Sustainable Street Vendors Spatial Zoning Models in Surakarta

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Abstract. Various strategies that have been carried out by Surakarta's government to organize street vendors have not achieved the goal of street vendors' arrangement comprehensively. The street vendors arrangement strategy consists of physical (spatial) and non-physical. One of the physical arrangements is to define the street vendor's zoning. Based on the street vendors' characteristics, there are two alternative locations of stabilization (as one kind of street vendors' arrangement) that can be used. The aim of this study is to examine those alternative locations to set the street vendor's zoning models. Quatitative method is used to formulate the spatial zoning model. The street vendor's zoning models are formulated based on two approaches, which are the distance to their residences and previous trading locations. Geographic information system is used to indicate all street vendors' residences and trading locations based on their type of goods. Through proximity point distance tool on ArcGIS, we find the closeness of residential location and previous trading location with the alternative location of street vendors' stabilization. The result shows that the location was chosen by the street vendors to sell their goods mainly consider the proximity to their homes. It also shows street vendor's zoning models which based on the type of street vendor's goods.

Keywords: Sustainable street vendors, Spatial zoning, GIS

1. Introduction

The high poverty rate in a country is directly proportional to the growth of the informal sector, including the street vendors. Street vendors (referred to as hawkers) can be interpreted as a merchant offering goods or services, where the trading locations used are public spaces such as roads, sidewalks or parks [1]. Streets vendors always have to serve their consumer needs, who are mostly from the poor sector [2]. Street vendors sell goods at low prices [3]. Various strategies that have been carried out by Surakarta's government to organize street vendors (PKL) have not achieved the goal of street vendors' arrangement comprehensively. In fact, street vendors have contributed significantly to the populist economy. Therefore, it is important to strive for locations that can ensure the sustainability of their livelihoods.

Structuring in the city of Surakarta has several forms of Relocation and Stabilization [4]. This is in accordance with the local act of action delivered by McGee and Yeung [1]. According to him, relocation is a temporary removal of the street vendors because the location is being built or restored. In this sense means that once the location is completed, the street vendors will return to occupy the old location. In contrast to the concept of Relocation that is conducted by the city government of

Surakarta. Relocation is to move the street vendors from the old location that is considered not the appropriate allocation to other locations in the form of a market so that the street vendors changed the status of a trade market/ formal merchants. Relocating street vendor always accompanied by clashes between governments and the street vendor triggered by the difference of interests [5]. Stabilization (or in Surakarta city is better known by the local term 'shelterisasi') is placing street vendors in the same location or not far from their original trading location by occupying public space such as sidewalks, shoulders, and parks by providing identical trading facilities or shelter and some supporting infrastructure such as electricity, clean water, waste management, parking and security. Structuring street vendors in the form of stabilization will be more applied by Surakarta Government because it is considered more flexible. While the status of street vendors' will remain as informal traders, although they charged for retribution by government (Sub-Field of Street Vendors Management).

Street vendors are generally located in the most profitable areas in the city centre [6]. Street vendors always locate near public areas (parks, bus or railway terminals, offices, schools, and so on) where people can easily buy necessary goods from them [7]. They utilize space based on the strategic location, accessibility, main activity, and space comfort [8]. But the street vendors also usually locate themselves without any guideline [9]. There are 19 alternative locations of street vendors stabilization in Surakarta based on proximity to activities, government land availability, road noise, and road function [10]. From the 19 alternative stabilization sites scattered in the city of Surakarta, some further consideration needs to be used to determine whether these locations can be acted upon as sites for stabilizing street vendors. Those considerations, inter alia, the need to see the proximity of the alternative location with the street vendors' residence and previous trading location. Therefore, this study formulates a zoning model that can be allocated for street vendors based on proximity to the residence and previous trading locations.

