SPATIAL DISTRIBUTION OF ECO-FRIENDLY COFFEE SHOPS IN MALANG CITY

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ABSTRACT

Along with the increasing population and lifestyle of people drinking coffee, coffee shops increased significantly. This not only impacts socially and economically but also impacts the environment. Sustainability demands coffee shops to manage environmental problems that arise from business activities. This article aims to examine the environmental aspects (energy, water, waste) and spatial aspects of coffee shops in Malang city. The methodology of this research was focused on data acquisition related to tabular and geospatial information provided online through social media, news websites, and online food order applications. Descriptive quantitative and spatial approaches were made in this research. The results showed that most coffee shops in Malang city-operated daily for 7-12 hours, provided food and beverages, and used a combination of glass/porcelain and disposable materials as the packaging. These could trigger problems related to high energy and water consumption and waste generalization. Meanwhile, several coffee shops began to initiate the green action by using steel straw, reusing cups, and reducing plastic. As located mainly in the city center and densely populated area, the local government should pay more attention to this area regarding environmental management and urban planning. Hopefully, the emergence of coffee shops can contribute positively socially and economically without exacerbating the urban environmental problems.

Keywords: *Environment; Urban planning; Spatial distribution; Coffee shop; Malang.*

A. INTRODUCTION

International Coffee Organization (2021) states that world coffee consumption has increased from 2016 to 2020. The largest consumption comes from European countries, followed by countries in Asia. Indonesia itself is the largest coffee exporting country in the world after Brazil. Coffee is even used as a diplomacy strategy among countries (Intentilia, 2020). Along with increasing the population and people's lifestyle in consuming coffee, the number of coffee shops has increased significantly (Si et al., 2015; Yun & Kim, 2019).

Globally, the emergence of coffee shops all over the world is affected by Starbucks, an American company that becomes the leading coffeehouse in the world. It has been affecting the coffee culture in which quality of coffee and the comfort of the place matter & it becomes an urban lifestyle (Ferreira & Ferreira, 2018; Purnomo et al., 2021). In Indonesia, coffee culture can be defined as the

changing from habit to lifestyle. It's a shift from drinking coffee from traditional to modern coffee shops. Starbucks entered Indonesia in 2002 and has been an ultimate trigger to the growth of the local coffee shops industry in Indonesia where innovations are made as modification of Starbucks concept (Nurhasanah & Dewi, 2019). Coffee shops are not only a place to drink coffee but also a place to work, study, have meetings and spend leisure time. The reasons for the cleanliness, attractiveness, convenience and comfortable atmosphere of the coffee shop are considered by visitors to make the coffee shop a place of activities (Jeon & Jo, 2011).

There are some benefits of growing coffee shop business to economic and social aspects. It enhances economic growth, provides jobs to people, stimulates local investment to the community and triggers development of the city (Suarez et al., 2017). It influences the behavioral changes in coffee culture where local values are integrated in adjusting to the modern concept of coffee shop (Gumulya & Helmi, 2017; Nurhasanah & Dewi, 2019; Purnomo et al., 2021). It triggers creativity and innovation in business development (Azzuhri & Tanjung, 2018; Fitrianingrum & Angga, 2019; Gumilang et al., 2021; Putranto & Hudrasyah, 2017). Furthermore, it can contribute to conflict resolution and act as political strategies

(Samnuzulsari et al., 2019; Taqwadin et al., 2019). However, there are also environmental impacts that should be taken into account. The growing coffee shops in cities possibly exacerbate the existing urban environmental problems. As the consequences of their economic and social activities, cities face moderately identical environmental problems such as pollution, waste management, water availability, and energy (Vardoulakis & Kinney, 2019).

Discussions about the coffee production process and the resulting environmental impacts continue to warm. As one of the important commercial products traded globally, coffee is a valuable and growing industrial raw material (Giraldi-Díaz et al., 2018). The demand for environmentally friendly coffee production from upstream to downstream urges entrepreneurs to also apply appropriate business concepts including coffee shops (The Sustainability Consortium (TSC), 2017). The concept of sustainability is a focus that must be considered. Social, economic and environmental aspects become pillars that are upheld simultaneously. This is what also encourages coffee shop entrepreneurs to also speak out about environmental preservation in business practices (green practices) that are carried out both at the global and local levels. Some examples of these coffee shops include Starbucks,

which has required consumers to pay for disposable cups since 2018, initiating green practices at the global level (Si et al., 2015; Yun & Kim, 2019). In Indonesia, several environmentally friendly practices have been carried out by local coffee shops, including the Kon Kopi A shop in Malang which encourages consumers to bring refillable bottles, a mobile coffee shop in Banyuwangi and a shop in Bantul that serves coffee purchases by exchanging plastic waste (Albab, 2019; Sustaination, 2019; Syarifudin, 2018).

