

How Smart can a City Be? Conceptual Framework for Kampung Bharu, Kuala Lumpur

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Abstract

Cities today are facing numerous challenges due to the rapid urbanisation. Cities are often the centre of economic activities and the focal point for tourist and investors. As a result of the concentrated economic activities, cities are facing various environmental, social and economic challenges, which added pressure on the city organisation and infrastructure, as well as the need of local authorities to perform their task efficiently. Today, the assistance of smart technology is important in city development and management. Nevertheless, the steps that have been taken during the implementation is increasing quickly, as these inventive technologies offer huge benefits and potentials in solving key issues of most cities including Kuala Lumpur. Consequently, urban areas in both developing and developed countries currently aimed at incorporating innovative technological solutions to transform into smart cities. In line with this, the Malaysian government aims to transform Kuala Lumpur and its neighbouring areas as a liveable, resilient and exciting metropolitan city. In line with this vision, this paper discusses the benefits of implementing smart city components, through the proposed smart city conceptual framework for Kampung Bharu. This paper also highlights the relevant components of smart cities that can be proposed in order to enhance the Kampung Bharu's quality of life, economic growth, as well as its environment, specifically at Kampung Bharu Food Haven (KBFH) areas, which are located at Jalan Raja Muda Musa, Jalan Raja Alang, Jalan Raja Uda and Jalan Raja Abdullah. Among the proposed smart city components are smart infrastructure, smart waste management and smart services. All components intended to transform Kampung Bharu into a Smart City that can contribute to improved quality of life.

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1 INTRODUCTION

Cities today are facing numerous challenges due to the rapid urbanisation. Cities are often the centre of economic activities and the focal point for tourist and investors. As a result of the concentrated economic activities, cities are facing various environmental, social and economic challenges, which added pressure on the city organisation and infrastructure, as well as the need of local authorities to perform their task efficiently. Today, the assistance of smart technology is important in city development. Nevertheless, the steps that have been taken during the implementation is increasing quickly, as these inventive technologies offer huge benefit and potential in solving key issues of most metropolitan cities [1], including Kuala Lumpur. As a consequence, major urban areas in both developing and developed countries transform into smart cities. The Malaysian government aims to transform the Kuala Lumpur and its neighbouring areas as a liveable, resilient and exciting metropolitan city [2]. In line with this vision, this paper discusses the benefits of implementing smart city components, through the proposed smart city conceptual framework for Kampung Bharu. This paper also highlighted the relevant components of smart city that can be proposed in order to enhance the Kampung Bharu quality of life, economic growth, as well as its environment, specifically at its food haven areas, which are located at Jalan Raja Muda Musa, Jalan Raja Alang, Jalan Raja Uda and Jalan Raja Abdullah.

2 SMART CITY CONCEPT

The concept of smart city focuses on many aspects such as human investment, social lifestyle and the use of information technology (ICT) to improve urban services

and delivery [3]. The concept was introduced in the 90's when there is a significant need to address the issues that should be tackle by particular stakeholders to manage cities [4] [5]. In order to achieve a successful smart city, understanding the need of urban community is the most important step should be taken by all the stakeholders [6]. Though the concept of smart city have been widely discussed in recent years, yet there is still lack of consensus to the definition of a smart city. Smart city initiatives revolves around four scope; technological, organizational, collaborative and experimental [7]. Numerous authors have designed the conceptual and typological methods in providing a systematic understanding of smart city concepts and strategies. Some authors emphasis on the important components of smart cities, the importance of information and communication technology (ICT), understanding the balance between people, cost effective instrument, sustainable resources, institution and economic growth as crucial for a city to be considered smart [6].

3 METHODOLOGY

The study conducted site observation to collect relevant information and to assess the current issues of Kampung Bharu, a traditional village located in the heart of Kuala Lumpur. This paper also reviews and analyses previous studies on the concept of Smart City and its implementation. The process is crucial prior to establish a proposed framework of Smart City for Kampung Bharu, Kuala Lumpur.

4 CASE STUDY: KAMPUNG BHARU

The development of Kampung Bharu Kuala Lumpur is an important benchmark

for the present situation of the Malay community in Kuala Lumpur. This Malay settlement area recorded many nostalgia, history and events that greatly affect the continuity and struggle of the Malay community in large urban area such Kuala Lumpur. Located in the heart of Kuala Lumpur, Kampung Bharu is known as the most popular choice for people to enjoy local food. A variety selection of restaurants and food kiosks are one of the characters that makes Kampung Bharu as “food haven” of Kuala Lumpur. Kampung Bharu is also one of DBKL's Food Trail Kuala Lumpur spots [8]. For this study, the focus in implementing the Smart City's element are the food haven's area indicate in figure 3. Apart from that, the impact in implementing the Smart City element into the study area will also give benefits to the local community. Common issues faced by visitors that come to Kampung Bharu are lack of parking, traffic congestion and safety.



Figure 3: Food Haven Kampung Bharu (yellow hatched) located in the strategic area.

