RESEARCH REPORT ON "SMART CITY" IN ASIA PACIFIC REGION

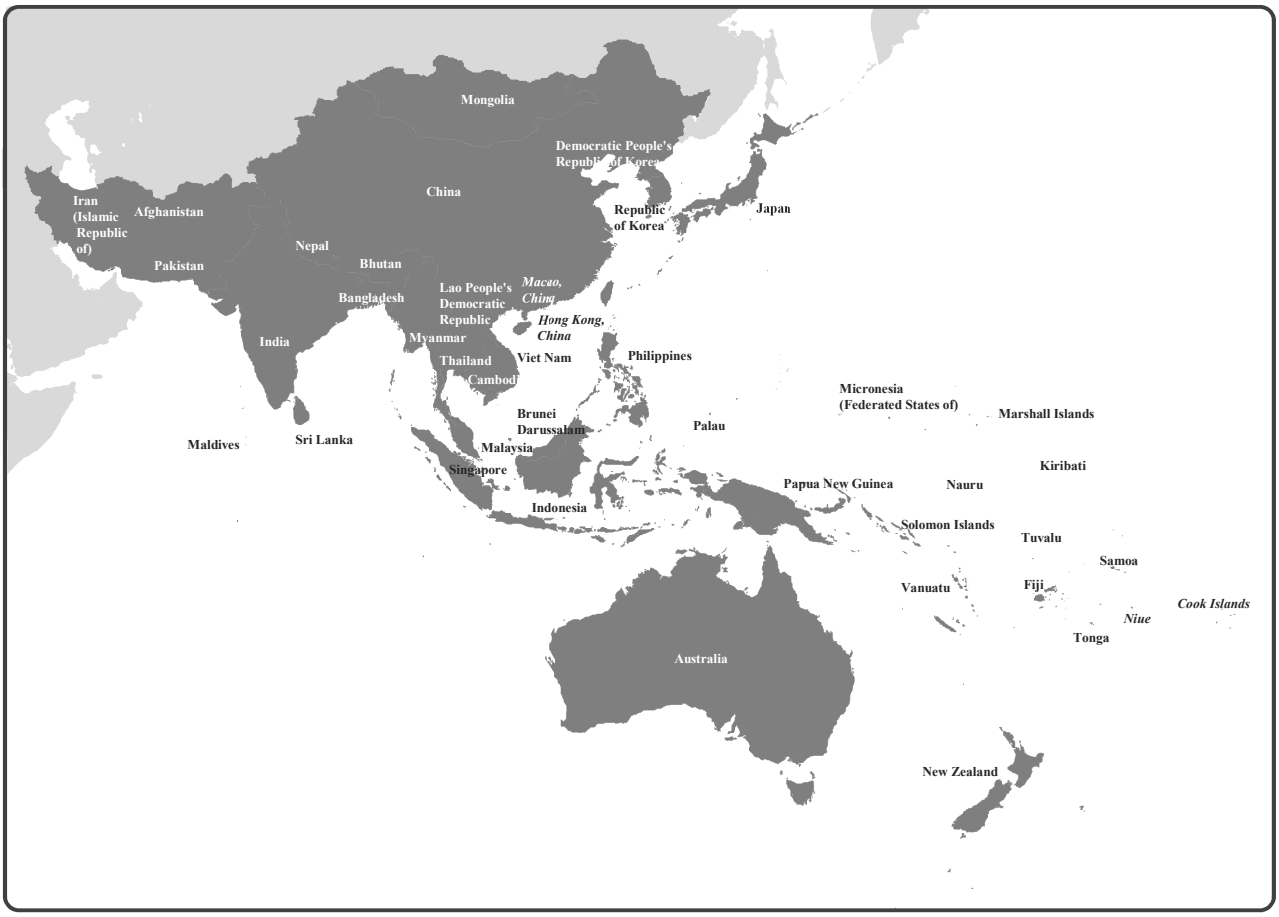
Asia-Pacific Telecommunity (APT) is the only intergovernmental organization specialized in the ICT field in Asia-Pacific region, established in 1979 by the joint initiatives of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and the International Telecommunication Union (ITU) with the objective of fostering the development of telecommunication services and information infrastructure throughout the region, particularly focus on developing areas.

Through its various programmes and activities focused on 5 Strategic Pillars as follow, the APT continues to support and assist its 38 members, 4 associate members and 136 affiliate members (as of April 2018) to realize the positive benefits of ICTs and cope with the challenges of rapidly evolving ICT environments.

For further information, please visit the APT website at https://www.apt.int.

Strategic Pillars of the APT (Strategic Plan of the APT for 2018-2020)

a. Connectivity: Developing the digital Infrastructure;
b. Innovation: Enabling conducive environments and harnessing the benefits of new technologies;
c. Trust: Promoting security and resilience through ICT;
d. Capacity Building: Promoting inclusiveness and enhancing expertise; and
e. Partnership: Solidifying strategic cooperation with stakeholders.



38 Members and *4 Associate Members* of the APT

APT Publication of Research for
Information Sharing on ICT Policy and Development 2016

RESEARCH REPORT
on
"SMART CITY"
IN ASIA PACIFIC REGION
in 2017

Research Report on "Smart City" in Asia Pacific Region in 2017

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EXECUTIVE SUMMARY

"*Smart City*" becomes a popular topic in each country of the Asia Pacific region. Some countries are *starting* their urban policy development whereas other countries are *promoting* their urban policy development of the "*Smart City*" application. Today, the "*Smart City*" concept has become a key in bridging academic researches, projects and commercial initiatives exploring the role that new ICT services and products can play in increasing the quality of life (QoL) of citizens in urban life. However, number of divergent operationalizations, approaches and definitions of "*Smart City*" exist and a lack of overview in thinking about the concept of "*Smart City*" carries on today. In other words, the term "*Smart City*" does not has an unified standard definition.

The ICT policy development on "*Smart City*" is not limited to focus on the urban areas. It should be also applied to the rural areas. The urban policy development of "*Smart City*" is closely related with the policy making of each country, in which this point is different from other projects such as e-agriculture, e-learning, e-commercial, and so on. Hence the collection of case studies regarding "*Smart City*" application according to the "*Smart City*" policy making of each country can be gainful and informative for an efficient and comprehensive guidance for designing and implementing the vision and policies of "*Smart City*" application in the rural areas.

In this context, a survey framework was prepared to help to capture various APT governances in Asia Pacific region that deliver the benefits based on guiding principles of the implementation and operation for the "*Smart City*" application. Besides that, a workshop was conducted to share the information gathering through the relevant knowledge and discussion of the ideal situation in rural areas among those who responded the questionnaire about the policy making regarding the "*Smart City*" application.

This research report is intended to guide the future municipalities or governments to introduce the "*Smart City*" application to the rural areas. To foster the regional cooperation for urban and rural developments of "*Smart City*" application, this research report collects the case studies on the policy making regarding the "*Smart City*" development from those pioneering countries and share the latest information about the efficiency and effectiveness of the "*Smart City*" implementation and operation in the urban areas. Thus, the concrete scopes of this research report are as follows:

- Introduction of "*Smart City*" concept and its related international standardization activities;
- Assessment of survey and workshop on the case studies of "*Smart City*" application in Asia Pacific region; and
- Guidance of implementation and operation for the policy making regarding "Smart City" application.

The findings of this research report are: firstly, this research report has introduced smart city concepts and its related international standard activities. Secondly, this research report has shown an assessment of survey and workshop on the case studies of ongoing smart city application to the countries in Asia Pacific region, which are starting/promoting the smart city policy making by sharing the information of other pioneering countries in Asia Pacific region for guiding future directions of policy making on smart city application. Third, this research report has presented an efficient and comprehensive guidance of the implementation and operation procedures on the policy making regarding the smart city application.

The recommendations of this research report are as follow:

- Future research work is required to collect more number of responders from the APT members, associate members and affiliate members in order to ensure the value of the statistical figures is reflected to the actual relative frequency of all the schematic themes, which are used to measure the performance of city services and QoL as specified in ISO 37120 standard specification under ISO/TC 268 Sustainable development of communities;
- In order to improve accountability and to increase awareness and participation of the APT members, associate members and affiliate members, dissemination through promoting this guidance of implementation and operation on the policy making regarding the smart city application is required; and
- The key performance indicators (KPIs) of the ISO 37120 standard specification that are used in the survey framework are intended to be specified the performance of smart city application generally and broadly. Perhaps the KPIs from the ITU-T Y.4901/L.1602 standard specification should be also considered for investigating an efficient and effective guidance on the technique and evaluation of smart city application.

ACKNOWLEDGEMENTS

This research report has been compiled under the APT Publication of Research Project for Information Sharing on ICT Policy and Development. The authors of this research report would like to thank the APT for providing the grant to make up the contents, which are an accumulation of various information of people across many countries in Asia Pacific region. The authors also would like to sincerely thank to the list of the involved people in alphabetical order as follow:

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Last but not the least, the authors of this research report expect to share the contents to promote, improve, and expand the policy making regarding smart city for municipalities and governments in the rural areas of Asia Pacific region.

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TERMS, DEFINITIONS AND ACRONYMS

Asia-Pacific Telecommunity (APT) [1]

APT serves member countries in the Asia Pacific region that is one of the key organizations of governments, spearheading development and innovation programs in cooperation with telecom service providers, manufacturers of communication equipment and research and development organizations in the field of ICT.

Asia-Pacific Telecommunity Standardization Forum (ASTAP) [1]

ASTAP is to establish regional cooperation on standardization among APT members and becomes a regional platform for cooperating and contributing to global standardization activities.

Bridging the Standardization Gap (BSG)

BSG is to address the disparities in the ability of developing countries, relative to developed ones, to access, implement and influence international, regional, and local standards.

Information and Communication Technology (ICT) [2]

ICT is the infrastructure and components that enable modern computing. ICT is generally accepted to mean all devices, networking components, applications and systems that combined allow people and organizations (i.e., businesses, nonprofit agencies, governments and criminal enterprises) to interact in the digital world.

Internet of Things (IoT) [3]

IoT is an infrastructure of interconnected objects, people, systems and information resources together with intelligent services to allow them to process information of the physical and the virtual world and react.

International Organization for Standardization (ISO) [4]

ISO is an independent, non-governmental international organization to bring together experts from 162 national standards bodies to share knowledge and develop voluntary, consensus-based, market relevant International Standards that support innovation and provide solutions to global challenges.

International Telecommunication Union (ITU) [5]

ITU is the United Nations specialized agency for ICTs. ITU allocates global radio spectrum and satellite orbits, develop the technical standards that ensure networks and technologies seamlessly interconnect, and strive to improve access to ICTs to underserved communities worldwide.

Key Performance Indicator (KPI) [6]

KPI is an indicator of performance deemed by an organization to be significant and giving prominence and attention to certain aspects.

Smart sustainable city [20]

A smart sustainable city is an innovative city that uses Information and Communication Technologies (ICTs) and other means to improve quality of life. efficiency of urban operation and services and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental, as well as cultural aspects.

The Telecommunication Technology Committee (TTC) [8]

TTC is a Japanese incorporated association that contributes to standardization activities in the field of ICT by developing and disseminating standards for information and communications networks.

1 Introduction

Nowadays, “Smart City” becomes a popular topic in many countries of the Asia Pacific region. Some countries are *starting* the smart city implementation of the urban development policies whereas other countries are at the stage of *promoting* their development policies. According to the United Nations’ E-Government Development Index in 2016 [9], only Singapore, Malaysia and Viet Nam are engaging their citizens on the ICT for implementing smart city development policies. As a result, many countries occasionally lag behind in starting, planning, implementing, operating and promoting the smart city development policies. It is naturally desirable to seek the ways for eliminating the lags. Therefore, the purpose of this research report is to explain, collect, analyze, and disseminate the guidance information on the policy making regarding the smart city application referring to the activities of those leading countries, especially in the Asia Pacific region.

The rest of this chapter are as below. **Section 1.1** reviews the definition of smart city. **Section 1.2** describes the standardization activities of smart city. **Section 1.3** explains the research methodology that is used in this research report. Last, the structure of this research report is elaborated in **Section 1.4**.

1.1 Definition of Smart City

A smart city does not has an unified standard definition. The smart city is originally an urban development vision to integrate multiple information and communication technology (ICT) and Internet of things (IoT) solutions in a secure fashion to manage a city’s assets – the city’s assets include, but are not limited to, local departments’ information systems, schools, libraries, transportation systems, hospitals, power plants, water supply networks, waste management, law enforcement, and other community services [10]. The goal of building a smart city is to improve quality of life (QoL) by using urban informatics and technology to make better the efficiency and effectiveness of services which sufficiently meet citizens’ needs. ICT allows city officials to interact directly with the community and the city infrastructure and to monitor what is happening in the city, how the city is evolving, and how to enable a better QoL [10]. Figure 1.1 shows smart city components and how technology can be integrated with many sectors to enhance services. Through the use of sensors integrated with real-time monitoring systems, data are collected from citizens and devices – then processed and analyzed. The ‘*information and knowledge gathering’* in this way is a key to tackling inefficiency of services and identifying specific problems which obstruct that the citizens’ needs are met.

Figure 1.1: Integrated many sectors for enhancing services in the smart city [10]

Municipalities and governments that are thinking to introduce and embark the smart city initiatives need to start by developing a roadmap. In Figure 1.2, the top three components to develop a roadmap for a smart city are studying the community, developing a smart city policy, and engaging the community through smart government and infrastructure.

Engage the Public	● Know how to implement your strategies, initiate e-government solutions, IoT, etc.
Define the Objectives	● Develop a **policy** as a driver and create roles, requirements, plans, and strategies
Study the Communities	● Find out why there is a need to build a smart city ● Know the business needs, the demographics, attractions, people desires and needs

Figure 1.2: Roadmap for development of smart city [10]

1.2 Standardization Activities of Smart City

Standardization refers to the consistent and regular use of procedures, methodologies, techniques, and tools specified beyond the degree of individual projects [11, 12]. Standards that consist of specification documents, definitions, rules and guidelines for the development of a product or a process establish specification convergence in a wide range of sectors [12]. Smart city standardization working items are being developed by a variety of both new and well-established by international bodies such as ITU [13], ISO [14], and IEC [15] and from domestic body, e.g., BSI [7]. Besides that, joint standardization is also available in the ISO/IEC JTC 1 standard specification. The standards work in ISO/IEC JTC 1 includes the detailed standards on specific issues that are fundamental to the implementation of smart cities, as well as work on the smart city standards. These smart city areas of standards clearly are much wider than the ICT areas. **Table 1.1** gives an overview of the major international and national standardization activities on smart city.

Table 1.1: Smart cities related standardization activities [12]

Standardization Body	Activities
ITU [13]	ITU-T plays a significant role in providing a consolidated platform for discussions on smart city development policies, strategies and standards. ITU-T has developed a set of key performance indicators (KPIs) through its Study Group 20 to assist smart cities in integrating ICT services into their existing urban operations. These indicators are contained in Recommendation ITU-T Y.4901/L.1601, Key performance indicators related to the use of information and communication technology in smart sustainable cities and in Recommendation ITU-T Y.4901/L.1602, Key performance indicators related to the sustainability impacts of information and communication technology in smart sustainable cities. The main purpose of developing these KPIs is to provide smart cities with a credible monitoring system for their smart city transitions. In addition, these KPIs were approved as international standards by the ITU-T Study Group 5 (SG5) on Environment and Climate Change and Circular Economy, in which this SG5 aims to act as an open platform for smart-city stakeholders – such as municipalities; academic and research institutes; non-governmental organizations (NGOs); and ICT organizations, industry forums and consortia – to exchange knowledge in the interests of identifying the standardized frameworks needed to support the integration of ICT services in smart cities.

