The Difference in The Level of Sense of Security After the Smart City Concept in Solution of Crime Issues in George Town, Penang

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Abstract

The application of the Smart City concept is a smart solution to crime in the present day after various efforts have been implemented to improve the safety of the city's citizens. This concept is used now because it can reduce crime cases and can increase the sense of security of the city's citizens using applications and smart technology developed by the administration. The pandemic that hit the world in 2019 has further boosted the use of technology in society's lives until now. Thus, this study aims to examine the difference in the level of safety before the existence of the Smart City concept and after the existence of the Smart City concept in solving crime issues in George Town. The difference in the level of security is very important in this study because it can evaluate the difference in the effectiveness of this concept. The mixed method applied in this study involves questionnaire instruments and in-depth interviews. Questionnaires were distributed to 400 respondents consisting of traders, residents of the surrounding area, as well as employees working in the city, while 10 people were interviewed in depth using purposive sampling involving traders, authorities such as the Penang City Council and the Police. The study found that there was a more positive difference in the sense of security where respondents showed a higher sense of security after the concept of smart city. Thus, the study can prove that the application of the smart city concept that is currently being developed in the solution of crime issues shows a positive change because it can reduce crime cases and increase the sense of security of George Town smart city citizens.

Keywords: Smart City, Security, Crime, Sense of security, Application, Technology

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Introduction

The concept of a smart city is gaining popularity globally to address urbanization, environmental concerns, and economic growth. The smart city concept is a smart solution concept adopted by the current Malaysian Government for urban planning and management. This concept was not only introduced in Malaysia but has long been practiced in developed countries such as United Kingdom, Canada, Korea, Dubai and Singapore to improve the functional efficiency in a city by using applications and smart technology (Plan Malaysia, 2019).

Smart cities use advanced technologies and data analytics to improve the quality of life for their citizens, increase the efficiency of infrastructure and services, and promote sustainable economic growth (Jose Sanchez Gracias & Gregory S. Parnell (2023). The introduced smart city concept is in line with the Sustainable Development Goals, especially the 11th agenda which is Sustainable Cities and Communities which aims to make cities and human settlements more inclusive, safe, resilient and sustainable (United Nations, 2019). A city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens (Giffinger et al., 2007).

The concept of smart cities implemented in Malaysia is to have 16 Policies, 36 Strategies & 112 Initiatives and 94 indicators to make cities more competitive and at par internationally in addition to providing cooperation between stakeholders and strategic planners and enabling municipal issues to be overcome (Malaysia Plan, 2019). In Malaysia, seven main domains are outlined to represent the priority areas in the development of Malaysia's Smart Cities, namely:

1. Smart Economy
2. Smart Living
3. Smart Environment
4. Smart Governance
5. Smart Mobility
6. Smart Digital Infrastructure

The smart economy, smart people, smart governance, smart mobility, smart environment and smart life are examples of this (Deloitte, 2015; Khatoun & Zeadalli, 2016). The implementation of the Smart city concept is one of the main agendas in national development. Without the aspect of safety in city life, it is difficult for the people to have a well-being of life. George Town smart city has five main domains namely Smart Community, Smart Environment, Smart Mobility, Smart Economy and Smart Government. However, this study focuses on the difference in the level of security before and after Smart city concept in solution of crime issues in Georgetown Penang. The rapid urbanization process has caused an increase in the number of people in all cities around the world. This causes crime to increase.

The issue of urban crime often becomes a hot conversation from time to time and creates a feeling of insecurity among urban communities (Rasidah Sakip, 2011). This can also be proven by various criminal cases in the city such as theft of property, injuries, robbery, grazing, robbery and other cases that can cause loss of life (Daily News, 2020). The community is worried and concerned about the dangers and effects of crime that are difficult for society to accept in the current challenging times. Careful and balanced planning needs to be done to ensure that the quality of life in the city will always be good and in turn can increase the productivity of its citizens (Nor A'aini 2009). A study by Asmah (2005) stated that the community that exists in a country is the most important element in creating a peaceful atmosphere in the country.

As we know George Town is an urban area that has a high crime rate compared to other areas in Penang. It is because if compared to other smart cities around the world, the level of

the crime index in Malaysia such as Kuala Lumpur, Johor, Selangor and Penang is still considered to be at a high level and needs to be improved especially in George Town Penang. It is because the state government hoped to lay a stronger foundation to bring Penang to greater heights by being committed to its Penang2030 vision 'A Family-Focused Green and Smart State that Inspires the Nation.

