Users' Perceptions on Pedestrian Prioritized Neighborhoods: a study on Terrace Row Housing Estates in Malaysia

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ABSTRACT

Malaysia is currently enjoying an overhang of housing supply. The focus is gradually shifting from providing just a mere shelter to something more socially. Terrace row housing estates in Malaysia is the major prototype of housing in the country. Pedestrian activities are catalyst to social interaction, but have been ignored in this model. During the last century, motor age established the supremacy of car prioritized models over that of pedestrians around the world, Malaysia has not been an exception. The adverse social impact of such models led many countries to come up with new or retrofitted models. Such studies have not been done enough in Malaysian context. This study at first searched for residents' perception on social interaction, and then went on to measure their responses on different context specific urban design elements that have the capacity to generate and sustain pedestrian activity inside these communities. A questionnaire survey containing both structured and open ended questions was conducted online with the sample containing responses from all over Malaysia through stratified conditional sampling. Statistical analysis showed that residents do agree with the need for social interaction, but to achieve that, they support pedestrian activity primarily to ensure security at around individual housing units, not necessarily across the blocks or around the whole neighborhood. Qualitative analysis hinted that a unique multicultural society, and the extreme hot tropical climate might play a role here. However, small scale retrofits can still enhance pedestrian activities in these existing communities that can lead to social sustainability.

1. Introduction

Around three fourth of the housing stocks in Malaysia today belongs to terrace row housing estates (NAPIC, 2007). Primarily aimed to solve the housing shortage, a construction boom in the past few decades apparently met the demand, and currently Malaysia can boast of an oversupply of the housing stocks (Tan, 2011). At this point, supply of housing stocks are not only targeting to provide basic shelter, but also targeting to build up community. While the former is a more tangible goal, the latter is not. Therefore, older models of terrace row housing estates which are being repeated without much experimentation and without any study of them on their social impacts, the second goal might fall short to be achieved. This study was an attempt to fill up that void as it tried to find out the social determinants of users' choice making on their housing. The findings were expected to encourage developers and planners to experiment on newer models of housing estates or on retrofitting older ones.

2. Background Study

2.1 Existing Models of Terrace Row Housing

Malaysian terrace row housing estates followed the Western trend of neighborhoods with grid iron street network embedded with the existing topography. Motorized vehicles were prioritized over pedestrian or bicycles while designing these networks (Ghazali, 2007).

The history of such pattern of terraced row houses can be dated back to the sixteenth century in Europe, where a row of houses shared side walls. The roads were suited for horse chariots, and the facades with their uniform fronts and uniform heights formed a 'stylish' wall to shape the urban landscape (Croot, 2004). The typical Victorian terrace houses in England had two basic prototypes namely 'through' terraces and 'back-to-back' terraces, with the former having both a front door and a back door, while the latter being bricked in on three sides. The 'through' terraces still faced the backs each other, but were separated either by an alleyway or by a garden center that was the basis of the formation of super-blocks (Shane, 2014). The basic concept of terrace row housing was to content an increasing demand of urban housing in a limited area without sacrificing vehicular access. For that reason, the grid iron pattern street network was always a first choice as far as planning principles were considered. However, that obviously restricted pedestrian movements. Crossing the roads became increasingly dangerous as vehicles became faster and faster with time. From the days of horse chariots to modern day cars, vehicular accessibility remained a priority to a fast moving urban life and had been criticized by utopian urbanists consistently, who thought pedestrians as major ingredients to a healthy social life in urban neighborhoods (Schuyler, 2002).

2.2 Garden City movement and Motor Age

The famous Garden City movement by Ebenezer Howard was a strong reaction to what he might have foreseen as the invasion of motorized vehicles in urban life that could threaten the utopian concept of having a home blended with 'nature' (Christensen, 1986). His concept of a centralized industrial part of the city separated from the peripheral car-

free residential zones with a green belt in order to keep it free from pollution was indeed an idealistic approach (Howard, 2013). However, rapid urbanization led towns to be built in very quick time during the start of twentieth century, and unfortunately there were little response to his concepts around the world. The terrace houses were immediately more popular as they were well suited for high to medium density and also they did not restrict car access, even though they have been dirty, unhealthy in the beginning due to improper planning guidelines (Peacock, 2007).

In fact the motor age came as a blessing to mankind in some way as people could travel distances in less time, and they did not necessarily need to live absolutely close to their workplaces. Besides at some point in time, owning a car also became a matter of prestige and status (Gartman, 2004). Therefore it was not abnormal that neighborhoods started to be planned with main focus on car-friendly street networks, such as grid iron patterns. That could ensure car access to each house with less complex route. Terrace houses just solved the problem to meet the demand of the rising working class in the urban areas. However, with the 'nature' elements apparently disappearing from residential areas with the emergence of such terrace row houses, and cars taking priority over pedestrians, utopian planners started to worry about a less humanistic society in future.