ISO [14]	ISO are developed by groups of experts within technical committees (TCs), which are made up of representatives from industry, NGOs, governments and other stakeholders who are put forward by ISO's members. ISO/TC 268, Sustainable cities and communities, is responsible for the ISO 37100 series of standards to help cities define their sustainability objectives and put strategies in place to achieve them. Standardization in the field of Sustainable Cities and Communities will include the development of requirements, frameworks, guidance and supporting techniques and tools related to the achievement of sustainable development considering smartness and resilience, to help all Cities and Communities and their interested parties in both rural and urban areas become more sustainable. ISO 37120 defines and establishes methodologies for a set of indicators to steer and measure the performance of city services and quality of life (QoL). ISO 37120 is applicable to any city, municipality or local government that undertakes to measure its performance in a comparable and verifiable manner, irrespective of size and location.
IEC [15]	In June 2013, IEC agreed the establishment of a Systems Evaluation Group (SEG) on smart cities to consider a smart city as a system of systems and to review whether IEC should set up a Systems Committee (SyC) to oversee standards in this area. The first plenary was in December 2013 and the final report will be presented to IEC in June 2015. The role of the SEG is to identify standardization areas that: • need a Systems approach; • address Cities relevant cross-cutting issues; and • are within the scope of IEC, i.e., in the electro-technical field. In addition, IEC SEG on smart cities evaluates relevant works and propose to establish an SyC with regard to smart cities including the SyCs' scope, general use cases, a possible reference architecture model, a standardization roadmap, a collection of to be defined terms and definitions, and a mapping of closely related activities in cooperation with ISO and other organizations, fora and consortia.
Joint of ISO and IEC [16]	ISO/TC Technical Management Board has set up a Strategic Advisory Group (SAC) on smart cities, which had its first meeting in June 2014. This aims to: • propose a clear working definition of smart cities; • describe the smart cities landscape and identify the aspects of the smart city concept that are most relevant to ISO; • review the existing initiatives and standards activity in ISO; • develop a gap analysis to identify areas for standards development in ISO and areas for collaboration with other standards bodies, and • coordinate ISO input, and nominate experts, to the IEC/SEG1. It has engaged with the leadership of the IEC/SEG1, the ITU-T SG5 Focus Group on smart cities, the ISO/IEC JTC 1/SG1 and WG11 on Smart City and the CEN-CENELEC-ETSI SSCC-CG, in order to help avoid duplication of efforts on international standards activity on smart cities.

BSI [7]	The UK Department of Business, Innovation and Skills commissioned BSI to develop a standards strategy for smart cities. This strategy aims to accelerate the implementation of smart cities and minimize the risks of failure in April 2012. The strategy outlines a foundation of knowledge to help cities as the embark on a programme to become smarter: 1. BSI PAS 180 Smart Cities – Vocabulary; 2. BSI PAS 181 Smart City framework – Guide to establishing strategies for smart cities and communities; 3. BSI PAS 182 Smart City Data Concept Model; 4. BSI PD 8100 on Smart City Overview – a guide for city managers; and 5. BSI PD 8101 Smart cities – Guide to the role of the planning and development process.

1.3 Research Methodology

The research methodology that is used to achieve the objectives of this research report is depicted in **Figure 1.3**. In January 2017, the research project team held its first meeting in Tokyo, Japan and agreed a work plan and the expected deliverables for this research report on the policy making regarding smart city in Asia Pacific region. Subsequent to this meeting, a questionnaire framework was prepared and agreed, the details of which are given in **Chapter 2** of this research report.

The research project team had decided to use ISO 37120 standard specification, "Sustainable development of communities – indicators for city services and QoL." to be used as a baseline formulating the questionnaire. A consensus from the 28th APT Standardization Program Forum (ASTAP-28) was obtained for questionnaire circulation. Besides that, the responses of questionnaire from APT members, associate members and affiliate members are obtained and the narrative of workshop on policy making for smart city are analyzed.

An assessment of survey and workshop is given in **Chapter 3**. A first draft of the research report on the policy making regarding smart city was produced in December 2017. The Expert Group Bridging the Standardization Gap (EG BSG) in ASTAP met in January 2018 to review the draft research report and to incorporate feedbacks into the final research report.

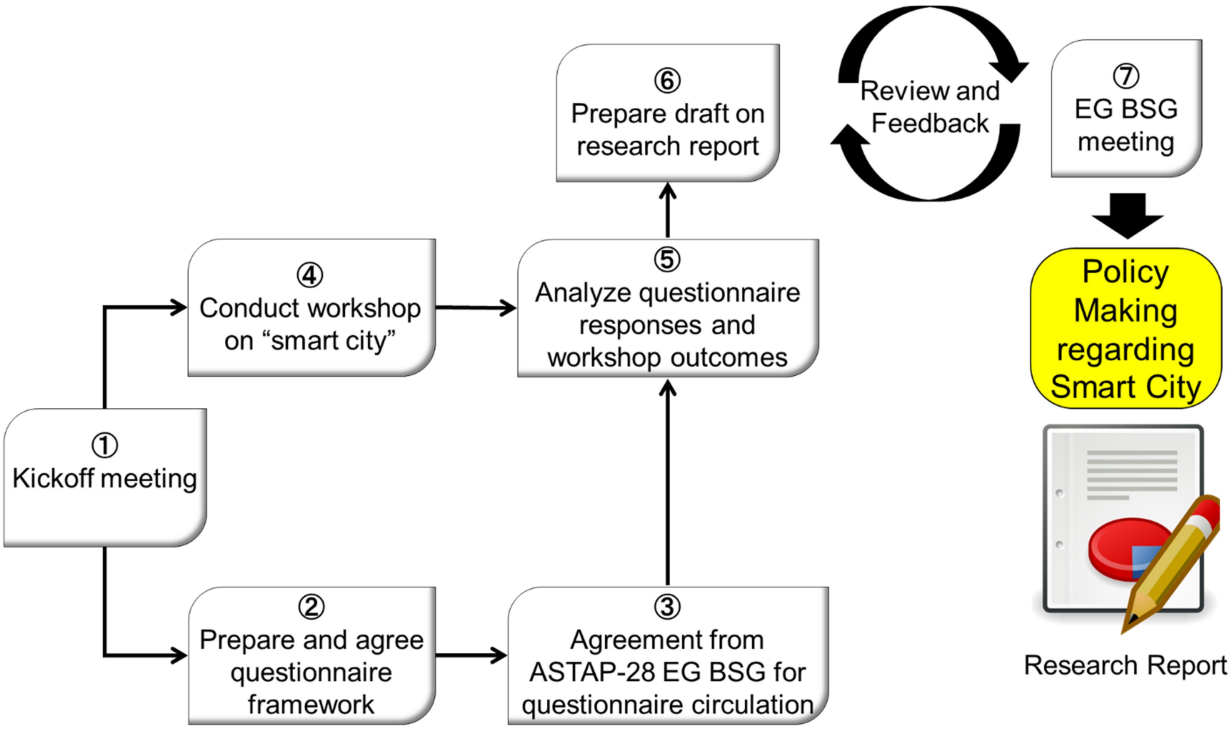

Figure 1.3: Research methodology of this research report

As briefly aforementioned above, through the outcomes of survey and workshop that are collected from responders of APT members, associate members and affiliate members in Asia Pacific region, this research report is written. The research report mainly targets users who will have benefits to implement and operate the smart city application given by municipalities or governments who will have benefits to implement and operate the smart city application. **Figure 1.4** shows the process of where the outcomes of survey and workshop are collected and who will have the benefits from this research report.

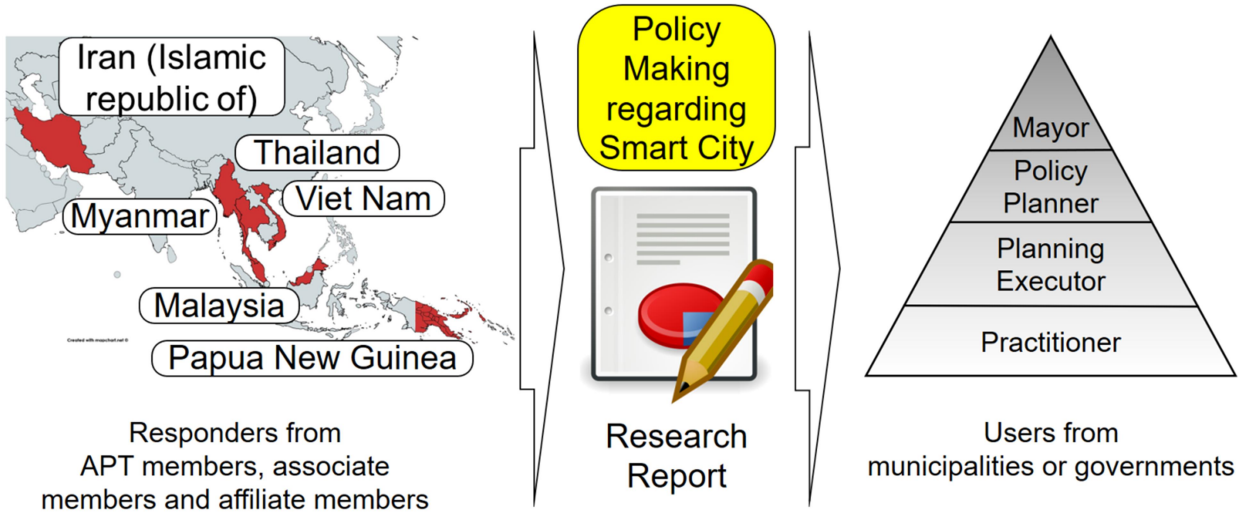

Figure 1.4: Users from municipalities or governments who will have benefits in this research report

Figure 1.5 illustrates the guidance scope of this research report, which is mainly focused on the implementation and operation of smart city application. These information can be found in details in **Chapter 4** of this research report.

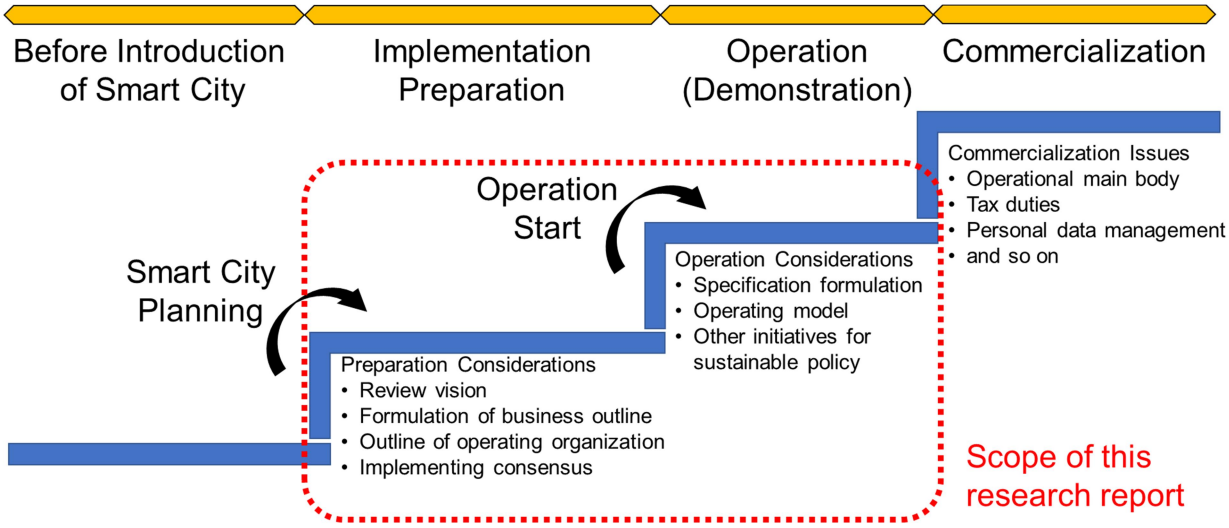

Figure 1.5: Guidance scope of this research report

1.4 Structure of Research Report

Figure 1.6 shows the structure of this research report. **Chapter 2** explains the survey framework and methodology of strategic model. **Chapter 3** presents the assessment of survey and workshop. **Chapter 4** introduces the guidance of implementation and operation using the operational model and approach. The use cases of smart city application from Malaysia and Thailand are also elaborated. Last, **Chapter 5** concludes this research report.

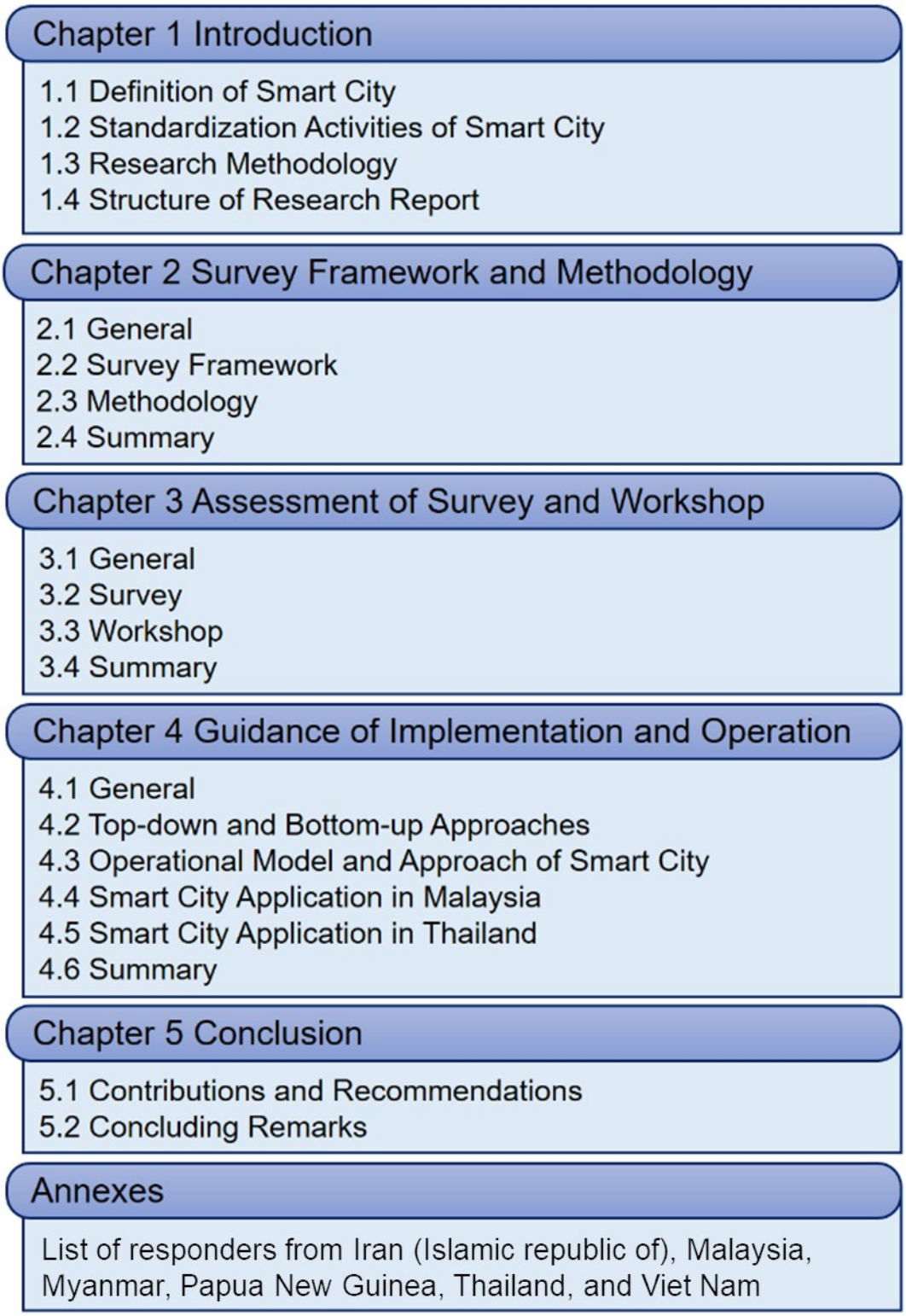

Figure 1.6: Structure of this research report

2 Survey Framework and Methodology

2.1 General

The research project team is engaging its members on the topic, entitled "Case studies of smart city application in the Asia Pacific region for the rural areas," in order to answer the following questions:

- Introduction of smart city concept and its related international standardization activities;
- Assessment of survey and workshop on the case studies of smart city application in Asia Pacific region; and
- Guidance of implementation and operation for the policy making regarding smart city application.