The environmentally friendly practices in coffee shops will have a major influence on the perceptions of coffee shop visitors regarding the concept of environmental conservation in coffee shop production and business (Yun & Kim, 2019). Indirectly, it contributes to urban environmental management and urban planning regarding its spatial distribution and efforts done to address the environmental issues through its daily operations. Coffee shops can inform their environmentally friendly activities or programs to the public either directly or through the use of information and communication technology (Biswas, 2016).

There are many research about coffee shop in Indonesia done by analyzing its operation from cultural (Gumulya & Helmi, 2017; Nurhasanah & Dewi, 2019),

communication (Hardiyanti & Puspa, 2021), tourism (Cakranegara, 2020), architectural (Ifani, 2019), social (Taqwadin et al., 2019; Viartasiwi & Trihartono, 2020), political (Samnuzulsari et al., 2019), linguistic (Zahra et al., 2021), and business (Azzuhri & Tanjung, 2018; Fitrianingrum & Angga, 2019; Gumilang et al., 2021; Putranto & Hudrasyah, 2017) and spatial (Maulana et al., 2021) approaches. Nevertheless, environmental aspects of coffee shop are rarely discussed. This study intends to fill this need. The aim of this study is to examine the environmental aspects (energy, water, waste) and spatial aspects of coffee shops. Analyzing the environmental and spatial aspects of coffee shop activities from the information presented in the online food ordering application and coffee shop websites (social media and online reviews) would be extremely useful to local government, entrepreneurs and public particularly during the COVID-19 pandemic since it helps to identify coffee shop operations, environmental problems that likely arise, possible improvement solutions both from environmental and spatial perspectives.

B. MATERIALS AND METHODS

This research was conducted by collecting the location of coffee shops in Malang City (Figure 1). The coffee shops

location data were gained from Google maps and Google Street View. The availability of information was searched from online food ordering applications (GoFood/GrabFood), social media (Instagram/Facebook) and reviews on particular websites.

The data collected was limited in accordance with the availability of information on energy, water, and waste as the main focus on green or eco-friendly business practices developed mainly from research by Si et al. (2015) and Pena Moreno & Salgado (2014). The first stage of the study was listing what information found related to these three aspects, then analyzed the data statistically to understand the daily coffee shop operations generally

and find the environmental problems that likely arise. The result was explained descriptively by connecting the findings with related literature to find possible solutions.
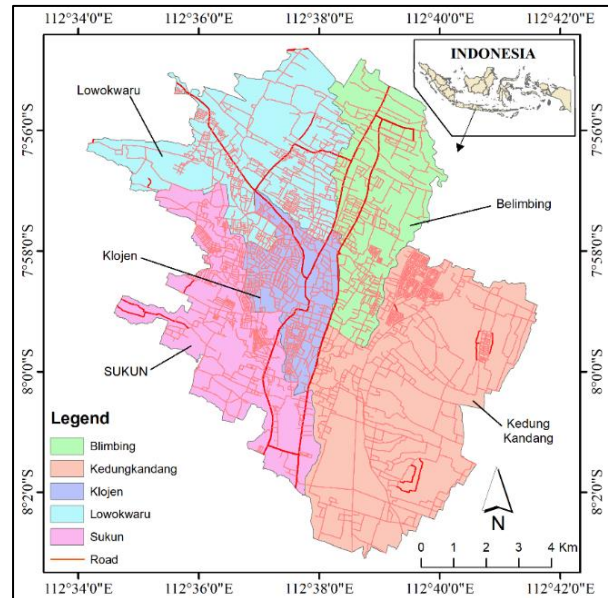

Figure 1. Malang City Administration Map

Table 1. Assessment of Coffee Shops

Eco-friendly indicator	Operational Hours (energy usage)			Menu (Water usage)			Packaging (Waste production)		
Variable	1-6 hours	7-12 hours	>12 hours	Coffee only	Coffee and other beverages	Food and beverages	Glass only/less plastic/ tumbler	Glass & disposable cups/boxes	Disposable cups/boxes
Score	9	6	3	6	4	2	3	2	1