2.3 Rise of Radburn

Radburn Concept seemed to give a solution to that with the characteristic cul-de-sacs restricting the vehicular movements, while still providing car access to every house in the neighborhoods (Martin, 2001). The concept moved from Europe to United States with reasonable success (Badger, 2011). The primary idea of Radburn was the separation of pedestrian and vehicular traffic. It was aimed to bring back pedestrian ambience inside neighborhoods to make the society more humanistic. It had significant initial positive bi-products as well, such as narrower streets that were less expensive to construct. From planning point of view, it has been considered as the most significant notion in the twentieth century, while from sociological point of view, Dahir (1947) considered it as a new hope for a humanistic society (Dunaway, 1955, Gatty, 2014).

However, Radburn did not go without its flaws. The reasons were not only physical but also social matter. The physical reasons included residents' inconvenience with orientation issues inside neighborhoods, and too many dead spots that instigate crimes (Rasdi, 2007). However, the major complaints were from social point of view. There were opinions that it might work only for people who are anything but not below middle class. The reason stated was that middle class or upper may actually have the luxury to have the ability to own them, and might have some spare time for pedestrian interaction, while lower class may not have ownership, therefore might lack sense of space. Coupled with lack of time to spend as leisure time due to economic frailty, the nice pedestrian spaces might not be utilized for the purpose of generating human interaction it was supposed to serve. Therefore those zones can consequently encourage more crimes to occur (Rasdi, 2007). From another perspective, some other researchers concluded that it is not affluence, but homogeneity in terms of social class is the key for success in Radburn (Lisney, 2014). Therefore it seemed to be fair to conclude that Radburn may not provide universal solution to bring back the utopian neighborhoods, but might work for certain socio-economic groups of people at certain contexts.

2.4 Newer Concepts

The pursuit for better models to create humanitarian society through planning continued and subsequently new ideas rolled in. The main concern was how to create a physically safe and socially secure pedestrian prioritized neighborhood without sacrificing car-accessible street networks. What Radburn tried was to create two segregated worlds. In the end both the worlds contained some basic flaws. The vehicular world was totally inhospitable to pedestrian, while the pedestrian one remained empty, and totally insulated from actions in the active vehicular zone. Therefore, they remained non-attractive. Adding to that, only pedestrian, or only cars did not appear to keep eyes on the streets effectively, thus it created less secure neighborhoods (Lisney, 2014).

Woonerfs, Shared Routes, Loops, Fused Grids, or Home zones, all attempted to provide a solution (Grammenos and Pidgeon, 2005; Hubbard, 2012). They adopted the principle of filtered permeability rather than complete segregation of the two modes. The concept was not to totally segregate cars from pedestrians, but allow them on the same street with pedestrians getting the highest priority, and cars the least. Change in material or texture (for example: brick paving) in roads were started to be used for traffic calming (Appleyard, 1981). Not only they were more livable, but also they offered more eyes on the street to ensure more security. Some of the models worked in particular

Figure 1: Typical Terrace Row Housing Estates in Malaysia. (a) Double Storied, (b) Single Storied
(Source: Authors)

contexts, while other did in other contexts (RSPD, 2002). Therefore it was clear that particular context, be it social or climatic, plays a significant role to select a model, and there is no universal model that suits all.

2.5   Malaysian model of Terrace Houses

Malaysian urbanization gathered momentum in recent decades. Naturally the consequence was to meet the housing demand in towns. Comparing with some other booming cities in Asia, Malaysian housing did not need to be heavily dense and go vertical. Therefore, medium density Terrace Row Housing was chosen as an immediate solution to solve the issue of high demand (KPKT, 2014). Terrace row houses can be traced back to local Malaccan houses or the Chinese shop houses in Malaysia, but in fact their predecessors are most likely to be the Western models in Europe (Saji, 2012). However, it was not the row houses, but the street network that was the main concern in this study. Car prioritized grid street network was chosen to be associated with these row houses (Fig 1). As a result, they expected to face the similar problems that the Western world faced before, neighborhoods that generate the so-called non-humanitarian society. From previous studies, Khan (2012) emphasized that though there was little doubt that pedestrian friendly neighborhoods were the key to achieve that goal, neither grid iron nor Radburn can become the straightforward remedy for that. The apparent homogeneity of the residents in terms of economy in Malaysia suggested Radburn or the newer methods could work. However, there was no attempt to do so.

Moreover, the pedestrian walkways inside grid pattern street networks were not friendly enough in terms of safety (for example, not friendly to wheel chair or children's stroller), as well as from climatic issues that related to protection from tropical sun and heavy rain. The car remained the dominant mode, while the pedestrians were relegated to almost non-existent. That also implied that there were no 'combined' eyes to keep the neighborhood secure, thus an overall sense of security loomed. As one can expect, aspiration for a humanitarian society generated from livable streets through human interaction remained a distant goal to achieve.

In gist, they failed to address properly the two universal demands, namely, security and safety. Moreover, learning from other contexts, the model currently suits the working class, which tends to invite

gentrification in near future. Such neighborhoods would likely to create more 'unknown' neighbors aggravating the loss of sense of community (Logan, 1985).

