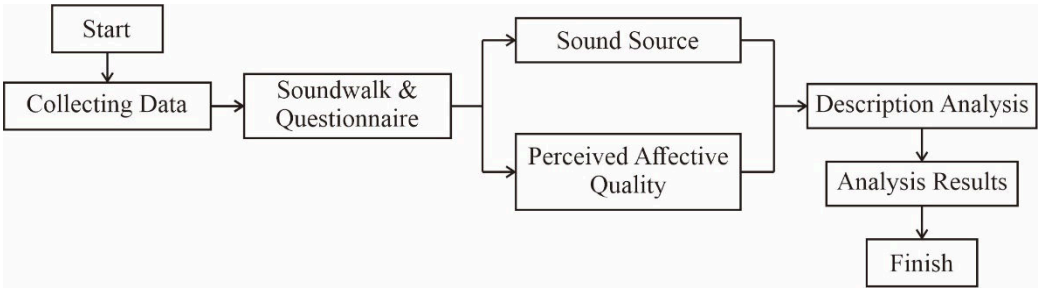

Figure 1. *Research Flow*
Source: Author, 2025

The authors declare that there are no conflicts of interest related to the publication of this manuscript. Ethical procedures were followed to ensure the anonymity and voluntary participation of respondents. Participants were not required to disclose their real names; instead, they were assigned a consistent participant code (e.g., P01–P12) for identification

across observation sites. All data were collected with informed consent and used solely for academic research purposes.

2.1. Location

The exploration was conducted in the historical heritage area of Catur Gatra Tunggal Kotagede, based on its current conditions (Figure 2). The researcher emphasizes the current conditions because the elements of Catur Gatra Tunggal Kotagede are no longer intact, so that now it is only a context of the original spatial layout. The Catur Gatra Tunggal concept consists of four spatial elements: the mosque, market, town square, and palace. The Catur Gatra Tunggal Kotagede that still physically exist are the mosque and market. The town square area has become a dense settlement and the palace area has remaining evidence of its heritage in the form of the Watu Gatheng site and the Cepuri fort. The stopping point for sound observation is determined based on the value from the context of each element of Catur Gatra Tunggal, namely Pasar Legi Kotagede as the center of the economy, Masjid Gedhe Mataram Kotagede as the center of worship for Muslims, Kampung Alun-alun as a tourist village as well as a settlement that emphasizes culture, and Kampung Ndalem as a settlement with sacred symbols at the Watu Gatheng site and the tomb of Hasta Rengga. Points T1 to T7 are considered to be able to present these values. The selected route (Figure 1) starts at Pasar Legi Kotagede (T1) and proceeds to Kampung Ndalem (T7), based on accessibility considerations.

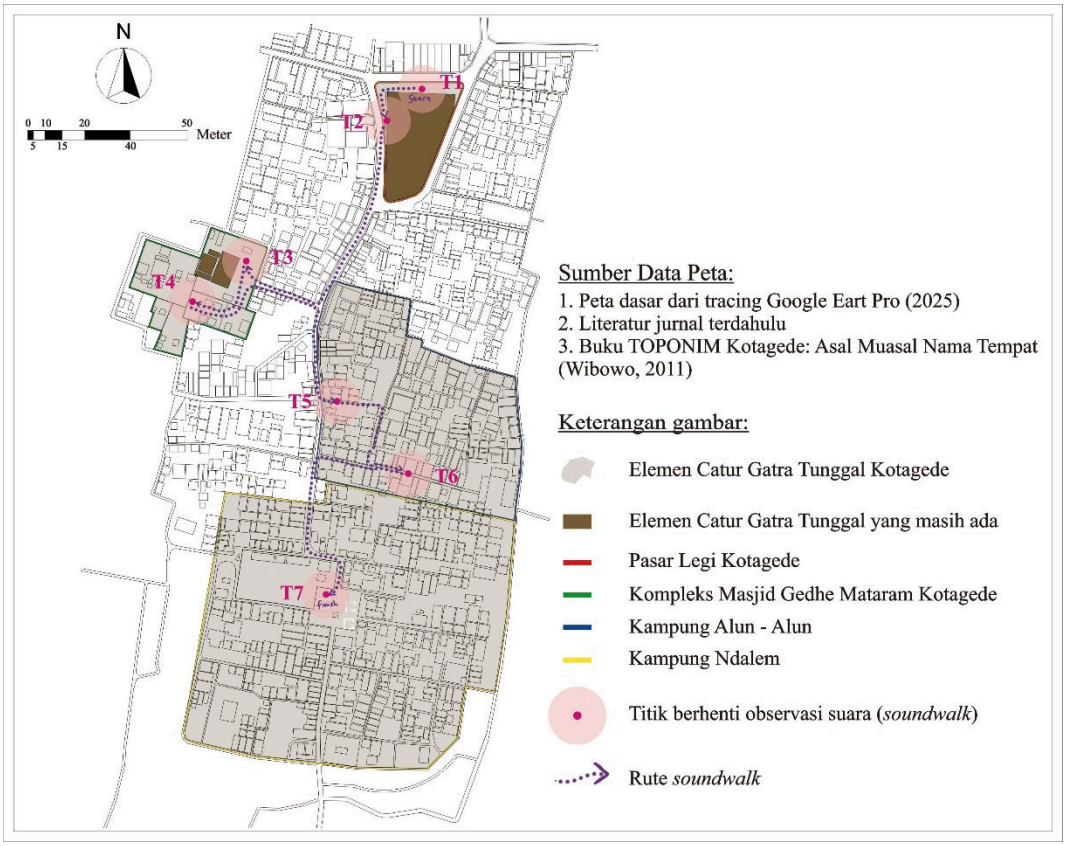

Figure 2. *Soundwalk map and rute*
Source: Author, 2025

2.2. Time

The soundwalk was conducted on Friday and Saturday during three time periods: morning (06:00–07:30 WIB), afternoon (11:45–13:15 WIB), and evening (18:45–20:15 WIB). The variation in observation times was intended to capture changes in community activities throughout the day.