2. Methods

Research conducted by Widodo [11] proves that street vendors are located with consideration of proximity to their houses, city hustle, and accessibility. Proximity to residences is also one of the factors considered in choosing a location [4,12–14]. Based on Mc Gee and Yeung [1] street vendors will choose a location that: 1) not far from home; and 2) approaching the consumer or not far from the old location. It becomes the basis of zoning consideration to locate the unregulated street vendors to the alternative stabilization location. In this research, street vendor's zoning models are formulated based on two approaches, which are:

1) Distance to their residences
   The first approach is based on perceptions of the street vendors that they will theoretically be located close to where they live
2) Previous trading locations
   The second approach is, based on the main factor to determine the location of street vendors' stabilization that has been pursued by Surakarta Government, considering the proximity to the previous trading location factors

Geographic information system is used to indicate all street vendors' residences and trading locations based on their type of goods. Through proximity point distance tool on ArcGIS, we found the closeness of residential location and previous trading location with the alternative location of street vendors' stabilization. The number of street vendor (of trading locations or residential) which has the closest distance to a stabilization alternative location showed the tendency of that potential alternative stabilization location to be a stabilization location for street vendors. Technical processing of zoning models using ArcGIS tools are:

1) Spatial Zoning Model 1
   a. Mapping out stabilization alternative location of street vendors with ArcGis

 b. Mapping the trading location and residence of street vendor respondents per type of goods in Surakarta city through ArcGIS software

 c. Determining Model 1 by measuring the closest distance of street vendors' residence to street vendors' stabilization alternative location, which is done by using ArcGIS Proximity-Point Distance analysis tool. With these analytical tools, the location of the street vendors' residence which close to a particular stabilization location alternative can be identified.

 d. Conducting a classification based on alternative stabilization location which close to street vendors' residence

2) Spatial Zoning Model 2

 a. Mapping out stabilization alternative location of street vendors with ArcGis

 b. Mapping the trading location and residence of street vendor respondents per type of goods in Surakarta city through ArcGIS software.

 c. Determining Model 2 by measuring the closest distance of street vendors' previous trading location to street vendors' stabilization alternative location, which is done by using ArcGIS Proximity-Point Distance analysis tool. With these analytical tools, the location of the street vendors' previous trading location which close to a particular stabilization location alternative can be identified.

 d. Conducting a classification based on alternative stabilization location which close to street vendors' previous trading location (Figure 1).
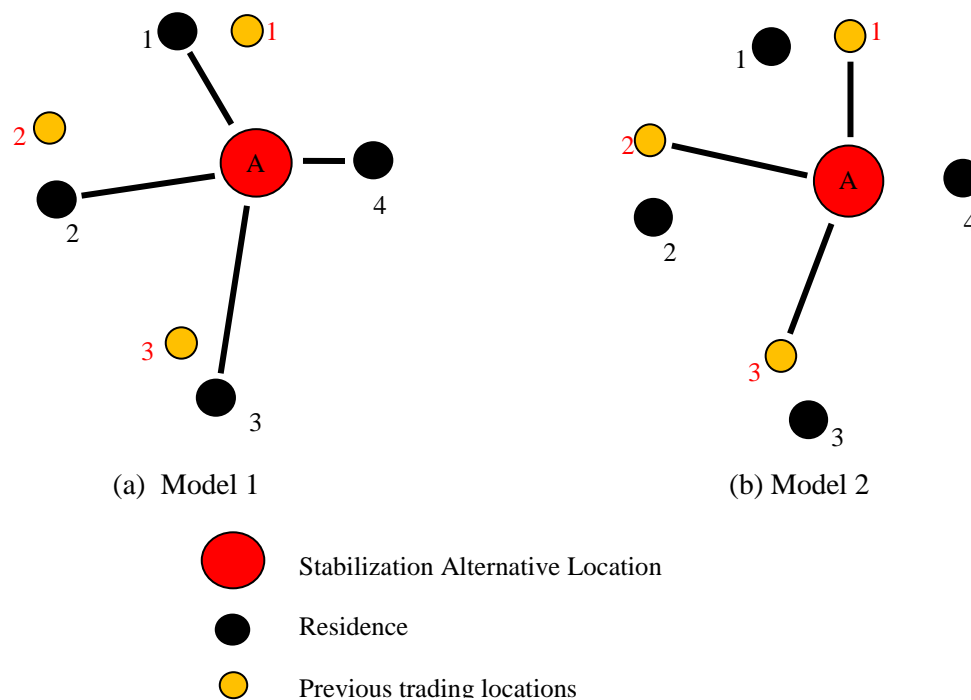