2.6   Local socio-cultural factors Ignored

Some other local issues related to Malaysian context has also been identified by Khan (2012) that complicated the issues even further. The 'Kampung's refer to country houses in Malaysia. One of the cultures in Kampung is to arrange social events open air in front of one's own front yard. When people moved in to urban areas, they brought that culture with them, which is expected to stay for generations as an expression of cultural identity (Bhugra, 2004). But unlike in Kampung, terrace row houses do not offer residents to have luxurious front yards. So, it became a usual practice to occupy the front road during such events, the front road by the way is the common road for the accessibility for all the neighbors in the street. However, it is permitted by the law to such temporary blocking, and neighbors seem to be tolerant in Malaysia to a reasonable extent even though it certainly hampers car access to certain neighbors during those days. There remains a possibility of danger in case of emergency situations in particular houses in case of ambulance access, firefighting truck access, or police access for crime is necessary.

The Suraus are small mosques inside neighborhoods. It is one of the essential elements in this Muslim majority country. Traditionally a Surau is not only a place to pray, but also a place for social interaction. Journey to Surau is also highlighted in Hadiths as a catalyst for social interaction (Tirmidhi, 2014). However, there appears to be no special attempt to highlight such journeys to Suraus from individual houses. This could have been not only a physical asset to the neighborhood, but also a social means to lead to positive social interaction. Communal places are the busiest parts in neighborhoods. When they are located strategically, and houses are connected with them in a way that local culture is also respected, they can become the catalyst to social interaction eventually leading to attractive neighborhoods.

2.7   Rigid and Backdated Building regulations

The building regulations in Malaysia are administered by Local government and National Housing Department. These regulations are quite comprehensive (Saji, 2012). However, they appeared to remain rigid for decades in terms of street network design or the above

(a)   (b)

Figure 2: *(a) Typical backlanes, (b) Typical connectors*
(Source: Authors)

mentioned humanitarian issues inside neighborhoods. The 'Through' model of terrace houses became the dominant prototype comparing to other types such as middle rise apartments, or high rises. This model was locally characterized by several building regulations, which appeared as a result of certain pragmatic reasons. Among them are the back-lanes which separated the rear of the two back-to-back houses. Historically, they were supposed to serve as a secondary access, also a place for garbage collection, sewage lines, and an extra access for fire trucks. Those needs have long been tackled with other methods. Secondary access is seldom used these days, garbage trucks come at the front road, sewage lines do not need a backlane but they join at the front road with the main sewer, fire trucks are now better equipped and can reach the back of the house even from the front road. However, the backlanes remained a strict regulation until now (TCPA, 1976). The only significant contribution of backlane is that it acts as a buffer between two back-to-back rows, and an option for back yards to get some natural ventilation (Fig 2a).

Land use planning remained strict with a compulsory 10% area to be released as green field in the whole neighborhood, and a centralized commercial area the number of shop lots of which are decided from a certain percentage of the number of residential units inside the neighborhoods. Usually they occupy the front part of the neighborhoods, while the residential parts remain in the deep (Khan, 2012).

Another significant contributor to the planning of street network is the connectors (Fig 2b), which are supposed to serve as a fire breaker along the length of the row houses (Saji, 2012). Depending on the width of the houses, commonly a group of eight, twelve, sixteen or such number of houses are separated by a connector. There is no clarity of which mode, vehicles or pedestrians, is prioritized in any of the front road, back lanes, or connectors. Therefore, there is always a danger of pedestrian safety in these roads.

A number of consequences generate due to these backdated bylaws. Firstly, the backlanes are seriously underused, and significantly contributes to lack of security in the neighborhood because of lack of natural eyes there to offer security. The connectors contribute to undetermined and unsafe pedestrian journey inside the neighborhoods. The green fields offer a good place for residents to gather around, however, there is still no guideline on strategies to locate them inside the neighborhoods, thus discouraging residents from many parts of the neighborhoods to enjoy a pleasant, safe, and secure journey to those areas. Shop lots, and *suarus* remain as very important parts of the neighborhoods, but the journey to these communal facilities usually ignore any other modes than cars to reach them from most part of the neighborhoods. Therefore, they contribute little to obtain that livable humanitarian society that aspire housing not to be just shelters by threating to create social exclusiveness among residents (Lee and Stabin -Nesmith, 2001). However, do these issues really make an impact of making a choice for residents in Malaysia? That was to be the aim of this study.

2.8   The Challenges

Since more and more developers are still investing on constructing this kind of neighborhoods, one might assume that the property market is still hot even though all the above mentioned issues are remaining in the frame. The users' choice is dependent on several other variables. One significant variable is price, as it might always have the last word. The locational factor is also important as people look for better location that suits their travel distance, or social status. And last but not the least, the demographic factors are significant contributors to housing choice. These include age, gender, income, education, job status etc. They can all contribute individually or collectively on the housing choice (Tandoh and Tewari, 2013). Therefore, current trend of huge real estate developments suggest that the other variables are just too overpowering than the pedestrian issues.

