CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN: A STUDY OF FEAR OF CRIME AND SOCIAL INTEGRATION BASED ON DIFFERENT ROAD HIERARCHY IN A RESIDENTIAL AREA IN PENANG, MALAYSIA

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UNIVERSITI SAINS MALAYSIA

2012

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Thesis submitted in fulfillment of the requirements

for the degree of

Doctor of Philosophy

UNIVERSITI SAINS MALAYSIA

October 2012

ACKNOWLEDGMENT

I would like to take this opportunity to thank all the people have made this dream a reality. First and foremost, my sincere appreciation, gratitude, and heartfelt thanks go to my kind supervisors. Assoc.Prof.Dr. Aldrin Abdullah, you saw in me what I could not see in myself, and I am a changed person because of that. Enduring this journey would not have been possible without your encouragement, guidance, thoughtfulness, and farsightedness. Assoc.Prof.Dr. Nordin Abd. Razak, you taught me more than anyone about research and statistics, thank you for the invaluable advice and guidance in regards to statistics and data analysis.

Next, I must acknowledge the sacrifice, love and support of my family. Mohammad Javad, during all the ups and downs you have been my sounding board and thank you for supporting my decision to take this path and helping me along the way. I do know how lucky I am to have you. Mom and Dad, I am who I am because of you. Thank you for all you do. My sisters deserve considerable praise for instilling the value of an education. I love you all very much, and I am forever indebted for all you have done for me over the years.

I would like to thank Universiti Sains Malaysia for providing me the financial support to pursue my doctoral degree in the field of Landscape Architecture and I am truly grateful. Thank you to School of Housing, Building and Planning and Institute of Postgraduate Studies who have helped directly and indirectly through this process. I would like to acknowledge the assistance of the Penang Police Department for providing me the crime statistics. Last but not least, I must acknowledge my amazing friends, thank you for always listening and believing in me.

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CPTED	Crime Prevention Through Environmental Design
FOC	Fear of Crime
AMOS	Analysis of Moment Structures
SPSS	Statistical Package for the Social Sciences
SEM	Structural Equation Modeling
CFA	Confirmatory Factor Analysis
χ^2	Chi-square
df	Degrees of freedom
χ^2/df	Normed chi-square
GFI	Goodness of fit Index
CFI	Comparative Fit Index
TLI	Tucker-Lewis Coefficient
NFI	Normed fit Index
RMSEA	Root Mean Square Error of Approximation
BCS	British Crime Survey
U1	Cul-de-sac
U2	Local street
U3	Minor collector
U4	Major collector
U5	Arterial
CCTV	Closed-circuit television

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PENCEGAHAN JENAYAH MELALUI REKABENTUK PERSEKITARAN: KAJIAN KETAKUTAN TERHADAP JENAYAH DAN INTEGRASI SOSIAL BERDASARKAN HIERARKI JALAN BERBEZA DI KAWASAN PERUMAHAN DI PULAU PINANG, MALAYSIA

ABSTRAK

Pelbagai penyelidikan mengenai keselamatan persekitaran telah dijalankan akibat kerisauan terhadap isu keselamatan. Pengaruh kaedah Pencegahan Jenayah Melalui Rekabentuk Persekitaran (PJMRBP) di dalam mengurangkan jenayah dan ketakutan terhadap jenayah telah mendapat banyak sokongan dari aspek teoretikal. Walaubagaimanapun, hubungan "jangkaan multivariatnya" masih belum disahihkan secara empirikal. Kajian ini menumpu kepada penilaian konstruk PJMRBP yang telah dihipotesiskan sebagai satu penentu kepada ketakutan terhadap jenayah dan integrasi sosial berdasarkan hieraki jalan yang berbeza. Kaedah-kaedah tinjauan kajiselidik dan pemerhatian telah digunakan untuk menyukat pembolehubah-pembolehubah kajian. Sebelum menjalankan tinjauan utama, data kesalahan jenayah 2010 dari Jabatan Polis Pulau Pinang telah digunakan sebagai satu indeks jenayah untu menentukan konteks jenayah. Satu senarai semak telah dikendalikan menggunaan kaedah pemerhatian dalam lapangan untuk menyukat konstruk PJMRBP dan kebolehtelapan jalanraya diikuti dengan satu tinjauan soalselidik untuk mengkaji ciri-ciri demografi responden, persepsi penduduk tentang ketakutan terhadap jenayah, tahap integrasi sosial dan pengalaman menjadi mangsa. Kajian ini menggunakan kaedah persampelan sistematik berstrata untuk memilih sampel di kalangan stratum (hierarki jalan). Pada keseluruhannya, 294 responden dari satu kumpulan penduduk yang terpilih telah melibatkan diri dalam kajian ini.

