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Women, Perceived Safety and Spatial Configuration of Urban Streets

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ABSTRACT

Women's rights to the city can be understood where everyone has equal rights and access to the city or public spaces. There has been an emphasis on "is the more integrated or connected street is a safe street for a woman?" This paper aims to examine the spatial dominance in streets as public spaces from women's viewpoints and analyse the relationship between perceived safety and spatial configuration of urban streets network. Streets have been chosen to test this relationship as streets are linear urban spaces. This paper investigated quantitatively that relation through; (i) computational analysis of the street configurationally using space syntax, and (ii) a questionnaire survey involving 73 women respondents in four traditional streets in Kuala Lumpur; Jalan Hang Kasturi, Jalan Petaling, Jalan Tuanku Abdul Rahman, and Jalan Pudu. The research examined four main streets segments with high, average, and low values of pedestrian route choice regarding the presence of pedestrians including women, and police officers, active street shops, and the number of street-facing buildings, CCTV, visibility, and comfort that influence the women perceptions of safety when in and about in the city. The results indicate that women feel safe in the street when pedestrians and other women and active street shops occur. However, there is no correlation between the measures of integration and safe streets. Jalan Pudu is the most integrated street but an unsafe street while Jalan Hang Kasturi is a safer street with low global integration and average numbers of connections to adjacent streets, although Jalan Hang Kasturi is a pedestrianization street. A significant contribution of this study is the finding that women experienced streets differently based on the street vitality characteristics, not the accessibility.

KEYWORDS

Women, Urban Safety, Streets Network, Connectivity, Integration

1 INTRODUCTION

The aim of creating safe streets is to invite people on the street or pedestrianization, especially among women pedestrians (Wekerle, 2000; Mehta, 2013). Souza et al., (2018) claim that in the transportation perspective, the safe street design is a subset of the walkable environment at the neighborhood and city scale, those intended to support pedestrians and operated to enable equal access for all users. As many people invoke the phrase, "there must be eyes on the street", attributed to Jane Jacobs, who discusses the relationship between safety and design, linking the fear of crime to urban design and acts of incivility in daily life. Jacobs widened her attention to consider safety in general, including parks, streets, and housing projects, and debunked the prevailing myths about good design and expected human behavior (Hillier, 2004). Jacobs' perceptions of urban safety were far more complex and nuanced than this phrase suggests.

> *"If a city's streets are safe from fear and barbarism, the city is thereby tolerably safe from barbarism and fear….The core dimension of a safe city is that a pedestrian must feel personally safe on the street among all these strangers. It does not take many incidents of violence on a city street to make people fear the streets. As they fear them, they use them less, which makes the streets more unsafe" – Jane Jacobs*

In the following, many studies examine the movement and activities that occur in urban public spaces related to gender composition space (Sutton et al., 2005; Arjmand, 2016; Beebeejaun, 2017; Khalili et al., 2015; and Souza et al., 2018). The current study addresses these limitations and fills a gap by counting women and men on streets that differ in space use (Tandogan and Ilhan, 2016). For the sake of diversity and urban equality, it is essential that women feel safe, welcoming, and comfortable on the streets as these areas provide great opportunities to engage in economic, physical, and social activity. Ever, street avoidance, safety, or uneasiness, especially for women, become a concern especially female employment has increased in past decades thus showing that women have had a strong presence in public spaces and make them be a part of everyday urban life (Mehta, 2009; Tandogan and IIhan, 2016; Beebeejaun, 2017). Indeed, women have reported that they are likely to experience public hassles and incivilities and be in the streets or public spaces. However, several factors such as safety, crime, rising of cin-dependent that increases the traffic volume on the streets lead to fewer women's presence in public space (Khalili et al., 2015; Souza et al., 2018). These studies have found similar findings that assess street use by gender have identified women are often not quite half the users, as eloquently quoted by Souza et al., (2018). One of the factors that contribute to the essence of women in urban space is the perception of safety; poorly maintained buildings, homeless, strangers, crime hotspots, poor streetscape, gloomy business activities, and internal and street exterior (Tandogan

and Ilhan, 2016; Arjmand, 2016). Feminist researchers began to conduct empirical research on the relationship between women's fear of crime, their avoidance of specific urban spaces, and how this might affect the vitality and life of places. They found that women were twice as likely as men to report feeling unsafe, even though men are far more likely to be the victims of crime in urban spaces. Studies on gender and use of space highlight that men and women perceive urban space differently (Khalili, 2016), which influences their perception of safe, spatial belonging, territorial behavior, and sense of comfort. As an example, women's lack of safety in urban spaces has been correlated with the masculinization of the space, which influences their spatiotemporal presence. Women's safety is not necessarily only associated with experienced violence as fear of crime, 'soft' forms of verbal or visual harassment may also have a significant impact on women's experience in public space (Arjmand, 2016). Given this emphasis, two (2) research question has been set up; (i) what are the factors of feeling safe and unsafe when walking in the city to support the public life in urban streets, and (ii) to test the relationship between space and fear of crime among women pedestrians. This study indeed contributes to the literature by offering insightful knowledge of the roles of the built environment with the effects on everyday activity in cities by analyzing the spatial configuration of street networks.