Throughout the last century, there was a struggle to decide how important the role of pedestrian activity is. Not only because physical inactivity caused by subordinated role of pedestrian in our cities is one of the biggest public health problem of the twenty first century, but also lack of pedestrian activity in a residential neighborhood failed to achieve a purposeful community. No other countries have faced this like the United States in such a large scale. There have been researches that passionately tried to metaphorically urge to 'get America out of the car and back on her feet', and much have been actually done to create or restore, or retrofit neighborhoods towards a vibrant atmosphere through pedestrian prioritization (EW, 2014). The case of United States, Australia, or Canada was different from Europe or other parts of the world as they had the chance to experiment because of the vastness of available open land (WN, 2014). Therefore, after the initial madness on car prioritized neighborhood during early last century, they still had the option to turn around, look for pedestrianized options, either by designing new models of neighborhood, or retrofitting older and unfit ones. Not many other countries, especially in the densely populated ones in Asia can afford to do that, and mistakes cannot be rectified that easily. But whether countries like Malaysia, having one of the slower population growth rate, and still with some notable amount of land for residential development, can afford to do those known mistakes and then reconcile to laborious rectification over time, or should learn from the other parts of the world that went through similar phases, remain to be seen.

With all these instances and evolutions of neighborhoods elaborated in the literature review, this study aimed to identify whether the residents were concerned about social interaction which was considered a dependent variable, and find the correlation with three latent variables that included the issue of security embedded with natural surveillance with the help of interactive and livable pedestrian routes, the presence of traffic-free pedestrian routes that addresses safe environment for children and elderly, and the presence of barrier free and climatically protected connections to communal facilities. These three latent variables reflected the impact of pedestrian activities from a lower scale to higher. For example, natural surveillance included positioning of houses, activities in front roads or back roads etc. that are concerned with the vicinity of the housing units. This level was defined as 'Unit level'. The traffic free routes reflected pedestrian activities across housing blocks, and the scale that includes these range of activities were defined as 'Block level', while the connections to communal facilities reflecting the pedestrian activities across the whole neighborhood were of the highest scale and was defined as 'neighborhood level'.

It was hypothesized that awareness on community bonding would be high if it the dependent variable showed stronger correlation with all the independent variables. The significance of the study remained on the fact that the level of that awareness might give the planners a thought whether there is a need to encourage developers and residents to retrofit the existing terrace housing estates into more active pedestrian zones as soon as possible, or to let it suffer the same fates as other developed countries faced long ago before ultimately reconciling to remedies. It could definitely become a sustainable measure by not leaving the huge

amount of existing housings unpopular in near future, if there is such a threat, and can be a lesson for other developing countries who are surging themselves towards achieving self-reliance.

The limitation of the study remained as whether a too general conclusion can be done with a limited sample size. But the homogeneity of the terrace row housing estates being the major housing prototypes indicated that the sample can still be useful in predicting context specific suggestions.

3. Methodology

3.1 Respondents of the study

Samples were taken from all over Malaysia through online survey. More than 200 respondents were initially surveyed, with few of them rejected due to incomplete answers. The questionnaire included 29 questions or item variables strategically arranged to cover four major latent variables later on defined as the independent variables, which were the operationally defined as Social Determinants. Stratified conditional sampling method was used where the respondents were selected through several criteria. Each of the states and territories represented at least 5% of the total population. The two major ethnic groups were represented in a 2:1 (Malay:Chinese) proportion as it is in the total population (DSM, 2014).

Terrace Row Housing Estates represent around three-fourth of the housing stocks in Urban Malaysia at present (NAPIC, 2007), and therefore are the biggest housing market. The conditions included a minimum 5 years stay in the neighborhood which reflected that they were steady enough with their choice of housing. The other criteria included their intention to move or not to move out in the next five years, in order to further reinforce their steadiness. Studies showed that

people's housing needs change more frequently during 'young' and 'mature family (I)' stages rather than in 'mature family (II)', and in 'post mature family stage'[1] (Khan, 2014a; Khan, 2014b), and therefore only the former two were the respondents for this study.

3.2 Statistical Methods

Statistical procedures were performed in order to investigate the users' choice. In the first instance, exploratory factor analysis and reliability test via Cronbach's Alpha was performed though SPSS software. The strength of the item variables was measured by factor loadings. Selected item variables were then went through Confirmatory factor analysis using AMOS software by assigning certain item variables to construct the latent variables. The complex model consisted of these 4 Latent Variables namely Spontaneous Sense of Community Bonding [CB], Children and Elderly Safety [CES], Security [S], and Connection with Community Facilities [CCF]. The first one was the dependent variable and the other three were the independent ones. Lastly, Correlation and Regression analysis were performed in estimating the coefficient of all 4 Latent Variables in order to check their interdependency and the individual contribution of independent variables to the dependent variable.

3.2.1 Quantitative Analysis

Quantitative analysis was done through several statistical methods. These are discussed below.

(a) *Exploratory Factor Analysis*

Factor analysis was performed on 29 item variables to examine their loadings. In achieving this, the questionnaire item variables with factor loading less than 0.400 were eliminated from the item set. The

