Designing a Sustainable Framework for Inclusive Smart City: Harnessing Findings and Lessons from a Study of Selected Local Governments in Kedah Malaysia

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ABSTRACT

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The smart city concept originates from the search for building an equilibrium approach to sustainable development that aims to synergize environmental dimensions with economic and social changes. It is estimated that by 2050 more than two thirds of the world population will live in cities. However, the world has witnessed that rapid urbanization can lead to greater urban poverty, massive deforestation, profound social instability, water crises, and devastating spread of diseases. These risks have further exacerbated as more people have migrated from rural areas to cities. How effective these risks can be addressed will largely depend on how well the cities are governed. As such, the smart city concept is an innovative way to try to mitigate those risks. By creating a balance that links economics, social, and environmental dimensions, it is hopeful that rapid urbanization will now be driven by creating a sustainable quality of life for citizens that empower them to collaborate with the city councils to develop the city. The planned urbanization will now incorporate residents' quality of life, social inclusion, and economic opportunities while reducing the impact of environmental degradation. Therefore, an urban development model that is more social and environmentally friendly is important to ensure that our cities are both efficient and resilient. Building upon this foundation, this paper aims to examine to what extent local governments in Kedah are ready to design a smart city

concept that focuses on citizen needs, embracing citizen-centric design, and promote engagement of citizens and communities. Using qualitative approach that focuses on interviews with local administrators, the study hopes to unearth current urban development model and whether this development takes into consideration the important of inclusive smart city as part of the government initiative to pursue a sustainable quality of life for the city residents in Kedah. The findings of this study reveal four important themes: inclusivity, governance, implementation, and challenges. Smart city concept is a viable solution to solve the dilemmas of urbanization. However, transformation to smart city requires the design of a more inclusive and accessible features to advance and promote engagement of all citizens.
Keywords: *Smart City Concept, Inclusivity, Sustainable quality of life, Local Governments, Kedah.*

INTRODUCTION

In the last few years, smart city concept has been gaining popularity among local government administrators. It has been widely embedded into strategic development planning for the future. Apart from making the city friendlier to economic and social sustainability, this concept has enabled the cities to focus on creating a sustainable environment for the years to come (Mori dan Christodoulou, 2012). This is important because according to The United Nation Population Studies, there is an increasing rate of mobility from people moving from villages into the cities and this rate is expected to reach 70 percent in 2050 (PBB, 2008).

In Europe, it is estimated that more than 75 percent of people have migrated to cities and is expected to reach 80 percent by 2020 (EEA, 2016). The urbanization phenomenon takes place because of greater work opportunities and rapid industrialization. The trend of urban migration seems more pertinent in the developing world in which statistics have shown that more than 20 million citizens have migrated to the urban cities in Asia, Latin America, and Africa (PBB, 2018). Consequently, while rapid urbanization speeds up the economic growth, it also entails social problems as well as environmental degradations. The increasing social and and environmental issues facing many cities in the world today have encouraged researchers to search for answers to these issues. The potential solutions include creating a smart city that enables city administrators to deal with depressing social issues, falling air quality index, high unemployment, affordable housing, increasing crimes, poor public transportation, and illegal squatters. These problems have pushed the city administrators to find proactive policy prescriptions to alleviate these challenges. Using technology as the leverage, cities are using data and technology to make themselves inclusive, smarter, more effective, better connected, and more productive. This smart city

concept has been tried and tested in many developed countries like America, UK, and Australia. While smart city concept attempts to integrate social and economic opportunities into the design of the cities, it also advocates sound environmental policy that focuses on greater environmental and energy sustainability (Turcu, 2012).

According to International Labor Office (ILO), it is smart to invest in improvement of accessibility in infrastructures and services rather than spending more money to focus on rebuilding, renovating or redesigning existing inaccessible infrastructure or facility to make them more accessible and inclusive. Taking into account the loss of human capital and opportunity cost incurred due to inaccessibility, economies stand to lose a great deal more when significant groups, such as persons with disabilities are excluded from participation.

Importantly, the current city reform aims at ensuring that future cities, towns and basic urban infrastructures and services are more environmentally accessible, user-friendly and inclusive of all people's needs.

In recent years, designers and developers have been encouraged to think more about movement within the city. Accessible design, usable and inclusive design, and universal design are all approaches to design that can make it easier for everyone to use, including people with disabilities and older age. Such concepts focus not only on buildings, transport infrastructure, public space and parks, but also to products, services and facilities that help improve the movement and connectivity of all citizens. As a result, opening up the city to all by improving the accessibility for all urban residents will involve a wide array of different types of designers.