Kajian menggunakan kaedah-kaedah deskriptif dan inferensi untuk analisis statistiknya. Kedua-dua teknik model persamaan berstruktur menggunakan AMOS dan perbandingan statistik menggunakan SPSS telah digunapakai untuk menganalisis data. Pengukuran PJMRBP yang digunakan di dalam kajian ini merupakan kaedah multi-dimensi yang pertama di dunia. Selain daripada keaslian kaedah pengukuran, kajian ini juga menyumbang kepada penambahan ilmu melalui penelitian corak ketakutan terhadap jenayah berasaskan hieraki jalan yang berbeza. Hasil kajian menunjukkan bahawa terdapat satu pengaruh positif yang signifikan oleh kebolehtelapan jalanraya terhadap ketakutan terhadap jenayah, Sementara itu,

terdapat pengaruh langsung yang negatif ke atas integrasi sosial. Penduduk yang tinggal di jalan mati mempunyai persepsi yang rendah mengenai ketakutan terhadap jenayah. Walaubagaimanpun, apabila jalan mati ini dihubungi oleh laluan pejalan kaki, maka persepsi mereka bertukar menjadi tinggi.

PJMRBP merupakan faktor yang effektif dalam meningkatkan integrasi sosial. Kesan integrasi sosial ke atas ketakutan terhadap jenayah adalah negatif dan signifikan. Dapatan kajian juga menunjukkan bahawa PJMRBP mempunyai hubungan negatif secara tidak lansung ke atas ketakutan terhadap jenayah melalui integrasi sosial. Ini menggambarkan kepentingan menerajui hubungan sosial yang kukuh dalam menjana perasaan selamat terutamanya dalam konteks kawasan tinggi jenayah. Hasil kajian juga menunjukkan bahawa integrasi sosial merupakan perantara kesan PJMRBP terhadap pemangsaan, di mana PJRMBP yang tinggi dikaitkan dengan penamgsaan yang rendah. Walaubagaimanapun, bertentangan dengan kebanyakkan kajian lain, kajian ini mendapati hubungan tidak signifikan di antara umur dan jantina. Ini mungkin disebapkan oleh konteks jenayah yang tinggi di kawasan kajian. Penyelidikan ini menyimpulkan bahawa strategi PJMRBP haruslah digalakkan kepada penduduk terutamanya mereka yang tinggal di kawasan kejiranan yang kurang stabil.

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ABSTRACT

The concern for environmental safety has led to extensive research on the subject of crime prevention. The influence of Crime Prevention through Environmental Design (CPTED) in reducing crime and fear has found broad theoretical support, but its multivariate predictive relationships have not been empirically validated. This study focuses on the assessment of the CPTED construct that is hypothesized to be a predictor of fear of crime and social integration based on different road hierarchy. Prior to conducting the main survey, the 2010 offence data was used as an index of crime to determine the crime context. A checklist was administered by using on-site observation to measure the CPTED construct and street permeability followed by a questionnaire survey to examine the residents' demographic characteristics, fear of crime, social integration and victimization experience. The study employed a stratified systematic sampling method in order to select samples among stratums (road hierarchy). In all, 294 respondents from a selected group of residents were involved in this study.

The study employed descriptive and inferential methods for statistical analysis. Both structural equation modeling technique using AMOS and inferential statistics using SPSS were employed in order to analyze the data. It should be noted that the CPTED measurement used in this study is the first multidimensional CPTED measurement in the world. Besides the novelty of the measurements, the study contributes to the body of knowledge by examining patterns of fear of crime based on different road hierarchy. The study finding shows that there is a significant positive direct influence of street permeability on fear of crime, while there is negative and direct influence on social integration. Residents on cul-de-sacs perceived lowest level of fear of crime, but when they are linked to a footpath they will tend to be associated with a high level of fear.

CPTED is found to be an effective factor in enhancing social integration. The effect of social integration on fear of crime is negative and significant. The findings also reveal that there is a negative indirect effect of CPTED on fear of crime through

social integration. This reflects the importance of leading strong social ties in generating feelings of safety, especially in high crime contexts. The results further demonstrate that social integration fully mediates the effect of CPTED on victimization, where high CPTED level is associated with less crime experiences. However, contrary to other studies, the study also found a non-significant association of fear with age and gender. This could be due to the high crime context of the study area. This study concludes that CPTED strategies should be encouraged among residents especially in less stable neighborhoods.

CHAPTER 1

INTRODUCTION

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1.1 Background of the Study

The pace of urbanization has been more rapid all over the world in recent decades and becomes a consequence to have impact on urban social structures and communities relationship within the societies. It is believed that the increase of population rate and migration into cities are key factors contributing to the growing poverty rates and consequently crime rates in urban areas. Malaysia is one of the most rapidly urbanizing countries in Southeast Asia (Wong et al., 2006). According to the Malaysian Government Transformation Programme (2010), the overall crime rate in Malaysia has increased from 746 reported crimes per 100,000 persons in 2006 to 767 in 2007 and 2008, a rise of nearly 3%. Evidence shows that property crime comprised 81% of reported crimes and violent crime is only 19% each year (Royal Malaysian Police (RMP), 2010). This puts into perspective the importance of addressing the property crime. This extensive range of urban problems has culminated higher levels of fear among the society.