Kampung Bharu is located in close proximity to various important areas such as KLCC, Chow Kit, Jalan Tunku Abdul Rahman and Kuala Lumpur General Hospital. The variety of buildings and mixed land use in the surrounding areas such as

offices, public buildings, shop houses and commercials contributed to the high volume of people visiting KBFH as a place to eat and dine. Apart from that, the Masjid Jamek Kampung Bharu, located in the boundary line of KBFH, is a powerful placemaker to facilitate people to remember the area. Also, the study found that part of Masjid Jamek Kampung Bahru's minerate has the potential to become a landmark for the KBFH area. The high structural design along Jalan Raja Abdullah can help people to navigate to the area. In addition, Jalan Raja Alang, directly facing KBFH, is a very significant link between Chow Kit and Kampung Bharu. Nevertheless, the study found that although KBFH has a strong urban context, there are some issues that need to be addressed to strengthen the development of Kampung Bharu as a sustainable city through the implementation of smart city elements. Findings from the observation analysis revealed the following issues and problems.

- i. Traffic congestion along the KBFH perimeter road – Jalan Raja Abdullah, Jalan Raja Muda Musa and Jalan Raja Mahmud.
- ii. No connected walkway from LRT Kampung Bharu to KBFH area.
- iii. Poor quality of walkway inside KBFH.
- iv. Lack of parking space.
- v. Conflict between vehicles and pedestrian (who buying from stalls)
- vi. Loading and unloading space for restaurant and stall operation.
- vii. Unclear food waste management operate by all food stall owner.
- viii. Lack of street lighting.
- ix. No open space for any community activities and gathering.
- x. Conventional type of business in each restaurant.

5 KAMPUNG BHARU SMART CITY CONCEPTUAL FRAMEWORK

Smart cities can take many shapes, and not all solution make sense in all districts [9]. The smart city conceptual framework for the Kampung Bharu, is based on the character and issues discussed earlier. All important issues, problems, characteristics, people, location, size, population, surrounding, cultural, speciality and uniqueness of the Kampung Bharu are taken into account in designing this conceptual framework. As stated early on, this paper will highlight on the Kampung Bharu Food Haven (KBFH) as a focal area, owing to its strong influence and impact on the Kampung Bharu community, economy, environment, population and location.

5.1 SMART CITY INFRASTRUCTURE FOR KAMPUNG BHARU

In order for Kuala Lumpur to achieve a world class city status, the smart infrastructure elements have to be implemented in Kampung Bharu area to tackle all related issues. Infrastructure such as road, parking, pedestrian walkway, landscape and its sewerage system must be aligned with the latest technologies that will lead to better and sustainable lifestyle inside Kampung Bharu. The smart infrastructure such as smart road, smart parking system, smart lighting and smart waste management are some of the global smart city implementation that being used by any smart city in the world that will integrate to the existing and future planning on each local authorities' strategies.

5.1.1 Smart Road System

In order to enhance the quality of infrastructure in the KBFH area, integration between related roads are very important. Through observation, Jalan Raja Alang and Jalan Raja Muda Musa are two important roads contributed to the vibrant atmosphere caused by the food stalls and restaurants. The study also found that both roads were among the largest contributors to traffic congestion in the KBFH area. Hence, the study suggests to proposed *shared space* concept to be implemented with priority given to accommodate pedestrians. The road perimeter for vehicles such as cars, motorcycles and others are to be relocated to Jalan Raja Ali, Jalan Hassan Salleh to Jalan Raja Muda Musa which leads directly to Jalan Raja Uda. Among the proposed elements include the permeable surfaces for the pavings, the use of glow in the dark materials for the lines on the road and the Electric Priority Lane for electric vehicles. This is to promote the reduction of carbon emissions that can be generated through vehicles and energy generated from the infrastructure itself.

5.1.2 Smart Parking System

Parking is one of the main issues faced by both visitors and also local people at KBFH. Most parking spaces provided within the area is owned by residents in Kampung Bharu itself. This is one of the reasons most of the parking space provided in the area are usually not safe and not proper. This problem also leads to the safety of vehicle owner as most of the parking provided are very limited with lack of basic infrastructure and security wise. Hence, the study proposes Smart Elevated Parking System to be implemented in the area. From the observation study, there are two locations

are recommended for *Elevated Parking System* to accommodate visitors who come to KBFH. The elevated parking system are linked with the smart parking system which consist of payment and monitoring system for each vehicle via application from smart phone and also integrate with authority - PKB or DBKL for record and observation purposes.

5.1.3 Smart Lighting

The lack of street lighting in the KBFH area is one of the problems that must be address in order for Kampung Bharu to contribute some part of Kuala Lumpur as a world class city. The use of street lighting can lead to two interests which are security and also energy saving. Through the observation, most existing street lighting create a conflict with the existing landscape which become the consequences of the lack of lighting lux in that particular area. This conflict will lead to the public safety issues especially to the people who come to KBFH for dinner. The *'Connected Security Lighting System (CSLS)* was proposed in the area involving many pedestrian activities. CSLS is a smart lighting system designed to reduce the level crime of pedestrian. A Bluetooth-connected system directly to application via smart phone and the use of sensors in each lamp post capable that of controlling the brightness of the lux [10]. The sensor indirectly able to identify early crime movements and integrate with the monitoring authority system involved for the purpose of early prevention.