2 THEORY

2.1 Public Spaces and Women's Safety in the City

Socio-cultural aspects can also make the issue of women's safety in urban spaces more complex, which goes beyond its correlation with masculinization. Gender norms and traditions prescribe behavioral codes to maintain what is socially perceived as appropriate behaviour for women. Therefore, to protect their social reputation and cultural modesty, many women use tactics to negotiate their presence in public spaces to mitigate the risk of violence or fear of being socially stigmatized by self-regulating. The types of places and time of day when they use and access urban spaces and by self-policing such as remaining alert to any potential harm that might happen to them while in the space. For example, Khalili et al., (2015) said that in Istanbul, women choose to go to specific shopping malls where there can maintain their lifestyle. One of the oldest Jewish neighborhoods in Jerusalem, where the residents seek to apply the orthodox dress code to all women entering their area, has associated Mea Shearim with physical discomfort and tension. Women try to avoid passing through it. In addition, women in these socio-cultural contexts need to justify their presence in public spaces to be socially accepted, which can be observed in their purposeful spatial behaviors such as shopping, carrying something, or moving fast towards a destination. While at night, many women choose instead only to use 'privatized' public spaces such as shopping malls and gated communities. Carmona (2021) categorizes shopping malls as internalized spaces, distinguishing the characteristics of their publicness as ambiguous spaces. Although they might not be precisely public spaces, women feel much safer in shopping malls, so they use such spaces to buy groceries and socialize instead of being on the streets. This also demonstrates how urban public spaces are decreasing in plurality for women.

One of Maslow's human needs is safety. In the absence of safety and psychological needs, we will see an individual will turn into a mechanism looking for security by using his/her full capacity. If safety needs are not met or dissatisfied, then fear comes to the forefront. According to Sutton and Farral (2005), fear can be a sense of anxiety, distress, suffering, danger, hazard triggered in response to a threat or perceived threat. Tandogan and Ilhan (2016) define fear of crime as a sense of security and/or feeling of vulnerability. Nubani and Wineman (2005) support the definition of fear of crime as a form of psychological disorder reducing the quality of life, restricting access to social and cultural activities, impairing social interaction within the community. Damaging social peace, justice, and a shared sense of trust within a community, the fear of crime reducing human relations are examples of negative impacts on individuals, the economy, and social cohesion. It could impose limitations on people's daily routines. People being afraid of crime do not often go outside and they tend to stop their interactions with strangers outside (Carmona, 2021). This can be supported by Farral et al., (2007) that fear of crime includes a variety of emotional states, attitudes, or perceptions. In the context of urban vitality and safety, fear of crime may affect the everyday life of urban residents. Fewer people use the street, public spaces such as the parks, squares are deserted, city services may not be used by the people who need them, stores in downtown centers may lose customers and employers have a more limited market of employees (Mehta, 2009). As shown in Figure 1, dark station, bus stop or sky bridge crosswalk, long alleyways, poorly-lit streets, empty parks and dense wood/landscape, the presence of homeless or strangers, a dark-tinted glass of the building (e.g. offices, towers, shop lots), silent-isolated streets are defined as passive urban space where fear of crime is highly perceived by women.

Figure 1: Urban public spaces are sites where most women encounter strangers including a 'lonely' alley or street which contributes to women's fear of crime. The photos were taken by the author around Kuala Lumpur.

Further, fear of crime correlates with victimization as fear is often related in the literature to factors such as gender (women more fearful than men), age (young people less fearful), race, minorities tend to express more fear), neighbourhood cohesion (less cohesive and deprived neighbourhoods show higher levels of fear), confidence in the police (less confidence in society's institutions goes hand in hand with higher levels of fear), levels of local incivility (more disorder brings more fear), the experience of victimisation (victims tends to be more fearful), perception of risk and assessment of offense seriousness (individuals tend to declare do be more fearful about being a victim of violence than about theft, for example) (Box et al., 1988).

The particular importance of the topic of fear of crime is its gender dimension. Most recent studies on fear of crime recognize that gender is the most consistent factor in explaining who fears crime. There is a broadly divergent set of explanations as to why women are more likely than men to fear crime. Farral et al., (2007) suggests that women's fear about sexual assault in public space explains why women tend to declare being more fearful than men. Hillier (2004) indicates that women's fear of violent crime is related to the social construction of space within a patriarchal society – crime and fear of crime may be seen as another way in which a group in society is able to dominate space.

Numerous studies have statistically revealed that women are less victimized than men and the elderly have less chance of being victimized than young people because of their vulnerability (Arjmand, 2016). However, women and the elderly are more fearful compared to young people and men. Women often report levels of fear of crime that are 2-3 times higher than men. Due to their fears and safety anxiety, women and the elderly take more precautionary behaviour and spend more time in safer places to reduce the chances of being victimized. In contrast, as men and young people have less fear of crime, they take less precautionary behaviours against crime and spend more time outdoors and are more exposed victims of crime. Zavestoski and Agymen (2014) termed the unsafe street as street harassment which ranges from physically harmless leers, whistles, honks and nonsexual explicit evaluative comments, to more insulting, threatening behaviour. The cases of street harassment and the underlying fear of it escalating into something worse makes most women feel unwelcome and unsafe in public at least sometimes, especially when they are alone. It causes women to restrict their time in public alone and to be on accompany while there, limiting their movement, and access to facilities or desired destinations. It also reminds them that they live in a society in which, because they are female, men are allowed to interrupt and bother them at any time in annoying, disrespectful and threatening ways, virtually without any consequences. Across the country, Malaysian women are facing verbal and physical harassment every day. According to Royal Malaysia Police statistics, a total of 57,519 cases against women are reported from 2015 to 2019. The cases include domestic violence, sexual abuse, verbal sexual harassment, cyberbullying, rapes, and street harassment. In the same duration, 66% of girls aged 14 to 21 recorded had experienced unwanted sexual attention or harassment in a public place.