Since safety and security have always been a major human need throughout history (Cozens, 2007a, 2008a), and the amount of crime rate has been rapidly increasing all over the world, crime prevention has received a great deal of attention in recent years. Different approaches have been used for crime prevention in urban environments in order to reduce crime and fear of crime. The Malaysian government through its laws is trying to control such phenomenon. Traditional crime prevention measures have been considered for the punishment of offenders as being used after crimes happened. Most of their efforts refer in combating crime through suppressive

or police force related methods. For many years, a lot of money has been spent in order to reduce this problem which is instead still considered as society's main social concern. Therefore, it is important to think of alternative options for the solution of criminal problems in our cities. To this extent, contextual place-based crime prevention methods are being deployed as the efforts of preventing or reducing crimes before they happen.

Research suggests that residential burglary can be collapsed into three distinct settings, namely occupancy (single-family and multi-family), design (attached, detached or semi-detached) and structure (houses, apartments, condominiums and public housing) (Moreto, 2010). Moreover, Mawby (2001) has identified four distinct factors that contributed to the variation of burglary pattern, namely surrounding area, household characteristics, immediate design and planning features, and other aspects of lifestyle affecting the location. However, the present study seeks to investigate household characteristics and planning features of the residential area to draw a true picture of crime and fear of crime.

A review of the literature indicated that there are two aspects contributing to influence crime and fear of crime, namely social and physical aspects of the environment (Greenberg et al., 1982). A study on the influence of neighborhood conditions on psychological outcomes has found that residents' behavior and emotions have links with physical and social cues of the neighborhood and the urban environment (Austin et al., 2002). Studies have noted that social factors have great effects on crime risk where high levels of social ties and integration are associated with low crime risk (Hirschfield & Bowers, 1997; Sampson & Groves, 1989). Besides the effect of social aspects in crime rate, physical configuration of the neighborhood layout is the other aspect of crime affected by permeability. Evidence

suggests that the spatial layout of street networks has an effect on people's movements in space and consequently on crime opportunities (Johnson & Bowers, 2010; Skjaeveland & Garling, 1997).

Johnson and Bowers (2010) suggested that the street network configuration plays a vital role in establishing people's utilization of places, movements and their perception of the surrounding environment. They suggested that permeability have influence on burglary rate and it may vary at different spatial scales. An important concept in security and safety of the built environment is Crime Prevention through Environmental Design, most commonly known as CPTED (Hess, 2008). Although CPTED was coined by Jeffery (1971), the security concept through environmental design evolved by Jane Jacobs theory on the relationships between urban configuration, crime and social interactions in the early 1960s (Hess, 2008).

The physical-crime prevention approach focuses on the built environment and crime reduction. Generally, crime is not equally distributed among all segments of an area. The claim that crime may only be concentrated in particular places has been acknowledged by several studies (Eck et al., 2005; Johnson & Bowers, 2010). This means that certain places within an urban environment have higher crime rates rather than others. Crime clusters in some locations which are known as crime hotspots, while it appears to be absent in others (Eck et al., 2005). The reason why crime occurrence fosters in some areas and not in others depends on various factors which may come to influence the crime placement (Johnson & Bowers, 2010). Crime mapping is a technique that draws from geographical and environmental criminology to interpret crime places and why crime occurs (Wakefield & Fleming, 2009).

According to Cozens (2002), the mapping of crime distribution was initiated in the midst of the nineteenth century. It was supported by Garland (1997) who stated that

there was a long and continuous study of the so-called ‘dangerous places’ during the nineteenth century. It can be considered as a starting point towards developing crime prevention using design strategies. Crime prevention methods and efforts to control crime through social and physical techniques skyrocketed during the 1970s. Jacobs (1961) drew attention to the urban design and narrowed the investigation area of crime-space studies. In Jacobs’ work, she emphasized on specific elements of design that she posited may enhance the safety, while Angel (1968) and Jeffery (1969, 1971) expanded the relationship between crime and urban design in terms of crime reduction approaches (Cozens et al., 2001).

Considering the role of both social and physical aspects in crime incidents, this study examines the effects of physical elements namely CPTED, Permeability and Road Type on Crime and Fear of Crime by means of taking into consideration the social factors, namely Social Integration and demographic characteristics of the neighborhood. Road type as a typological variable refers to the degree of road hierarchy as defined by Jabatan Kerja Raya Malaysia (JKR) or Public Works Department Malaysia (PWD). The degree of road permeability as a syntactical variable measured the degree of accessibility to the whole spatial system that is adapted from Shu’s (2000) work. The current study seeks to examine the role of the environmental features of the built environment, in particular neighborhood’s layout, on victimization and residents’ perception of safety and fear of crime. To put it simply, the study considered road type and demographic characteristics (such as age, gender, type of ownership, educational level, length of residence, household income, ethnicity and occupational status) as exogenous variables which have effect on endogenous variables namely Victimization (in particular residential burglary), CPTED, Fear of Crime and Social Integration.