2.3. Participant

A total of 12 participants took part in the soundwalk, including 6 males and 6 females. They had academic backgrounds in architecture and urban design, and were within the age ranges of 17–25 and 26–45 years. None of the participants had visual or auditory impairments.

2.4. Data collection

Data collection was carried out using soundwalks and questionnaires. Prior to the soundwalk, participants were given a detailed explanation of the procedures for conducting the soundwalk and completing the questionnaire. During the soundwalk, each participant

was provided with a map as a guide for the walking route and designated stopping points, and was asked to complete a questionnaire containing the following:

- Personal data: gender, age, educational background, and hearing or vision impairment
- Visiting hours
- Sound observation point
- The sounds heard at each stopping point and the perceived affective quality: pleasant, chaotic, exciting, uneventful, calm, annoying, eventful, or monnotonous. This perceived affective quality assessment is recommended in ISO 12913-2 (2018).

The questions in the questionnaire related to sound were designed to capture participants' perceptions of each sound they heard. The assessment applied the Perceived Affective Quality (PAQ) framework to understand how the soundscape at the research location contributes to its identity. The respondent's data were then processed and analyzed to determine the soundscape conditions at the site.

3. RESULT AND DISCUSSIONS

Based on observations conducted through soundwalks and questionnaire responses collected on Friday and Saturday during the morning (06:00–07:30 WIB), afternoon (11:45–13:15 WIB), and evening (18:45–20:15 WIB), the following data and analyses were obtained:

3.1. Sound source categories

The first step in conducting the soundwalk is to identify the sounds heard by participants at each stopping point, then categorize them based on their sources, namely natural sounds, human voices, traffic noise, technological sounds, and mechanical sounds. The sound identification is conducted according to the elements that constitute Catur Gatra Tunggal.