A good, well-designed, and maintain built environment is crucial in the rapid urbanization process. The urgency and needs of modern life caused an urbanized environment that gives huge priority to vehicular instead of pedestrians. Pedestrians are neglected during the design and planning process where streets become a thoroughfare instead of the public realm. Due to the many criminal cases involving women, UN Women, UNICEF and UN-Habitat launched a joint program Safe and Sustainable Cities for all, aiming to address the need for a safer city for women specifically. UN Women Safe Cities Global Initiative has also taken steps to overcome safety issues for women in public spaces by identifying the need for a gender approach to urban design. UN-Habitat addressed the issue of poor street planning and design and clearly suggest that attention be given to a pedestrian-oriented environment. With the changes in demand for high-rise buildings, more buildings are designed to meet a single purpose and led to a less pedestrian-oriented environment with no 10-foot walkway, disconnected sidewalk, and fewer ground floor spaces for pedestrians. The trend in building high-rise buildings has created an individualised or isolated building with poor linkages connectivity which is important in safety and walkability. Table 1 shows the important attributes of street vitality characteristics that need to consider when designing and planning equal streets for everyone in urban areas.

Table 2: Attributes of the street vitality characteristics for a safe city

Safety and security	Feeling safe when walking at the site, confident in walking alone at the site both during daytime and when it is dark, not afraid of whom to meet.
Attractiveness	Not too easy to get an overview, appealing surroundings, no unpleasant odors.
Traffic conditions	Pleasant sound level, pleasant and exciting sounds, no bothersome car traffic, fresh air.
Social meeting places	Easy to meet requirements for rest, food, and toilet, enough places to sit down, be protected from the weather by buildings, vegetation or topography, smooth and nice pavement surface.
Move efficiently	Minimal differences in altitude, not too windy, feel free to choose your own speed, not too much presence of vegetation, nature and water.
Physiological factors	Not too high temperatures, not too hard/exhausting trip, not too dry air, not being blended of light.
Space and light	Not too narrow surroundings and not too dark.
Comfort	Comfortable weather for walking, comfortable feeling.

Modified from Al-Giyadh and Al-Khafaji (2021)

In the previous section, it is suggested that the design of urban form and the spatial layout and appearance of public spaces influence perceived and actual safety. It can provide environmental cues as to whether to participate in public settings. To note, planning and design interventions can help block opportunities for crime, instil feelings of safety, and thus facilitate physical activity (Al-Ghiyadh and Al-Kafaji, 2021). It is important to understand that design and policy strategies need to respond to perceived safety issues since both have the ability to constrain women's activities and move freely in the city.

Jane Jacobs (1961) coined the term eyes on the street, stressing that the design of neighbourhoods has a role to play in defining opportunities for surveillance. Coming from the same line of thought but directly focused on crime occurrence, Oscar Newman developed a theory based on the interaction between the individuals and their environment, which he referred to as defensible space in 1973. Newman stated, for instance, that the type of building influences what occurs on the streets surrounding them – that the housing design can actually make individuals feel safe. A fundamental concept of this theory is that of natural surveillance: the 'capacity of physical design to provide surveillance opportunities for residents and their agents'.

Whilst Jacobs was interested in the block and neighbourhood as a unit, Newman focused on the building and its immediate surroundings. While Alice Coleman's work was influential in the development of designing out crime principles. She tested some of Newman's ideas of how poor urban design could affect crime and communities. Five key design factors created a faster social breakdown: number of dwellings per entrance, dwellings per block (as block size increased, so did the types of incivilities), number of storeys, overhead walkways, and spatial organization. Since then, numerous studies have further tested whether and how micro-spaces can generate opportunities for crime (e.g. Bassanese 1999; Grohe 2006), and there have been further theoretical developments, such as in Zelinka and Brennan (2001), Hillier (2004), and Johnson and Bowers (2010). Later, Hillier explores links between the micro-urban environment and crime in a London borough, UK. Such vulnerability depends not only on particular types of streets, buildings, or facades and socio-economic contexts of their daily activities.

3 DATASETS AND METHODS

This paper developed two basic key ideas; street spatial configuration and women-based movement in the city, using a a quantitative method. Street configuration plays a role in pedestrian movement (Hillier et al., 1993) and affects pedestrians when they have to decide what route and direction they choose for their trips, or encourage or discourage the route selection, which pedestrians can to arrive in the opportunities. This scenario created a new niche in urban studies – the natural movement (Hillier et al., 1993). The natural movement refers to the distribution of configuration values in the axial map called integration and connectivity (Hillier and Hanson, 1984), calculating the level of accessibility of street segments from all other street segments within a spatial system. Streets with many connections to their adjacent streets have a

high connectivity value, whereas a street with a few connections has a low connectivity value. Integration is an indicator of how easily one can reach a specific line of the axial map (Hillier, 2007). Integration measures the mean depth of every axial line. For the context of this research, the researcher employed two parameters in Space Syntax; local integration (pedestrian movement) and global integration (the entire streets system). For the global integration of analysis, Space Syntax considers every possible relationship in the system – from anywhere to anywhere, whereas for the local integration analysis, only measures a particular local catchment area as three steps from the centreline.