5.1.4 Smart Waste Management

In implementing the smart city and its components to the Kampung Bharu, the great challenge is how the community of Kampung Bharu manages the waste in

appropriate way with low cost and efficient. One of the main concerns with our environment has been solid waste management, which have negative impact not only on the health and environment of our society quality, but also in influencing tourist decision to their chosen destination, which smart city aims to improve [13, 14]. The location of the Kampung Bharu in a very congested areas near to the city centre, has made waste management is a big challenge. Factors contributing towards this challenge are, its location, size of the area, receive a lot of visitors due to its popularity as a Malay's food hub in Kuala Lumpur as well as its residents, where most of the residents reside within their food stalls or shops compound or at the same building or adjacent to their business premises. Therefore, the process of waste collection, separation at source, transporting the bins or containers daily and quickly, are important to avoid any diseases, contaminations, any bad images, as well as to maintain the location as one of tourism destination [15]. At present, the waste management system at Kampung Bharu involve a large number of employees being appointed by the Dewan Bandaraya Kuala Lumpur (DBKL), to attend a certain number of dumpsters and this is done every day periodically. This leads to a very inefficient, costly and unclean system in which some dumpsters will be overflowing and some dumpsters might not be even half full. Smart waste management system is introduced in which each dumpster is embedded in a monitoring system which will notify the corresponding personnel of the Kampung Bharu if the dumpster is full. By using this system, it is also possible to separate wet and dry waste into separate containers [16]. Therefore, this smart system technology provides an effective solution to

waste management problem at most prominent roads where majority of the food stalls, cafes, shops and public areas of the Kampung Bharu located.

5.2 SMART CITY SERVICES

Smart cities leverage information and communication technology (ICT) to enhance quality, performance and interactive of urban services with the goal to reduce cost and improve services to citizens [17]. Through smart city services with the help of the Internet of Things (IoT) solution for smart city, the IoT and connected technologies shall help in improving the social economic welfare, quality of life of the Kampung Bharu community, reducing the impact of urban activities, optimising expenses and promoting community participation. It is one of the efficient way by engaging people with important information and awareness through the smart applications in any devices [18]. To achieve this goal, the government can invest in-house teams to develop apps or invest in off-self solutions. Through this great platform, small to medium size homegrown business in Kampung Bharu will have the opportunity to market their products online. This viable method of smart apps can do the same job as needed, while reducing costs of advertisement and promotions, rental costs, and time investments

5.2.1 Food and Beverage Kiosks

With this smart service system, the food chain particularly the medium and small size, can roll out the technology along with simplified their kitchen displays, subsequently, shall help the business owners of Kampung Bharu to decrease their operating costs. In addition, the smart kiosks system shall provide necessary data such as, food nutrients, ingredients, availability, time,

preparation periods, as well as cashless services for payment. These interactive and informative smart kiosks, subsequently helps users with health issues, allergies, queue waiting-time, spaces, security and safety via cashless payment as well as bring more business to the areas by encouraging more food services namely, FoodPanda, HonestBee, GrabFood to Kampung Bharu. The use of this smart technology, will eases the process in ordering food, while helping to reduce waiting time, as well as reduce traffic congestion around the KBFH areas.

5.2.1.1 Safe City Monitoring

To protect the residents and tourists, Iot sensors shall be installed around Kampung Bharu particularly housing areas, and KBFH areas such as, Jalan Alang, Jalan Hamzah, Jalan Raja Muda Musa, Jalan Raja Uda where all food cafes, stall, shops are located and congested with locals and tourist. The IoT sensors will deliver actual information to relevant departments in case of emergencies, if the sensors sense any suspicious activities and incidents. Smart sensors in street lights, surveillance cameras, and real-time monitoring for actuators mechanism shall be installed in areas with high potential of crimes and accidents [22]. These security measures can be taken in various forms of smart devices such as rescue drones, smartphones notifications as well as digital boards for public announcements [23].

6 CONCLUSION

From the perspective of a smart city, this paper finds that the successful implementation of a smart city lies in the value of every decision made, and the technique of the decision performed. In the case of Kampung Bharu, the impact of the

use of smart technology can help to create a more sensitive and responsive community towards the surrounding environment, meet the current needs of the residents and to improve the quality of life. Unfortunately, most of the studies and plans implemented are more towards smart city concepts that prioritise the advancement of technology application solely, rather than the need of the people. The local government on the other hand, is the main driver of the smart city, to ensure the objectives are deliverable and successful. Therefore, smart cities require a smart government, and the government approach should first define key segment of the people, as such, any method of solution that has been chosen shall be based on the needs of the people. To make a successful smart city, technological innovation management of government is important, especially in the use and management of information that can be revolutionised in every network, in order to empower people through technology. In addition, the process of shifting from a traditional city to a smart city, will not occur overnight, inter-governmental collaboration, private organisations and smart citizens are important, in successfully create a liveable and sustainable smart city for better quality of life.

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