(a) Model 1   (b) Model 2

🔴 Stabilization Alternative Location

⚫ Residence

🟡 Previous trading locations

Figure 1. Visualization of Street Vendors' Stabilization Alternative Location Proximity with Residence and Previous Trading Locations

   Then mapping technique of ArcGIS was used to map the entire criteria of spatial zonation of "ideal" street vendors in the Surakarta city. Furthermore, efforts were done to clarify the result of research, namely the model of sustainable street vendors, in the form of interviews with the government (market service sub field of PKL/ street vendors structuring).

3. Results and Discussions

The zoning model is based on two approaches, distance to street vendors' residence and previous trading locations.

3.1. Spatial zoning model 1

The determination of this zoning model is based on proximity to the street vendors' residence [1]. The survey which conducted on street vendors in Surakarta City by the type of goods shows that most of the street vendors' residence do not far from their trading locations. It shows that in determining their trading location, street vendors consider the proximity to their residence. Based on this, spatial zoning model analysis of street vendors' location was based on the proximity of the residence shown in the table 1.

Table 1. Proximity of Street Vendor's Residence with Stabilization Alternative Location

No	Alternative Location	Raw Food	Dine in fast food	Take away fast food	Non-food	Service	Average
1	Around Kartopuran Field	11.9	21.54	**25.86**	17.24	15	**18.73**
2	In front of Dinas Pendidikan dan Olahraga (Dispora)	7.14	12.31	8.62	10.34	11.67	**10.25**
3	East of AUB and UTP Mojosongo	7.14	4.62	6.92	10.34	8.33	7.42
4	South of Tax Office	4.76	7.69	10.34	5.17	6.67	7.07
5	Front of Bonoloyo Public Grave	9.52	6.15	8.62	5.17	6.67	7.07
6	East of State Land Office	**19.05**	1.54	5.17	6.9	3.33	6.36
7	West and North of Senior High School 6 Surakarta (SMA 6 Surakarta)	7.14	6.15	5.17	3.45	8.33	6.01
8	St. Yosef High School (SMA St. Yosef)	7.14	6.15	5.17	5.17	1.67	4.95
9	West of Laweyan District Office	4.76	1.54	5.17	5.17	6.67	4.59
10	East of Moewardi Hospital	9.52	1.54	3.45	3.45	6.67	4.59
11	West of Junior High School 14 Surakarta (SMP 14 Surakarta)	0	7.69	3.45	6.9	1.67	4.24
12	South of Lotte Mart Tipes	2.38	3.08	3.45	5.17	5	3.89
13	South of Pedaringan warehouse (Jalan KH. Dewantara)	0	6.15	1.72	3.45	6.67	3.89
14	Front of Samsat	4.76	4.62	3.45	5.17	0	3.53
15	East of Kasih Ibu Hospital	2.38	3.08	1.72	3.45	5	3.18
16	Surakarta State Hospital	0	1.54	1.72	1.72	3.33	1.77
17	East of Sala View Hotel	0	3.08	0	0	1.67	1.06
18	North of Tax Office	2.38	1.54	0	1.72	0	1.06
19	Adi Sucipto Fruit Market	0	0	0	0	1.67	0.35
Total		**100**	**100**	**100**	**100**	**100**	**100**

The table above showed a sequence ranging from large to small, related to the percentage of street vendors who have proximity to the residence with stabilization alternative location. Based on the proximity factor to the residence, 18.73% of the street vendors in Surakarta were closest to the stabilization alternative location of Kartopuran Field. Spatially, there was no street vendors'

stabilization location in the southern part of Surakarta. The number of street vendors in the south was much higher than the number of street vendors in the north Surakarta. Therefore, for street vendors who live in the southern city of Surakarta, the stabilization alternative location of the Kartopuran Field was the closest location from their residences.