To achieve one of the research objectives, an axial analysis of four (4) traditional and well-known streets in Kuala Lumpur was done within a 3km radius using DepthMap. The selected four (4) streets are Jalan Hang Kasturi (well-known as Kasturi Walk), Jalan Petaling (forming the Chinatown area), Jalan Tuanku Abdul Rahman, and Jalan Pudu, which each street presents unique characteristics as a traditional shopping street with the presence of many people from different gender, race and socio-economic background doing their business and daily activities. Historically, Jalan Pudu, or Pudoh Street in 1960, where Jalan Pudu located in the Pudu Market, one of the largest wet markets, the Plaza Rakyat, and the oldest bus station, Pudu Sentral. Besides, the four (4) streets are connected to the ring roads or highways, and transit terminal (LRT Pudu Station, LRT Pasar Seni Station, and LRT Masjid Jamek). Figure 3 shows the output of the axial line generated from the centreline of the street networks in Kuala Lumpur.

The questionnaire survey collected the women's perception of safety when walking, passing by, or other stationary activities (such as shopping, meeting, smoking, 'killing time', and sightseeing) using the service Google Form. The respondents' samples are among the women pedestrians aged 18 to 60 years old and from different employment statuses who were randomly chosen to participate in the survey. The questionnaire was distributed randomly via social media platforms (Facebook and Twitter), and instant messaging (Whatsapp) to reach the respondents easier. In total, 73 women pedestrians from various socio-economic backgrounds were agreed to participate in the survey, which took place for two weeks, from 8 November to 22 November 2022. The researcher has been in the four (4) streets alternately during the weekdays to reach as many as the respondents to participate in the survey. The survey decided not to be conducted during the weekends because less presence of women pedestrians on the streets as they are off day and be at home.

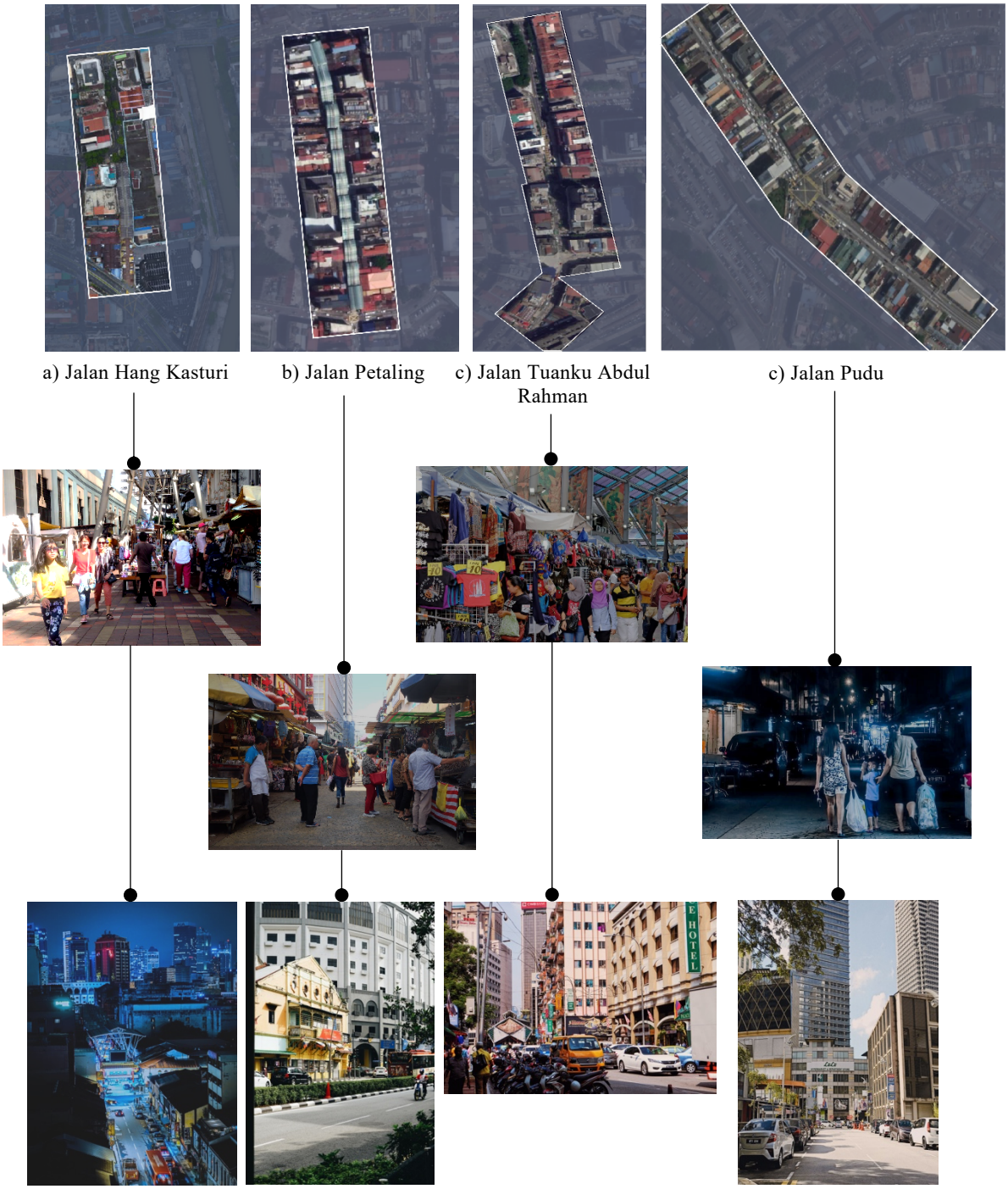

Figure 2: The multi-case study presents different street typology with different scenarios of how women perceived safety when walking in the city.