Table 1: Result of Exploratory Factor analysis

	Latent Variables	Item Variables (Key parts)	Loading
1		**First meeting time with immediate neighbors after moving in**	**0.466**
2		**Place of first meeting Incident**	**0.702**
3	SI	**Frequency of meeting with neighbors**	**0.541**
4		**Significance of maintaining acquaintance with immediate neighbors**	**0.744**
5		*Reason for maintaining acquaintance with neighbors*	*0.417*
6		*Numbers of acquainted neighbors in the same block*	*0.402*
7		**Area for children to play**	**0.465**
8	CES	**Need for Children to move traffic-free inside the neighborhood**	**0.579**
9		**Significance of Traffic-free route from home to park**	**0.701**
10		*Significance of safe cycling inside neighborhood*	*0.656*
11		**Natural surveillance in straight line blocks**	**0.509**
12		**Issues of face-to-face neighbor's house**	**0.492**
13	SEC	**Issues of back lanes between two rows of houses**	**0.533**
14		**Suggestions on how to use back lanes**	**0.731**
15		*CCTV/Alarm system as replacement for natural surveillance*	*0.419*
16		**Options/Preferences to go to the shops**	**0.562**
17	CCF	**Options/Preferences to go to the mosque/S*urau***	**0.633**
18		**Options/Preferences to go to the park**	**0.689**
19		**Maximum preferred travel time to go to any of these community facilities**	**0.409**

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[1]Young family: All children below 18, Mature Family (I): At least one child over 8, Mature family (II): At least one child married, Post mature family: All children over 18

remaining 19 items were then grouped into four factors identified through the background study, where User's choice-making to live in a particular house inside terrace row housing estates was hypothesized to be dependent on four Latent Variables. Factor 1 was referred to as Social Interaction [SI] consisting of 6 item variables; Factor 2 was referred to as Children and Elderly Safety [CS] that had 4 items; Factor 3 comprised of 5 survey items on Security [SEC], while 4 items on Communication with Community Facilities [CCF] were grouped as Factor 4. All their reliability values (Chronbach's Alpha) were above 0.7 indicating strong reliability of the measurement. Exploratory Factor Analysis confirmed 19 variables distributed within four factors with factor loading higher than 0.400 (see Table 1).

(b)   Confirmatory Factor Analysis

Confirmatory Factor Analysis using path analysis in Structural Equation Modelling was conducted to determine the conformity of measurable items with acceptable limits of goodness of fit for further analysis of the

model (Fig 3). Four items with loadings less than 0.10 were eliminated leaving 15 items in the construct (italic and not bold in Table 1).

After modifying the model, it did not pass the 'goodness of fit'. Rmsea was 0.1 (threshold is $0.05 - 0.08$), and CFI 0.53 (threshold is ≥ 0.9) (MacCallum et al., 1996).

After the failure of the CFA model, the latent variables were transformed into measurable composite variables in SPSS, considering the 19 items again, as they all had their qualitative significance. The new composite variables (SI as dependent, and CS, SEC, and CCF as independent variables) went through correlation and regression analysis in order to identify their interdependence, and consequently, the contribution of independent variables on the dependent variable.

(c)   Correlation analysis

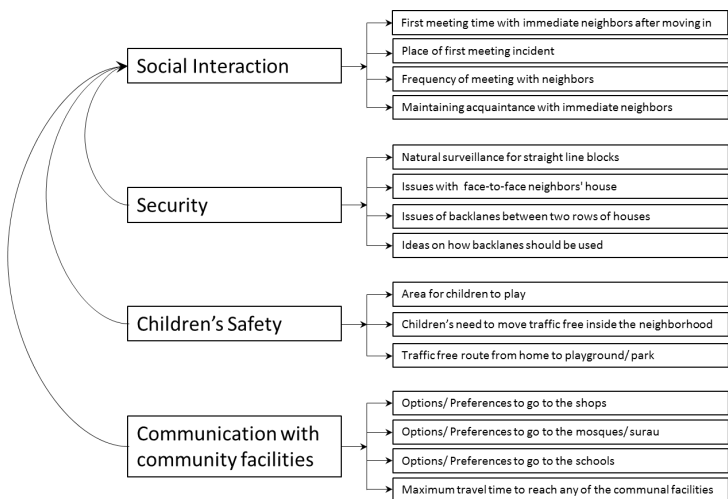Correlation analysis was performed to examine the strength of

Figure 1: *Proposed Conceptual Model*

***Table 2:** Correlation Coefficients*

	SI	SEC	CS	CCF
SI	1	.440**	−.350**	.052
		.000	.000	.605
SEC	.440**	1	−.437**	.092
	.000		.000	.359
CS	−.350**	−.437**	1	−.125
	.000	.000		.211
CCF	.052	.092	−.125	1
	.605	.359	.211	