In addition, 10.25% of street vendors in Surakarta City have the closest distance between their residence and stabilization alternative location in front of Dispora. Spatially, this alternative location was one of strategic alternative location for street vendors to reach from any direction in Surakarta. There were also many major activities in the area, but the area would be quiet after the afternoon. Therefore, there should be an effort to enliven the area at night by optimizing the street vendors' potential. Furthermore, creative events that can revive the area permanently is needed.

The less percentage of street vendors who have close proximity to their homes with stabilization alternative location indicates that there were few / no street vendor whose houses are close to these alternative locations. In addition, when viewed by type of goods, for take-away fast food there are 25.86% of street vendors whose homes were close to stabilization alternative location in Kartopuran Field. This condition indicated that some take away fast food street vendors was trading in a location not far from the location of the Kartopuran field because the locations were close to commercial activities, offices, services, and education. The dominance of street vendors Surakarta who trades in Southern Surakarta was very high if compared in Northern Surakarta. Most other street vendors' type of goods have the same pattern, which was the closest alternative stabilization location with street vendors' residence is the Kartopuran Field, except for raw-food street vendors.

Raw Food street vendors amounted to 19.05% had the closest residence with East BPN Surakarta alternative location. This indicated that the location was close to street vendors' residences which were currently located in the alternative location. This was caused by street vendors of raw food products come from out of town (majority coming from Karanganyar regency) which went to Surakarta via Jalan Ir Sutami. The Raw Food Street vendors' product from outside the city always stay trading in a location until their goods ran out, then they return to their residence to bring the other goodson the next day. From all of type of goods, dine-in fast food street vendors' residences have high proximity to almost all stabilization alternative locations (except Adi Sucipto fruit market). This indicates that this type of street vendors will always choose the trading location (previous trading locations) close to their residenceswhich has economic activity that can be served by their goods [1]. The spatial zoning model 1 shown in figure 2.
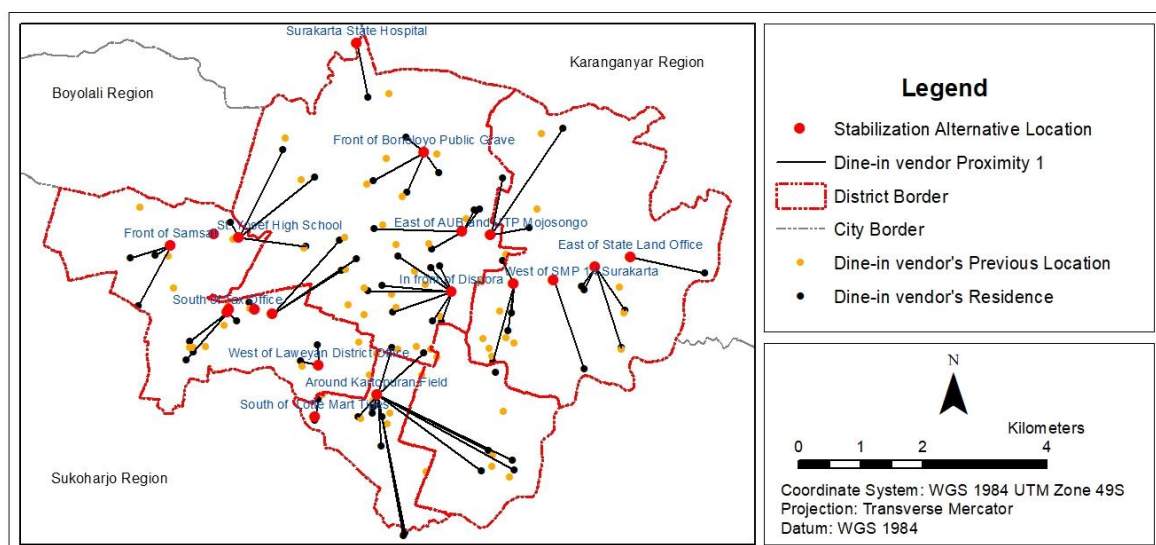