Indeed, road type is included as a variable along with a host of other theoretically relevant factors related to Victimization (Beavon, 1984; Beavon et al., 1994; Shu, 2009; Shu & Huang, 2003), Fear of Crime (Foster et al., 2010; Hillier, 2004; Jacobs, 1961; Newman, 1972; Poyner, 2006), CPTED (Brown & Werner, 1985; Jacobs, 1961; Newman, 1972) and Social Integration (Brown & Werner, 1985; Mayo, 1979; Newman, 1972). Such an analytic approach allows the researcher to examine whether the level of the road hierarchy is important for understanding crime and the fear of crime. Besides limited empirical studies on the relationship between CPTED and Fear of Crime, previous studies have only examined street pattern differences in terms of victimization experiences and burglary distribution, particularly in the European context (Shu, 2009) and the focus is not given on people's perception of crime that influences fear of crime and the quality of life (Beavon et al., 1994; Shu, 2009). The current study addresses this shortcoming in the literature by testing a comprehensive model for Fear of Crime, Victimization, CPTED, Permeability and Social Integration. In doing so, this study examines whether Fear of Crime and other variables differ across road types and residents' demographic characteristics. This approach provides a comprehensive understanding of how street contributes to the crime experiences and the fear of crime.

1.2 Problem Statement

It may seem that today "crime is part of our way of living" (Brantingham & Brantingham, 1993, p.22). According to Nasar and Jones (1997), fear of crime is considered as a major urban stressor. Crime problems are social issues that have affected millions of people's lives each year. Despite numerous studies regarding crime and urban design relationships, police officers draw more attention to the traditional target hardening strategies such as the punishment of offenders (Cozens et

al., 2001). According to the Malaysian crime statistics, 'housebreaking and theft' is one of the most frequent crime types after 'theft of motorcycles' in Malaysia and the trend is similar in the state of Penang (Royal Malaysia Police, 2010). The increase of household crime has a more devastating impact on individuals compared to other types of crime. The amount of loss by 'housebreaking and theft' far exceeded other property crimes (Abdullah, 2006). It is clear that such crimes negatively affect people's perception of safety and increase fear of crime in a community, because the home is the last place where they can retreat into (Hedayati et al., 2010).

It is believed that both social and physical factors affect crime and the level of perceived fear of crime. To date, little research has explicitly explored the interplay of social and physical factors in the field of crime and fear of crime (Foster et al., 2010). Without denying that social variables are influential on victimization and perceived fear of crime, there is a need to more closely examine the physical factors that may contribute to crime and fear of crime. This is due to the fact that the design of physical environment plays an important role in fostering or preventing opportunities for crime to occur (Foster et al., 2010; Gardiner, 1978; Hedayati et al., 2011b, 2012a; Newman, 1972; Poyner, 1983; Poyner & Webb, 1991). Thus, even though a lot of money has been allocated to reduce crime, it is instead still considered as society's main social concern. Brantingham and Brantingham (1998, p. 53) stated that "most planning proceeds with little knowledge of crime patterns, crime attractors, crime generators, the importance of edges, paths and nodes or the site specific solutions that facilitate or even encourage crime".

On the other hand, economic aspects should be considered in the creation of developments. Cozens (2007a) noted high financial costs of crime to the community, although mostly emotional and psychological and the costs of fear of crime have not

been explicitly evaluated. Evidence suggests that if crime prevention strategies are employed at the early stage of each development, it would be cheaper than employing them at later stages (Hedayati et al., 2011a; Schneider & Kitchen, 2002). There has been limited empirical evidence simultaneously evaluating residents' perception of safety and elements of actual neighborhood conditions and particularly the housing conditions according to visual assessments (Austin et al., 2002). This study examines CPTED features in outdoor residential settings in the proximity to the home and the street level by taking into consideration residents' perception of the surrounding environment. The study used the CPTED approach as one of the most effective crime prevention techniques to reduce crime and fear of crime (Crowe, 2000).

Despite a large volume of work on the topic in developed nations, fear of crime and place-based crime prevention ideas remain largely untested in the Malaysian context in particular. The literature reviewed reveals that there is an extensive empirical research examining a significant correlation between physical environment and crime incidents in the neighborhood; nevertheless there has been surprisingly little empirical evidence that examines CPTED elements and dwelling's fear of crime in different urban environments (Hedayati et al., 2012b; Md Sakip, 2012). A recent study argued that few studies dealing with whether there exists a significant influence of spatial configuration (CPTED-based designs), or social and economical reasons for distribution of residential burglary (Chang, 2011). A critical gap in the knowledge affects this area of studies. There have been very few empirical studies examining fear of crime in developing countries, resulting in a limited or even biased understanding of the topic in such countries (Adu-Mireku, 2002). Although there have been a large number of studies in assessing physical and social disorder, the

development of a reliable model of disorderly measures lagged until the present time (Jones et al., 2011).

Furthermore, there are two contradicting theories regarding crime and space, namely Jane Jacobs' (1961) Eyes on the Street approach and Oscar Newman's (1972) Defensible Space theory. Jacobs' study of the life cycles of major American cities is more concerned with macro-scale planning such as commercial and business settings, while Newman's work focused on micro-scale settings such as public housing and residential settings. Moreover, existing theories on the relationship between crime distribution and road type is Eurocentric, and therefore would probably be unsuitable in the Malaysian context. Despite decades of empirical researches, the influence of street permeability on crime still remains highly debated (Johnson & Bowers, 2010). In spite of the variety of researches in the field of crime and space, yet there are no directly relevant studies that can define whether closing streets or through roads will work in a specific situation (Clarke, 2004). Therefore, one of the main objectives of the current study is to address this issue in the Malaysian context. The study aims to clarify the best spatial configuration of the street network so it discourages crime. The present study contributes to the existing body of research on the topic in relation to Penang, Malaysia. It additionally provides new insights on this matter, particularly in relation to measures of CPTED elements and how crime and fear of crime are perceived by residents across different design typologies.