- Pasar Legi Kotagede

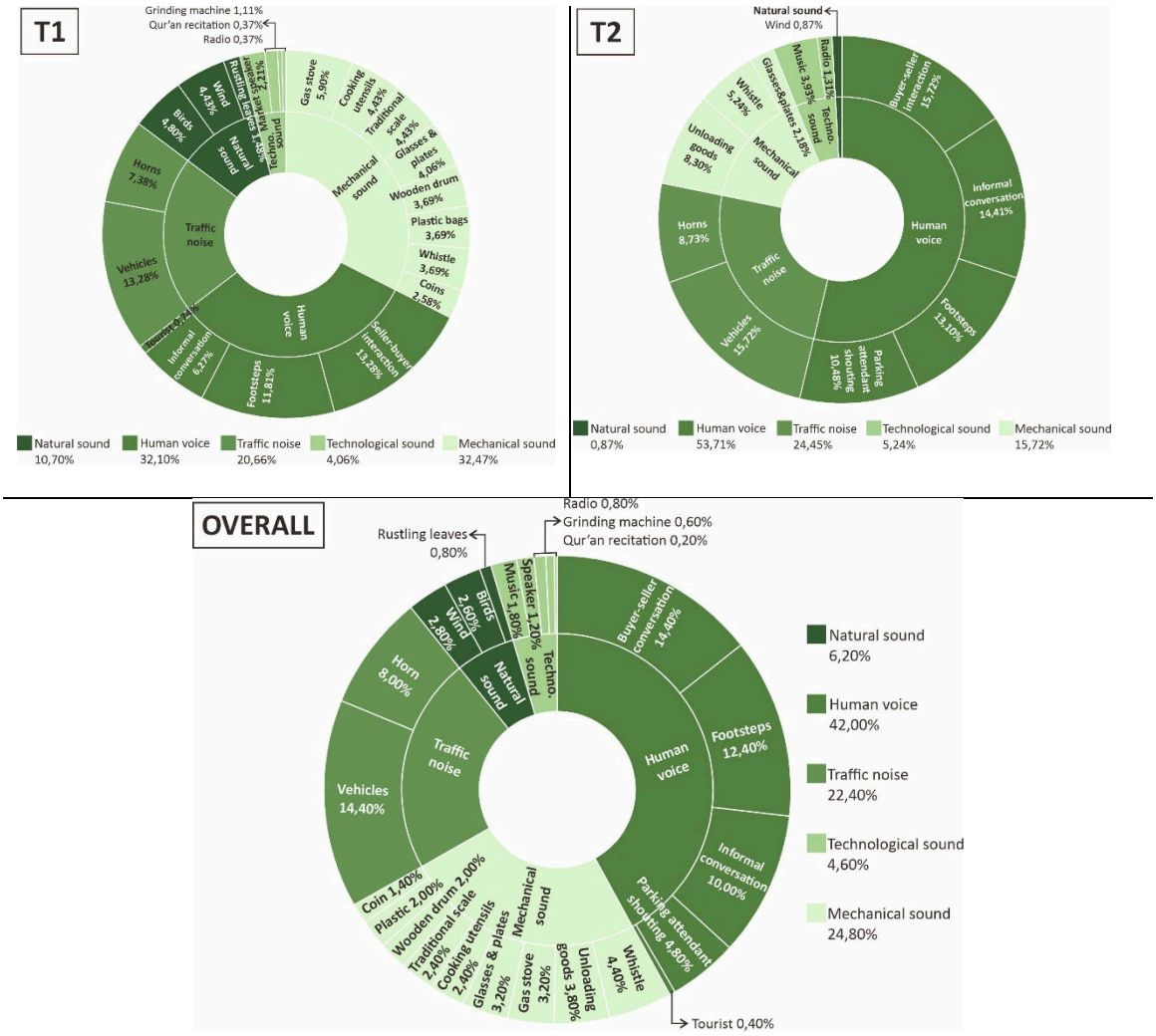

Figure 3. *Sound categories at Pasar Legi Kotagede*
Source: Author, 2025

Fig. 3 shows all categories of sounds heard in the Pasar Legi Kotagede area at observation point 1 (T1) and observation point 2 (T2). However, there is a difference in the dominance of sounds heard between the two points. Sounds with the mechanical sound category (32.47%) are slightly more dominant than human voice (32.10) at point T1. Sounds with the human voice category (53.71%) are very dominant at point T2. Judging from the percentage of sound types, points T1 and T2 both have the highest buyer-seller conversation sounds. As seen in the sound diagram at Pasar Legi, overall buyer-seller conversation sounds (14.40%) are the most dominant in forming its acoustic environment. However, on the other hand, vehicle sounds (14.40%) also dominate this area. This is because the market is a place

where trade interactions between sellers and buyers occur. According to its function, Pasar Legi is also the center of the economy in the Catur Gatra Tunggal area so that there is a crowd there. The community generally uses private vehicles to go to the market and they choose to park on the side of the road around the market.

- Masjid Gedhe Mataram Kotagede Complex

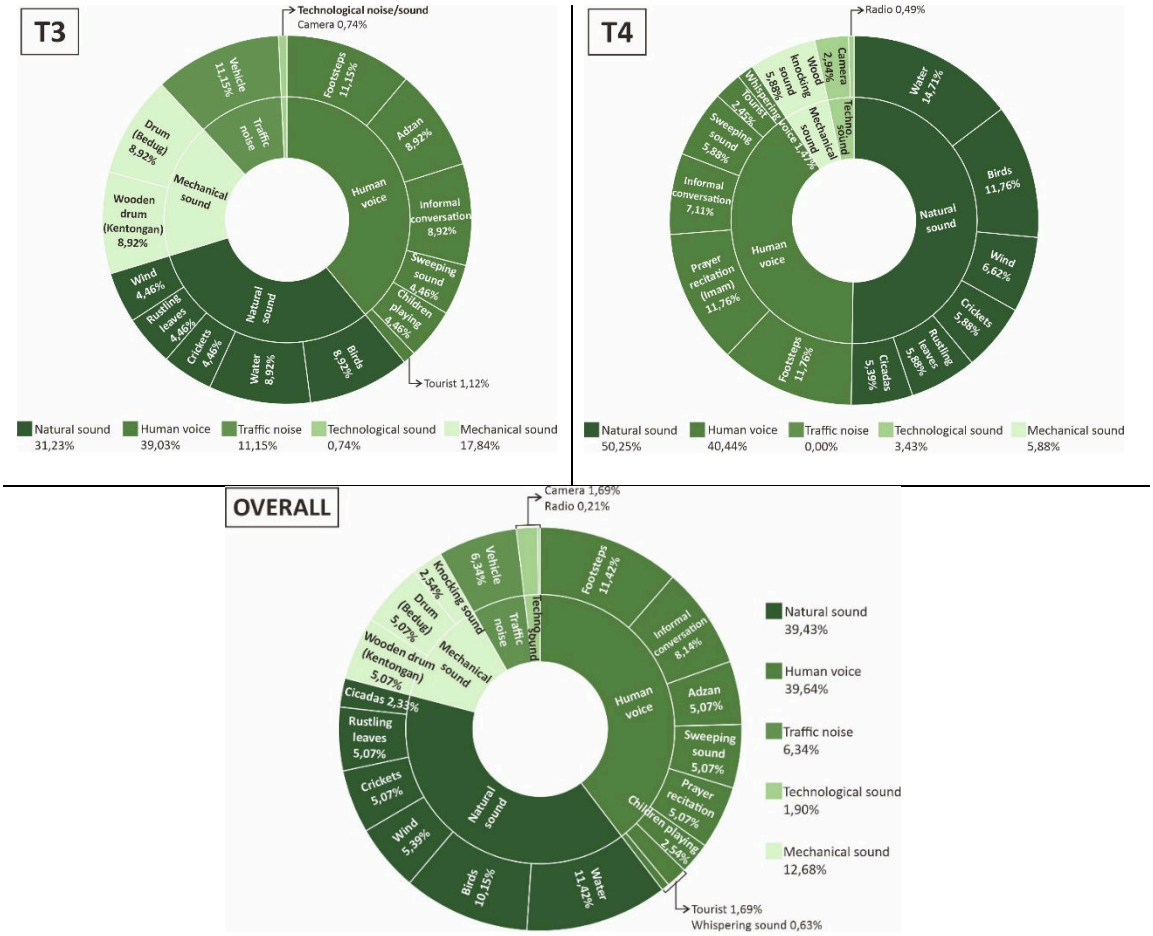

Figure 4. *Sound categories at Masjid Gedhe Mataram Kotagede Complex*
Source: Author, 2025