Figure 2. Spatial Zoning Model 1 Based on Proximity to Street Vendors' Residences

3.2. Spatial zoning model 2

Determination of this zonation model is based on proximity to the previous trading location (existing). Several precedents in structuring street vendors in Surakarta city is based on the problems that arise as a result of street vendors. The concept of stabilization arrangement of street vendors in Surakarta City is implemented by arranging street vendors at the previous trading locations. This shows that Surakarta City Government in choosing the location of stabilization is based on the location of the existing street vendors. This method is taken so street vendors do not lose their customers. Based on this, the following table shows analysis of street vendors' previous trading locations proximity to the stabilization alternative locations (Table 2).

Table 2. Proximity of Previous Trading Locations with Alternative Locations

No	Alternative Location	Raw Food	Dine in fast food	Take away fast food	Non-food	Service	Average
1	Around Kartopuran Field	21.43	20	25.86	17.24	23.33	**21.55**
2	In front of DinasPendidikandanOlahraga (Dispora)	9.52	20	12.07	17.24	15	**15.19**
3	West and North of Senior High School 6 Surakarta (SMA 6 Surakarta)	11.9	7.69	5.17	15.52	10	9.89
4	West of Laweyan District Office	2.38	6.15	12.07	5.17	8.33	7.07
5	Front of Bonoloyo Public Grave	11.9	6.15	10.34	5.17	1.67	6.71
6	St. Yosef High School (SMA St. Yosef)	9.52	6.15	6.9	3.45	5	6.01
7	West of Junior High School 14 Surakarta (SMP 14 Surakarta)	4.76	4.62	1.72	10.34	8.33	6.01
8	East of AUB and UTP Mojosongo	4.76	4.62	3.45	5.17	6.67	4.95
9	South of Tax Office	7.14	6.15	1.72	5.17	1.67	4.24
10	South of Pedaringan warehouse (Jalan KH. Dewantara)	0	4.62	5.17	3.45	5	3.89
11	East of KasihIbu Hospital	0	3.08	5.17	1.72	6.67	3.53
12	East of State Land Office	9.52	0	3.45	1.72	0	2.47
13	North of Tax Office	2.38	1.54	1.72	1.72	1.67	1.77
14	East of Moewardi Hospital	2.38	0	3.45	1.72	1.67	1.77
15	Front of Samsat	0	4.62	0	1.72	1.67	1.77
16	East of Sala View Hotel	2.38	1.54	0	1.72	1.67	1.41
17	South of Lotte Mart Tipes	0	1.54	1.72	1.72	0	1.06
18	AdiSucipto Fruit Market	0	0	0	0	1.67	0.35
19	Surakarta State Hospital	0	1.54	0	0	0	0.35
Amount		**100**	**100**	**100**	**100**	**100**	**100**

Based on the above table, the zonation model result did not show significant difference with the first zonation model. There are 21.55% of street vendors have the closest distance between their existing trading locations and alternative stabilization locations in Kartopuran Field. This was caused spatially, only stabilization alternative location of Kartopuran Field which was located in the southern city of Surakarta. Therefore, the presence of street vendors in the southern city of Surakarta that was numerous, closest to the stabilization alternative location of Kartopuran Field. A total of 25.86% of

take-away fast food street vendors closely related to the Kartopuran Field. This meant that take-away fast food vendors widely scattered around the Kartopuran Field.