There are some examples containing specification details of CPTED design principles (Crowe, 2000; Jeffery, 1971) that are included in building and neighborhood development guidelines. However, the assumptions and processes based on CPTED are poorly tested (Hedayati et al., 2011b; Md Sakip, 2012; Md

Sakip & Abdullah, 2011; Minnery & Lim, 2005). Indeed, the majority of previous studies examined a single dimension of CPTED, not all dimensions simultaneously. A part from the studies conducted by Minnery and Lim (2005), Hedayati et al. (2011b, 2012b, 2012c), Md Sakip (2012) and Md Sakip and Abdullah (2011), no other studies have directly measured CPTED dimensions and its relationship with crime and fear of crime. Although there has been a large number of empirical studies on CPTED and the levels of crime incidence and fear of crime, the construction of a valid and reliable instrument to measure the CPTED construct has yet to be rigorously developed and tested (Hedayati et al., 2012a, 2012b). This is due to the limited basis in the underlying theories regarding the measurement of the CPTED construct. In addition, Hedayati et al. (2012a, 2012b) have directly measured CPTED dimensions focusing on a low-rise dwelling in Penang, Malaysia. However, that specific study only focused on low crime context and the scale of measurement might not apply in a high crime context. This gap provides a justification for the present study to develop a comprehensive instrument to measure CPTED in which samples not previously studied. This study adds to existing knowledge by examining the perception of residents in a high crime context with different road types.

1.3 Research Aim and Objectives

The study focuses on road type and landscape design with an emphasis on the social aspects of the relationship between humans and the environment. This is due to the fact that physical layout and social characteristics of the neighborhood play a vital role in reducing crime and fear of crime. Since the offender's targets and type of offences are culturally differentiated, thus crime needs to be measured as a subject matter from the local point of view. Professionals such as landscape architects, planners and designers should consider crime problems from a different perspective

through an improvement of the physical design of the urban environment rather than only punishment after crime committed.

The main aim of the present study is to examine the influence of CPTED, Victimization, Social Integration and demographic variables on Fear of Crime based on different road types. Moreover, it also seeks to examine the relationship between the distribution of burglary and the type of roads, and how CPTED and its respective indicators (namely Surveillance, Access Control, Territoriality and Maintenance) influence Victimization, Social Integration and Fear of Crime. This study examines Fear of Crime in a neighborhood and its relationship with the physical features, rather than only consider individual design elements such as physical features of buildings, spatial arrangement of the environment and the street network systems. The study aims to address the following research objectives:

1. To examine differences of CPTED, Fear of Crime (FOC), Social Integration, Victimization and Permeability of residents based on different road types;
2. To investigate differences of CPTED, FOC, Social Integration and Victimization of residents based on demographic characteristics undertaken in this study; and
3. To identify direct or indirect influence of CPTED, Social Integration, Victimization and Permeability on FOC.

1.3.1 Research Questions

Based on the above research objectives, there are three research questions in the study that need to be answered:

1. Are there any differences in CPTED, Fear of Crime (FOC), Social Integration, Victimization and Permeability of residents based on different road types?

2. Do the level of CPTED, FOC, Social Integration and Victimization of residents vary across different demographic characteristics?
3. Is there any direct or indirect relationship between CPTED, Social Integration, Permeability, Victimization and FOC?

By addressing the aforementioned research questions, the study makes novel contributions to the body of knowledge. First, the novelty refers to the multidimensional measurement of the constructs used in the present study. It should be noted that the CPTED measurement used in this study is the first multidimensional CPTED measurement in the world. Second, since previous studies only explored burglary distribution among different road types, this study would shed light into the body of knowledge by examining the patterns of perceived Fear of Crime based on different road types. Third, examining the effects of both social and physical characteristics of the neighborhood on Victimization, Fear of Crime and Social Integration is an importance contribution of this study. Finally, this study empirically investigates the relationship between CPTED and Fear of Crime in a high crime neighborhood with mixed-race population, which has never been done in the Malaysian context.

1.4 Scope and Limitations of the Study

The current study focuses on terraced houses, in Penang, Malaysia. The study selected terraced houses as the samples for the survey because a majority of the landed properties in the study area are terraced houses (more than 95%). Of a total 189,788 residential units in Penang Island (only Island part of the State) (Ministry of Finance Malaysia, 2011), the study area contains 1,179 terraced houses which is located at Mukim 12 (Bayan Lepas), Barat Daya district. As reported by Ministry of Finance Malaysia (2011), 9.8% of the total residential units in Penang Island are

terraced houses. The population for the study includes all households who live in terraced houses within the study area. As the scope of the study is on terraced houses, the result of the study might not be generalizable to other house types.

Although the present study makes a valuable contribution to the existing body of knowledge, there are a number of limitations in relation to the design of the data collection procedure that must be considered for further validation of the study findings. The current study has used official property crime statistics as a starting point for the research. The approach used is partially determined by the limitations on available information on crime.