Street vitality is crucial to achieving the quality of life in economic dynamism and social justice for urban inhabitants. The quality concept includes freedom, expression right, welfare, hygiene, and expectation. According to Lynch (1961), vitality is quality of life besides meaning, proportionality, access, supervision, authority, efficiency, and justice. Lynch adds to create a high vitality of urban space environment; there are three (3) operation factors; survival, security, and adaptability. The security factor involves the absence of environmental toxins, diseases, risks, or control of these items to minimize the fear of facing these risks and establish a safe environment. To adapt to the research topic, the researcher modified several security factor items to suit the character of the study area.

Table 2: The assessment of street vitality for four selected streets in Kuala Lumpur

Attributes of street vitality	Jalan Hang Kasturi	Jalan Petaling	Jalan Tunku Abdul Rahman	Jalan Pudu
Land use	Commercial	Commercial	Commercial	Commercial Offices
Active street shops	Yes	Yes	Yes	Yes
Street facing building	Yes	Yes	Yes	Mixed
Lighting at night	Yes but poor lit at night	Yes	Yes	Yes but poor lit at night
Presence of police officers or police bit	Yes but less frequent	Yes but less frequent	Yes	No
Street length	400m	1100m	960m	1200m
Intersections	2	4	9	11
Traffic Conditions	Pedestrianize	Pedestrianize and for loading purposes	One-way 2-lanes Shared space	6-lanes road
Modifications of street space	Yes	Yes	Yes	No
People's culture	Malay-cultural street	Chinese-cultural street	Textile district	Pasar Pudu Pudu Sentral
Identity and belonging to area	Poor	Strong	Strong	Average

Source: Author

The land use of the four (4) streets are commercial; hotels, banks, grocery shops, workshops, cafés and restaurants, stationery and printing shops, self-service laundry, clinics, pet shops, hardware shops are examples of services and retailers activity in the streets. These activities contributed to the variety of attractions on each street. It can also see that each street has its unique selling products, which help the consumers get the necessary items. Street facing buildings and active street shops can be seen in all four of these streets as the architectural style of shophouses in Jalan Hang Kasturi, Jalan Petaling, and Jalan Tuanku Abdul Rahman are 2-storey of colonial building style. The 10' way in front of the sshophouses internal air well, decorative façade and decorative windows contributed to the active business activity and improved the internal and external vision. Only Jalan Hang Kasturi and Jalan Petaling provide well-lit at night (e.g. 24-hrs restaurants and convenient stores) compared with Jalan Tuanku Abdul Rahman, who is only active after midnight during the festive season (e.g. Hari Raya Aidilfitri). During the day and night observation, the researcher saw several police officers on

patrol the areas, and there are a police bit in Jalan Tuanku Abdul Rahman and a police station in Jalan Pudu. Besides the presence of many pedestrians or people on streets during the day, a police officer patrolling and the nearby police station helps to increase the feeling of safety among women pedestrians. These findings have been supported by the research conducted by Mahdzar, Jaberolansar and Hakim (2019) that demonstrates the spatial configuration in urban spaces (using the streets in Johor Bahru as the case study) was the most important factor in determining the viable cognitive map, clarity and easy navigation that improve the sociability and thus, increase the pedestrian feeling of safety. Sociability here means the quality of being sociable with the presence of people nor the strangers in public space and the feel of belonging to a place.

4 RESULTS

4.1 Analysis of Spatial Configuration

The spatial layout was analysed using space syntax methods by assigning syntactic values to every street segment in the system. Another layer was created on top of the map to prepare the axial map. The axial map is a network of intersecting axial lines. The axial map is represented by the longest lines of sight that can be used to characterize every segment in Kuala Lumpur. The first analysis was a global measurement (R*n*), which helped observe the relationship between each axis and all other axes, and to show the degree of integration. The secondary analysis was a local measurement (R3), which helped to identify the relationship of an axis with its connected axes (up to three steps away). Local integration is the default indicator for human movement, as Hillier stated that people tend to take paths that minimise trip length or maximise trips effectively. This is called natural movement whereas natural movement identifies natural human activities in the configuration of the street network. It means that urban designers could predict human activities in the street (read: space).

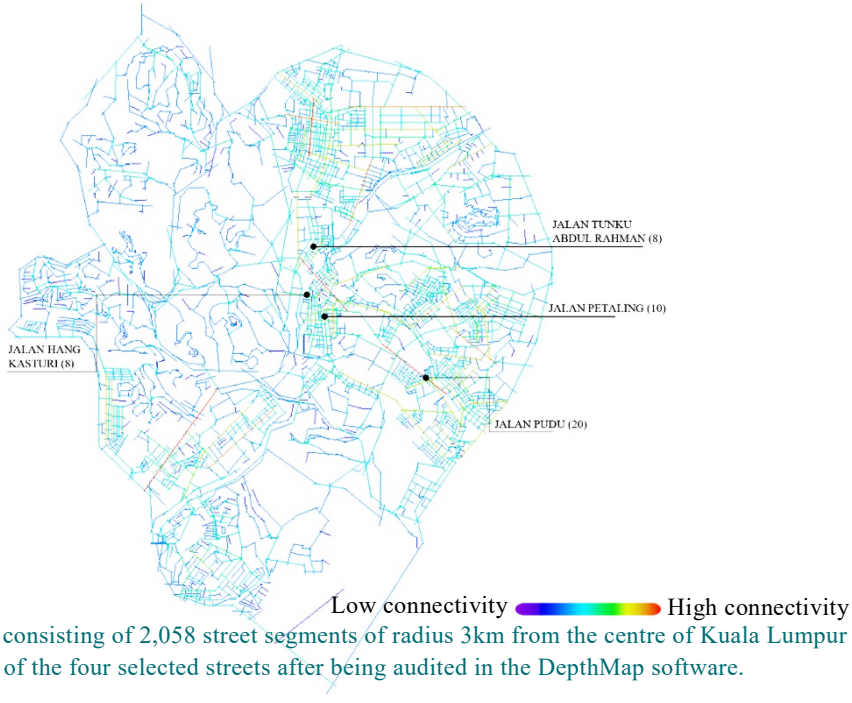

Figure 3: The Axial map consisting of 2,058 street segments of radius 3km from the centre of Kuala Lumpur which consists of the four selected streets after being audited in the DepthMap software.