Fig. 4 shows that not all sound categories are heard in the area of the Masjid Gedhe Mataram Kotagede complex. The traffic noise category is not heard at observation point T4. This is because point T4 is in a very sacred and private area. No vehicles are allowed to enter or park. The location is also far from the village road. This is different from point T3 which is near the entrance gate and close to the village road. Near point T3 there is also a parking area for motorbike users who want to pray or perform other Muslim worship. Points T3 and T4 both have sacred functions, but point T4 is more private because it is close to the tombs

of previous kings. The sound category that dominates point T3 is human voice with a contribution of 39.03% of the entire soundscape composition. The sound of footsteps is the type of sound with the highest percentage, which is 11.15%. The sound of footsteps is produced by local residents and visitors who want to pray or go on vacation. Vehicle sounds also have the same percentage, which is 11.15%, but their presence is not too noisy because they are on village roads and their intensity is not frequent. The sound category that dominates the T4 observation point is natural sound with a percentage of 50.25% of the entire soundscape composition. The sound of water has the highest percentage, which is 14.71%. This water sound is the sound of dripping from the tap around the T4 point. The presence of this dripping sound is not something that is designed or intentional, but it is enough to be a concern for the soundwalk participants.

Judging from the overall sound diagram in the Masjid Gedhe Mataram Kotagede complex, human sound is the sound category that contributes the most to the formation of the soundscape with a percentage of 39.64% of the total sound composition. Natural sound also has a fairly large contribution, its percentage is close to human sound, which is 39.43%. The sound of footsteps and the sound of dripping water have the same percentage, which is 11.42%. This finding reflects the balance between human voices and natural elements in the mosque environment. As its main function as a center of Muslim worship, this area not only reflects the spiritual relationship between humans and God, but also reflects harmony with the natural environment. This balance strengthens the acoustic character of the area as a sacred, calm space, and in harmony with the principle of sustainability in Islam, namely responsibility for nature as part of worship.