Spatial analysis began with assessment and categorization of the eco-friendly coffee shops. These were done particularly to see the distribution of coffee shops in the city regarding their environmental aspects. Until now there is no specific standard regarding green coffee shops. Therefore, referring to standards of the Green

Restaurant Association (2021), information of coffee shops was assessed with this proportion (energy: water: waste = 3:2:1). The indicators of eco-friendly used in the study were adapted from Nonaka et al. (2015), Pena Moreno & Salgado (2014), Si et al. (2015), Sirikan (2018). The standard details are described

in Table 1.

Based on the results of the assessment, coffee shops were categorized into three categories. The higher scores mean the coffee shops are more eco-friendly. Categorization of coffee shop made only for the spatial analysis purpose. Categories of coffee shops described in Table 2.

Table 2. Category of Eco-friendly Coffee Shops

Score	Category	Eco-Friendly
1 - 6	A	Low
7 - 12	B	Medium
13 - 18	C	High

C. RESULTS AND DISCUSSION

Coffee Shops in Malang City

Based on the search results on Google Maps, Google Street View, Social Medias and online food ordering applications, the number of coffee shops found reached 82 coffee shops. These coffee shops were scattered throughout the five districts (Belimbing, Kedungkandang, Klojen, Lowokwaru, Sukun). It varied from traditional coffee shops selling coffee in very limited space to modern coffee shops providing spacious and attractive places for the customers. All coffee shops served dine in and take away but not all the coffee shops used the online food ordering applications such as GoFood and/or GrabFood. Several coffee shops had their own delivery system such as receiving orders by phone and delivering food/beverages it in person by motorcycle. Thus, there are three Eco-friendly indicators for each coffee shop: Energy, Water, and Waste.

Energy

There were three categories of coffee shop operating hours in Malang City. Most coffee shops in Malang city operated around 7-12 hours (49%) (Figure 2). Average opening hours were in the afternoon to evening. This is probably influenced by the interest of visitors who are more interested in enjoying coffee at night. The main markets for coffee shops are usually middle income class and young people (Putranto & Hudrasyah, 2017). These two targets will use more time from afternoon to evening to simply gather or do assignments. In Indonesia, local coffee culture also affects the standards of hospitality in coffee shops (Purnomo et al., 2021). This is also likely to influence the operational time of coffee shops.

The length of opening hours of each coffee shop affected energy usage, especially electricity to support the use of various coffee machines, food coolers and lighting. The longer the coffee shop operating hours, the greater the possibility of electricity demand to serve consumers' order, both coming directly and ordering via online applications (Nonaka et al., 2015). However, the use of energy-

efficient machines can be done to reduce electricity consumption (Kanyan et al., 2016; Nurani et al., 2019). In terms of carbon emission, different sources of electricity will influence the number of carbon emitted where fuel sourced electricity has the worst impact to the environment (Nurani, Wibowo, Maharani, et al., 2020). Coffee shop operating hours not only affect energy needs but also water needs. The longer the coffee shop operates, the greater the water required (Sirikan, 2018).

Water

The research results showed that 55% of coffee shops in Malang City provided a diverse menu, not only focusing on coffee but also other beverages and food (Figure 2). Main meals and snacks were also provided by most coffee shops. Coffee shops that only sold processed coffee were 24%, while the rest chose to sell coffee and other drinks besides coffee. The innovations at each coffee shop are also varied, where each coffee shop also has its own characteristics and taste as a differentiator (Ifani, 2019; Nurhasanah & Dewi, 2019).

The more diverse the menu is served, the more water use in the coffee shop will be (Singh et al., 2014). The activity of using water is mainly needed for the process of washing food ingredients, water used to process coffee and other foods, the

process of washing used cooking equipment and the glasses or plates used to serve dishes (Styles et al., 2013). Not only focusing on food processing, water is also needed for sanitation purposes such as the routine cleaning process of floors or coffee shops, as well as toilet and sink needs. If there are fewer menus served and the simpler the processing process, the water needed can be suppressed even though the number of orders or the number of buyers will affect how much the menu is served and in the end the water is used (Saito, 2013) .