First, official statistics on reported crime in the study area are available only at the street scale level. The Penang Police Department has allowed the researcher to record burglary incidents only at the street level. Therefore, a main limitation in the official crime statistics refers to the lack of the information that shows the specific location of crime events during the mapping crime process. It can be noted that this is a course level of data collection and the map may not able to obviously show the exact crime places. The evidence suggests that crime can be implemented over large areas, but its impact has greater effectiveness at the local scale (Minnery & Lim, 2005). Therefore, the precise crime places are necessary in order to have a more accurate crime mapping. As the main variable of the study is road type, it would be appropriate to also consider theft of motorcycles, as constitutes the highest crime rate in Malaysia (RMP, 2010). The lack of official motorcar crimes by Mukim can be considered as a second limitation of the study. To overcome this, the present study has employed a questionnaire survey in order to measure this type of property crime.

A third limitation of the study is the absence of official subdivision of the study area by neighborhoods. As the study is conducted on the neighborhood level, the

identification of neighborhood boundaries is captured through local research and existing unofficial information. This refers to the fact that although there is an increasing demand for using the neighborhood as the unit of analysis, no universal way of defining it has been explained (Chaskin, 1998). Chaskin (1998) defines the neighborhood from the social science perspective and breaks it into three major categories: the neighborhood as a social unit, the neighborhood as a spatial unit and the neighborhood as a network of relationships, associations and patterns of use. He further argues that neighborhood's boundary identification indicates the existence of neighborhood identity and fosters a sense of community among residents (Chaskin, 1998). However, the operational definition of the term neighbourhood used in this study is provided in Section 1.7.

Another possible criticism of the present study refers to the type of dwellings. As such, the scope is only on terraced houses in the sample frame, while other types of houses (i.e. apartment and semi-detached) have already existed in the area. Further research would benefit from a comprehensive study including all house types. Such a study could contribute in providing valuable insights into the underlying subject matter. The final concern is about the generalizability of the results. The survey carried out in a high crime area, includes low to middle class neighborhood in Penang, Malaysia. Meanwhile, the scope of the study is on terraced houses within the boundary of the study area. Therefore, the generalizability of the findings to other crime settings and other house types is yet to be determined.

1.5 The Significance of the Study

From early prehistoric cave-dwellers to medieval and modern cities, the organization of settlements has always tended to provide security and safety as major human needs (Cozens, 2007a). As urbanization growth increases, there is a need to improve

humans' living conditions in urban neighborhoods. The present study was carried out in urban residential neighborhood. As Neal (2003, p. 8) argued "neighborhood is seen as the most important urban element that establishes the social and economic sustainability of the area, providing the community ties which hold it together...". Evidence suggests that crime and fear of crime are vital tools in providing sustainable development in urban areas (Cozens, 2008b). Crime concerns remain important issues for many people (DeFrances & Smith, 1998). Several studies found that social cohesion and neighborhood safety are associated with the Social Disorganization Theory, which takes into consideration the fact that neighborhoods with a high sense of social cohesion are able to control their surrounding area and becomes a consequence in minimized crime rates (Shaw & McKay, 1969; Van Wilsem et al., 2006).

There are many ways to access sustainable development in developing countries. The Malaysian government was established as one of the Six National Key Result Areas (NKRA) during the Prime Minister's speech on July 2009, addressing the socio-economical issues that represent the most concern to the people (Government Transformation Plan, 2010). Among the targets, reducing crime is an issue which must be considered as a key factor in order to reach improved social welfare and consequently sustainable development. The present study further contributes towards the social welfare that is being supported by the Malaysian Government, in particular residential housing development. Therefore, the findings of this research are in line with the Malaysian Government Transformation Programme's (GTP) vision.

The state of Penang is accounted as one of the six crime hotspots in Malaysia (Fong & Lai, 2012). In response to this, the minister of Housing and Local Government reported that "so far, we have installed 496 CCTVs at 25 local authorities, including

the 12 hotspots" in major cities (Kam, 2010). He further stated that the Malaysian Government spent a lot of money in year 2010 for the Safe City Programme (Kam, 2010), which shows that the Malaysian government recognizes crime problems and has put great emphasis in reducing burglary and car-theft in residential area through the recently announced NKRA in the GTP.

Limited multi-ethnicity empirical studies in relation to fear of crime and spatial layout can be another importance of the present study. As the study area composed of multi-cultural ethnicity residents, the findings of the present study may contribute to the body of knowledge. Furthermore, it was important to research the aspects of spatial pattern analysis and residential burglary in Penang, Malaysia as there has previously been minimal research conducted into this field in the study area.

Finally, the importance of this study also refers to the advantages of using both observation and questionnaire to examine the influence of physical factors on residents' perceived fear of crime. The proposed hypothesized model is based on multidimensional measures of the constructs using structural equation modeling (SEM). This would imply more reliability in measuring the subject matter.

1.6 Thesis Methodology

This research is a cross-sectional design carried out in a residential housing neighborhood in Penang, Malaysia. As the study samples are the individual household, the unit of analysis is at the individual level. The study employed stratified sampling method based on road type to select the samples from the population. The research design in the current study is descriptive and explorative in nature. In order to answer the research questions, this study has adopted a quantitative approach and involved two parts. The first part of the data collection involved an on-site observation of residents' environmental design features enclosed in the

housing layout, followed by a questionnaire survey. A detailed section of the research methodology is provided in Chapter 4.