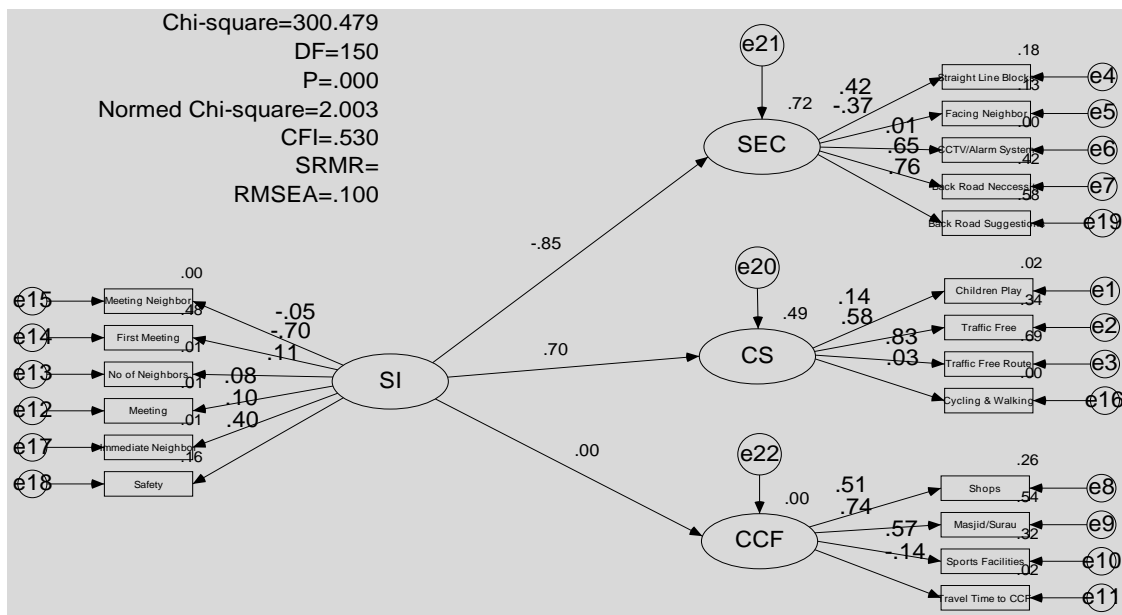association between the composite variables. Table 2 presented the

Figure 2: *Assessment of Normality*

correlation estimates of the factors. It appeared that CCF does not correlate with any of the other variables (italic and not bold in table 2).

(d)   Regression Analysis

Table 3 presented the coefficient parameter estimation for the regression equation. This showed the effect of Children and Elderly Safety [CS], Security [SEC], and Communicating with Community Facilities [CCF] on Social Interaction [SI]. After a backward stepwise regression analysis, CCF appeared to have no predicting capacity, while CS was marginally above the threshold (at α = 0.05). Only SEC appeared to be a significant predictor to SI. The item variables under the composite variables showed significant correlations with each other, and

Table 3: Regression Coefficients

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.477	.457		5.424	.000
	SEC	.435	.121	.356	3.591	.001
	CS	-.396	.202	-.195	-1.959	.053
	CCF	-.007	.126	-.005	-.058	.954
2	(Constant)	2.469	.431		5.734	.000
	SEC	.434	.120	.355	3.610	.000
	CS	-.395	.200	-.194	-1.973	.051

a. Dependent Variable: CB

therefore it was safe to declare that the composite variables had enough power to generate themes.

3.2.2   Qualitative Analysis

Due to limited sample size, it was probably too ambitious to come to generalized conclusions only from the statistical analysis. Therefore, qualitative analysis was continued, which gave rise to certain interesting propositions.

(a)   Pedestrian activities were supported at the Unit level near the vicinity of the housing units

Social Interaction had relatively stronger positive correlation with Security, we checked on the item variables and the answers to open ended questions. Straight line blocks, which are also face-to-face are often considered not to have enough potential to generate natural surveillance as someone at the gate can only have a view of few house fronts (Fig 4a). Therefore, natural surveillance is poor compared to non-face-to-face arrangement, such as around a courtyard, where one can view many more house fronts through a wider angle. These courtyards could also give rise to more pedestrians in front of their houses, as many respondents suggested.

The under used backlanes are almost like black spots in the neighborhoods, and often burglaries in the middle of the night is approached through backlanes. There were plenty of suggestions on how to make use of these backlanes, turn them into shaded walking zones, or children's play zones, or shaded sitting areas, or for gardening and such. All of them are in fact pedestrian activities (Fig 5). Therefore, improvement in pedestrian activities through other arrangements in planning rather than face-to-face straight line blocks, and through retrofitting backlanes were supported by respondents because they had the potential to automatically improve the security.

(b)   Pedestrian activities were not considered that significant at the Block level

However, all these physical improvements in the neighborhood that had the potential to improve pedestrian activity was related to a comparatively smaller scale. More precisely, these improvements were related to the vicinity of one's individual housing units. The second variable related to Children's safety did not quite considered as contributors to social interaction. Looking into details of the item variables, the picture became clearer. The playgrounds are usually located centrally in the neighborhoods. Therefore, it might be one or two blocks away from any housing unit on average. The presence of
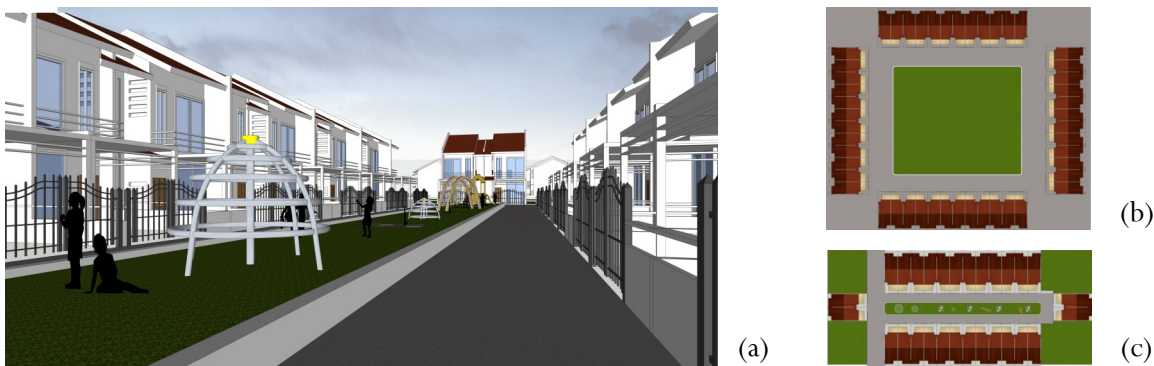