The topic of policy making regarding smart city is complex, broad, varied, and requiring interdisciplinary effort. Meanwhile, a questionnaire is a chance to know what are the opportunities for municipalities and governments, which can see in the introduction of the smart city application – as well as what is needed to make it a reality. Therefore, a questionnaire framework is prepared to help to capture various APT governance processes that deliver benefits based on the guiding principles of implementation and operation for the smart city.

The objective of this chapter is to introduce and review the survey framework that comprises of typical schematic themes including their peculiar performance indicators for case study on the policy making regarding the smart city application. The remaining of this chapter is organized as follow. **Section 2.2** discusses the survey framework under the ISO 37120 standard with its themes and indicators. **Section 2.3** addresses the methodology on the 3ETH strategic model, which is used for the questionnaire. Finally, the concluding remarks are drawn in **Section 2.4**.

2.2 Survey Framework

2.2.1 Standard ISO 37120: Sustainable Development of Communities

A smart city is a system of systems with a unique history and set in a specific environmental and societal context. In order for the smart city to flourish, all the key smart city actors need to work together with utilizing all of their resources, and to overcome the challenges and grasp the opportunities that the smart city faces. The "smartness" of the smart city describes its ability to bring together all its resources, to effectively and seamlessly achieve the goals and fulfil the purposes it has set itself [10]. In other words, the "smartness" of the smart city describes how well all the different smart city systems, and the people, organizations, finances, facilities and infrastructures involved in each of them, are:

- To make individually work more efficient; and
- To act in an integrated way and coherent way, to enable potential synergies to be exploited and the city to function holistically, and to facilitate innovation and growth.

Many important areas of standards are related to the aforementioned both points. However, the role of smart city standards focus on the second, in other words, on enabling the integration and interoperability of city systems in order to provide value for both the city as a whole, and the individual citizens.

ISO 37120 [14] standard specification under ISO/TC 268 Sustainable development of communities, entitled "Sustainable development of communities – indicators for city services

and QoL," defines and establishes methodologies for a set of indicators to steer and measure the performance of city services and QoL. ISO 37120 standard specification has 17 schematic themes as illustrated in Figure 2.1, i.e., economy, education, environment, safety, health, transportation, energy, governance, wastewater, water and sanitation, solid waste, recreation, shelter, urban planning, finance, fire and emergency response, and telecommunications and innovation. The corresponding indicators are quantitative, qualitative or descriptive sets of measurements and metrics. City, municipality or government are the expected users of this ISO 37120 standard specification.

Figure 2.1: 17 schematic themes of ISO 37120 standard specification

2.3 Methodology

2.3.1 3ETH Strategic Model

The schematic themes inside the questionnaire are based on the ISO 37120 standard specification under the ISO/TC 268 sustainable development of communities. Since the ISO 37120 standard specification has 17 schematic themes, all of schematic themes is generally and broadly specified for the large-scale of metropolitan. Rather than focusing on all the schematic themes as mentioned above, the research project team had decided to select a few of the schematic themes for fitting actual circumstances in rural areas as well as in urban areas. Throughout the discussion, the research project team had finalized the scope of schematic themes in the survey framework is limited to five main themes, i.e., energy, environment, education, transportation, and health. In this research report, "3ETH" is an abbreviation to represent those five main themes. Therefore, 3ETH strategic model is defined to represent the scope of schematic themes that are used in the survey framework. The key performance indicators of 3ETH strategic model are shown in **Table 2.1**.

Table 2.1: Key performance indicators of 3ETH strategic model

Schematic Theme	Key Performance Indicators (unit)
Energy	• Annual electricity consumption of capita (kilowatt-hours per person) • Annual electricity consumption in public facilities (kilowatt-hours) • Percentage of renewable energy consumption (%)
Environment	• Air quality of PM 2.5 concentration of smart cities (micrograms per cubic meter) • Greenhouse gas emissions per capita (%)
Education	• Female gross enrolment ratio (%) • Percentage of secondary education graduates (%)
Transportation	• Annual number of private passenger cars per capita (cars per person) • Number of large-scale public transportation systems per 100,000 people (public transportation systems per 100,000 people) • Annual number of used times of public transportation systems (times per public transportation system)
Health	• Average life (year old), number of beds per 100,000 people (beds per 100,000 people) • Number of physicians per 100,000 people (persons per 100,000 people)

2.4 Summary

In summary, the survey framework for the case studies on the policy making regarding smart city application in this research report is bounded with the 3ETH strategic model rather than focusing all the schematic themes under the ISO 37120 standard specification with the purpose of efficient collection of the necessary information about the smart city application both in rural areas and in urban areas.

3 Assessment of Survey and Workshop

3.1 General

In general, ICT that is used in smart city should not be limited to the urban areas. It should be applied to the rural areas. However, it seems that such case studies that are related to the smart city application for rural areas is not so popular. If the case studies on smart city application for the rural area can be included in the ICT handbook, entitled "Handbook to introduce ICT solutions for the community in rural area," it will become more useful for the communities in the rural areas. Since the development of smart city is closely related with the policy making of each country, in which this point is different from other projects such as e-agriculture, e-learning, and so on, the collection of case studies on smart city application including the smart city policy making of each country can be a useful information as the systematic and comprehensive guidance for developing a vision and policies of smart city application in the rural areas.

In order to revise the work plan of EG BSG on the existing ICT handbook work item for extending the scope and timelines to include the case studies of the smart city application, the research project team identified the needs to build additional section about the case studies of smart city in the ICT handbook by circulating a questionnaire on the case studies of smart city application in the Asia Pacific region. In this context, the questionnaire may retrieve the case studies that contain an energy management system is able to generate more renewable energy consumption in the smart cities area, a transportation management system is able to support a large-scale number of passengers in the public transportation system for daily activities in the smart cities site, and so on. Besides that, the questionnaire also covers the policy making of each country in Asia Pacific region. Furthermore, the research project team had conducted a workshop in Japan for discussing and sharing the more information among those who responded to the questionnaire as representatives in countries about the policy making of the smart city application.

The aim of this chapter is to analyze and disseminate the outcomes of survey and workshop that are comprised of the case studies of the smart city application. The structure of this chapter is organized as follow. **Section 3.2** analyzes and summarizes the survey that is conducted through the circulation of questionnaire. **Section 3.3** addresses and reviews the workshop event with the invited speakers. Last, the concluding remarks are drawn in **Section 3.4**.

3.2 Survey

In this survey, a questionnaire is prepared. The objective of questionnaire to collect the case studies about the policy making regarding smart city application from countries in Asia Pacific region. The questionnaire scope of the schematic themes that is based on the 3ETH strategic model under the ISO 37120 standard described in **Chapter 2**. More specifically, five schematic themes of the 3ETH strategic model and their corresponding KPIs are as follow:

a) Energy management - annual electricity consumption of capita (kilowatt-hours per person), annual electricity consumption in public facilities (kilowatt-hours), and percentage of renewable energy consumption (%);
b) Environment management - air quality of PM 2.5 concentration of smart cities (micrograms per cubic meter) and greenhouse gas emissions per capita (%);
c) Education management - female gross enrolment ratio (%) and percentage of secondary education graduates (%);
d) Transportation management - annual number of private passenger cars per capita (cars per person), number of large-scale public transportation systems per 100,000 people (public

transportation systems per 100,000 people), and annual number of used times of public transportation systems (times per public transportation system); and

e) Healthcare management - average life (year old), number of beds per 100,000 people (beds per 100,000 people), and number of physicians per 100,000 people (persons per 100,000 people).

The questionnaire are divided into six subsections: primary contact information, general information, current themes for building smart cities, standard for smart cities, case study information, and additional information as shown in **Figure 3.1**. The target responders for this questionnaire are APT members, associate members and affiliate members.

SMART CITY CASE STUDY SUGGESTION

1. Primary Contact Information

Date		*Country*	
Organization		*Name*	
Email		*Telephone*	

2. General Information

Name of Smart Cities	
Population (est. year)	
Main Source	

3. Current themes for building smart cities (choose more than one if necessary)

☐	Economy	☐	Education	☐	Energy
☐	Environment	☐	Recreation	☐	Safety
☐	Shelter	☐	Solid Waste	☐	Urban Planning
☐	Finance	☐	Fire and Emergency Response	☐	Governance
☐	Health	☐	Transportation	☐	Telecommunications and Innovation
☐	Wastewater	☐	Water and Sanitation		

4. Standard(s) or Standard Project(s) for Smart Cities

Standard(s) or standard project(s) to be developed over the next 3 to 5 years for smart cities at the system of systems (city) level. Example:

Reference No.	Title	Standard/ Approved	Date for Publication	Reference to International Standards

5. Case Study Information

Title	
Abstract	

Details (optional)

Assumptions	
Procedures	
Results	
Issues	

6. Additional Information (e.g., table, picture)

Please attach the best picture(s) in describing your idea(s) using diagrams, pictures, flow charts, architectures or relevance.

Figure 3.1. Structure and contents of the questionnaire

3.2.1 Status of Questionnaire in ASTAP-28

APT had organized the 28th APT Standardization Program Forum (ASTAP-28) on 6th – 10th March 2017 in Bangkok, Thailand. The Expert Group on Bridging the Standardization Gap (EG BSG) group met two times in Session 5 and Session 7 on 8th March 2017. The chairperson of those meetings is Ms. Nguyen Khanh Thuan, with the assistance of two vice chairperson: Dr. Hideyuki Iwata from NTT Japan and Mr. Seok Kyu Kang from TTA Korea. The meeting had around 30 attended participants.

In particular, an input document ASTAP-28/INP-42 (i.e., ASTAP-28-INP-42-R1-BSG-Handbook_with_Smart_City_Policy) proposed the revision of the scope and timelines to include the smart city application for rural area projects, and circulate a questionnaire on smart city policy making of each country in Asia Pacific region. The meeting was discussed and agreed on the revised work plan in details with the active contribution of delegates from Japan, Korea, Papua New Guinea, and Viet Nam. The consensus of the meeting was as follow:

a) The scope of work plan was revised to include ICT pilot project cases with policies and smart city applications;
b) The work plan will be carried on until ASTAP-30 with the final report; and
c) The addition of e-aquaculture project will be updated to the report APT/ASTAP/REPT-13(Rev.1) at ASTAP-29

The questionnaire on smart city application in Asia Pacific region in the temporary document ASTAP-28/TMP-37 was approved as an output document of EG BSG, i.e., ASTAP-28/OUT-11 Questionnaire Smart City Application.

3.2.2 Response of Questionnaire

The target responder of the circulated questionnaire is mainly directed to the APT members, associate members, and affiliate members. The deadline of the circulated questionnaire was scheduled on 30th May 2017 (Tuesday). Since no response was obtained at first, the research project team had suggested to resent the circulated questionnaire and asked for prompt feedbacks from the countries in Asia Pacific region. Besides that, the research project team actively contacted individual APT members in Malaysia, Thailand, Viet Nam, Myanmar and Philippines.

3.2.2.1 Qualitative Analysis

Only three countries (Singapore, Viet Nam and Malaysia) are listed in the top 50 in e-participation globally, according to the United Nations 2016 e-participation index [9]. This present situation indicates that countries in Asia Pacific region occasionally lag behind in engaging citizens on the ICT policy making of smart cities application rather than in other countries. As a result, the planning, promoting and implementing of smart cities policy making can be assumed as an critical and serious issue in each country of Asia Pacific region. Throughout the collected survey at the end, six countries are responded to the circulated questionnaire. **Figure 3.2** illustrates the responded countries in Asia Pacific region. **Table 3.1** summarizes the outcomes of the questionnaire. More details of these questionnaire responses can be found in **Annex A.1** to **Annex A.6**.

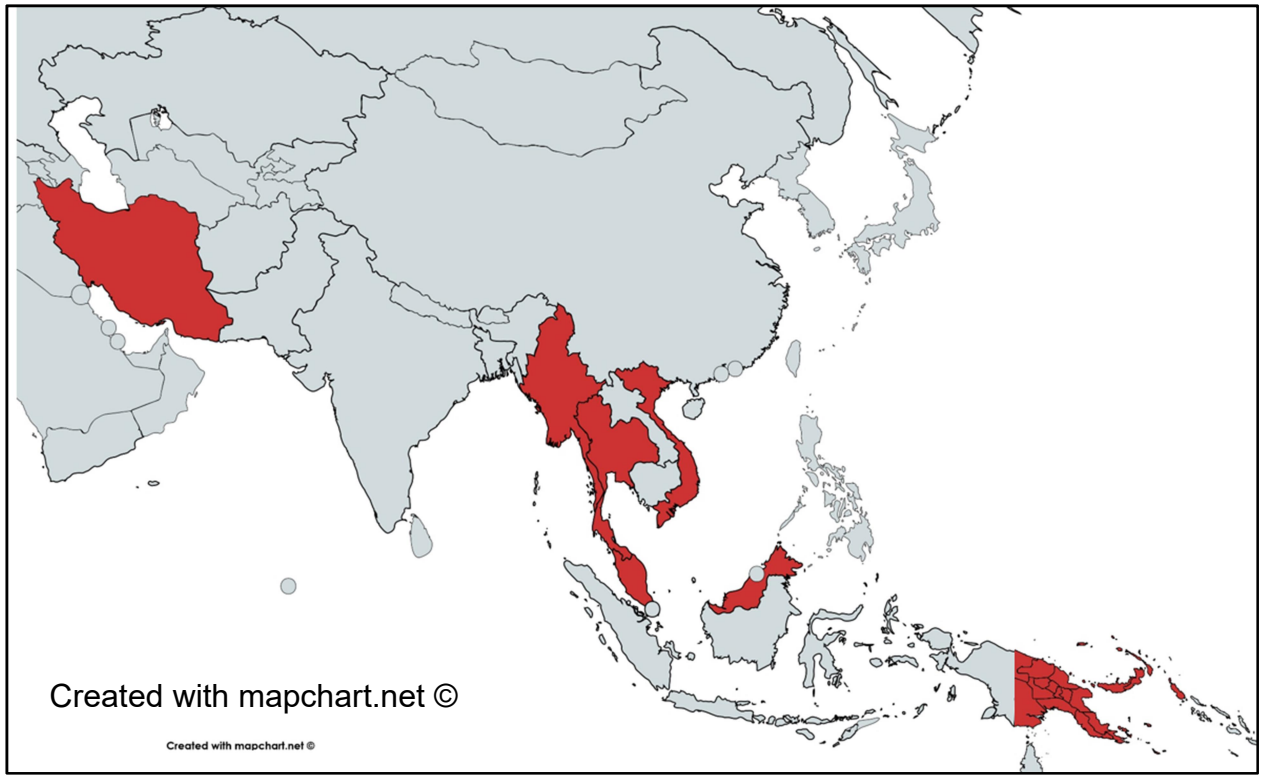

Figure 3.2. Responded countries in Asia Pacific region

Table 3.1: Summary of the questionnaire responses

Country	Schematic Theme	Targeted Smart City (Population)	Focused Case Study
Iran (Islamic Republic of)	• Transportation • Urban Planning	Tehran (13.27 million persons)	Bus Rapid Transit (RBT)
Malaysia	• Economy • Environment • Education • Transportation • Energy • Governance	Iskandar (1.5 million persons)	Low Carbon Lifestyle
Myanmar	• Transportation • Telecommunications and Innovation	Entire Myanmar (50.21 million persons)	Vehicle Registration by Radio Frequency based Identification (RFID)
Papua New Guinea	• Governance • Urban Planning	Paga Hill, Port Moresby (0.39 million persons)	Building Smart City in Paga Hill
Thailand	• Economy • Environment • Health • Education • Energy • Safety • Governance	Phuket Island (0.39 million persons)	Smart Tourism
Viet Nam	• Transportation	Bac Giang Province (0.20 million persons)	Traffic Enforcement System via Camera

3.2.2.2 Quantitative Analysis

According to the collected questionnaire, a relative frequency of all the schematic themes is plotted to show the popularity of the schematic theme for the collected questionnaire as depicted in **Figure 3.3**. The schematic theme of transportation management has the highest relative frequency, i.e., 20% compared to the rest of the schematic themes. Besides that, the 3ETH strategic model is occupied 55% of the overall relative frequency. This may be explained by the fact that the countries in Asia Pacific region are more concern on the smart city policy making according to the 3ETH strategic model. In other words, the concrete outcome of this survey retrieves that a transportation management theme draws high attention to be improved for people in their daily activities in the urban areas of Asia Pacific region.