- Kampung Alun – Alun Kotagede

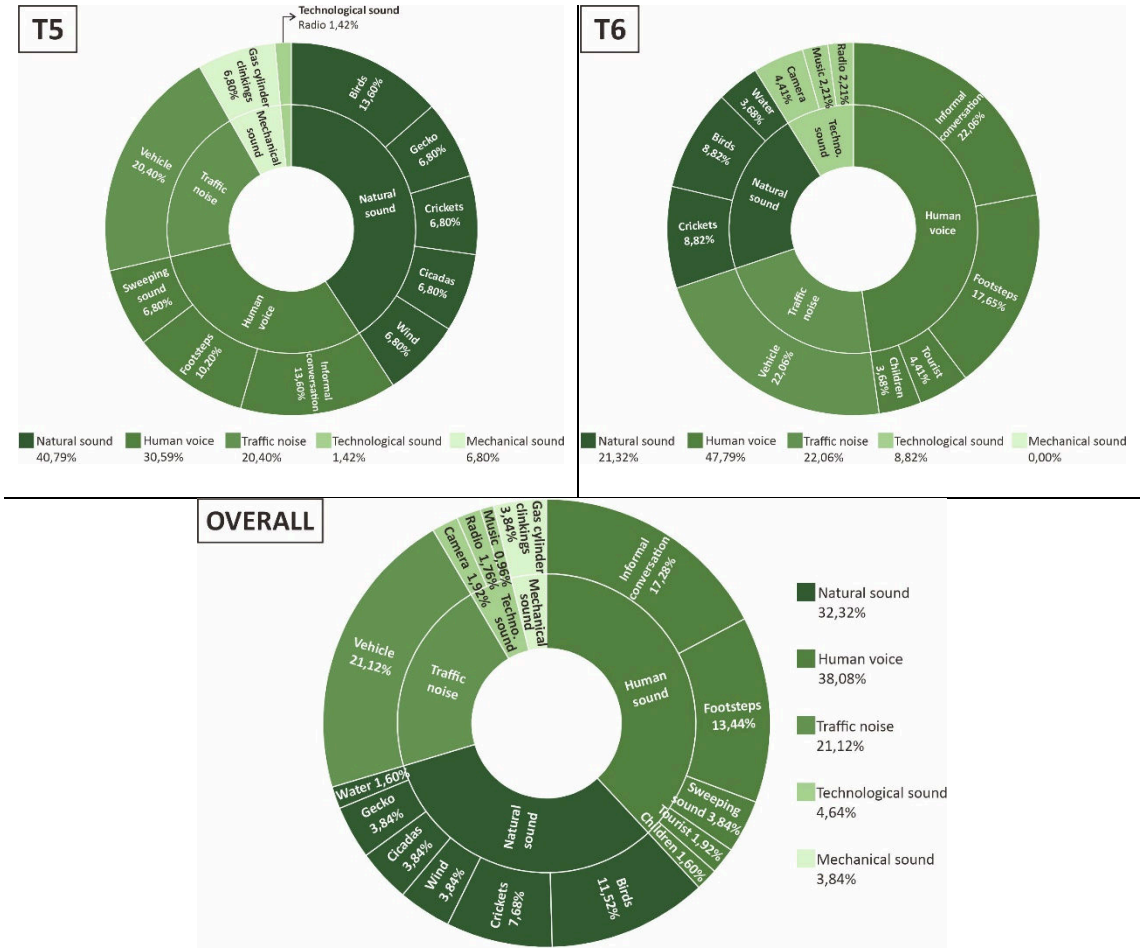

Figure 5. *Sound categories at Kampung Alun - Alun*
Source: Author, 2025

Fig. 5 shows that observation points T5 and T6 have different dominant sound categories. Observation point T5 is dominated by natural sound with a percentage of 40.79%, while point T6 is dominated by human voice with a percentage of 47.79%. The most prominent sound types from each category are bird sounds (13.60%) at T5 and informal conversations (22.06%) at T6. This difference is caused by the environmental characteristics of each point, even though they are in the same area with the same function, namely settlements and tourist villages that emphasize culture. Point T5 has a lot of vegetation that is a natural habitat for animals, and some residents keep birds that are placed on the terrace of their houses, thus strengthening the presence of natural sounds. Meanwhile, point T6 is one of the tourist destination areas and there is a building that functions as a center for

community gatherings (bale warga), so that social interaction is higher and results in the dominance of human voices.

Judging from the overall diagram, human sound is the sound category that contributes the most to the formation of the soundscape in Kampung Alun-alun, with a percentage of 38.08% of the total sound composition. Informal conversations are the sounds that have the largest percentage in this category, which is 17.28% of the total sounds heard in this area. However, the sound with the largest percentage overall actually comes from the traffic noise category, namely vehicle sounds reaching 21.12%. The sound of these vehicles is heard most clearly at point T5, considering its location close to the main road. Meanwhile, at point T6, the sound of vehicles is heard softer or fainter, due to regulations prohibiting motorized vehicles from entering the village area with the engine running. Although vehicle sounds are recorded as having the highest percentage as one type of sound, the acoustic environment of Kampung Alun-alun in general is more formed by the human sound category, which collectively contributes 38.08%. This shows that social activities, citizen interactions, and informal conversations are dominant elements in shaping the acoustic character of the area. Human voices are not only present in large numbers, but also create a distinctive atmosphere that is in accordance with the identity of the village as an active and community-oriented living space.

- Kampung Ndalem Kotagede

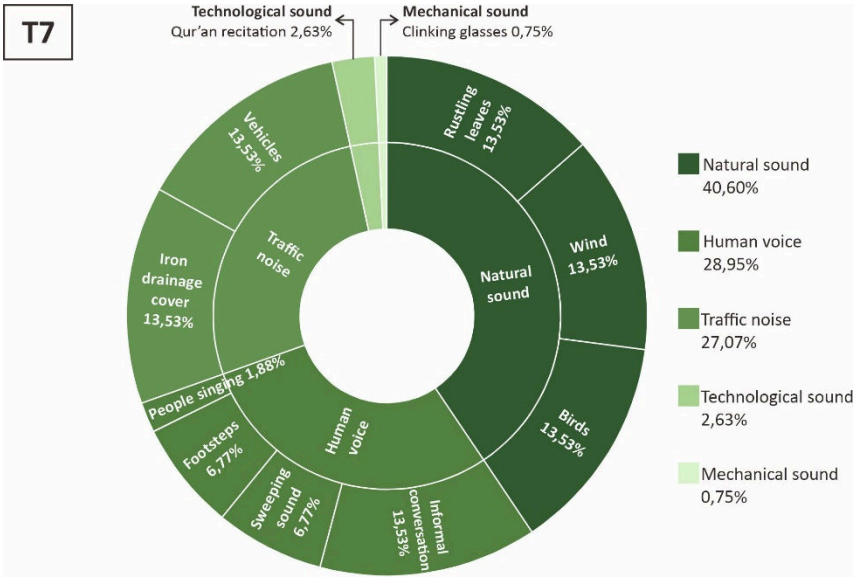

Figure 6. *Sound categories at Kampung Ndalem*
Source: Author, 2025

Based on Fig. 6, the sound composition at observation point T7 shows that the most dominant sound category is natural sound with a contribution of 40.60% to the overall soundscape. The natural sound category consists evenly of rustling leaves, wind, and birds, each of which has a percentage of 13.53%. This shows that the natural sound element at this point is very strong. These sounds are present because of the presence of three banyan trees whose existence continues to be maintained as a symbol of sacredness and several other shady vegetation.