Figure 4: Images from residents' responses on how to improve natural surveillance through pedestrian activity at the front of the housing units. (a) A view of face-to-face blocks separated by courtyard in order to widen the view for natural surveillance, (b) The courtyard may be square, (c) The courtyard may be rectangular (Source: Authors)

traffic free route to children's playground encourages parents to send their children to playground more often as the worries about crossing traffic is eliminated. Elderlies with wheel chairs can also have an option to wander around. As previous studies suggest, children's playground is like a magnet. When children's presence is plenty in the playground, parents are also encouraged to join them (Berg 2014). Obviously, that generates social interaction. The lack of interest of respondents on improving the traffic free routes led us to look closely on the answers to open ended questions. Some mentioned about the climatic factors such as excessive hot weather or occasional heavy rain can both discourage parents to send the children to playgrounds even if traffic free routed existed. Some other respondents referred to lack of time for them to have the option to send the children as many parents return home late, and evenings are considered by most parents as not suitable for kids to stay out both because of concerns related to insects, mosquitoes etc. which are common in tropical climate. Moreover, lacks of lighting facilities in most of these neighborhoods do not allow a wider time span for children to play there, especially once the sun is already set. In order to get support for retrofit models of these neighborhoods, where backlanes could become a traffic free route to playgrounds, simulated plans were shown to respondent in order to let them visualize the journey (Fig 6). However, they still were not convinced enough whether children go to playground more often through those retrofitted traffic free routes.

Figure 6: Simulated plans show retrofitted backlanes connecting every housing units in a neighborhood to the playground through traffic free routes. Color code: Black: Peripheral road, Grey: Internal roads, Red with white spots: Retrofitted pedestrianized backlanes, Red only: Retrofitted pedestrianized Connectors, Grey Blobs: Dead ends created due to retrofitting of backlanes and connectors.
(Source: Google Earth, authors)

Though not conclusive, but many parents seemed happy enough if the children play in front of their main gate on the front road, or even only inside the main gate (fig 7) as roads are often busy with cars. Though it at some point appeared to be tempting to declare that probably there are cultural differences in this aspect, and since the literature is mostly based on western models, may there is need to study local culture before calling the parents rather conservative in this issue. Actually, it also appeared to be a rather safe comment from the parents behind the reason not to be supportive to traffic free routes as there appeared to be not enough workable examples in the local context about how these traffic free journeys can work. In fact, except some very new models of terrace row housing estates there is hardly any example from where people can be more aware (Desaparkcity 2014). Therefore, a certain conclusion cannot be drawn whether the respondents are supportive to pedestrian activities that could connect blocks to blocks rather than only the vicinity of the housing units.

Figure 7: Children playing inside their main gate
(Source: Authors)

(c)   Pedestrian activities were totally unsupported at the Neighborhood level

However, the least supports were shown to pedestrian facilities that connect the housing to the neighborhood communal places such as shoplots, *suraus,* and the schools. It seemed that the respondents are totally fine with not having the pedestrian connections to these facilities. There was always an intention in this study to investigate if the residents in terrace row housing estates are interested to have social interaction along the whole neighborhood. The statistical analysis has pointed out that the interest is fine at unit level along the vicinities, blurred in block levels considering the traffic free routes to playground, and invisible at the neighborhood level. The open ended questions also supported this as many appeared to be rather unimpressed to have a journey to all of these facilities, which are often located at one end of the neighborhood, especially the shoplots, which are the busiest among them. Respondents did agree with the fact that shoplots are the best place for social interaction, but the journey does not need to be interactive. They seemed quite happy to travel there by cars, or in some cases by motorbikes, even though a car journey on average took 3-4 minutes, while the pedestrian journey took around 12-18 minutes depending on

the size of the neighborhoods. Considering the hot tropical climate, that time duration is obviously laborious, but the calmer and cooler night weather also could not pose any impact on the respondents to be more positive for those pedestrian routes. Certainly the walking distance is not impractical if it is climatically protected, comparing to many of the car dependent communities in the west (Mokhtarian and Bagley, 2002). Whether the cultural factor plays significant role on this need to be investigated, following which one may infer whether this attitude can be considered as positive or negative. That could be an interesting research topic, but was beyond the scope of this study.