As shown in Figure 3, among the four streets, Jalan Pudu scored the highest connectivity value while Jalan Petaling (10) and Jalan Hang Kasturi, and Jalan Tuanku Abdul Rahman scored 8 respectively. The huge gap in the connectivity results shows that Jalan Pudu, compared to other streets, provides many possible decisions about selecting routes for pedestrian movement. It can be observed in Figure 3 how Jalan Pudu has axes with high connectivity values that surround it. It can be supported that Jalan Pudu is 1200 m in length and has 11 intersections, which shows that pedestrians have many choices of routes. However, in spatial layout, the four streets are established as in grid-iron layout with the short block and have many directional changes. Grids are among the commonest forms of spatial organization in Malaysian cities like Kuala Lumpur during the British colonization. As we understood, gridiron encourages rectangular building forms, easy to navigate and remember. They are also the most circulation efficient urban forms for vehicles and pedestrians. While Jalan Kasturi dan Jalan Tuanku Abdul Rahman is surrounded by low connectivity axes. Jalan Kasturi is a pedestrianisation street surrounded by Jalan Tun Tan Cheng Lock and Jalan Tun Sambathan on the south with connectivity values 6 and 5. On the north is Leboh Pasar Besar. Jalan Tuanku Abdul Rahman is a 960-meter street stretched from Jalan Sultan Ismail demonstrating a strong identity and unique characteristics as a well-known textile street. As the connectivity value is 8, the route choice and the number of turns are limited.

Table 3: Syntactical values of four selected streets segment for women's pedestrian path networks

Streets	**Global Integration (R*n*)**	**Local Integration (R3)**
Jalan Hang Kasturi	0.651	2.608
Jalan Petaling	0.702	2.903
Jalan Tuanku Abdul Rahman	0.811	2.631
Jalan Pudu	0.823	3.295

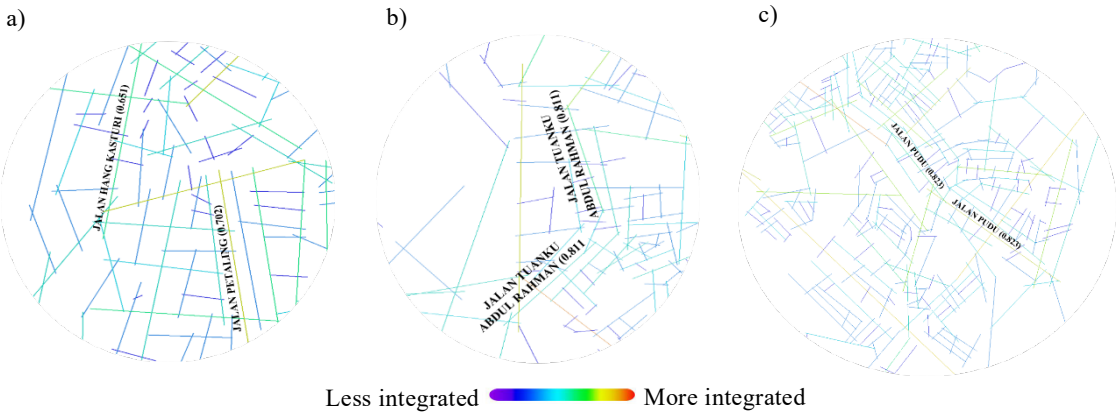

Figure 4: Space syntax measures of global integration (R*n*) calculated for each street segment in the case studies.

In this paper, the integration analyses were conducted based on the theory of natural movement. Natural movement refers to the ability of the street layout to predict pedestrian movement (Hillier et al., 1993). As the theory hypothesizes that more integrated streets, which are likely to be more accessible from other streets, will draw more pedestrians. Applying the global integration (R*n*) measures to the spatial configuration of Kuala Lumpur which consists of 4 streets (see Table 2), we can observe that the highest value is Jalan Pudu (0.823), followed by Jalan Tuanku Abdul Rahman (0.811), Jalan Petaling (0.702) and the less integrated is Jalan Hang Kasturi (0.651). These results can be observed in detail in Figure 4 where the four streets are compared in terms of global integration values. The highest value of global integration of Jalan Pudu and Jalan Tuanku Abdul Rahman make that in these axes the pedestrian natural movement happen.