On the other hand, informal conversations from the human voice category, vehicle sounds and iron drainage covers from the traffic noise category also have a percentage of 13.53%. The presence of conversation sounds comes from local residents and tourists who visit this area. Its strategic location and historical sites are an attraction for tourists and are used by residents to open simple food stalls. The presence of human voices indicates social activities that contribute to creating a lively atmosphere. Meanwhile, the presence of vehicle sounds and iron drainage covers is due to the location of the observation point which is on the side of the main road and the presence of iron drainage covers in the middle of the road which are in poor condition. The presence of vehicle sounds indicates that this location is close to road circulation, but does not completely dominate the overall soundscape.

3.2. Perceived Affective Quality

The next step is for participants to assess what they feel about the sounds recorded at each observation point based on the descriptors recommended by the ISO 12913-2 (2018) A method, namely pleasant, chaotic, exciting, uneventful, calm, annoying, eventful, and monotonous. From the participants' assessments at each observation point, it is summarized into an overall perception of sound at each location. The following are the results of processing participant perception data.

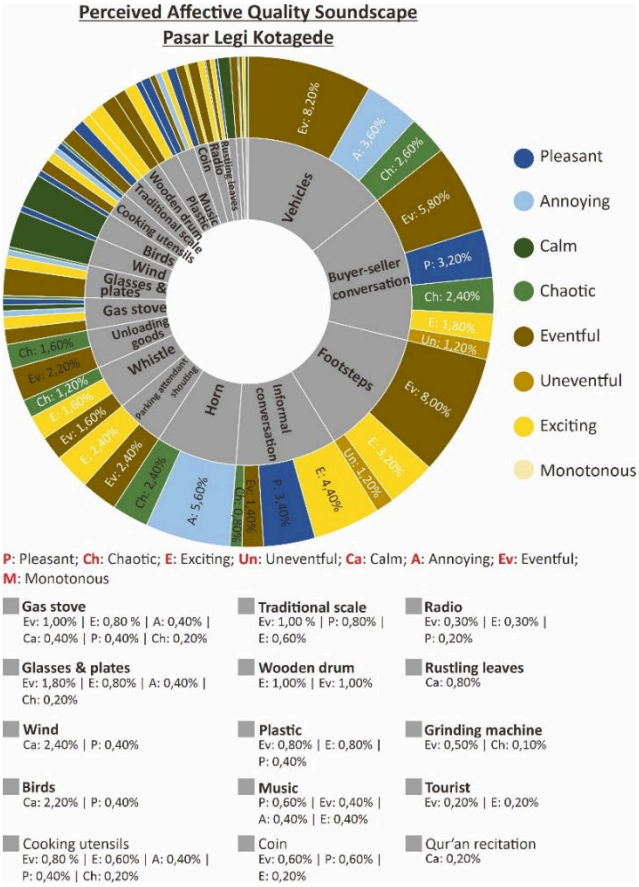

Figure 7. *Sound Perceived Affective at Pasar Legi Kotagede*
Source: Author, 2025

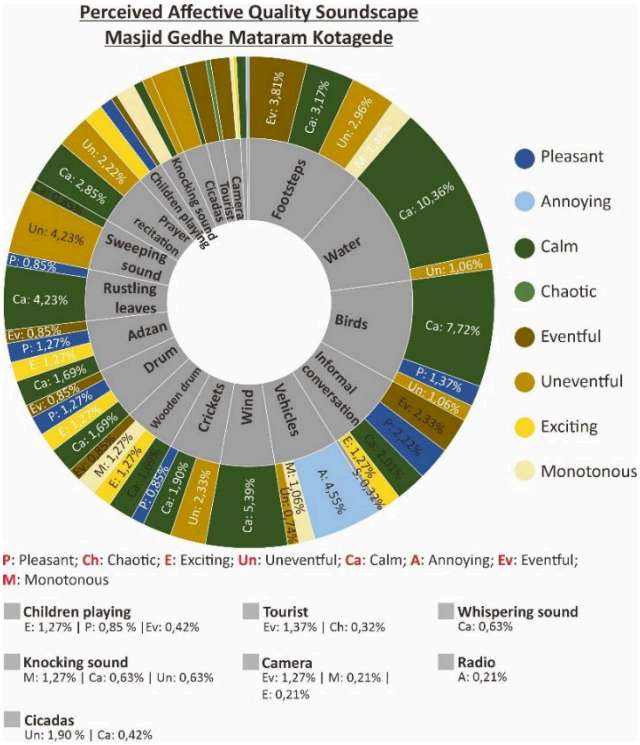

Figure 8. *Sound Perceived Affective at Masjid Gedhe Mataram*
Source: Author, 2025