When viewed for each type of goods, in addition to the stabilization alternative location of Kartopuran Field, 11.90% of the Raw Food vendors were each located near the alternative location stabilization Bonoloyo Public Grave and West and North SMA 6. This indicated that the distribution of raw food street vendors in Surakarta City was mostly located around these locations. In thestabilization alternative location of AdiSucipto Street Fruit Market, East Sala View, and Surakarta State Hospital, there was not a single take-away fast food street vendor that trade adjacent to the location. This was because at this time AdiSucipto Street Fruit Market was a form of street vendors arrangement made by the Government of Surakarta.Previously, it used by raw food street vendors (fruit) in the city of Surakarta. This meant that there are no unregistered street vendors near the location.

While for street vendors of dine in fast food majority located around the stabilization alternative location of Kartopuran Field and front of Dispora Surakarta City. On the other hand, for street vendors of take away fast food, 25.68% of the street vendors were located near the stabilization alternative location of Kartopuran Field, 12.07% located near the stabilization alternative location in front of Dispora and 12.07% street vendors located near the stabilization alternative location of Western Laweyan District. This indicated that the location distribution of take-away fast food vendors tend to be in the city centre. However, these conditions were different with non-food street vendors, most of them were located close to the stabilization alternative location in front of Dispora and Kartopuran Field. This showed the different location distribution with take-away fast food street vendors. Non-food street vendors were more likely to spread to the northern Surakarta. These differences resulted in different models of zonation. However, Non-food street vendors have a zoning model that was not significantly different from the service street vendors.

The location of south Pedaringan has specificity. This was because; this location had the exact same value both when viewed from the proximity with the house of street vendors or from previous trading locations. This indicated that the location of the south Pedaringan was adjacent to street vendors' residence and with the previous location. There were many street vendors who trade in the area and live not far from the location of the Pedaringan. The spatial zoning model 2 of dine-in street vendor is shown in Figure 3.
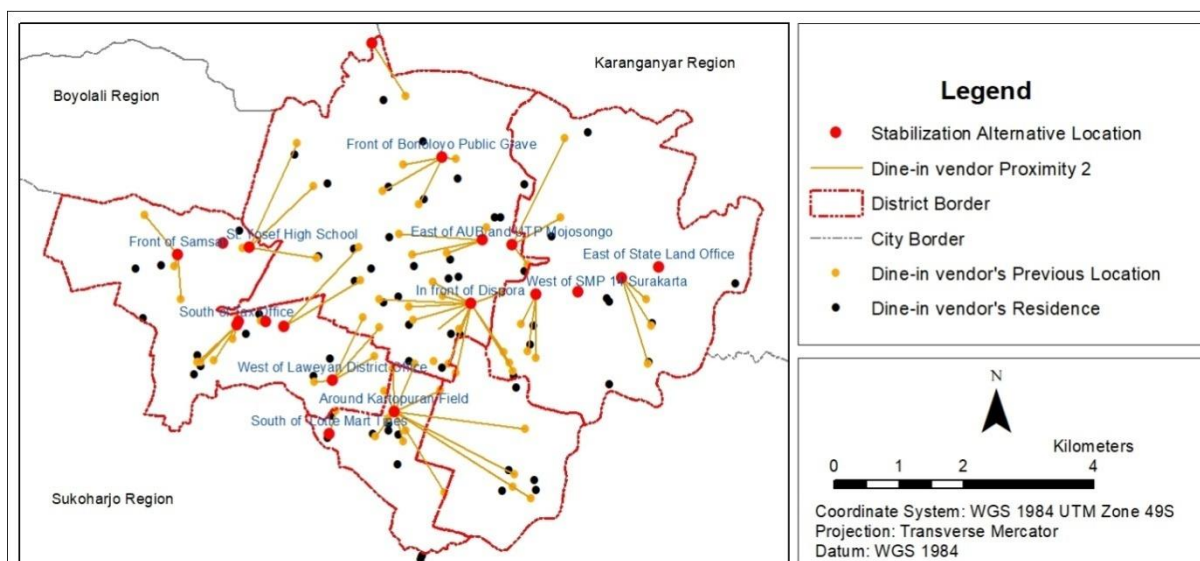

Figure 3. Spatial Zoning Model 2 Based on Proximity to Street Vendors' Previous Location.