However, the figure of the highest relative frequency that is achieved by the transportation management theme may not be statistically correct due to the limited number of responders from the circulated questionnaire. Therefore, future research work is required to collect more number of responders for reflecting a better figure of the highest relative frequency for all the schematic themes.

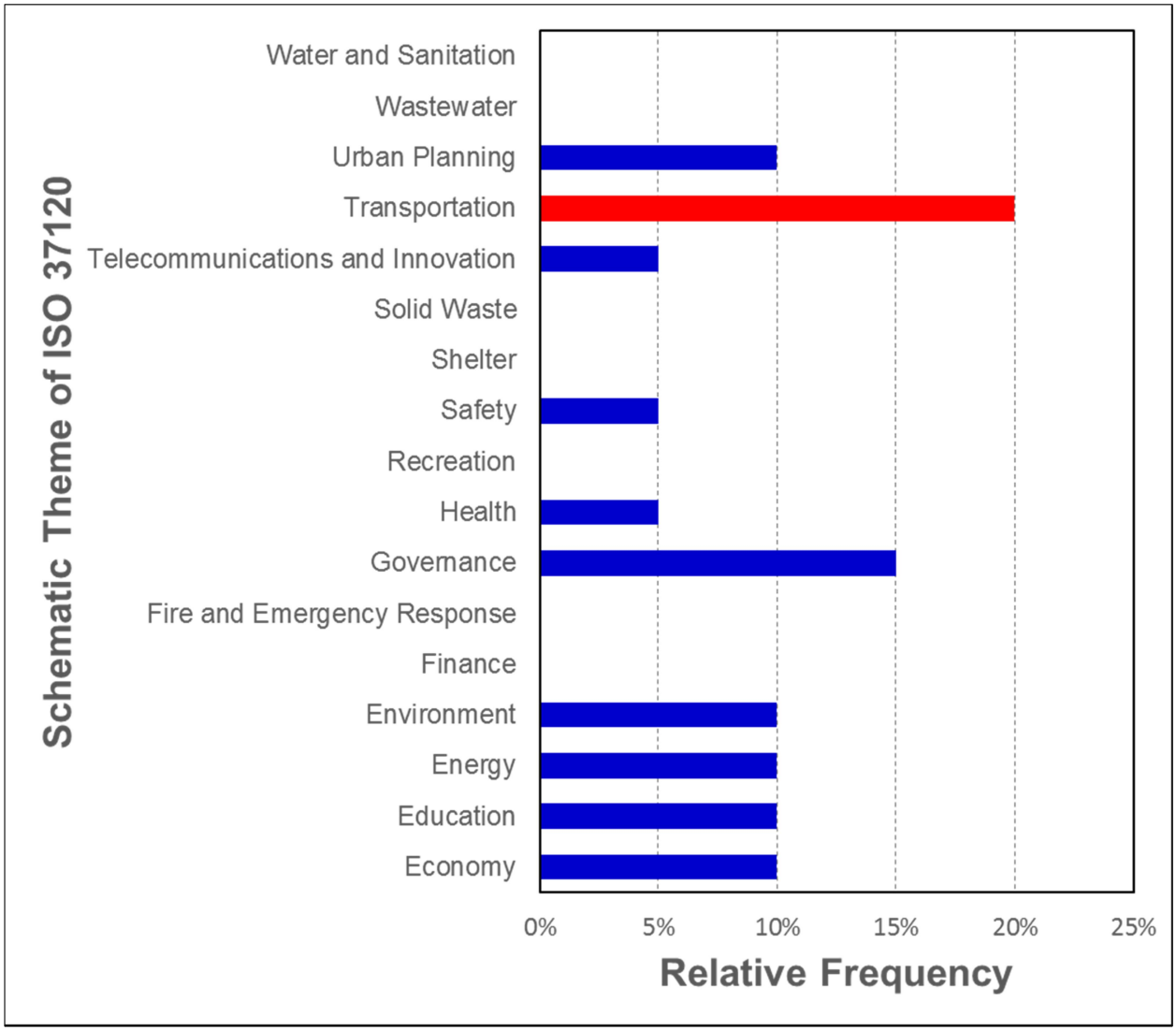

Figure 3.3. Relative frequency of schematic theme from the collected questionnaire

3.3 Workshop

Due to the limited information that was collected from the circulated questionnaire, the research project team had decided to invite the responder directly for attending the Workshop on "Smart City" in Asia Pacific region, 13th – 15th September 2017 at the TTC Conference Room, Shiba Koen Denki Building, 1-1-12 Shiba Koen, Minato-ku, Tokyo 105-0011, Tokyo. The objective of this workshop is to share and discuss the collected information about the case studies on policy making regarding the smart city applications. Through this workshop, the research project team can identify the smart city application in more details as the aspects of implementation and operation.

3.3.1 Program of Workshop

In this workshop, two moderators are invited. They are Prof. Yasuo Tan and Assoc. Prof. Yuto Lim, who are from the Japan Advanced Institute of Science and Technology (JAIST). Their roles are to chair the sessions and to share their expertise to this workshop. The research project team had prepared an official invitation letter to invite those responders of the questionnaire. Since the allocation budget is limited, the research project team had regrettably invited only a few responders from six countries, which included Malaysia, Thailand, Philippines, Indonesia, Viet Nam, and Papua New Guinea. The workshop program is illustrated in **Table 3.2**. In the program, three sessions and one panel discussion on the Smart City in Asia Pacific region were held at the TTC Conference Room, Shiba Koen Denki Building. For the purpose of academic viewpoint, the special sessions of IEICE Society conference were held at the Lecture room, Tokyo City University Setagaya Campus.

Table 3.2: Program of the workshop on "smart city" in Asia Pacific region

Date / ***Time***	***13th September (Wednesday)***	***14th September (Thursday)***	***15th September (Friday)***
09:00 – 12:00	Session 1 on Smart City in Asia Pacific Region [*Place:* TTC *]	IEICE Society Conference Special Session [*Place:* TCU **]	Session 3 on Smart City in Asia Pacific Region [*Place:* TTC *]
13:00 – 17:00	Session 2 on Smart City in Asia Pacific Region [*Place:* TTC *]	IEICE Society Conference Special Session [*Place:* TCU **]	Panel Discussion on Smart City Policies in Asia Pacific Region [*Place:* TTC *]

* TTC = Telecommunication Technology Committee Conference Room, Shiba Koen Denki Building, 1-1-12 Shiba Koen, Minato-ku, Tokyo 105-0011, JAPAN
** TCU = Tokyo City University Setagaya Campus, 1-28-1 Tamazutsumi, Setagaya-ku, Tokyo 158-8557, JAPAN

3.3.2 Narrative of Workshop

In this workshop, the total number of participations is 21 persons. The topic discussion is "Does the smart city policy making in the urban area works well for the rural area?" The discussion is narrowed down to four subtopics; technological needs, open data, government role, and sustainable financial support. Besides that, the photos of the workshop environment and four invited presenter are shown in **Figure 3.4** to **Figure 3.9**. The contents of the presentation can be found in **Annex B**.

Figure 3.4: Discussion session was held in the first day of the workshop

Figure 3.5: Presentation by Dr. Gopinath Rao Sinniah from Malaysia

Figure 3.6: Presentation by Mr. Felix Diou Rupokei from Papua New Guinea

Figure 3.7: Presentation by Mr. Pracha Asawateera from Thailand

Figure 3.8: Presentation by Mr. Dinh Hai Dang from Viet Nam

Figure 3.9: Panel discussion was held in the third day of the workshop

3.3.3.1 Technological Need

Through the discussion session in the workshop, the technological need is summarized as follow. The smart city application needs reliable, robust and resilient technologies to assist the heterogeneous ICT-systems to work together in safely and securely manner. The offering form of smart city application increasingly shifts from by individual service providers to by a service platform which is an infrastructure that enables the broad range development of public and private services. As a result, the standardized technologies and infrastructures are necessary to provide the personalized services and to develop the location-based services. Furthermore, the usability and accessibility of a wide range of standardized technologies, which are capable of working together to deliver complex systems and solution are essential for any smart city application.

3.3.3.2 Open Data

In the context of smart city application, the handling of open data generally refers to a public policy that requires the public sector agencies to release a set of government data (which is relating to many public activities of the agency) to the public for any use, or re-use, in an easily accessible manner. In many cases, this public policy encourages the open data to be freely available and distributable. The value of releasing such open data is depending on the combination of other open data obtained from various sources. For example, a geographical data combined with a mapping system can provide an abundance of location-based services. This value can be dramatically increased when the data is discoverable, actionable and available in standard formats. These data are then usable by other public agencies, third parties and the general public for new services of different sectors like transportation, education, environment, energy, health, and so on.

3.3.3.3 Government Role

The government role is a prerequisite for the development of smart city application. These days, the lack of horizontal and vertical integration across the various government supports and urban initiatives, and the relatively low level of interest shown by many national authorities, and limited efforts for the systemic development and implementation of government are serious problems. The development of transnational authentication systems for citizens and businesses, the development of agreed frameworks for data privacy, and the sharing and collection of individual and business data, are the keys of government role.

3.3.3.4 Sustainable Financial Support

A smart city application allows large efficiency gains and the least waste of resources. If the efficiency gains are measured through smart technologies and monetized through business models, then the investment and operational costs may be recovered through the efficiency gains. The valuable open data, which is generated by the smart city infrastructure, may be transformed by the municipalities and governments to have new insights and sold to different private sectors. The key is to generate a sustainable value chain for such business model upon the operation of smart city application. In this way, a sustainable financial support is continually available to encourage and simulate the advancement and richness growth of the smart city application.

3.4 Summary

In summary, the survey has analyzed and reviewed the case studies on policy making regarding smart city application from six different countries in Asia Pacific region. The quantitative results have revealed that the transportation management theme is mainly focused theme because it is recognized as one of the driving forces to realize the smart city infrastructure development. Besides that, the workshop has addressed many fruitful discussion and possible issues that are encountered when the smart city application is introduced.

4 Guidance of Implementation and Operation

4.1 General

This chapter describes an eclectic information for steering the guidance of implementation and operation on the policy making regarding smart city in Asia Pacific region. Because the implementation of smart city is mainly conducted in urban areas with the aim to improve the QoL by using the state-of-the-art informatics and technologies to meet the urban communities' needs, a QoL gap in between rural and urban areas has widened. Therefore, this chapter is to facilitate increased understanding on the policy making regarding smart city in order to ensure that the rural communities would experience the same QoL benefits of the urban communities. In other words, the objective of this chapter is to shed light on how the of implementation and operation of smart city application via the operating model. The remaining of this chapter is organized as follow. **Section 4.2** review the basic top-down and bottom-up approaches. **Section 4.3** describes the operational model on the policy making of smart city application. **Section 4.4** and **Section 4.5** review and summarize the city-specific solutions of the smart city application in Malaysia and Thailand, respectively. Finally, **Section 4.6** concludes this chapter.

4.2 Top-down and Bottom-up Approaches

In the context of business management, project management has taken the top-down and/or bottom-up approaches and adapted it towards projects planning. As top-down planning is still prevalent in many organizations, the bottom-up planning method is also widely used [17]. In the context pf smart city, the main different in between the top-down and bottom-up approaches is the participation of citizens and stakeholders. The top-down approach promotes a high degree of coordination, whereas the bottom-up approach allows more opportunity for people to participate directly [18]. **Figure 4.1** shows the difference between top-down and bottom-up approaches to encouraging the participation of citizens and stakeholders in smart city application.

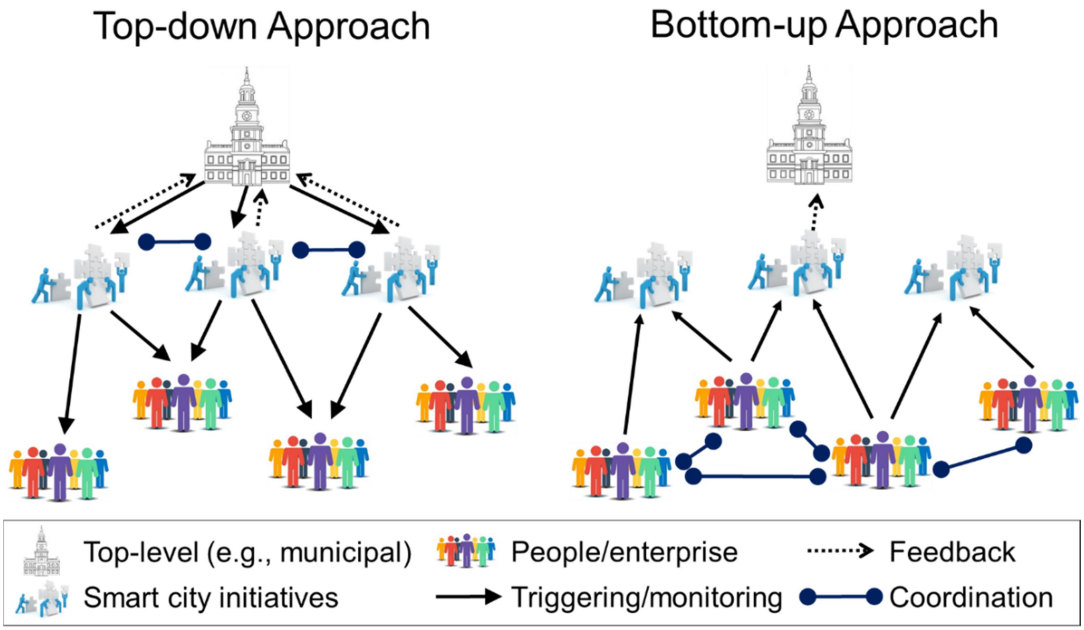

Figure 4.1 Top-down and bottom-up approaches to encouraging the participation of citizens and stakeholders in smart city application [18]

4.3 Operational Model and Approach of Smart City

In this research report, an operational model is defined as both an abstract and visual representation (model) of how a municipal or government implements, operates, and commercializes the vision, policies, strategic initiatives, tactical decisions of the smart city application for better QoL of its citizens. Regardless of the initial introduction of smart city application in either rural areas or urban areas, in principle, the process of smart city application would goes through the four-step operational model as shown in **Figure 4.2**. The four steps are introduction, implementation, operation and commercialization.

In the step of smart city introduction, the characteristics of smart city should be clarified well of what is – and what is not – being considered in the implementation of smart city. One example of smart city characteristics is that smart city collects increasing amounts of open and inclusive data about city life to support effective actions and decision making in real-time manner. Need is an expression of something desired by humans whereas a requirement is a formalized statement of some functionalities. The need and the requirement contribute an output and an outcome, respectively. One example of smart city needs is that the urban or rural communities require a better QoL.

To accomplish the smart city need, the requirements of smart city are the usability and accessibility of technological needs, the openness of collected data, the role of government involvement, the well-concluded policy making, and the sustainable of financial support. These requirements will be explained in the following section. A plethora of requirements is required to be functioned along with the building the smart city application in both urban and rural areas. Upon the requirements, the policies are made according to a vision, challenges and strategies of the smart city application.

In the step of implementation preparation, at least the following four considerations should be taken into account when the smart city planning is initialized. First, the vision highly requires to be revised in conjunction with the analysis of smart city, in which the analysis includes the characteristics, needs, requirements, and policies of the smart city application. Second, formulation of business outline and the outline of operating organization are prepared and checked. Finally, a consensus is obtained before the implementation of smart city application.

In the step of operation, there is the following considerations in operation if the implementation of smart city application is successful. The formulation of measures or indicators is essential for evaluating the entire smart city application; therefore, they should be examined. Those indicators can refer to the international standard specification, e.g., ITU-T Y.4901/L.1602 and ISO 37120. Furthermore, the operating model is required to be specified for smoothing the coordination within the entire organization. Additional initiatives for the purpose of sustainable smart city may be considered for a long-term basis.

In the step of commercialization, many issues can be popped out within and outside the operational main organization body. Besides that, the tax duties should be clarified well of what is – and what is not – being tax upon the service usages of smart city application. In addition, the personal data have to be secured and well-manageable. The personal data can be distributed to many other sources for any use, or re-use purpose. In this case, the releasing of open data must be systematically and properly managed via any newly technologies.