1.7 Operational Definitions of Terms Used in the Study

This section provides operational definitions by focusing on the exact meaning of terms used in this study. There are a number of terms used in the study that require precise definition. Definitions of burglary, neighborhood, road and road hierarchy are given in this section.

Burglary: In this study, the victimization survey mainly focuses on household offence (burglary) as well as motor vehicle offence. Burglary is defined as "the illegal and unlawful entry into a home or structure to commit a felony or theft" (Mawby, 2001). It should be noted that the terms *burglary* and *household offence* are used interchangeably throughout the study.

Neighborhood: Although a large body of scholars has used the term 'neighborhood' in their research, but there is a very little attention in terms of the spatial definition of this term in the literature (Guo & Bhat, 2007). In addition, the Congress of New Urbanism (CNU, 2002) suggested that neighborhoods include "a mix of shops, offices, apartments, and homes". Rukwaro & Olima (2003, p.145) concluded that a residential neighborhood must provide "… adequate social services for education, health, recreation and religion … and response to the socio-physical factors within built urban environment". The term *neighborhood* in this study refers to an area with almost homogenous characteristics that is spatially separated from the adjacent areas (such as highway) as well as being high crime context.

Road: Most people interchangeably use the terms road, street and highway (Clontz, 1997). As indicated in the Malaysian geometric design of roads guideline (Arahan Teknik Jalan 8/86, 1989), the two terms of *road* and *street* are interchangeable for a

wide range practical purpose, but each has a slightly different connotation. One of the main differences between the two words is that a *road* connects two different places such as towns, while *street* is track for travelling within the towns. Street is indeed a small public road. Department of Environment and Resource Management of Queensland outlined a definition of a road as "an area set aside for the present or future use of the travelling public. The term includes: a street, esplanade, reserve for esplanade, highway, pathway, thoroughfare, track or stock route, a bridge, causeway, culvert or other works in, on, over or under a road and any part of a road" (DERM, 2011). For this research, the terms *road* and *street* are used interchangeably.

Road hierarchy: A system of road hierarchy defines different functions of roads and paths categories with regards to actual and intended uses within the network system. As defined, a road hierarchy is "a structured approach to defining a particular use for a road... Decisions regarding a road's width, provision of on-street parking, provision of access points from allotments, speed limits, priority at intersections, type of traffic control devices etc. can be more easily and consistently made when it is understood what the road is intended to be used for" (Charles Sturt City Council, 2006). However, the study used the road hierarchy as recommended by Jabatan Kerja Raya Malaysia (JKR) (Arahan Teknik Jalan 8/86, 1989). Therefore, the term *road type* in the present study refers to the road hierarchy as defined by JKR.

1.8 Organization of Chapters

This section focuses on the organization of the thesis, adding clarity and understanding about the thesis structure more deeply. This thesis is organized into seven chapters. **Chapter 1** starts with an overview of the research background, followed by the problem statement which is a description of the issues supposedly addressed by this research. Research aim and objectives of the study are advanced,

followed by the research questions. Then, an explanation of the scope and limitation of the present research is outlined. This is followed by identification of the significance of the study. The chapter then proceeds by discussing the operational definition of the terms used.

Chapter 2 gives a broad overview of crime and fear crime as a major social concern. This chapter then articulates the three dimensions of Fear of Crime. This is followed by an explanation of Social Integration and its three dimensions. This is followed by an assessment of the literature on the relationship Victimization, Fear of Crime and Social Integration. Then, crime trends in Malaysia are discussed.

Chapter 3 outlines a comprehensive review of the existing literature pertaining to crime prevention methods, followed by similarities and differences of the place-based crime prevention methods. It introduces the concept of CPTED and its origin, followed by an explanation of the dimensions of CPTED. The chapter proceeds with a discussion about the application of CPTED techniques in Malaysia. This is followed by an assessment of the relationships between CPTED and Victimization, Fear of Crime and Social Integration. The chapter provides a general classification of the road type, and then the study focused on the Malaysian classification as the study area. Street pattern and the concept of permeability based on different road types are outlined followed by the relationship between street design and crime. Finally, a hypothesized model of the study is outlined.

Chapter 4 aims to introduce the research design, presenting different approaches of data collection employed in the study. In order to select the study area, the research used a crime mapping procedure to find crime hotspots. The chapter introduces different types of crime mapping theories and the reason of using *street theory* before describing the analytic technique in order to select the study area. Then,

sampling frame, sample size and sampling method are discussed. A description of the survey instruments is presented based on the questionnaire survey and personal observation in relation to other previous work. The chapter then outlines the results of a pilot survey carried out in Penang, Malaysia. This is followed by a description of data analysis procedure and the validation of all variables included in the final model.

Chapter 5 focuses on preparing data for analysis. The chapter presents the results of the measurement model testing, conducted mainly for the purpose of validating the items used as measures of the respective constructs. This is followed by the results of outlier and normality assumption tests. Finally, the chapter will end with a summary.