Furthermore, Penang is the first state in Malaysia to introduce facial recognition system for CCTVs. The IOC controls over 1,000 smart CCTVs installed all over the state which will help the police track down wanted criminals and reduce crime rates in the state. The CCTVs can also detect and alert authorities for immediate action. Under the Penang Smart cities Initiative, 73 initiatives involving smart government, smart community, Smart mobility, Smart environment, and smart economy have been outlined.

Therefore, the main purpose of this smart city development concept is to reduce crime by applying the concept of smart solutions developed by the administrators to provide a safe environment to improve the quality of life of the people. However, with the availability of technology and smart applications can lower the crime rate in the city. This can be proven with the following statistics.

Crime that occurs in Penang shows a decrease from year to year, from 5541 cases in 2017, to 5008 cases in 2018 and further to 4692 cases in 2019 (Royal Malaysian Police Penang, 2020). Although the number of crimes that have occurred has a decrease for the last few years, it is still at a worrying level (Najib, 2020). Therefore, is very important to be studied the difference in the level of security because we can evaluate the effectiveness of the smart city development that has been done by the administrator in improving the city's security and the city's citizens' sense of security.

Study Area

The study focuses on the city of George Town, Penang because the area has the highest incidence of crime in Penang before and now experienced a decrease in crime cases from year to year. George Town is an area that has been improved and redeveloped by applying the smart city concept to solve municipal issues. George Town Smart City is in the North-East district of Penang where it is a settlement area, administrative center, business, tourist, education centre. The Northeast region is a densely populated area with the largest population in the smallest area (119 km2) compared to other regions (DOS Penang, 2020). George Town Smart City is located at coordinates 5°24′52.2″N 100°19′45.12″E/ 5.414500°N 100.3292000°E. The map below shows the study area which is the smart city of George Town. In terms of ethnicity, the Chinese represent 57.8% (340.3 thousand people), followed by Bumiputera representing 22.5% (132.6 thousand people), Indians 10.1% (59.7 thousand people), and non-citizens representing 0.4%(53.3 thousand people).

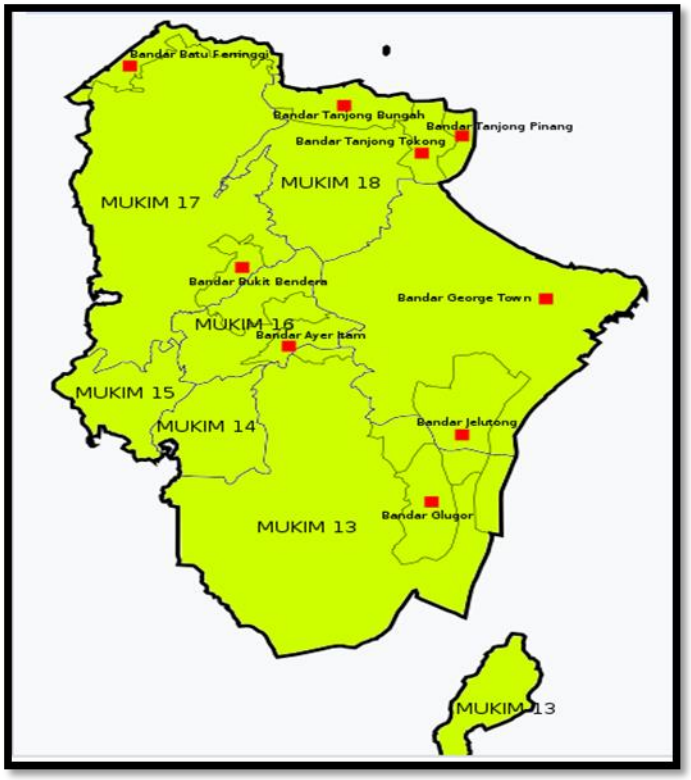

Figure 1: The city of George Town

Materials and Methodology

A mixed method approach was applied in this study involving questionnaire instrument and in-depth interviews. Questionnaires were distributed to 400 respondents consisting of traders, residents of the surrounding area, as well as workers working in the city. Meanwhile, ten people were interviewed in-depth using purposive sampling involving traders, authorities such as the Penang City Council and the Police.

Material

To obtain information for this research, several data collection techniques were utilized such as preliminary surveys, followed by actual field work (consisting of Questionnaire Surveys and in-depth interviews). A preliminary survey was conducted in the study area to observe the security issues in the city. In addition, a preliminary survey was also conducted to study the smart initiatives and smart technologies that have been made for the development of George Town's smart city. Through this survey, it can give an overview and ideas to study more deeply. The instrument in this study, which is the questionnaire, was built and distributed at the later stage but before that a preliminary study was conducted on 30 respondents to test the Cronbach Alpha value. The Cronbach Alpha value obtained was 0.90 which shows that the research instrument is in good condition and can be used to continue the study.