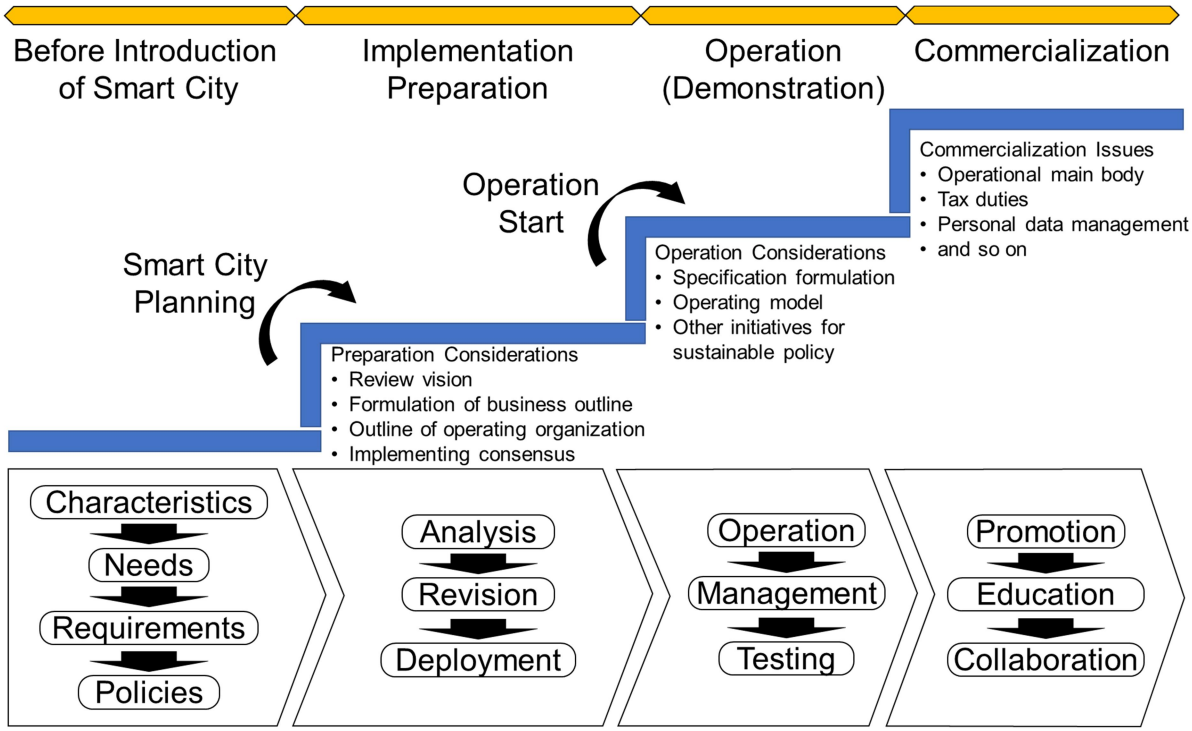

Figure 4.2 The four-step operational model of smart city application

Figure 4.3 illustrates how the role and responsibility for strategic, tactical and operational management are assigned across the different levels within the municipal or the government. Vision that is the need and desire to transform the city into a smart city with a better QoL is decided by a mayor of a municipal or a government. Then, a set of policies, strategic initiatives, and tactical decisions that is used to accomplish the vision are designed, produced and reviewed by a policy planner. The policy planner also determines the objectives of individual enforcement units to realize the strategic initiatives that have been made at the decision-making level. Next, a planning executor formulates a set of measures or KPIs, which are based on the standard specification of smart city to execute all the initiatives and decisions. Lastly, a practitioner promotes the business affairs of smart city application when the smart city application is operating.

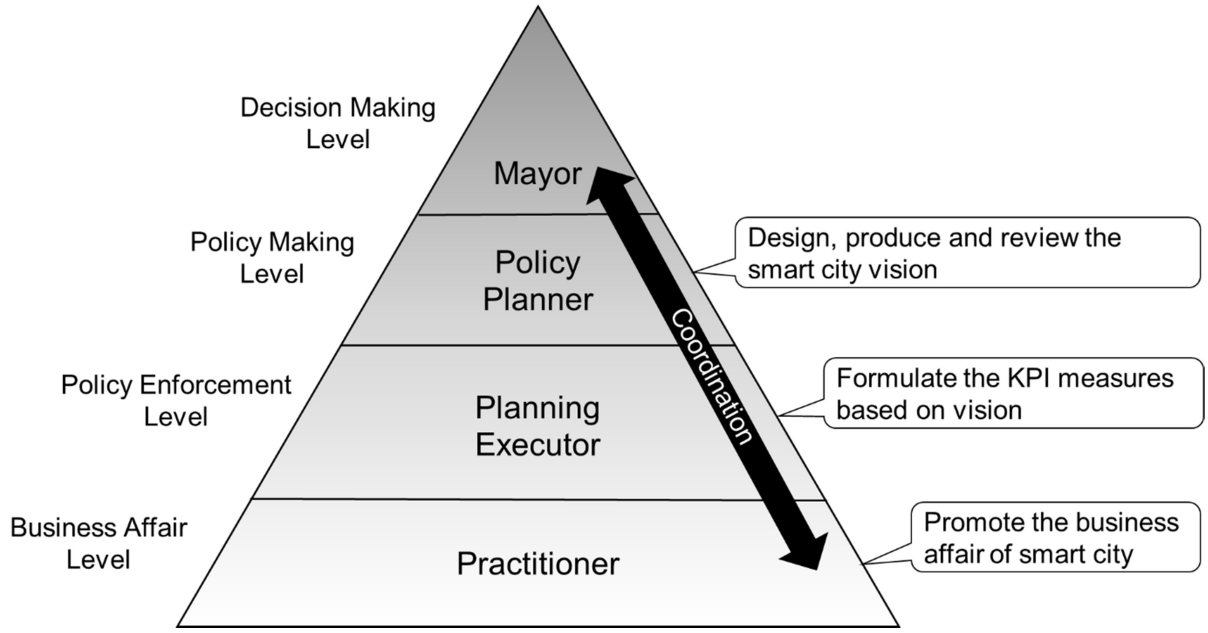

Figure 4.3: People involvement of municipalities or governments [19]

Why a smart city is successful and what elements contribute to its success? In fact, all the smart city implementations have a mixture of participants in governments, commercial industry and civil society, but the position and nature of participation varies, as do the roles of the participants. The participant of citizen and relevant stakeholders is important to ensure the success of the smart city application. Besides that, an operational approach that is significantly important to ensure the smoothness and manageable of the smart city operation. In the context of this research report, the operational approach consists of three different types, i.e., vision-embodied type, problem-solving type and integrated type. The participation of these three types is different and depends on the basic top-down and/or bottom-up approaches. **Figure 4.4** shows the classification types of operational approach.

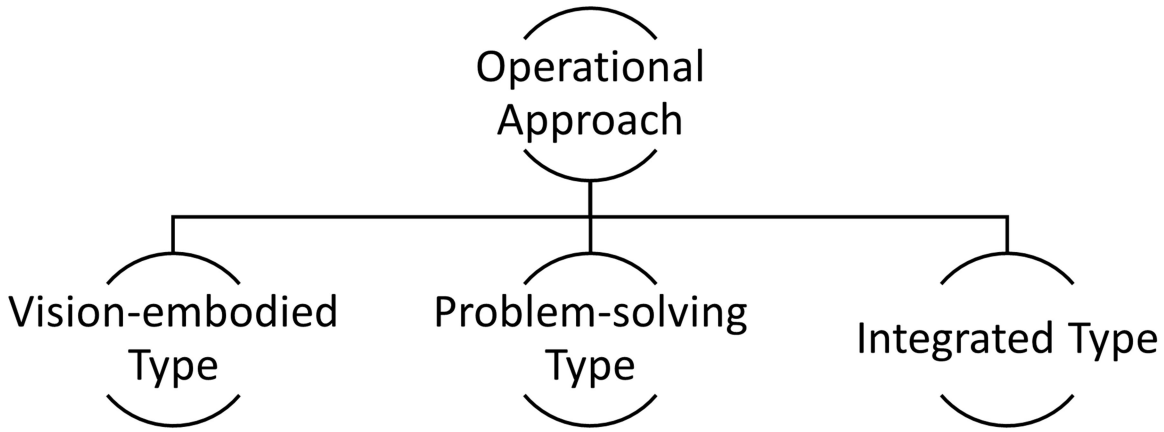

Figure 4.4: Classification of operational approach

The vision-embodied type that is a top-down approach promotes a high degree of coordination, whereas the problem-solving type that is a bottom-up approach allows more opportunity for people to participate directly. The integrated type is a combination of both vision-embodied type and problem-solving type. The attempt of integrated type, in which citizens and relevant stakeholders involved, ensures that all people who are affected by or interested in a certain issue have the potential to influence processes and decisions on this issue, or at least have access to relevant information. This might be organized by accessing to a central data hub (e.g., platform) as well as by the construction of a knowledge management system which allows a cross-linking of knowledge of sectorial developments.

Furthermore, the advantages and disadvantages of vision-embodied type, problem-solving type, and integrated type are summarized in **Table 4.1**. In the integrated type, the participation from citizens and stakeholders play a role as a kind of feedback, which gives high feasibility of milestones and initiatives in the smart city application. The integrated type also allow an easy to communicate with each other within the operational municipal or government, which is composed of relevant departments. As a result, the integrated type always guarantee an involvement of all layers of citizens and municipalities; therefore, its applicability is higher than others. The only disadvantage of the integrated type is that an additional cost and time spent for running the feedback mechanism, which depend on the size of the participation. **Table 4.2** illustrates the examples of challenge and strategy for top-down and bottom-up approaches of the integrated type.

Table 4.1: Advantages and disadvantages of vision-embodied type, problem-solving type, and integrated type

	Vision-embodied Type	Problem-solving Type	Integrated Type
Advantages	• Provide early insurmountable risks and enormous opportunities • Within the operational municipal is composed of relevant departments, it is easy to communicate with each other • Services can be managed from one central to keep oversight on many divergent aspects	• Requirements and initiatives are well-specified at the early stage • Because those activities cover the running cost in the business model, it can be expected to make a profit • Operation and management are controllable regardless of the change of person	• Feedback from citizens and stakeholders gives high feasibility of milestones and initiatives • Within the operational municipal is composed of relevant departments, it is easy to communicate with each other • Involvement of all layers of citizens and governments is high
Disadvantages	• Cost and time spent for measuring, what is not measuring are too high • Concerned about sustainable policy continuation when the person in charge in the municipal changes • Defining requirements and initiatives can be excessive before next step	• All requirements and initiatives must be known upfront • Methodology created and used for each problem-solving are identical • No independent enterprise can well-fit and accept the entrusted contracts that based on the purpose of the project	• Additional cost and time spent for running the feedback mechanism

Table 4.2: Examples of challenge and strategy for the top-down approach and bottom-up approach of the integrated type

		Challenge	Strategy
Integrated Type	**Top-down Approach**	Reduce administrative cost in the feedback mechanism	Improvement of cost usage by visualization
		Contribution of participation to policies, initiatives and tasks within the municipalities	Implementation of smart city's policies, initiatives and tasks to all the layers of citizen
	Bottom-up Approach	Improvement of residents' services	Regional revitalization based on CSV (creation of common value) and providing regional redemption structure
		Improvement of residents' consciousness	Enhancement of smart city awareness through dissemination of service usage to residents

4.3.1 Vision-embodied Type

In the vision-embodied type, the vision is clear at the initial stage of the smart city implementation. It uses the top-down approach that introduces the policies, initiatives and objectives to be addressed in order to realize the smart city application. In **Table 4.3**, the review outcomes conclude that the approaches in Papua New Guinea and Myanmar are belonging to the vision-embodied type.

4.3.2 Solving-problem Type

In the problem-solving type, a citizen problem assumed to be clear at the first place. For example, the transportation services leads to heavy traffic in daily life of a city. To deal with this, the problem-solving type uses a bottom-up approach to addressing the manifested issue clear among the citizen. In **Table 4.3**, the review outcomes summarize that the approaches in Iran (Islamic Republic of) and Viet Nam are fall into the problem-solving type.

4.3.3 Integrated Type

Effective smart city operation needs to balance both top-down and bottom-up approaches. On another occasion, collecting the information by sensors, cameras, and smart devices and taking policy actions by the top-level leadership may require the top-down approach during emergencies. On the other hand, improving the city transportation services with citizen participation may require the bottom-up approach at any time. In **Table 4.3**, the review outcomes summarize that the approaches in Malaysia and Thailand are classified as the integrated type of operational model. Due to the feedback mechanism regardless of the top-down approach or the bottom-up approach, the feedback is cycling to address the vision of the smart city application. In the next following sections of this research report, the analysis and review of the city-specific solutions excerpted from the case studies of Malaysia and Thailand are used to describe the contribution of the implementation and operation of a smart city.

Table 4.3: The review outcomes and examples based on the questionnaire responses

	Vision-embodied Type	**Problem-solving Type**	**Integrated Type**
Review Outcomes	• An administrative vision is indicated • A top-down approach that presents the issues to be addressed in order to realize the smart city application	• A bottom-up approach that is addressing issues to be solved in order to deal the problems manifested in the specified smart city application	• An administration vision is indicated • A feedback mechanism of citizen participation is established • Both top-down and bottom-up approaches are cycling to addressing problems of smart city application
Examples	• New smart city planning for a new ecosystem area • Examples: o New city at Paga Hill, Port Moresby, Papua New Guinea o New vehicle registration system, a RFID-based vehicle registration and control system in whole country of Myanmar	• Developing an new infrastructure for supporting the smart city application • Examples: o Bus rapid transit (BRT), an public bus transportation in Tehran, Iran (Islamic Republic of) o Traffic enforcement system, a vehicle traffic violation system in Bac Giang Province, Viet Nam	• Managing and operating vast complicated smart city initiatives in entire country • Examples: o Low carbo lifestyle blueprint for Iskandar city's carbon intensity emissions by 2025, Malaysia o Smart city for Phuket island's smart tourism by 2020, Thailand

4.4 Smart City Application in Malaysia

4.4.1 Iskandar Smart City

Iskandar smart city that is one of the smart cities in Malaysia was selected at the initial stage of national smart city application. In the Iskandar smart city, six domains are considered as shown in **Figure 4.5**. To explain the smart city application in Iskandar, we use the term project in this section. The vision of the project is to achieve a low carbon lifestyle. The project uses the Carbon Society Blueprint, which was launched in 2012, to cut Iskandar Malaysia's carbon intensity emissions by half by 2025 (see **Figure 4.6**) that will create a greener, more sustainable yet economically dynamic environment, and was established on Iskandar Malaysia's three pillars of the Economy, Community and Environment. There are five actions advocated by the Blueprint to fulfill a green economy vision, i.e., integrated green transportation, green industry, low carbon urban governance, green building and construction, and green energy systems and renewable energy. One of the main actions is to have an integrated public transportation system in Iskandar Malaysia, with the objective of increasing the public transport modal share in Iskandar Malaysia from the current 18% to 40% in 2025. More details can be obtained from **Annex A.2**.