4. Conclusion

Spatial zonation model of street vendors' location is obtained based on spatial data of street vendors' existence with 2 models that are based on proximity to the location of street vendors' residence and proximity to the previous location of street vendors. This is to maintain the closeness of street vendors with their customers and with their residences.

However, from 2 zonation models obtained, there is no significant difference in alternative location produced. This further reinforces that the previous (existing) location selected by street vendors to trade has considered closeness to their residential and consumer location. In other words, street vendors always choose a location close to home and close to their customers.

5. References

[1]   McGee T G and Yeung Y 1977 *Hawkers in Southeast Asian cities: Planning for the bazaar economy* (IDRC, Ottawa, ON, CA)
[2]   Bodhikong K and Moongjongklang B 2003 Problems and Possible Solutions for Stall Sellers and Street Vendors The Case of Stall Sellers and Street Vendors in front of Chulalongkorn Hospital *Case Study Report - Bangkok, Thailand*
[3]   Bhowmik S K 2005 Street Vendors in Asia: A Review Economic and Political Weekly
[4]   Rahayu M J and Musyawaroh M 2013 Stabilisasi Sebagai Bentuk Penataan PKL Makanan Siap Saji Di Kota Surakarta *TATALOKA* **15** 39–52
[5]   Permatasari A, Putro U S and Nuraeni S 2014 Strategic Analysis Relocating Street Vendor through 3D Negotiation Case Study: Street Vendor Surakarta, Indonesia *Procedia-Social Behav. Sci.* **115** 436–443
[6]   Manning C and Effendi T N 1985 *Urbanisasi, pengangguran dan sektor informal di kota* (Diterbitkan untuk Yayasan Obor Indonesia dan Pusat Penelitian dan Studi Kependudukan UGM [oleh] Gramedia)
[7]   Bromley R 2000 Street vending and public policy: a global review *Int. J. Sociol. Soc. Policy* **20** 1–28
[8]   Widjajanti R 2016 The Space Utilization by Street Vendors Based on the Location Characteristics in the Education Area of Tembalang, Semarang *Procedia-Social Behav. Sci.* **227** 186–193
[9]   Onyango J, Olima W and Onyango L 2012 Dynamics of street vending phenomenon in the Kisumu Municipality, Kenya *Int. J. Arts Commer.* **1** 107–120
[10] Rahayu M J 2013 Strategi Pemberdayaan PKL secara Partisipatif dalam Mendorong Ekonomi yang Berkelanjutan di Kota Surakarta *UNS Surakarta*
[11] Widodo A 2000 *Faktor-Faktor yang Mempengaruhi Pemilihan Lokasi Usaha Pedagang Kaki Lima (Studi Kalus: Kota Semarang)* (Program Pascasarjana Universitas Diponegoro)
[12] Ray C N, Sharma S B and Bhowmik S 2009 *Urban planning hawkers and hawking space: a study of hawkers of commercial centers in Delhi* (Center for Environmental Planning and Technology University (CEPT))
[13] Rahayu M J, Buchori I and Widjajanti R 2017 Study on Characteristic of the locations of Street Vendors Stabilization in Surakarta *4th International Seminar on Sustainable Urban Development, Trisakti, Jakarta*
[14] Rahayu M J, Werdiningtyas R R and Musyawaroh M 2017 Faktor-Faktor yang Mempengaruhi Keberhasilan Penataan PKL Sebagai Strategi Penataan Ruang Kota Surakarta *Reg. J. Pembang. Wil. dan Perenc. Partisipatif* **7** 109–122