In this context, there is a need to view inclusivity as an investment in a public good that contributes to effective, sustainable and equitable development for all and not merely an issue of cost or compliance. This will involve fundamental reconsiderations of policies that address the inclusivity especially for people with disabilities, and to focus on measures that contribute to accessibility for all residents.

For example, London has an automated traffic congestion pricing program, using its cameras to log and charge cars entering the central part of the city. In Korea, developers have been building Songdo, a smart city, from the ground up with connected infrastructure and building systems. Singapore has implemented dynamic routing systems for its public buses and installed flood sensors and monitoring throughout the island. Singapore was chosen as the "Smart City of 2018" at the Smart City Expo World Congress in Barcelona, Spain in November. In Barcelona, which is already known for its information technology projects, officials have taken note that being a smart

city is as much about serving people as it is about implementing devices. They are now trying to use their technology to improve democratic participation among their citizens.

BACKGROUND

The concept of smart city varies in its application. Some cities prefer to use intelligent to denotes the various application of technology in their services and design. Others have opted to be called digital city or hybrid city to reflect the integration technology in regard to infrastructure, governance, and services Holland, 2008). However, the common understanding of smart city centers around a convergence between people, technology, and services and how technology fosters the inclusivity of people and their environment to search for innovative solutions that are holistic which include creating a smart economy, smart living, smart governance, and smart environment (Donaghy, 2017; Travis, 2017).

Malaysia is taking steps to keep pace with the new initiatives, especially in new developments such as Cyberjaya and Putrajaya near Kuala Lumpur and the Iskandar Region in Johor. Penang intends to release a refreshed Penang Structure Plan 2030, with a key pillar being to transform the state using smart technologies. Shah Alam which is at the forefront of implementing the intelligent city concept in Malaysia has been actively promoting smart city concept. In developing the smart city blueprint, the city is guided by the philosophy of promoting social inclusion and actively engaging citizens and addressing urban challenges using technology as a key enabler. In doing so, the state government allocated RM22mil for the Smart Digital Ecosystem, with RM14mil set aside to develop Big Data Command and Control Centre as well as a Smart Apps Development Platform (Selva, 2016).

In addition to Shah Alam, George Town has also implemented some well-known smart city initiatives. For example, implementing a smart transport grid would allow for real-time adjustment of traffic light timings to improve traffic flow. Improving public bus tracking and monitoring would ease the daily grind for commuters and encourage them to drive less. The city could also improve and automate water use monitoring, waste handling and recycling. They are now trying to use technology to improve democratic participation among their citizens. Such new idea in smart city development augurs well with the commitment of the new federal government to improve transparency and accountability.

The climate and built environment in Malaysian cities also call for a specific, tailored approach. Since we are in a hot and wet climate, public transport tracking improvements would be beneficial, so that residents are not

running or waiting for buses in the sun, or getting wet in the rain. Smart building technology with sensors and shades would allow more efficient air-conditioning use and reduce overall energy costs.

The challenges with making urban areas more inclusive will be plentiful, further compounded by the diversity of Malaysia as a whole with each locality facing different challenges. But as with most issues, it starts with the people. We need to have policies and initiatives to foster smart cities and smart citizens at federal, state and local levels of government.

Local governments need to create the right partnerships among the government, private sector and local communities to make decisions about the best future cities we want and how to realize them. However, With Malaysians quickly adopting new technology, as proven by many urbanites' use of mobile apps, the real barrier to smart city implementation in the country is the lack of data transparency versus a tech-savvy population. In addition to that, the push for smart cities implementation is bogged down by energy and financial costs. Maintaining and supporting a city is becoming more expensive. We may no longer afford bureaucratic methods of governance. Transitioning to a new model requires municipalities to train their manpower and review each new policy to identify its efficacy. Some argue that this is difficult to achieve as they are frequently overwhelmed and understaffed (Norainah 2009).

METHODOLOGY

This study employs qualitative method in which personal interviews were conducted with five senior state government officials. Qualitative research design is more appropriate for exploratory research such as this one because it produces actual words of participants in the study and provide multifacet perspectives on the issue being studied. By adopting a qualitative research design, we are able to gain complex and rich details from individuals who are directly dealing with the smart city implementation. This is crucial because existing literature provides little knowledge about the implementation of inclusive smart city concept in Malaysia.