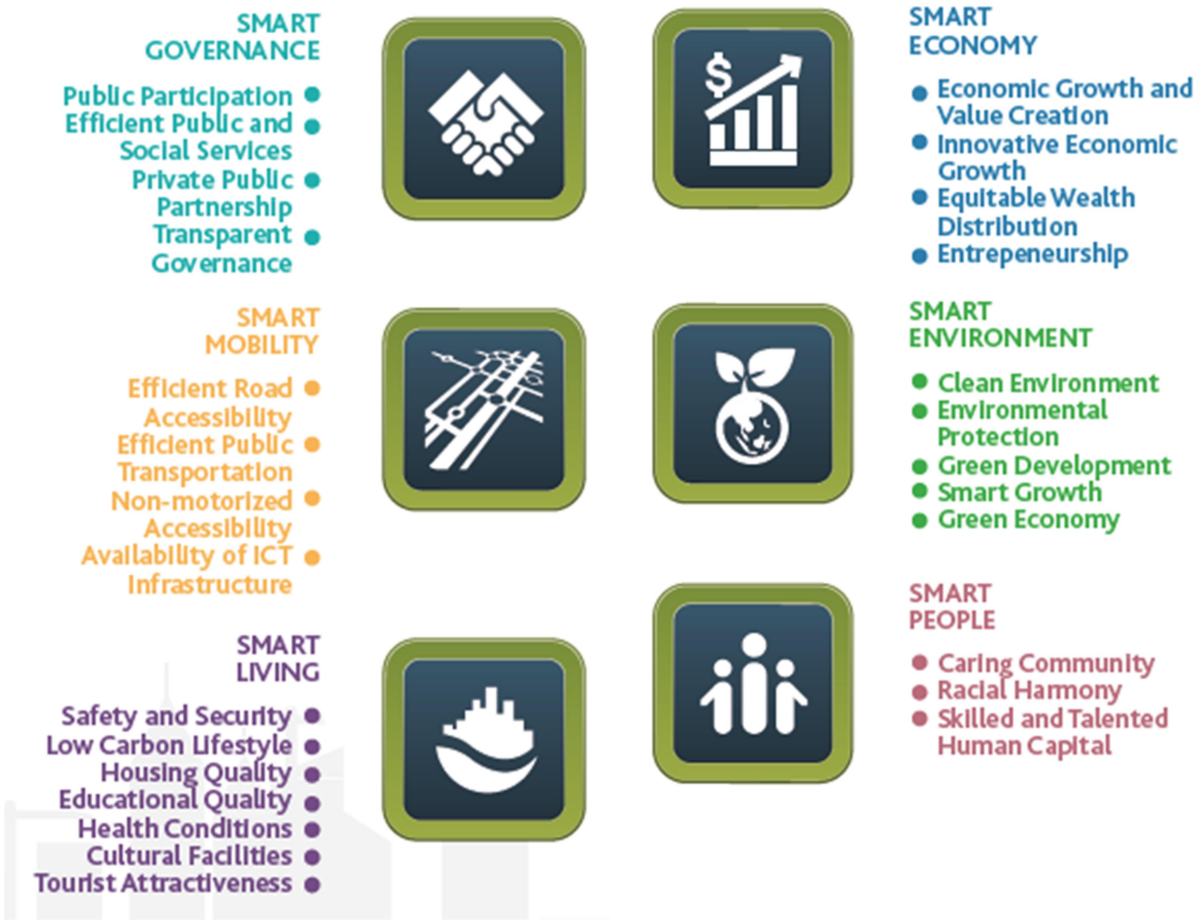

Figure 4.5: Smart city application in Iskandar, Johor, Malaysia

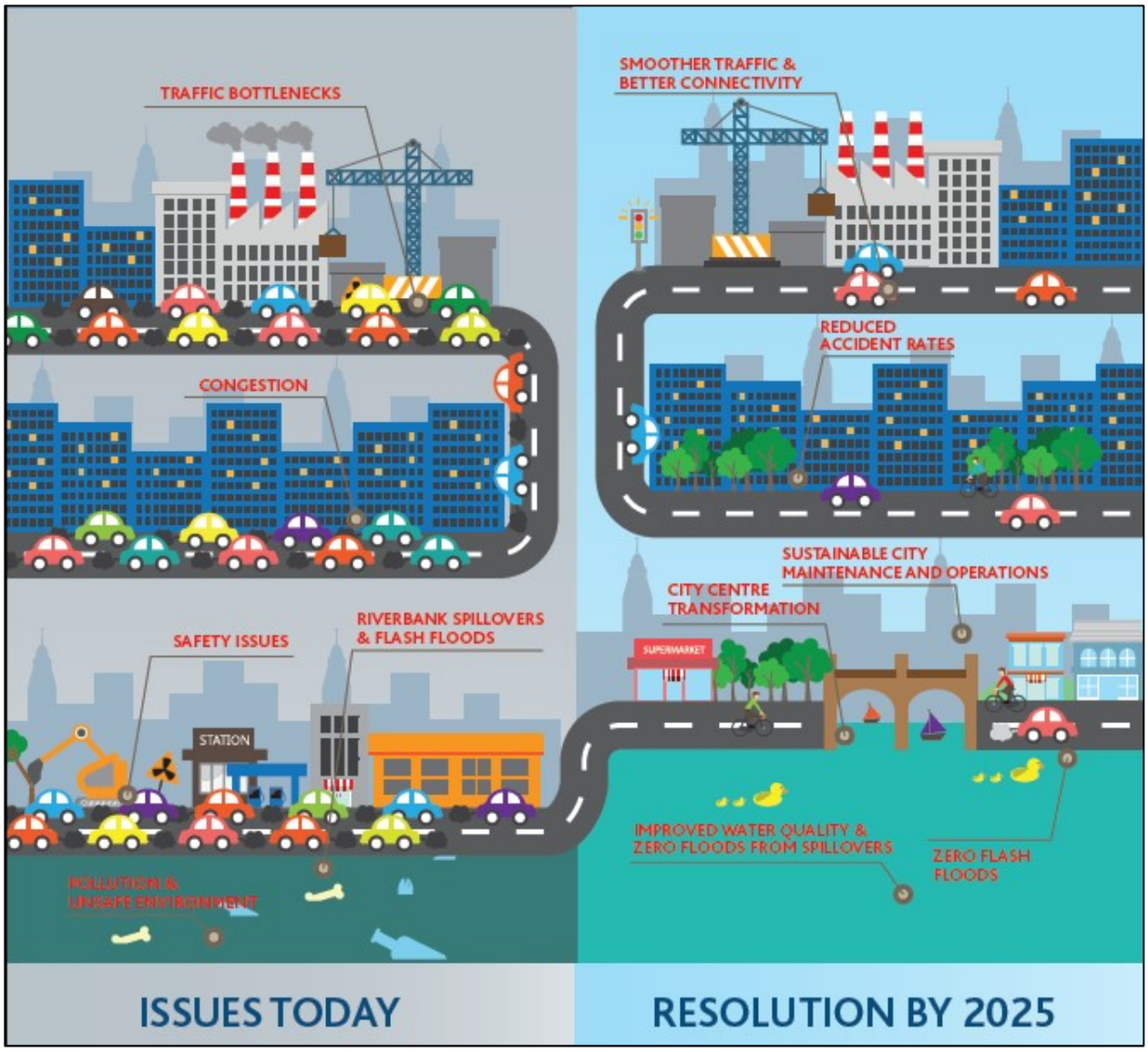

Figure 4.6: Smart mobility in Iskandar, Johor, Malaysia

4.4.2 Guidance Review and Analysis

Based on the shared information and discussion in the workshop, the smart city solution in Iskandar can be concluded in **Figure 4.7**. Note that the box in yellow color ( ) indicates the added components for realizing the smart city solution. For example, to achieve the integrated green transportation, cameras and smart devices are used. Then, the long term evolution (LTE) networks are used to gather all the sensed information on the public application support platform. By this way, the smart mobility service can be supported. The detail of guidance analysis of smart city Iskandar can be found in **Table 4.4**.

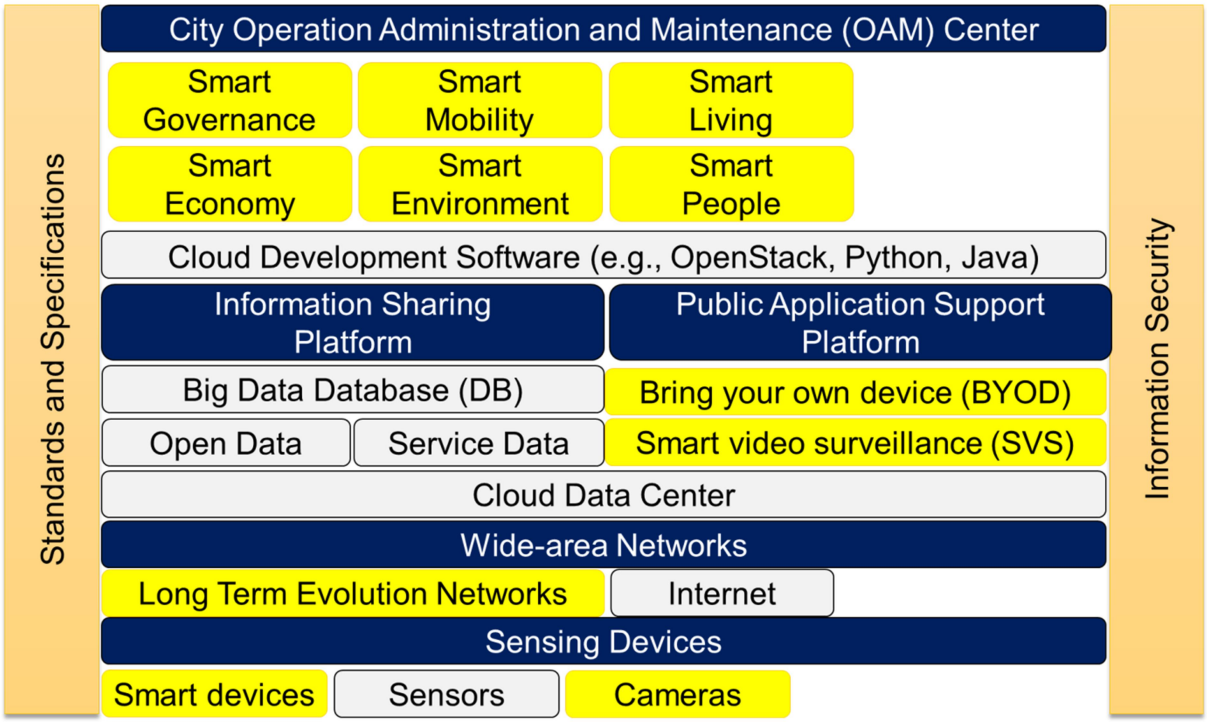

Figure 4.7: Smart city solution in Iskandar, Johor, Malaysia

Table 4.4: Guidance analysis of smart city Iskandar, Malaysia

Vision

- To create Iskandar Malaysia as the first choice to invest, work, live and play

Background

- Smart city Iskandar was endorsed by Malaysia Prime Minster on 1st November 2012
- Six domains are focused
- As of 2016, 49.5% of the 80 smart city projects have been completed

Challenges

Strengthen the institutional framework

- Lack of specific policy and strategies
- No mandatory regulations
- Lack of stakeholder participation

Provide conductive business environment

- Limited incentives and financial support
- Uncompetitive product cost

Intensify human capital development

- Few research and educational institutions focus on smart city agenda
- Limited technical capability
- Limited skills and knowledge workers

Intensify smart city research and innovations

- Limited funding to encourage R&D – local grant
- Lack platform for networking of related R&D

Promotion and public awareness

- Lack awareness on smart city
- Accessible information and effective promotion
- Involvement of media, NGO and individual

Strategies

- Enhance infrastructure, skills, science and technology research for the development of Iskandar, Malaysia

Total Number of Indicators

- 94 indicators were initially selected for incorporation in the 12-dimension index, which are (1) income and economic distribution; (2) education; (3) housing; (4) health; (5) environment; (6) security and safety; (7) communication, facilities and transportation; (8) leisure arts and culture; (9) government governance; (10) family institution; (11) social and community participation; and (12) unity and harmony between races

4.4.3 Smart Cities in Malaysia

Figure 4.8 shows other six smart cities in Malaysia. They are Penang Island, Selangor State, Cyberjaya city, Kuala Lumpur capital city, Melaka city and Iskandar city.

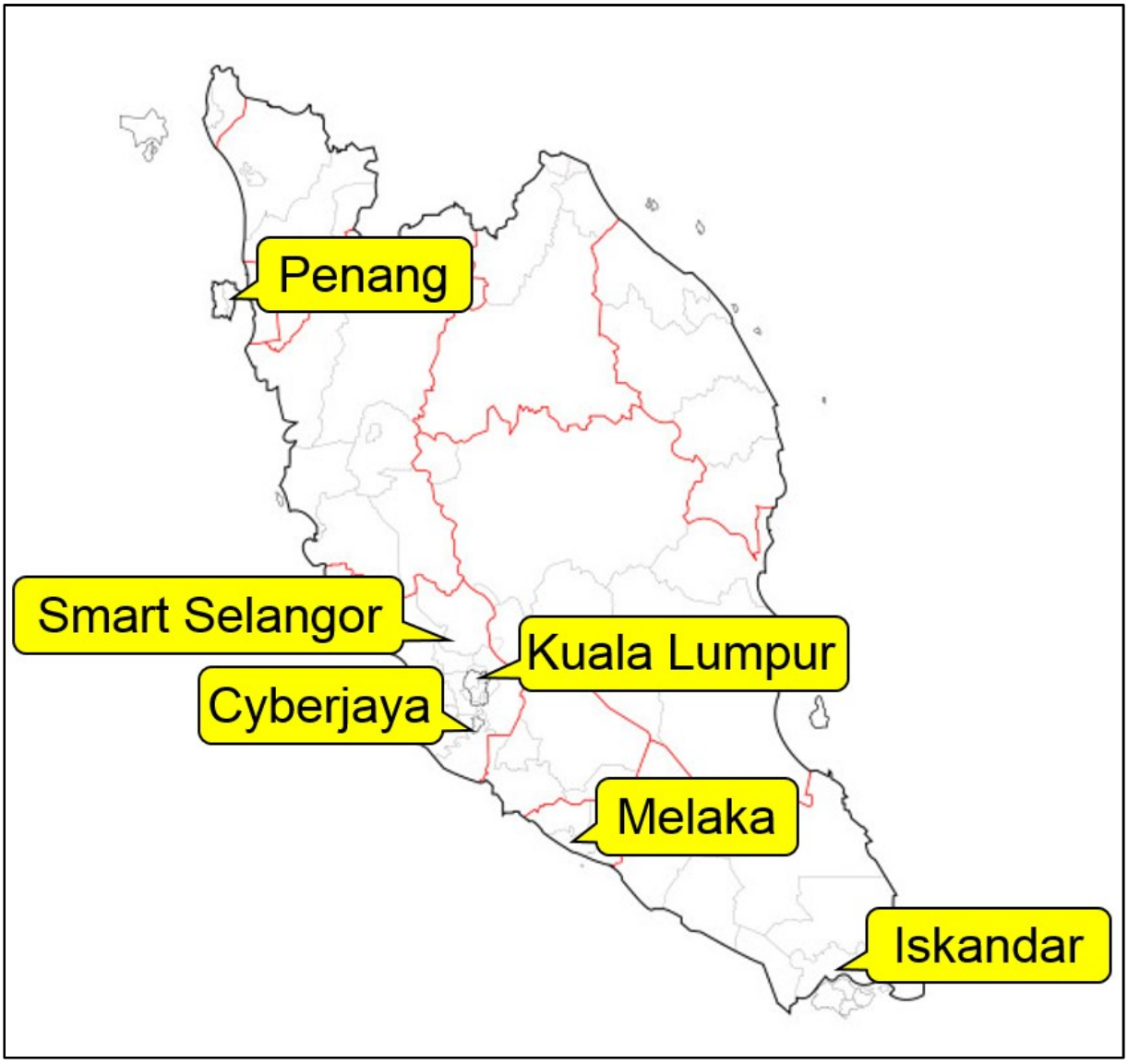

Figure 4.8: Early selected smart cities in Malaysia

4.5 Smart City Application in Thailand

4.5.1 Phuket Island Smart City

Phuket Island smart city that is one of the smart cities in Thailand was chosen as a pre-smart city project at the national level. In the Phuket Island smart city, seven domains are considered as shown in **Figure 4.9**. Smart tourism that is one of those domains is used to explain the smart city application in Phuket Island in this section. The vision of the smart tourism is to ensure the Phuket Island's tourism has a sustainable growth by enhancing creative economy to provide happiness for all. The strategies to achieve the smart tourism are to develop Internet infrastructure for tourist and local people; to support and develop platform and digital contents for tourist attractions; and to support and drive tourism entrepreneur to develop digital services. **Figure 4.11** illustrates more details about smart tourism in Phuket Island. Other smart domains can be viewed in **Figure 4.10**, **Figure 4.12**, **Figure 4.13**, **Figure 4.14**, **Figure 4.15**, **Figure 4.16** represent smart economy, smart safety, smart governance, smart education, smart healthcare, and smart environment, respectively. Also more details about smart tourism can be obtained from **Annex A.5**.