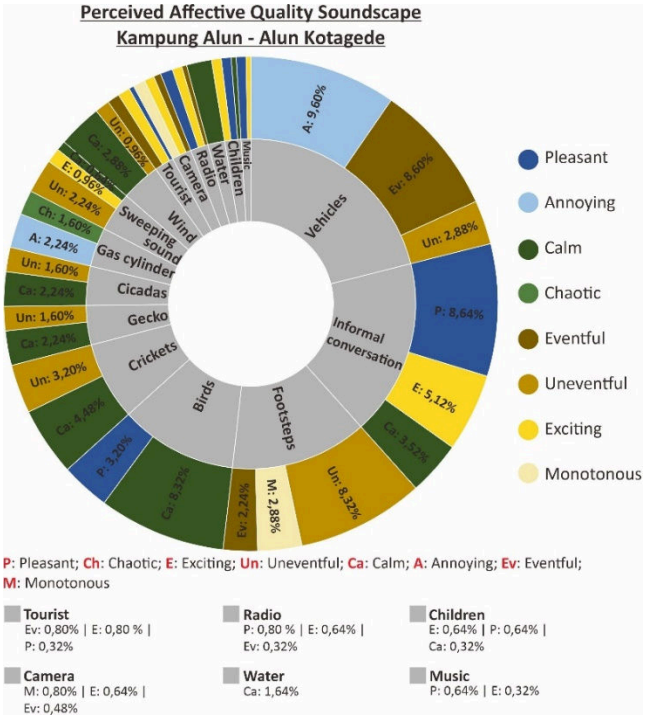

Figure 9. *Sound Perceived Affective at Kampung Alun - Alun*
Source: Author, 2025

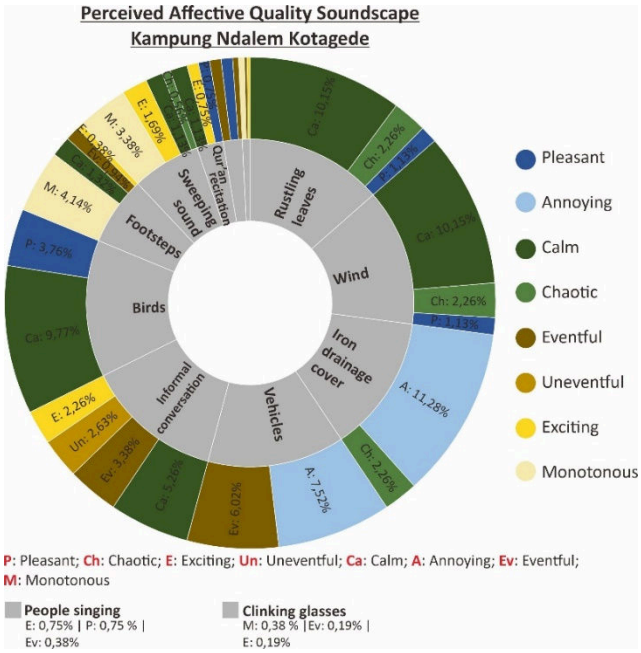

Figure 10. *Sound Perceived Affective at Kampung Ndalem*
Source: Author, 2025

Fig. 7-10 shows that the perception of sound can vary depending on the context of the location. Fig. 7 shows that Pasar Legi Kotagede is dominated by the perception of eventful. This reflects that Pasar Legi Kotagede has become a center of activity from time to time. The largest contribution to the sound that is perceived as eventful is the sound of vehicles from the traffic noise category of 8.20%. Meanwhile, the sound of buyer-seller conversation from the human voice category, which is the most dominant in forming the acoustics of Pasar Legi Kotagede, also contributes to the perception of eventful sound by 5.80%. Fig. 8 shows that the Masjid Gedhe Mataram Kotagede complex is dominated by the perception of calm. The sounds that contribute to the perception of calm are the sound of water (10.36%) and birds (7.72%) from natural sound category. Meanwhile, the sound of footsteps from the human voice category, which is the most dominant in forming the acoustics, also contributes to the perception of calm sound by 3.17%. However, the sound of footsteps has a higher percentage of being considered eventful, which is 3.81%.

Similar to the location of the mosque, Kampung Alun-alun Kotagede (Fig. 9) as a whole is dominated by the perception of calm with the largest contribution coming from bird sounds (natural sound category) of 8.32%. The sound of informal conversation from the human sound category is perceived as a pleasant sound with a percentage of 8.64%. While the sound of vehicles (traffic noise category) is considered annoying. Kampung Ndalem Kotagede (Fig. 10) as a whole is dominated by the perception of calm with a percentage of 38.9%. Although it is located near the main road, the contribution of calm sounds is the largest. The types of sounds that contribute the most to the perception of calm are rustling leaves and wind with a percentage of 10.15%. The sound of vehicles is considered annoying with a percentage of 7.52%. However, the sound of iron drainage covers contributes the most to the perception of annoying (11,28%). While the sound of informal conversations which are one of the dominant forms of the acoustic environment also contribute to the perception of calm sounds (5.26%).

Table 1. *Comparative summary of the Perceived Affective Quality (PAQ) dominance*

Location	Sound source category	PAQ dominance
Pasar Legi	Traffic noise Human voice	**Eventful**
Masjid Gedhe Mataram	Natural sound	**Calm**
	Human voice	Eventful
Kampung Alun - Alun	Natural sound	**Calm**
	Human voice	**Pleasant**
Kampung Ndalem	Natural sound	**Calm**

Location	Sound source category	PAQ dominance
	Human voice	
	Traffic noise	Annoying

Source: Author, 2025

Table 1 summarizes the Perceived Affective Quality (PAQ) across four locations within the Catur Gatra Tunggal structure in Kotagede. While some locations may share similar categories of dominant sound sources—such as human or natural sounds—the affective responses can vary significantly depending on the spatial function and contextual environment of each site. This highlights the importance of considering not only the type of sounds present but also the spatial context in which they occur when evaluating soundscape quality.