The study utilizes thematic analysis in anaylzing and interpreting relevant data. The thematic analysis offers an approach to interpret, discover, and report clusters and patterns of meaning related to smart city concept. It also allows researchers to categorize topics that are progressively combined into higher-order major themes, the signficance of which lies in their ability to answer pre-determined research questions. The whole process of data analysis is performed and facilitated by using ATLAS.ti Version 8. The table below identifies the respondents for the interview.

Table 1: List of Personal Interview

Respondents	Position	Location
One	Director of State Human Resource Department	Alor Star, Kedah
Two	Secretary of Langkawi Municipal Council	Langkawi
Three	Secretary of Sungai Petani Municipal Council	Sungai Petani
Four	Administrator, State Local Authority	Alor Star, Kedah
Five	Head of Smart City Division, Alor Star City Council	Alor Star, Kedah

In the administration of the interview, we have adopted six steps in line what Creswell (2013) suggested.

Table 2: Preparation for the Interview

Step	Item
One	Identifying the respondents
Two	Determinining the type of interview
Three	Utilizing suitable recording tools
Four	Preparing an interview protocol
Five	Pilot testing
Six	Determing the place of interviews

The interview sessions were conducted between April and May 2019. The duration of the interviews were between 30-45 minutes and the respondents were notified of the objective of research prior to the interview. After the interview, researches performed thematic analysis procedures that involve six phases that include familiarizing with data, generating codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. The following table potrays the main themes, sub-themes, and additional sub-themes of the issues being explored.

Table 3: Summary of Themes and Sub-themes

Themes	Sub-themes	Additional sub-themes
1. Inclusivity	• Context specific • People centered • Technology as an enabler • Promote inclusive development • Partnership	• Specific needs • Technology driven • Address needs of women, elderly, people with disabilities • Collaboration with private sector
2. Governance	• Policy direction • Law and Regulation	• Budgetary allocation • Procurement policies • Accessability
1. Implementation	• Infrastructure • Financial • Human Capital	• Physical facilities • Financial contraints • Shortage of staff
1. Challenges	• Awareness • Existing data on people with disabilities • Accessability • No benchmark	• Acessibility for people with physical disabilities • Design lack accessibility features • Lack of guiding policies/principles

FINDINGS AND DISCUSSION

There are four major themes derived from the interviews. They include inclusivity, governance, implementation, and challenges. The first theme is inclusivity. Smart city concept that focuses on inclusivity has garnered a lot of attention from academicians as well as practitioners. Malaysia has also taken keen interests in developing smart cities that are more environmentally accessible, user friendly, and inclusive of all people's needs. However, designers and developers of such concept agree that building a smart and inclusive city is highly context specific. This means that the needs of specific communities have to be incorporated into the design of infrastructures and services in the city. This argument augurs well with the respondents who indicate that city planners have to be sensitive with their own respective communities before implementing smart city concept. However, to do that, city administrators need to have precise data on the deprived groups. According to respondent two, this is an issue with the state government because the state does not have specific information regarding people with physical disabilities or elderly people. As far as gender is concerned, the data is readily available. To develop and design a city that is sensitive to the needs of various citizens especially people with physical disabilities, it is critical that

enough information is provided to the city planners so that they can design buildings and other facilities that have accessibility standards for all.

Secondly, all respondents agree that investing in technology guarantees indepedence and autonomy for people that constantly feel alienated and slighted by the existing facilities and services. By having digital technologies that is citizen-centric, cities can now reinforce the participation of everyone irrespective of diverse gender, age, and physical abilities. According to respondent five, the City of Alor Setar has committed to use technology to promote participatory governance. This will ensure that digital barrier will not impede the ability of all people to access products and services offered by the city. Finally, respondents also talk about the important for state and city governments to work together with all relevant stakeholders to develop and design infrastructures that recognize the potential of technology as an enabler yet at the same time has the potential to promote inclusivity that specifically addresses the needs of various communities.

The second theme is governance. All of the respondents agree that for smart city concept to be implemented, there has to be a clear policy direction from the government spelling out the direction to implement smart city. This is critical, as in the words of respondent two, "we do not want to be blamed later if the implementation goes wrong." Policy direction is also important because it entails monetary allocation. Since the implementation of smart city requires money, it is imperative that government set aside financial allocation to implement smart city concept. For example, the government of Selangor has allocated 36 million in 2017 to implement smart city ideas in its local governments. Many respondents indicated that although they agree with the concept, they feel the implementation will be difficult if financial allocation is not there. In the case of Langkawi, although the state government has indicated its intention to make the city a smart city, but there has been no financial allocation because the state government has yet to pass the blue print for Langkawi to become a digital city. In the words of respondent two, "without the approval of the blue print, the local government does not have financial means to implement smart city concept."