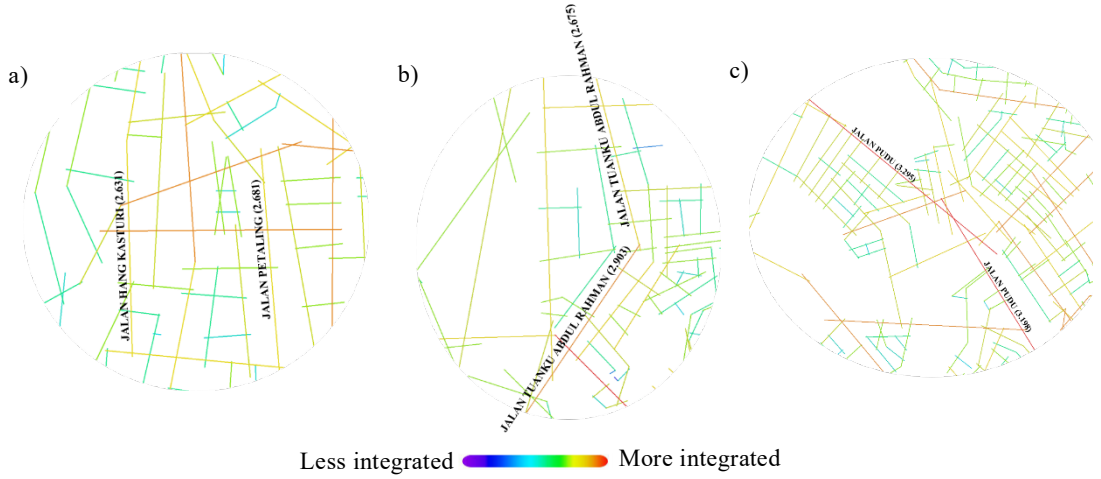

Figure 5: Space syntax measures of local integration (R*3*) calculated for each street segment in the case studies.

According to the local integration (R3) values of the four streets segment (see Figure 5), the result shows that Jalan Pudu scored the highest value with 3.295, followed by Jalan Petaling (2.903), Jalan Tuanku Abdul Rahman (2.631) and the lowest local integration value is Jalan Hang Kasturi (2.608). The adjacent axes of Jalan Pudu such as Jalan Imbi towards Bulatan Pudu and Jalan Cheras decrease because these streets purposely move vehicles, not for the pedestrian's fluxes in these streets. With the wide streets (6-lanes drive lane), Jalan Imbi, Jalan Pudu and Jalan Cheras limit the pedestrians to access. Besides, only Jalan Pudu provides pedestrian walkways with covered that enable the pedestrian to walk conveniently.

Discussing the correlation between the integration measures and safety, the results from global and local integration show no correlation with the level of safe streets. Responses from the women respondents ranked the safer street from Jalan Hang Kasturi, followed by Jalan Petaling, Jalan Tuanku Abdul Rahman and the unsafe street is Jalan Pudu. Jalan Hang Kasturi scored low for both global (0.651) and local integration (2.608). Jalan Hang Kasturi is a 400 m covered street stretched beside the Central Market which moves pedestrians to the LRT Station Pasar Seni and other main roads to the south. With the short length of the street and fewer attractions for local pedestrians, pedestrians only pass by the street to go to another destination, not to do other

activities such as eating, buying things, meeting or others. Those who spent more time in Jalan Hang Kasturi are the visitors. All these factors effects movement. Jalan Pudu is a more central segment of the main street and is likely to be the best used with the shortest routes.

4.2 Analysis of Women's Pedestrian Perception of Safety

Space syntax research has also developed a comparative approach to field observation and questionnaire survey which exercises can be conducted under two generally different conditioning circumstances; weekdays and weekends. The relationship between data related to the different pedestrian movements in different circumstances and spatial configuration analyses helps to determine whether the spatial configuration is mainly responsible for generating pedestrian movement, a feeling of safety, or the effects of some other variables (Nubani and Wineman, 2005).

The women's safety questionnaire survey and observation were carried out among women pedestrians in Jalan Hang Kasturi, Jalan Petaling, Jalan Pudu, and Jalan Tuanku Abdul Rahman in Kuala Lumpur (see Table 4). The findings provide an insight into their experience of feeling and being safe in the city. A statistic by the Ministry of Women, Family and Community Development found that Selangor has the highest number of violent crimes involving women victims (3,459 cases), followed by Kuala Lumpur (2,511 cases) and Johor (2,056) in 2015-2018.

Table 4: The background of the respondent's profile

Respondent profile attributes	N = 73	%
Age		
18-30	67	91.8
31-40	4	5.5
41-50	1	1.4
51-60	1	1.4
Employment status		
Employer	3	4.1
Government sector	6	8.2
Private sector	17	23.3
Self-employed	9	12.3
Unemployment (e.g. full-time housewife, retiree, student)	38	52.1
Accompany when walking and about in the city		
Alone	20	27.3
With friends or colleagues	31	42.5
With family members	22	30.2
****Valuable items bring when walking in the city**		
Handbag	61	83.6
Handphone	63	86.3
Earphone	23	31.5
Bagpack/laptop bag	11	15.2
Purse/wallet	73	100.0
Jewellery (at least a ring)	30	41.1
Watch	65	89.0

**The total does not sum to 100% because multiple responses were allowed

According to the survey, 45% of respondents agreed that 'being a woman' affects their safety in the city. The feeling unsafe in the city causes the women restrictions in choice and movement in the city. For women, regardless of which part of the city they live in, walk or move, the outdoor environment tends to be more dangerous than at the home. However, the awareness to prepare themselves for any harm or crime attempted or become a victim while walking in the city are still poor. It can be proven that the majority of the respondents did not bring protection items such as pepper spray, flashlight, and safety torch with shock effect, safety rod or whistle. Most of them only have a smart watch or mobile phone with an emergency tracker. Although, 56.2% of them have experienced vandalism when walking alone in the city. They frequently experience unwanted, frightening or intimidating behaviour in the streets. 23.3% of the respondents had experienced drunkenness, 20.5% had experienced obscene language followed by cat-called or wolf-whistled (19.0%). In that case, 65% of women said their unpleasant experiences of criminal or harassment had impacted their confidence and increased their fear of crime, thus they often tried to avoid the 'unsafe' street or places as a result.