3.3. DISCUSSION

Soundscape is formed by several types and categories of sound sources that are perceived and experienced by individuals in a certain context (Schafer, 1977). The perceived affective quality of soundscapes in the four locations of the Catur Gatra Tunggal structure in Kotagede reflects a relationship between the spatial function of each area, the dominant sound sources, and the affective responses of participants. Differences in activities that occur in different zones also affect the sound environment and acoustic perception (Meng & Kang, 2016). These findings align with the ISO/TS 12913-2:2018 framework and the model proposed by Axelsson et al. (2010), which identifies key affective dimensions of soundscape perception, including calm, pleasant, and eventful, depending on the type and dominance of sounds in a given context. The dominant sounds in the market area are buying-selling conversations human voice and vehicle sounds from traffic noise category. Both the mosque complex and the Kampung Alun - Alun share the same dominant sound categories—human and natural sounds. However, the types of sounds differ between the two locations: the mosque complex is characterized by the sound of footsteps and water, while the Kampung Alun - Alun is dominated by informal conversations and birdsong. While Kampung Ndalem it is dominated by natural sounds such as the rustle of leaves, wind, and birds.

At Pasar Legi, human sounds and traffic noise were dominant, resulting in a prevailing perception of eventful, which reflects the function of the area as a vibrant economic center. This observation is consistent with Kang and Zhang (2010), who argue that "human and transportation-related sounds are typically associated with increased eventfulness, though often perceived as less pleasant in urban open spaces". In contrast, Masjid Gedhe Mataram

was perceived as calm, influenced by subtle sound cues such as footsteps and water dripping, alongside an overall quiet atmosphere. Despite being a tourist destination, the sacred nature of the site, reinforced by codes of conduct, preserved its tranquil soundscape. This aligns with ISO (2018) and Axelsson et al. (2010), who state that "quiet, sacred, or spiritual spaces with minimal auditory intrusion typically evoke calm and positive affective responses". In Kampung Alun-Alun, the combination of bird sounds and informal social interactions resulted in both calm and pleasant perceptions. This suggests that cultural harmony and the absence of dominant natural sound can contribute to acoustic comfort. Payne (2013) supports this by stating that "blended soundscapes with natural and human elements, especially in socially cohesive areas, are often experienced as both calm and pleasant". Finally, Kampung Ndalem, known for its preserved historical character, elicited a general perception of calm due to the presence of natural sounds such as wind and rustling leaves. However, frequent vehicular noise was reported as disruptive, indicating a conflict between the desired acoustic heritage and modern intrusion. Aletta, Kang, and Axelsson (2016) highlight that "natural sounds can enhance restorative experiences, but their effects are easily compromised by mechanical noise, especially in heritage or residential environments".

This study has several limitations that should be acknowledged. First, the number of participants (n=12) was relatively small, which may limit the generalizability of the findings. While the participants provided valuable qualitative insights through soundwalks, the sample size does not represent a broader population and may reflect localized or individual experiences. Second, the study was conducted within a specific cultural and spatial context—the heritage structure of Catur Gatra Tunggal in Kotagede. Therefore, the findings may not be directly transferable to other urban or heritage environments with different socio-cultural characteristics.

4. CONCLUCION

This study is an initial attempt to identify conditions in the historical area of Catur Gatra Tunggal Kotagede through a soundscape approach and soundwalk method. Soundscape is formed by several types and categories of sound sources that are perceived and experienced by individuals in a certain context. This study also shows differences in the contribution of sound types and their perceptions in each location context. Differences in activities that occur in different zones also affect the sound environment and acoustic perception.

The composition of the soundscape at each point has different characters, depending on the function of the space and its spatial context. The dominant sounds in the market area are buying-selling conversations and vehicle sounds, in the mosque complex are the sounds of footsteps and dripping water, in Kampung Alun-alun are the sounds of informal conversations and birds, while in Kampung Ndalem it is dominated by natural sounds such as the rustle of leaves, wind, and birds.

Soundwalk participants' perceptions of the soundscape varied, yet certain prominent patterns emerged at each location. Pasar Legi Kotagede was dominated by the perception of eventfulness, indicating its role as an economic center characterized by intensive trading activities. In contrast, Masjid Gedhe Mataram Kotagede was perceived as calm, reflecting its sacred and private function as a center of Muslim worship, where despite being a tourist destination, visitors are required to respect and obey the rules. Kampung Alun-alun also evoked calm and pleasant perceptions, emphasizing cultural values and community harmony that support acoustic comfort, with such sounds symbolizing social cohesion. Meanwhile, Kampung Ndalem, as a settlement that preserves its historical character, was perceived as calm due to its sacred atmosphere, particularly near historical sites, although the relatively high intensity of vehicle sounds was considered disturbing and disruptive to the participants' acoustic experience.

This finding confirms that soundscape is an intangible element that is important to identify its existence and needs to be considered for its quality through the listener's perception. That way, it can be known how sounds contribute to the experience of space and the quality of the space itself.

This study serves as an initial contribution to providing empirical insights into soundscape perception across different spatial typologies within heritage contexts. It is hoped that the findings will encourage further research and inform more inclusive approaches to heritage conservation planning and urban sound policy development. The researcher recommends that future studies expand the number and diversity of respondents. The next research need conduct more in-depth investigations into the relationship between Perceived Affective Quality (PAQ) and the identity of each location.

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