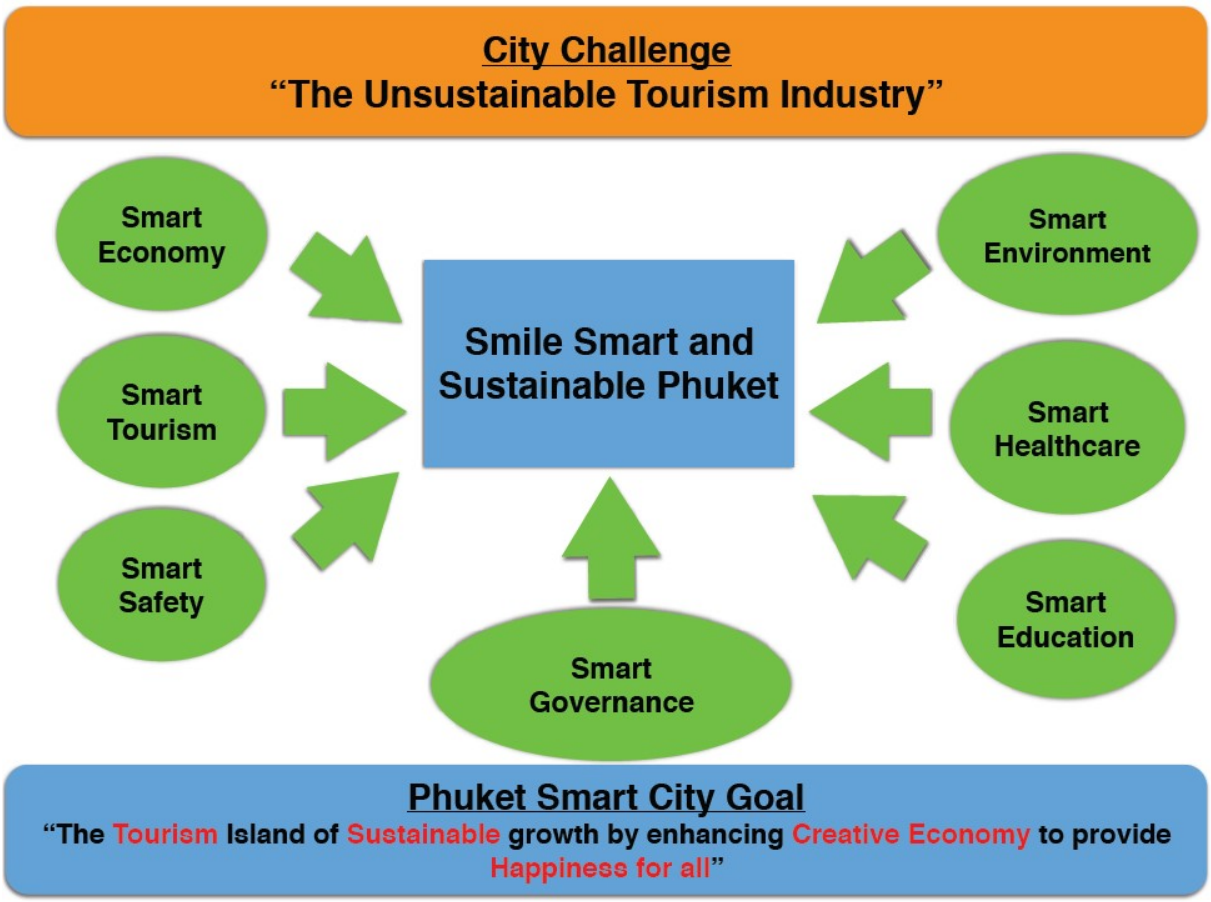

Figure 4.9: Smart city application in Phuket Island, Thailand

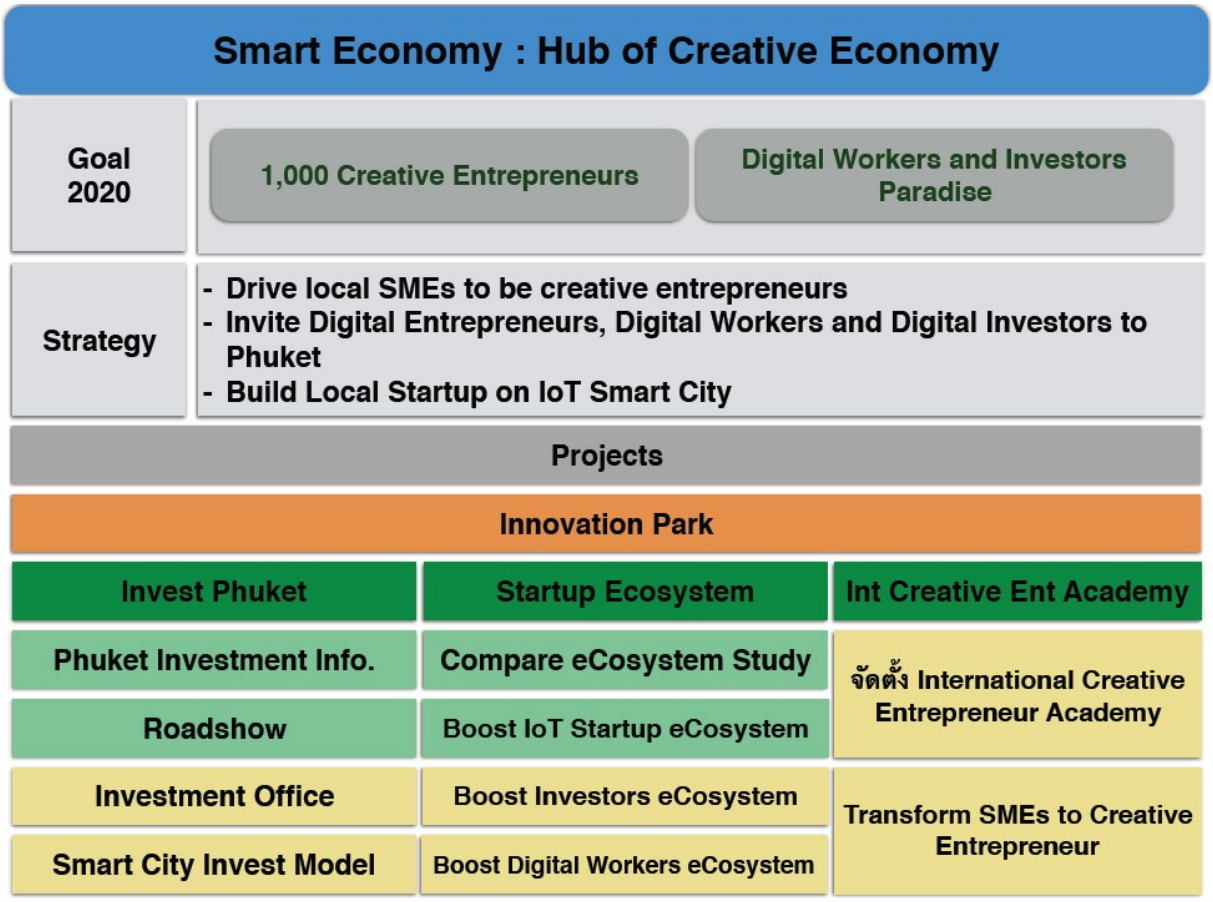

Figure 4.10: Smart economy in Phuket Island, Thailand

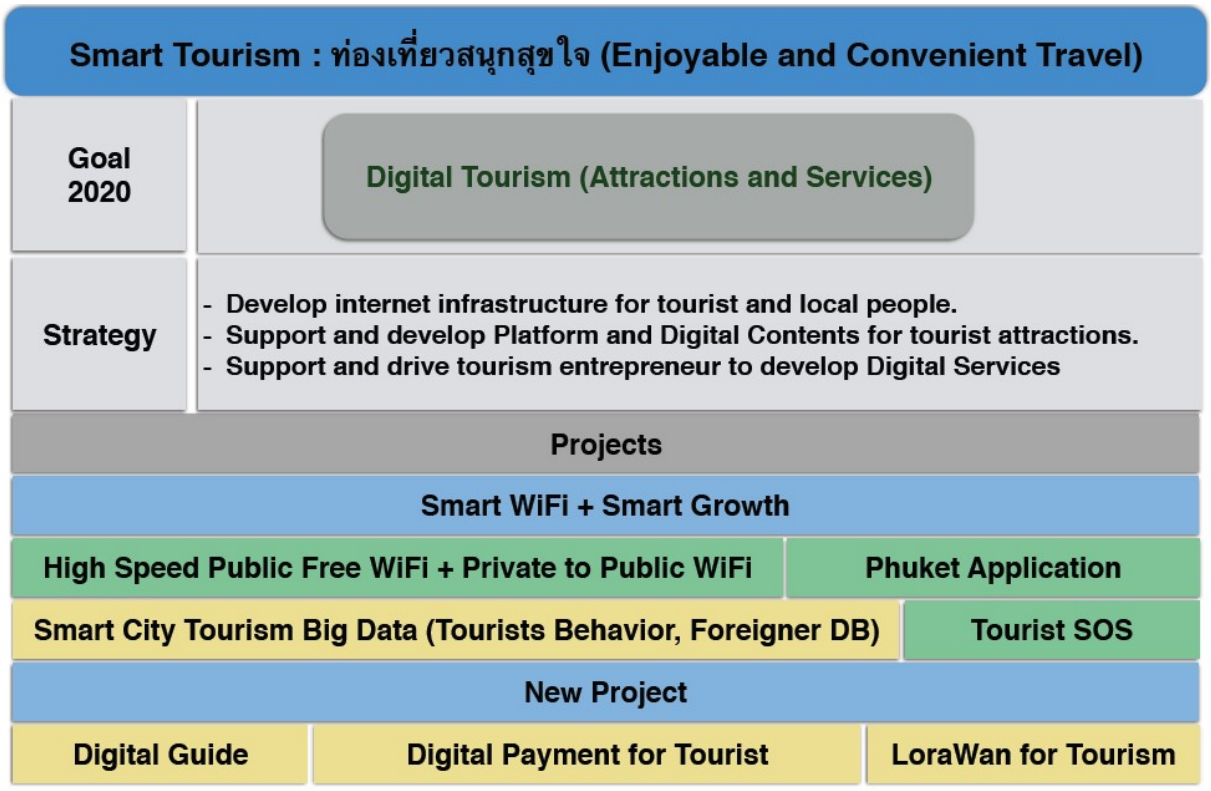

Figure 4.11: Smart tourism in Phuket Island, Thailand

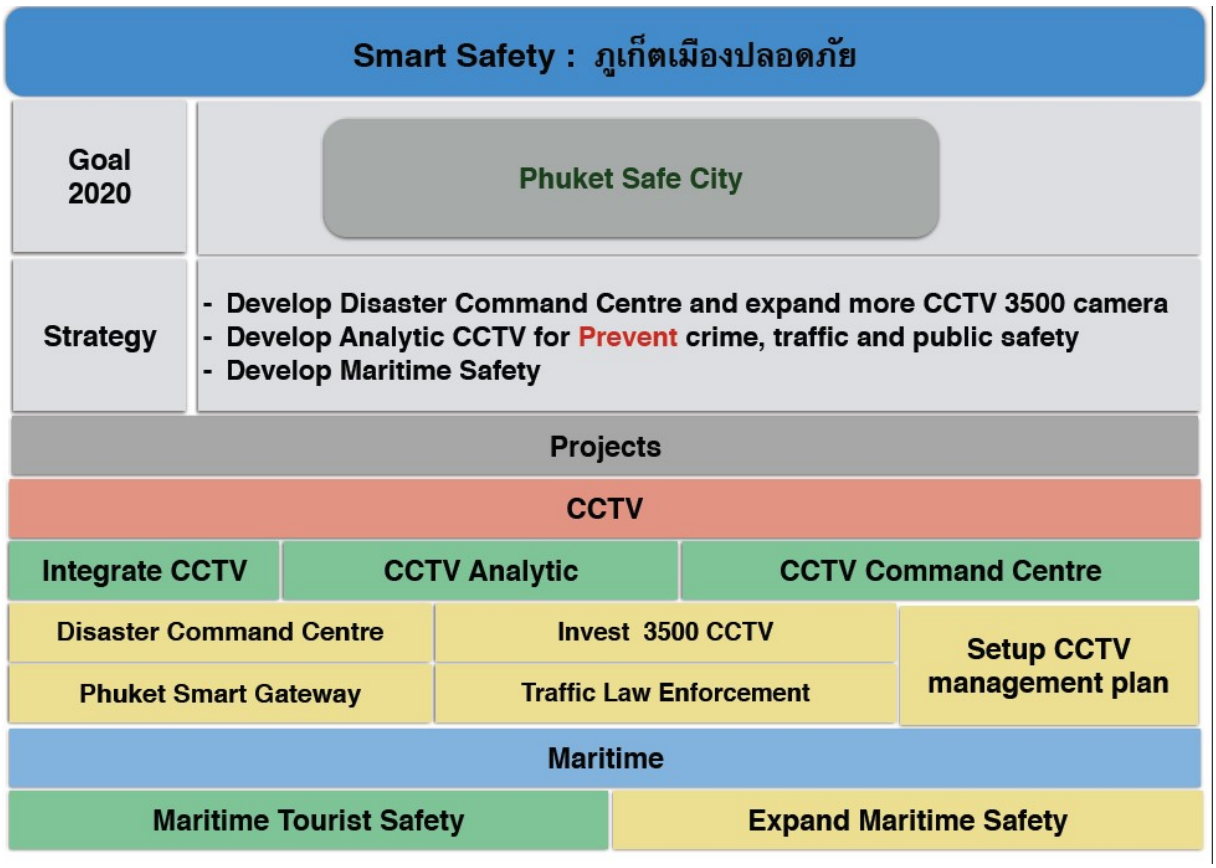

Figure 4.12: Smart Safety in Phuket Island, Thailand

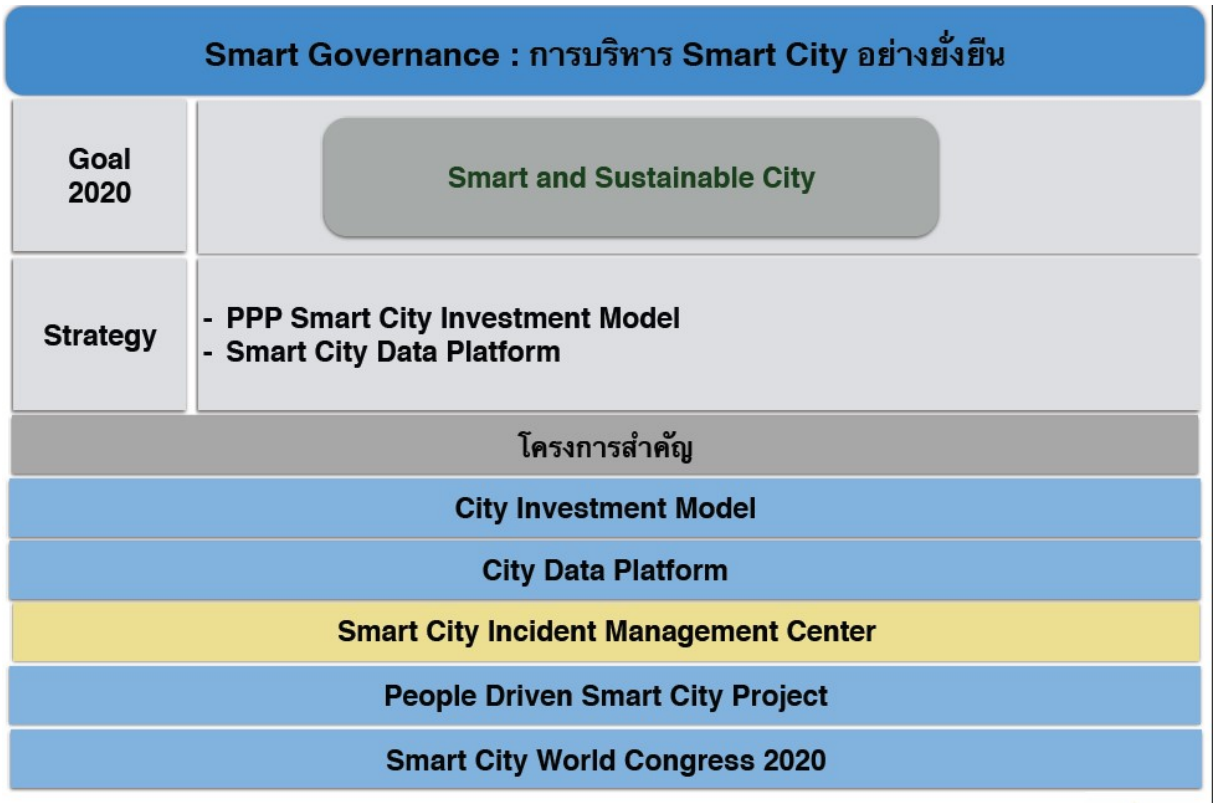

Figure 4.13: Smart governance in Phuket Island, Thailand

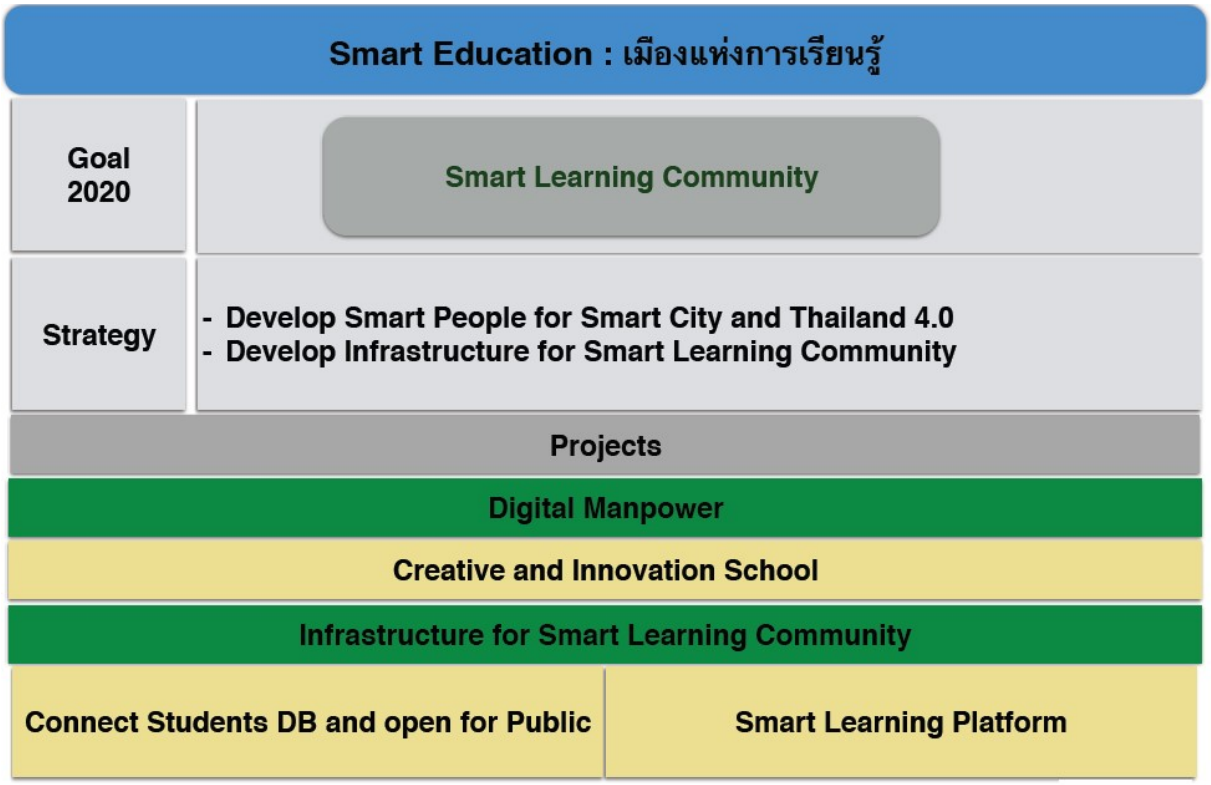

Figure 4.14: Smart education in Phuket Island, Thailand

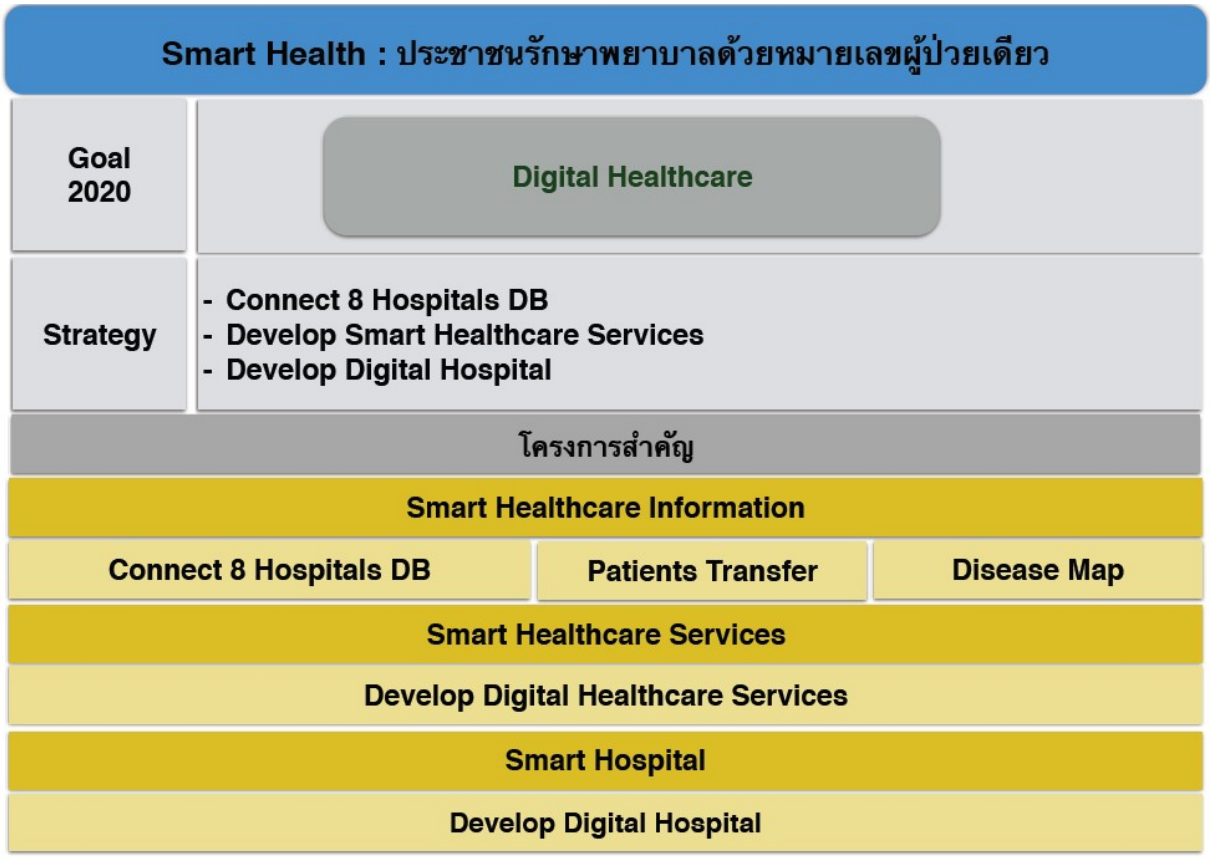

Figure 4.15: Smart healthcare in Phuket Island, Thailand

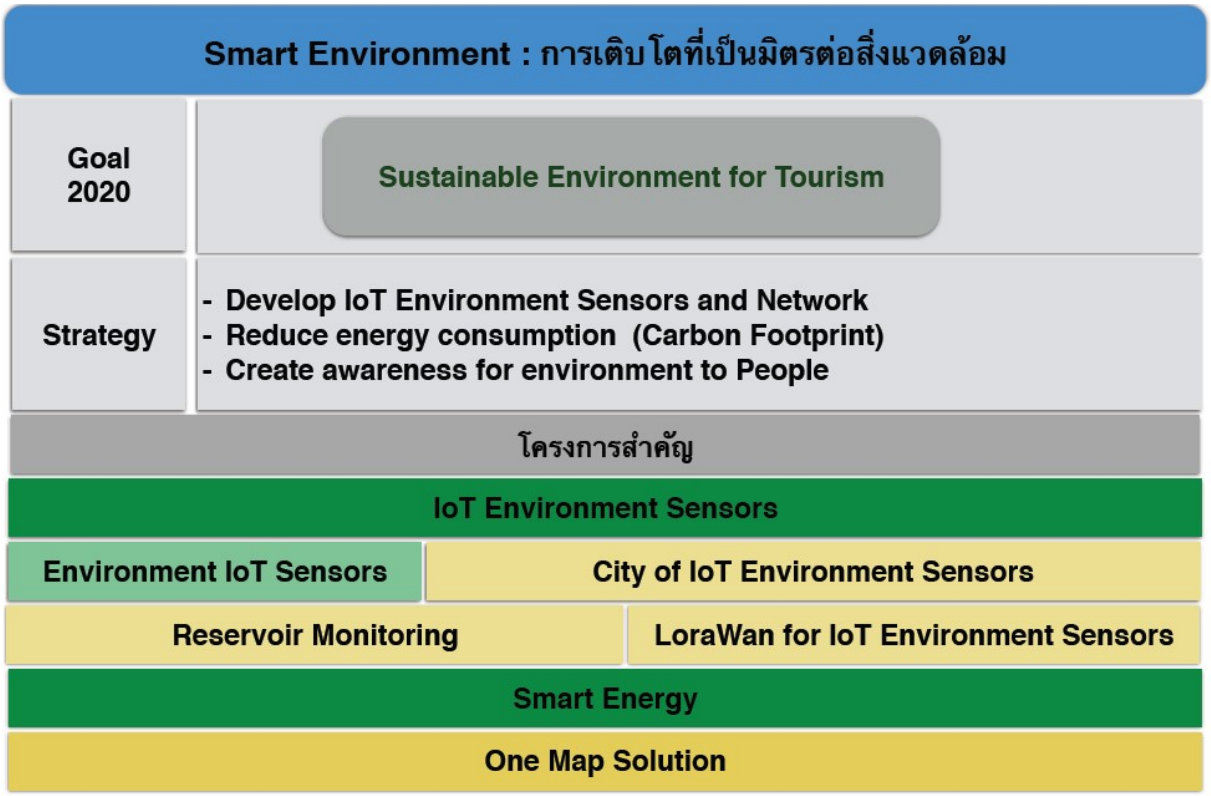

Figure 4.16: Smart environment in Phuket Island, Thailand

4.5.2 Guidance Review and Analysis

Based on the shared information and discussion in the workshop, the smart city solution in Phuket Island can be summarized in **Figure 4.17**. Note that the box in yellow color ( ) indicates the added components for realizing the smart city solution. For example, to achieve the smart tourism, smart phones, pan–tilt–zoom (PTZ) cameras and thermal cameras are used. Then, the WiFi networks are used to gather all the sensed information on the public application support platform. By this way, the smart tourism service can be supported. The detail of guidance analysis of smart city Phuket Island can be found in **Table 4.5**.

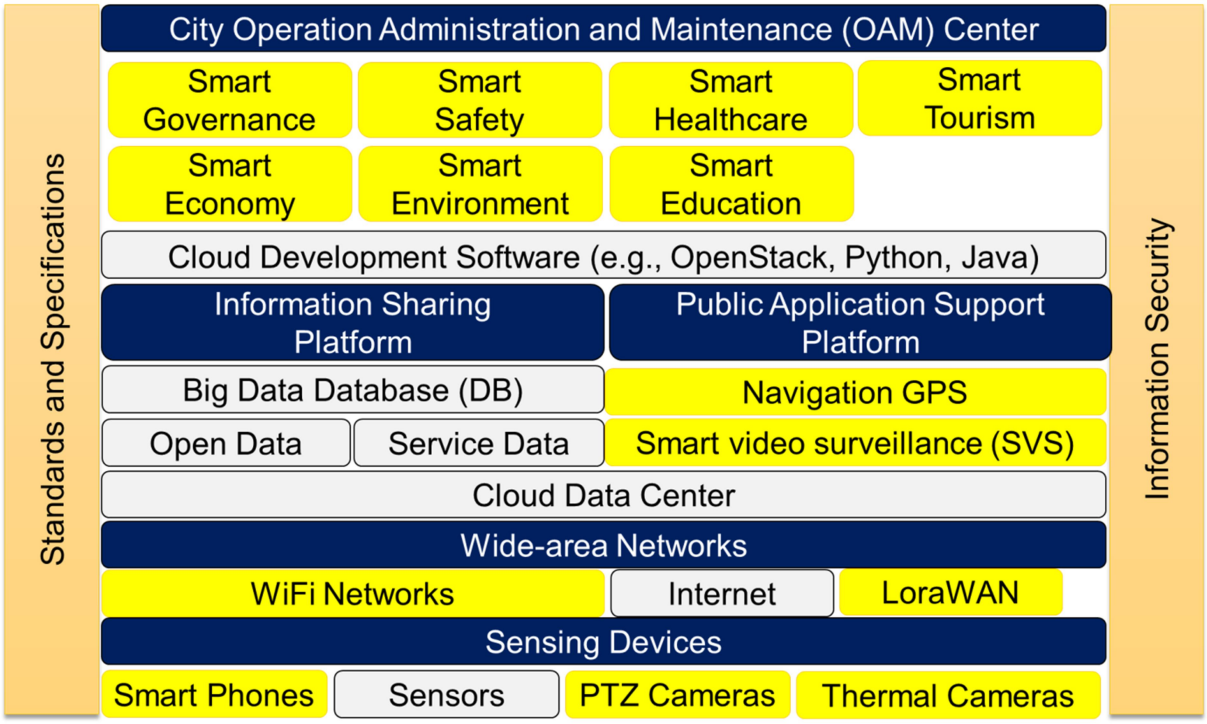

Figure 4.17: Smart city solution in Phuket Island, Thailand

Table 4.5: Guidance analysis of smart city Phuket Island, Thailand

Vision
• To create Phuket Island, Thailand as the tourism island of sustainable growth by enhancing creative economy to provide happiness for all
Background
• the Ministry of Digital Economy and Society looking to leverage on the Internet of Things to turn Phuket into a smart city by 2020 • Seven domains are focused
Challenges