In addition to the number of menus served, the use of water in the coffee shop can also be seen from the area, seating capacity, number of consumers, number of workers, type of cafe, type of kitchen, average food prices and number of operating hours (Sirikan, 2018).

Waste

The most important thing in serving coffee is the container used. The research result showed that 62% of coffee shops in Malang City used glass/porcelain materials and disposable cups/boxes for serving their food and beverages (Figure 2). Glass materials were primarily used for on-site serving while single-use cups/boxes are used for both live serving and online ordering and take-out. There were several coffee shops that were aware of the importance of protecting the environment

103

when reducing plastic waste by only using glass cups for on-site consumption. On the other hand, there were coffee shops that promoted the usage of tumbler and steel straw in order to reduce the plastic waste (9%). In other parts of the world, the reduction of plastic straws and plastic cups is rising, especially in Korea (Yun & Kim, 2019). This also applies to food containers or packaging listed on the menu.

The results of this research indicated that the number of waste produced from single-use cups made from both paper and

plastic as well as food containers from coffee shops in Malang city could be enormous. Particularly for coffee shops that accepted online orders that relied heavily on the use of plastic packaging for practical reasons. If the number of coffee shops and coffee buyers increased, the waste generated was also expected to increase. The menu variation also affected where not only coffee but food also uses packaging which in turn will be thrown away and become trash.
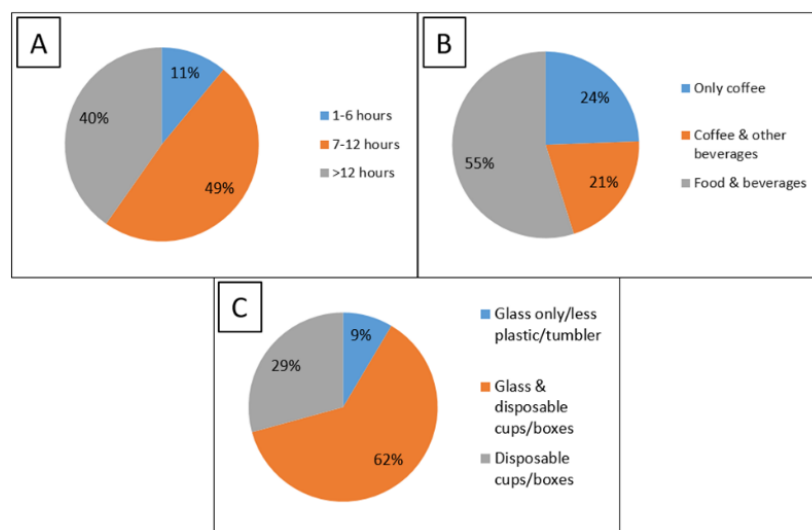

Figure 2. Pie Chart Diagrams of Operational Hours (A), Menu Served (B), and Packaging Used by Coffee Shops in Malang City (C).

Apart from beverage and food packaging, waste from coffee shops also mainly comes from coffee grounds and food scraps that are served (Filimonau et al., 2019). The more diverse the food menu is served, the greater the potential for organic waste to be produced. Based on research results on menus in coffee shops,

55% of coffee shops also served food. Therefore, coffee shops in Malang City had the potential to produce large amounts of inorganic and organic waste. This could increase the urban waste load and influence the municipal solid waste management (Nurani, Wibowo, Prihastopo, et al., 2020). Proper waste management in coffee shops

is needed by applying the principles of reduce, reuse, and recycle (3R) and composting (Singh et al., 2014). Garbage collection facilities should also be available in areas where coffee shops are centralized. Community-based solid waste management is also essential since most of coffee shops are located in settlement areas (Nurani, Wibowo, Rahmawati, et al., 2020; Wibowo & Nurani, 2019)

Towards Eco-friendly Coffee Shops

This research shows that there are several things that need attention for coffee shop managers so that coffee shop operations can be more environmentally friendly. Some adjustments are needed regarding energy, water and waste. Broadly speaking, it is necessary to determine effective operating hours, selective menu choices and the application of the reduce reuse recycle (3R) principle in coffee shop operations. One action will affect another aspect. For example, by determining operating hours more effectively means also reducing water consumption and waste generated. There are some steps that can be taken to improve coffee shop operations to make them more environmentally friendly (Table 3).