4.   Findings

4.1   Are residents' interested in pedestrian activities only to achieve Security?

It appeared that if pedestrian activity is concerned, residents were only interested if that can take care of their security issues inside the neighborhood, which was related to direct security breaches such as break-ins, or burglaries. From the responses through open ended questions, it did not appear irrelevant. In this modern urban setup, to be acquainted deeply with every neighbor to create social inclusiveness seemed irrelevant to respondents. For emergency, ambulance can be called; for vandalism, police can be called. For school going children, school buses are available; otherwise everyone has personal transportation to deal with that. For entertainment, everyone has the cable TV channels that can feed recreation to all ages from infants to elderlies. There is internet to solve major communication issues in daily life. Food, clothing, and everyday household needs are available at few minutes ride in the car. Otherwise home delivery services are in plenty. Therefore, it seemed to be rather a burden to know too much about the neighbors as some said it would bring unwanted misunderstandings. Just in case there is a problem in shared spaces such as front road, back road, drainage or garbage disposal issues, people keep the contact details of immediate neighbors. It does not derive from the need to build up a social network. According to several respondents, the houses remained secured islands often also with the help of self-implanted CCTV or Alarm systems. Block level pedestrian connections are not significant enough as small children tend to play inside their own front yard, while elderlies mostly remain captive inside their houses. Neighborhoods level pedestrian connections are not even in the thoughts, as adults do not find incentives to go to the parks, shops, and *Suraus* on foot, by which social interaction could have taken comparatively spontaneously as we have seen from many attempts in different other parts of the world, especially in the Western world. If a little pedestrian activity can improve natural surveillance to keep the house physically secured, that seemed to be enough of their awareness on pedestrian activity, though they all agree that social interaction is important.

Security being the major concern is not uncommon. After all, people need to take care of their properties and belongings as well as they need to protect their lives and those of their children and elderlies. Even in developed countries where pedestrian network is prioritized, security issues are more dominant than social interaction issues. Though larger cities with larger neighborhoods are not necessarily associated with higher crimes, It is learnt from the past that car prioritized neighborhoods bring in more security concerns (Mair and Mair, 2003). Studies and cases also showed though one cannot directly infer that pedestrian prioritized neighborhood would guarantee acquaintance, but 'isolated' and 'unknown' inhabitants can be the by-products of pedestrian unfriendly neighborhoods (Khan, 2012). A pedestrian prioritized neighborhood can not only provide people with the opportunity to walk freely inside the neighborhood, that ultimately contributes to good physical and mental health, provision for children to grow up close with nature, or giving the elderlies an option to take a breath in free air, but also increases the chance of making new friends, and acquaintances (Ecotown, 2014). But as long as the study showed, interaction at a higher level seemed to be far less concern to inhabitants. If it arose from climatic unfriendliness, then further studies can be done on different methods of climatically friendly pedestrian routes in this tropical climate where sun and rain are two major obstacles. But if it is a cultural factor, then we need to study deeply into the local cultural factors. It might be interesting if there are cultural issues that could suggest that Western models of pedestrian prioritized models may not be needed to be copied here. That can open up possible researches in this direction. This study cannot give much indication for that, but it might hint that context specific models for pedestrian prioritized neighborhoods might be needed.

4.2   Do Back lanes and Connectors have potential to be retrofitted to generate pedestrian activity?

Coming back to the issue of surveillance at the unit level, most of the respondents identified the backlanes as having both positive and negative prospects. We already discussed about the obsoleteness of backlanes in modern models. Therefore, we might see in newer models in near future without them. But the already existing huge number of housing estates cannot ignore the existence of backlanes, and therefore, both the positive and negative prospects should be carefully studied, and the respondents hinted exactly that.

The negative prospect is definitely the under usage of backlanes and connectors. But at the same time they have the positives if retrofitting measures can become a reality. Regarding the under usage of backlanes and the dangerous connectors, the respondents gave opinions on how to revitalize them. Most of them proposed that it can be used as pedestrian walkways. There were also suggestions on how the connectors can actually be used as party events or recreational areas for children. Some others were bold enough to call them unnecessary elements and to be included inside their property line. In any case, the backlane retrofit can bring in the natural surveillance with their pedestrian activity. That was one of the clearer findings in this study. Newer model of terrace housing estates as shown in Ghazali (2007)'s work in fact discouraged backlanes or connectors, while some activists have already shown how backlanes and connectors can be more active (AR, 2014).

Terrace row housings grow horizontally, and take vast land compared to apartment building complexes. Therefore one can argue the effectiveness of leaving a comparatively larger area of land to pedestrian usage. However, as long as the existing housing estates remain, backlanes would remain there. Therefore, if they have the potentiality to be retrofitted, they should become like that with the pedestrian activities. That will contribute to social interaction at least at a smaller level such as the unit level, leading to a much needed feeling of security as well.

5.   Conclusion

People in Malaysia are now much aware of different sustainability issues (Zen et al., 2014), which is a positive sign. However concerns over social sustainability seem to lag a little behind. Though this study just highlighted that people are in general aware about pedestrian prioritized neighborhoods, but that might just concerned only to achieve the security issues. Once that can be done by newer models or by

retrofitting backlanes and connectors, their awareness towards a pedestrian prioritized neighborhood for the sake of developing community bonding is likely to improve. However, climatic and cultural issues must be taken into perspective. Therefore, blindly following models from other countries might not directly solve this issue. This study might give an indication where the future studies should be directed, and simultaneously, might suggest to derive newer models without backlanes, or newer methods to retrofit backlanes in existing models of terrace houses to be a quick remedy to improve the security issues inside neighborhoods.

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