Most women feel reasonably safe when out and about in the city during the day while 35% of the women feel safe when out and about in the city after dark and 65% feel unsafe due to several factors. Among many factors of feeling unsafe when walking in the city, an unfriendly environment scored the highest with 70%, followed by lack of maintenance of trees and street lights (63%), abandoned/vacant buildings (58.9%) and the area or street is known as a crime hotspot (57.5%). The unfriendly environment includes also the wooden area with the poor maintenance of trees or landscape which will block the visibility between the pedestrian and vehicle on the roadside, and the street light. The presence of ambient lighting can affect crime through numerous mechanisms, which may operate by changing the behaviour of potential offenders and potential victims or both. Maybe, the most obvious way in which lighting can affect crime is by increasing the certainty of fear for a given crime, thus preventing criminal activity. This might be because the presence of the policemen can detect criminal activity more easily in the streets that are well lit because lighting increases the probability of a witness or because lighting help increase the effectiveness of complementary technology like surveillance cameras. The other way is the presence of well-lit during night time hours that makes women feel safer to be in the streets.

Most women feel safe and more convenient when out and about in the city during the day as they feel more comfortable with the presence of people or other pedestrians from both gender (76.7%) in the streets makes the women feel safe, followed by the active street shops (69.9%) and CCTV and high street visibility (65.8%). Other factors are the presence of police, the level of street comfort, a higher number of street-facing buildings and the presence of other women. For example, the installation of CCTV was predicted to deter potential burglars and reduce the incidence of commercial burglary as the four case study areas are the traditional shopping streets. As mentioned in the literature, the influence of the physical environment on crime has drawn

increasing attention in recent years – from the eyes on the street by Jacobs in 1961 to Crime Prevention through Environmental Design (CPTED) by Newman in 1972. The opening and active street shops as the cases study are the shopping streets increase more eyes on the street.

> *You can feel very male-oriented in Jalan Petaling. It does not matter what cultural or religious background you come from. There are lots of small shops and quite narrow pavements, and they are men who run those shops. There are little cafes and Chinese restaurants to hang out outside and chat with each other. Muslim women find it very difficult to go around in the city every day. These men weren't doing anything, but that's just how they felt. It was just how women perceived being safe, and their answer to how it would be better was, instead of having a wide street with cars on it and narrow pavements and shops there, the street would have been built like a square to feel it wider. It would not feel so enclosed, and you do not have to pass people quite much. It just gives a broader feeling. Women feel prohibited. They will not go to local women's areas if they think they have to pass along these men – A snippet from author field notes.*

a) Jalan Pudu b) Jalan Petaling c) Jalan Tuanku Abdul Rahman

Figure 6: The view at night in Jalan Pudu, Jalan Petaling and Jalan Tuanku Abdul Rahman when the shops closed, less people and the spaces are dominated by men. The photos were taken by the author.

5 CONCLUSIONS

This study found many criteria to determine a safe street for women. As the integrations (global and local) demonstrate no significant correlation with how women feel and perceive safety when walking in the city, street vitality and patterns play an important role in creating a safe environment for everyone. In particular, of creating a safe and equal street, streets are catalysts for urban transformation, as public spaces for people and corridors for the movement that needs multiple users and larger social, economic and environmental goals. From the active street shops and street-facing buildings to the presence of people and the police officers on the street became the significant criteria of perceived safety by a woman and their experience when walking in the city. Most women only feel safe walking in the city during the day. The observation results have revealed that the insufficient lit on the streets and other parts of the city centre (e.g. shops corridor, alley, sidewalks or be at the bust stop or train stations), and the dominated space by men, make women discouraged and fear to walk and about alone. It also can be said that every woman feels safe and experience the street differently due to their own behaviour. This study also confirm that both environmental and social factors need to be addressed to improve women's

perceived of safety in public spaces. Overall, a common and very clear theme emerges – women want bright, open, and active spaces filled with people they do not fear.

Although crime prevention is situational and should be tailored to the social and spatial specificities of each urban setting, urban design strategies seem to hold particular promise for blocking crime and reducing fear of crime in public spaces for women. In addition, to design interventions strategies for the public spaces including the street where the itineraries present low integration values. If the values are increased, the attraction to public spaces will be increased. The findings show that the application of space syntax in examining the spatial configuration of the street networks in a city makes it a baseline study for the city for everyone topic. Moreover, the findings contribute to providing better insights on spatial design interventions and spatial design normative policymaking to help urban designers, architects, urban managers, and the local governments. They are the common aspects for them to understand how streets work the way they do as well as to deliver the social, economic, and environmental expectations of pedestrian safety particularly, not only their ability to move traffic and provide vehicular access.

A safe city has always been the basic requirement of urban planning and development. Facing the increasing urgency of the urban public safety problem, this study puts forward the spatial configuration analysis from women pedestrians and urban design. It attempts to probe the basic direction and possible fields of theoretical research, aiming to deepen, improve, and expand relevant urban design contents. The researcher also attempted to put forward new research in an exploratory study to evaluate the factors affecting vitality using the vitality indexes to test the relationship between the feeling of safety and the level of street vitality.

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