Following that, the final questionnaire was distributed in a targeted manner so that the data can be collected accurately and correctly. In the questionnaire, there are open and closed

questions for the respondents to mark. To analyze the questionnaire, SPSS version 24 was used for the data involving profile of 400 respondents. The selection of respondents involves those living in George Town smart city area, including traders who are doing business in the markets, public employees as well as private employees who work in George Town area. This is because they are more knowledgeable about the area and the researcher gets more accurate information straight from them. The study also interviewed residents, traders, authorities such as Penang Municipal Council and Police Department in the Northeast IPD. Data triangulation was used to increase the reliability of the study. The determination and calculation of the sample size stated by Krejcie & Morgan (1970) was used to determine the sample size of this study. According to Krejcie & Morgan (1970), the procedure to determine the sample size is based on the following formula:

S = Sample Size
X2 = Table of Chi-square Values for 1% at the confidence level of 3.841
N = Population Size
P = Population Ratio
d = Degree of Accuracy

To test the levels, mean values and standard deviations are used. The following is a table of mean values referred to in this study (Creswell, 2014).

Level	Mean Value
Low	1.00 – 2.33
Moderate	2.34 – 3.66
High	3.67 – 5.0

Methodology

Figure 1 below shows the conceptual framework in this study. The process of dense urbanization creates various problems including crime. With the increase in crime rates in urban areas, the concept of smart cities was introduced to solve crime problems by using technology and smart applications. In this study, the community in the George Town area and local authorities such as the Penang State Government, and the Police became the respondents of this study. This study aims to examine the difference in the level of safety before and after the smart city concept was introduced to solve the crime issue in George Town Smart City. The results of this study reveal the difference in the community's sense of security before and after the smart city concept in solving crime issues in Georgetown Smart City.