According to respondent three, the state government is committed to establish itself as the hub for digital city, yet it cannot afford to do it throughout the state. Thus, the implementation of smart city idea will be done in phases and will be based on specific localities and special needs. For example, because Kulim township is set up for industrial area, that local government will be the first city that aims to implement the smart city concept. This is critical because by integrating technology into services, the city will be able to facilitate cooperation among citizens, industries, and government to

ensure sustainable social, economic, and environmental benefits. Therefore, financial allocation still dictates the ability of state government to improve sustainability living of communities through the implementation of smart cities.

In addition to policy, law and regulation are also important for the city administrators to implement smart city concept. Issues of transparency, inclusivity, and bureaucracies continue to be raised by respondents. For example, respondent three opined that procurement process has to be followed if on-line open tender for government projects are to be implemented. He argued that transparency is good but sometimes it can make the job of adminitrators more difficult especially when good regulatory practice (GRP) has to be observed. In addition to that, existing government regulations are not flexible for e-transactions. Complaints keep popping up when customers are not satisfied with the delay of actions by government officials. These delay take place due to old bureaucratic structure that adhere to strict rules and regulations. Furthermore, in regard to accessability, respondent two pointed out that because of income disparity among citizens in the city, there are cases where poor citizens are not able to enjoy smart city initiatives like e-payments or e-services due to the affordability issue. Thus, making every citizen having equal access to technology poses undue contraints on the government due to financial difficulties of the government.

Theme Three relates to implementation. Respondent four indicated that he faced many problems during the implementation of smart city in Sungai Petani. Infrastructure continues to become the stumbling block for effective implementation of smart city. For example, having a digital billboard that could help locals and tourists identify places of interest would be good for tourism industry in the city. However, building a digital billboard is very costly and the city cannot afford to install it. Unless private sector is paying for the billboard, the city cannot afford to have the billboard although it will bring a lot benefits to the city. Secondly, inadequate staff is another issue facing many local governments. Respondent two highlighted that due to shortage of staff, many smart city initiatives cannot be implemented. For example, a web-based designer that updates the progress and actions of the city is important to ensure that citizens can download any relevant information that they seek from the city and address any issues that are deemed important for the city to take. However, employing a web-based designer who is in charge of all the information technology initiatives is costly to some local governments compared to others. Thus, many smart city initiatives cannot be implemented and the city continues to receive complaints online due to the delay in

updating information in the website or other relevant issues pertaining to IT matters.

Theme Four is about challenges of smart city implementation. Although smart city concept is still in the infancy stage in Kedah, the state is committed to transform some of the urbanized cities into an inclusive city especially cities such as Langkawi, Alor Setar, Kulim, and Sungai Petani. According to respondent two and three, the state government is currently seeking domestic and international partners to collaborate in its effort to make the state a digital state in the future. This is because financial contraints continue to impede the state's ability to initiatiate smart city activities in many urban areas. Because Kedah is not a rich state, it continues to seek for smart partnership with private sector to develop and transform some of the cities into digital and inclusive city that incorporates technological advancement into its economic, social, and environmental sustainable activities. As in the case of Langkawi, respondent one revealed that lack of coordination among government agencies also hinder its ability to implement smart city initiatives. For example, because Langkawi Municipal Council is under the jurisdiction of the state government, it cannot initiate smart city activities in areas that are controlled by the federal agency. Thus, lack of coordination sometimes impedes the city's ability to fully digitized its acitivities. Finally, respondent five also addressed the issue of accessability of people of disadvantaged and underprivileaged groups. This is certaintly an issue that merits attention because for the city to be inclusive, it needs to ensure that people of all background can enjoy the benefits of smart city initiatives such as networked government or e-government services.

CONCLUSION

Inclusive smart cities is an important opportunity to ensure transparency, increase accountability, improve accessibility, address social inequality, preserve the environment, combat social ills, and empower citizens. Smart cities making investments in new infrastructure should focus on a framework that creates economic benefits for all including people with disabilities and older people. Inclusive smart cities also can advance essential rights, including decent work opportunities, an adequate standard of living, and opportunities to participate in all aspects of life. Consequently, promoting participatory governance in cities is a prerequisite for developing inclusive smart cities. It is easier to talk about designing a city that fosters the participation of all people, yet translating that design into a reality is easier said than done.

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