Table 3. Practices toward Eco-friendly Coffee Shop

No.	Energy	Water	Waste
1.	Resolve the effective operating hours	Providing selective menu	Use of glass-based containers for on-site service
2.	Selecting menu carefully	Use of basic ingredients as efficiently as possible	Use of tumblers for visitors
3.	Energy efficient equipment / machinery	Using equipment / machines that save water	Using biodegradable materials for take-away food packaging
4.	Green building	Waste water treatment	Practice of reduce, reuse, recycle in waste management and composting.

Various activities carried out by coffee shops should be conveyed through various uploads on social media or other news platforms by coffee shop managers starting from operating hours, menus, sales promotions, activities at the coffee shop, energy use, water use, waste processing to types of materials of packaging used. Social media can be a means of delivering information on environmental issues and encouraging people to understand and practice sustainable habits (Biswas, 2016). In addition, the existence of an online food delivery application can also play a role in this. As it is known that through this application, consumers can order quickly according to the information listed in the application, including details related to the product being sold. This is considered very effective, especially for meeting food

needs for working communities and households (Eswaran et al., 2020). The development of the internet can accelerate this process as long as information on the environmental aspects of the coffee shop business is fully available and easily accessible to consumers. It is very important for consumers to see and get various information directly so that environmental awareness is built because it takes three phases to achieve it, namely seeing, feeling and doing (Hansla et al., 2008). Good environmental awareness can encourage consumers to carry out pro-environmental activities, such as choosing

to use eco-friendly goods, including choosing eco-friendly coffee shops (Mostafa, 2008; Yun & Kim, 2019).

Spatial Distribution of Coffee Shops

From the search results on Google maps, the number of coffee shops found reached 82 coffee shops, from which 3, 62, and 17 coffee shops that were consecutively categorized as low Eco-friendly, medium Eco-friendly and high Eco-friendly (Figure 3). These coffee shops were scattered throughout the districts in Malang City. Klojen district as the city center had the highest number of coffee shops.
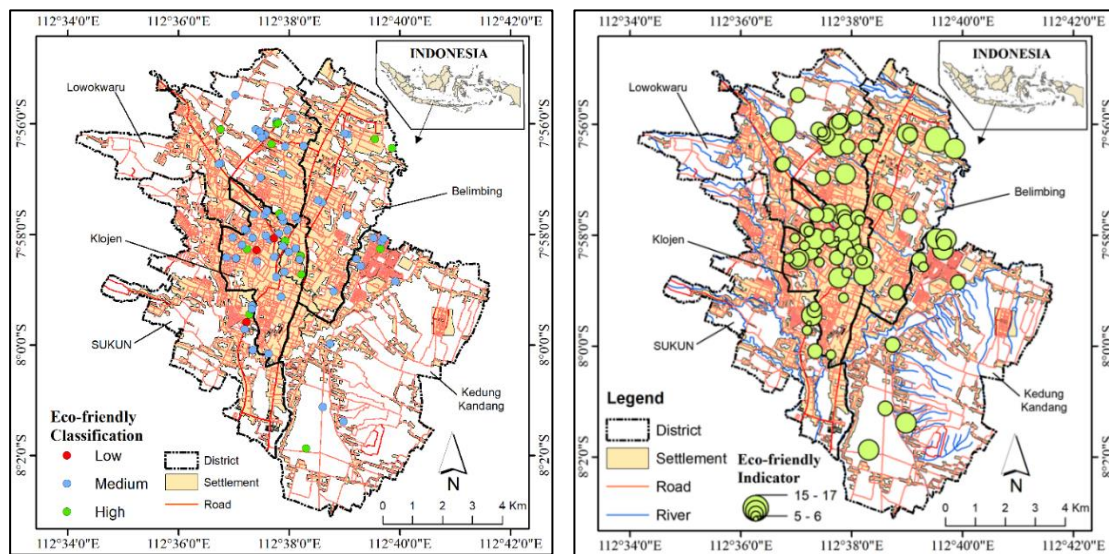

Figure 3. Eco-friendly Classification of Coffee Shops in Malang City (left) and Eco-friendly Indicator of Each Coffee Shop Presented in Green Graduated Symbols (right).