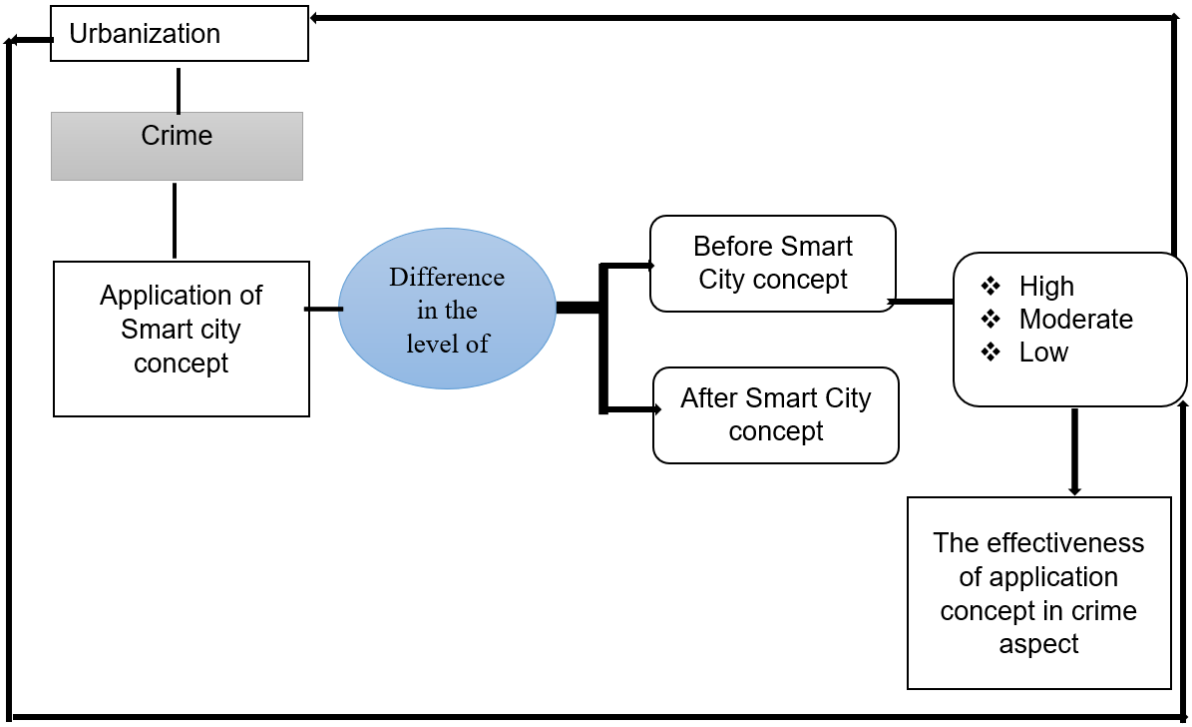

Diagram 2: Conceptual Framework

Source: Fieldwork, 2022

Profile of Respondents

The table below shows the profile of the respondents of the study involving 400 respondents. The majority are among men which are 222 people 55.5%, and 178 female respondents which is 44.5%. As for age, most respondents are aged 30 to 39 years, which is a total of 145 respondents. While one percent equal to 4 respondents are over 70 years old. Therefore, the mean age of the respondents was 39.36 ± 10.822 where the minimum age of the respondents was 20 years, and the maximum age of the respondents was 88 years. The mean value of respondents residing in George Town is 19.52 ± 16.234 where the minimum period of residence is 1 year, and the maximum period of residence is 71 years.

As for religion, most respondents are Muslim, which is a total of 180 people, equal to 45.0%, followed by Buddhists, a total of 124 people, equal to 31.0%. While the rest are Hindus as many as 60 people equal to 15.0 percent followed by Christians as many as 29 people equal to 7.3 percent and then there are adherents of the Taoism religion which is a total of 7 people together with which each recorded a total of 6 people equal to 1.8 %.

As for the distribution of the respondents' race, most respondents are Malays which is 33% equivalent to 132 respondents, followed by Chinese which is 39.5% equivalent to 158 respondents and the rest are Indians and others which is 27% equivalent to 108 people 0.5% respondents equal to 2 people are others. In terms of respondent status, the most respondents are married which is 74% equivalent to 296 people while for the unmarried which is 22.3% equivalent to 89 respondents. The rest are widows or widowers, which is 3.8% equivalent to 15 respondents.

As for the level of education, most of the respondents consisted of 34.5% equivalent to 138 students with SPM degrees followed by studies at the Diploma level which consisted of 23.3% equivalent to 93 respondents. While 9% equal to 36 people from the respondents have a Malaysian Skills Certificate (SKM) / Equivalent Skills. Next is that at bachelor's degree and master's Degree Level each is as much as 14.3% equivalent to 57 respondents, and 7.5% equivalent to 30 respondents. While the level of Doctor of Philosophy (PHD) is 4.0 percent equivalent to 16 respondents while the rest is other education or less than SPM which is 2.5 percent equivalent to 10 respondents.

In terms of employment, the most respondents are working as traders which is 43% equivalent to 172 respondents followed by working in the private sector as much as 30% equivalent to 120 respondents. Next is as much as 15.3% equivalent to 61 respondents are working as civil servants followed by self-employed groups of 9.8% equivalent to 39 respondents. While respondents who do not work are 6 respondents equal to 1.5%. The rest are students who work part-time by 0.5% equivalent to 2 respondents.

As for the period of residence, the most respondents have resided for more than 20 years in the smart city of Georgetown, which is as much as 40 percent. Next is followed by 32 percent of respondents who reside between 1 to 9 years and 28 percent of respondents who reside between 10 to 19 years in the Smart City of George Town.

In terms of the monthly income of the respondents, the most of respondents of the study have an income between RM2000 - RM2999 which is a total of 149 respondents equal to 37.3 percent, followed by an average salary of RM3000-RM3999 which is a total of 110 respondents equal to 27.5 percent. Next is as much as RM5000 and above as many as 73 respondents equal to 18.3 percent, RM1000-RM1999 as many as 43 respondents together with 10.8 percent and next is less than RM1000 which is as many as 20 respondents equal to 5.0 respondents. Based on salary, it clearly shows that the respondents of the study area have a high average monthly salary. The table below shows the profile of the respondents of the study involving 400 respondents.