Chapter 6 opens with an overview of the demographic characteristics of the respondents. Then, the chapter proceeds with presenting the results of the differences among the main variables of the study according to road types. This is followed by the results of the relationships between demographic factors and the main variables of the study. The chapter continues with the final model testing, using the SEM procedure to examine the direct and indirect effects of the variables undertaken in the study.

Chapter 7 summarizes the thesis by drawing conclusions of the main findings in relation to the available literature. Then, the study describes the contribution of the study to the body of knowledge, followed by a description of the implications of the study findings. Finally, it concludes the whole study and presents a number of recommendations and directions for future research.

CHAPTER 2

THEORETICAL BASIS OF FEAR OF CRIME, SOCIAL INTEGRATION AND VICTIMIZATION

CHAPTER 2

THEORETICAL BASIS OF FEAR OF CRIME, SOCIAL INTEGRATION AND VICTIMIZATION

2.1 Introduction

This chapter is divided into five main sections. The first part starts by discussing Fear of Crime as a main variable in the study. This is followed by a review of the research conducted hitherto, summarizing the different approaches to measure this construct that have so far emerged. The chapter continues with an overview of Social Integration and Victimization. This is followed by explanations of the relationships between Fear of Crime, Social Integration and Victimization. The last part presents an overview of crime trends in Malaysia and the study area. Finally, the study provides a summary at the end of the chapter.

2.2 Fear of Crime

Fear of crime has been considerably researched in recent years. Crime statistics recorded by the police often indicate victimization rates, while ignoring the most crucial indicators of fear of crime (Cozens, 2008b). The current debate regarding fear of crime refers to measuring this construct and its indicators (McCrea et al., 2005). Initial studies have only focused on fear of crime in the light of a unidimensional measure in citizen's fear of crime based on the US National Victimization Survey (NCVS) such as Baumer (1985) among others. Previous literature reported that the best measure of the fear of crime construct should be limited to feelings of fear (Hale, 1996), while others argued that it further includes cognitive judgments such as perceived risk after dark and the possibility of victimization (Franklin & Franklin, 2009; Gabriel & Greve, 2003). Studies criticized

the validity of unidimensional measure of fear, suggesting that (i) the intent of the question may influence by the absence of the word 'crime' (ii) all aspects of fear of crime may not be captured using singular measure and (iii) it does not differentiate emotional reactions to crime and objective risk assessment (Ferraro & Grange, 1987; Garofalo, 1979; Kanan & Pruitt, 2002).

According to Greenberg (1999), the ideal neighborhood for residents is a safe, clean and stable neighborhood, while crime and physical incivilities are associated with the poor quality of neighborhood. In addition, Dunstan et al. (2005) suggested that incivilities factors such as litter, vandalism, graffiti, abandoned cars, vacant properties, unmaintained gardens and lack of green space and trees may decrease the quality of an area. It is therefore important to consider such factors when measuring perception of residents. There has been considerable academic work suggesting that these factors may influence the morale and perceptions of the residents (Dunstan et al., 2005; Forrest & Kearns, 1999; Macintyre et al., 1993). Dunstan et al. (2005) proposed that disorder and incivility of an area can be measured by residents themselves and those from outside the area and certainly influenced by the area physical characteristics.

In addition, related investigation reported that fear of crime is reflected by three related dimensions, namely cognitive, affective and behavioral (Fattah & Sacco, 1989). Davies (2004) proposed different dimensions of crime, including area content, behavior, cognitive and affective domains, scale and time. He suggested that area content refers to demographic characteristics of individuals, while behavioral domains are informal interaction, local facility use, local organization use and political participation (Davies, 2004). Moreover, he identified security and safety as

affective domains, while people identity and symbolic communication are considered as cognitive domains.

In measuring fear of crime, researchers generally faced many issues such as using global or specific measures of fear (McCrea et al., 2005). This could be referred to the fact that a global measure involves single indicator and does not indicate any specific crime (Hale, 1996), and it ambiguously overestimates the prevailing influence of fear (Farrall et al., 1997). They further suggested that specific measures distinguish different dimensions of fear (Farrall et al., 1997). Although specific measures are better than global measures for specific purposes, the latter have been however employed by most researchers (Hale, 1996) due to lower costs and less time consumption (McCrea et al., 2005).

One advantage of using global measure is represented by the existence of an opportunity to conduct an international comparative study when using the same question of the International Crime (Victim) Survey (ICVS) since 1992 (Adu-Mireku, 2002). The question pertaining fear of crime measure asks respondents 'how safe do you feel when walking alone in your neighborhood at night?'. Franklin et al. (2008) argued that such a measure may represent various problems related to fear of crime, but the most important one is represented by the existence of ambiguity surrounding the measurement of NCVS-based in terms of differences between emotional fear and perceived risk. To overcome this concern, the current multi-dimensional fear of crime measures avoids the earlier ambiguity. Several studies (Hale, 1988; Skogan, 1977; Sparks et al., 1977) agreed with Garofalo and Laub's (1978) perspective that the 'safety-walking' measure cannot strongly predict the fear of crime. Garofalo and Laub (1978) argued that a more complete measure of fear of crime must be a part of a general measure of quality of life. Biderman et al. (1967)