The city will continue to develop in line with the development of its social and cultural life. Culture will shape the image of a city (Tallo et al., 2014). Malang city is one of the cities in accordance with the

concentric theory where the location of the city service center is in the middle of the city. According to Zhang et al. (2010) the purpose of urban development itself is to improve people's quality of life. When

106

viewed spatially and from the area seen, the development of Malang City is focused on the northern zone. Therefore, developing areas in Malang City are areas in the northern part, including Klojen, Lowokwaru, and Blimbing Districts.

Regarding the distribution of coffee shops in Malang City, which are centered in Klojen District, it is certain that the city center has a large enough area to accommodate numerous coffee shops with various levels of Eco-friendly indicators (Figure 3). This is explained by the document of Regional Regulation No.4 Malang City Spatial Planning 2010-2030 *(Peraturan Daerah No.4 Rencana Tata Ruang Wilayah Kota Malang Tahun 2010-2030)* which states that Klojen District is a city service center. In addition, according to data of Central Bureau of Statistic Malang City (*Badan Pusat Statistik/BPS Kota Malang*) (2021), Klojen District is a sub-district that has the highest population of other sub-districts and always increases every year. The high number of residents will be in line with the existing demand. Therefore, the number of coffee shops in Klojen District is very high. Lowokwaru District also has a fairly high number of coffee shops. This is influenced by the development of the education sector there.

Several well-known universities in Malang City are located in Lowokwaru District, one of which is Universitas Brawijaya. The existence of students and the younger generation supports the increasing demand for coffee shops. The concept of growth is an implementation of the theory of growth poles where the campus is the center of its development. This triggers an increase in economic profits that form an agglomeration of activities around growth centers (Richardson, 1976). In addition to developing in the field of education, coffee shops are also developing along the road. This growth pattern is in line with the concept of settlement patterns such as coffee shops in the city of Malang. This linear growth model is a city development model by following existing physical conditions or geographical features (Hamidah et al., 2014; Linard et al., 2012) Sukun and Kedungkandang sub-districts are two buffer sub-districts. When viewed from the spatial pattern listed in Spatial Planning of Malang City, the two sub-districts are dominated by non-residential areas.

If the population density is high, it will affect the development of the region (Harrison & Kain, 1974). A regional development, especially the economy, can explain the structure of the region, population density, activities and relations between regions (Li et al., 2018; Linard et al., 2012). In this regard, the high population density will also trigger an

increase in the demand for coffee shops. BPS Kota Malang (2021) states that Sukun and Kedungkandang sub-districts have a fairly low population density compared to the other three sub-districts, so this can affect the number of coffee enthusiasts. Therefore, the spatial distribution of shops in Sukun and Kedungkandang sub-districts is not as dense as in Klojen and Lowokwaru sub-districts which have their own charms such as high density, city functions, and growth centers such as campuses, schools, and other public places.

The spatial distribution of coffee shops in Malang City is very dependent on the development of the city, especially its social life. When an area has a high population with dense settlements and has a clear city function, this will be directly proportional to the growth in the number of existing coffee shops. The spatial structure, especially roads, is also very influential because most coffee shops develop along collector roads or main roads (Maulana et al., 2021). However, there is also an indication that distribution of coffee shops is starting to get closer to non-residential areas particularly green areas. It can be seen in Lowokwaru District and Kedungkandang District.

D. CONCLUSIONS

Coffee shops in Malang are categorized as medium eco-friendly coffee shops due to their energy, water and waste profile. Most coffee shops open for 7-12 hours (55%), provide coffee and non-coffee drinks as well as food (55%) and use glass/porcelain materials and disposable cups/boxes as their packaging (62%). The three of them describe the energy needs, water needs and potential waste generated from coffee shops in Malang City. Klojen district as the city center and area with the highest density of population is also the center of coffee shop distribution in Malang city. However, there is also an indication that distribution of coffee shops is starting to get closer to non-residential areas particularly green areas.

Some improvements that can be made to make coffee shops more environmentally friendly are determining effective operating hours, providing menus selectively and reducing plastic packaging for serving food and beverages. Local governments should provide adequate electricity and water grids and waste management in areas where coffee shops are growing particularly in Klojen and Lowokwaru District. The existence of coffee shops should not worsen the condition of the surrounding environment, especially in densely populated residential areas. Future urban planning should take this into account.

Further research is needed regarding green practices that have been applied in

every coffee shop to understand how far the development and potential of eco-friendly coffee shops in Malang are.

E. ACKNOWLEDGEMENTS

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