Table 1: Respondent profile

		Frequency	Percentage
Sex	Male	222	55.50
	Female	178	44.50
Age group (year)	20-29	69	17.25
	30-39	145	36.25
	40-49	114	28.50
	50-59	46	11.50
	60-69	22	5.50
	>70	4	1.00
Religion	Islam	180	45.00
	Buddha	124	31.00
	Hindu	60	15.00
	Christian	29	7.25
	Taoism	7	1.75

Ethnicity	Malay	132	33.00
	Chinese	158	39.50
	Indian	108	27.00
	Others	2	0.50
Marital Status	Single	89	22.25
	Married	296	74.00
	Widow	15	3.75
Education Level	Uneducated	1	0.25
	<SPM	10	2.50
	SPM	138	34.50
	STPM/ STAM	19	4.75
	Malaysian Certificate of Excellence (Skill Development)	36	9.00
	Diploma	93	23.25
	Degree	57	14.25
	Masters	30	7.50
	PHD	16	4.00
Employment	Unemployed	6	1.50
	Student	2	0.50
	Self-employed	39	9.75
	Government	61	15.25
	Private	120	30.00
	Business	172	43.00
Monthly Income	<RM1000	20	5.00
	RM1000 - 1999	43	10.75
	RM2000 - 2999	149	37.25
	RM3000 - 3999	110	27.50
	RM4000 - 4999	5	1.25
	> RM5000	73	18.25
Residence Period (Year)	1-9	128	32.00
	10-19	112	28.00
	>20	160	40.00
	Total	400	100.00

Source: Field Work (2022)

Discussion of The Difference in The Level of Sense of Security Before And After the Smart City Concept in Solution of Crime Issues in Smart City George Town

The study found the difference in the level of security before the concept of Smart City and after the concept of Smart City showed a change from a low level to a moderate level. Table 1 shows where the mean value of 4.17 and the standard deviation of 0.72 indicate the low level of respondents' sense of security before the concept of Smart City. After the concept of a smart city was introduced, the respondents showed an increasing sense of security, which is at a moderate level. Table 3 shows the mean, standard deviation and level of sense of security before and after the smart city concept in solution of crime issues in smart city George Town.

Item	Mean	Std. Deviation	Level
S1. Before the concept of smart city	4.17	0.72	Low
S2. After the concept of Smart city	6.50	0.95	Moderate

Source: Field work, 2022.

This clearly proves that the application of the smart city concept in solving crime issues in the Smart City of George Town shows a better and more positive development over time. This is also proven by the crime cases that occur in George Town City are also decreasing. Here are the statistics of crime incidents that are decreasing by year.

Table 4: statistics of crime incidents in George Town

	2015	2016	2017	2018	2019
Violent Crime	1231	1038	1078	891	951
Property Crime	5255	4892	4463	4117	3741
Total	6468	5930	5541	5008	4692

Source: Polis Diraja Malaysia, 2022

According to an interview with Penang IPD Criminal Investigation Division (2022), criminal activities in the city of George Town show a decrease in cases even among areas with high crime rates. This is not only due to the pandemic that has hit the world, but also due to the cooperation made by the community that helps to use advanced technology such as video recording, the transmission of crime locations quickly, and the use of smart technology that is used by the community and that is developed by the Government and parties private. Research by Lee Lamm Thye (2016), crime should be dealt with from various angles and all parties are responsible in helping the authorities to deal with crime problems. The quality of community life is important and needs to be given more attention (Asyraf et al., 2014).

With the variety of applications, mediums, or portals that are used as a platform for information variations consisting of text, audio and video, the options for sharing information are wider and more effective for the police and city administrators to improve security in the smart city of George Town. Therefore, a comprehensive, systematic and transparent planning is required in addition to being assisted by transparent, efficient and effective coordination so that the goals of urban planning and development are fully achieved (Dani 2008).The way people live has undergone many changes, along with the development of internet technology (Ahmad Fauzi, Norhasni & Andi, 2014). Life in the city is a yardstick of civilization because it symbolizes the progress and development of community thinking (Nik Hassan and Zuliskandar, 2011).

The development of technology or online applications brings changes to the daily life of the community in processing, sharing and disseminating information (Mohd Azul Mohamad Salleh et al., 2016). Smart applications and technologies that are developed can provide opportunities for users to communicate, access, share, and disseminate information to other users not only in Malaysia but throughout the country. A study by Andrews (2011) argues that through social media applications users can read, share and know what is displayed, as well as the activities and developments of other users on certain social media.

Furthermore, the increase and awareness of the use of technology such as CCTV, direct monitoring from the control room by the authorities, can help the police to detect and take early action in the event of a crime. The study also found that technology such as facial recognition systems, fingerprints help a lot in eradicating crime incidents with the help of technology that is being improved.

Conclusions

Based on the above analysis, it can be concluded that the development of George Town smart city is important in solving security issues in the city today. Criminal issues such as theft, drug distribution and addiction, assault, vandalism, various nuisances also create a sense of insecurity among the community. Therefore, not only in terms applications and smart technology, but the strength of social bonds in the community is very necessary to increase the sense of security among the community in the smart city of George Town.

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