• Tourist numbers are increasing rapidly, but there is a threat that the numbers will overwhelm the island's ability to sustainably manage its environment and social development • Deal with the unsustainable tourism industry • Improve local services, data from various sources, local and national government, businesses, social media and other open data sources, will be aggregated, visualized and made available to citizens, businesses and tourists via the Smart Phuket Application, which will provide users with access to city information, emergency contacts, updates on news and calendars. It will also be connected to an e-payment gateway which allows consumers to make purchases for food and hotel reservations. Emergency Alerts are also communicated via the app when adverse weather conditions are predicted to hit the area • Waste generation continually increases, as dues litter along roads, beaches and canals • Deal with climate change
Strategies
• Collaboration between residents, local government, higher education, and businesses in developing and implementation of a sustainable tourism standard operating procedures (SOPs), guidelines and assessment framework for different sectors • Develop internet infrastructure for tourist and local people • Support and develop Platform and Digital Contents for tourist attractions • Support and drive tourism entrepreneur to develop Digital Services • Support establishment of community beach groups (Green Club), and establish an awards and recognition scheme for businesses, institutions and communities that reduce waste and recycle; and set up easy to use recycling schemes and roadside collection and separation and composting of organic waste • Promotion of Energy Efficiency in all sectors, along with the switching of key consumption areas to clean fuel renewable energy (i.e., transportation)
Total Number of Indicators
• 26 indicators from 4 domains, which are (1) economic; (2) tourism; (3) environment; and (4) communication, facilities and transportation

4.5.3 Smart Cities in Thailand

Figure 4.18 shows other six smart cities in Thailand. They are Chiang Mai, Khon Kaen, Chonburi, Chacherngsao, Rayong, and Phuket Island.

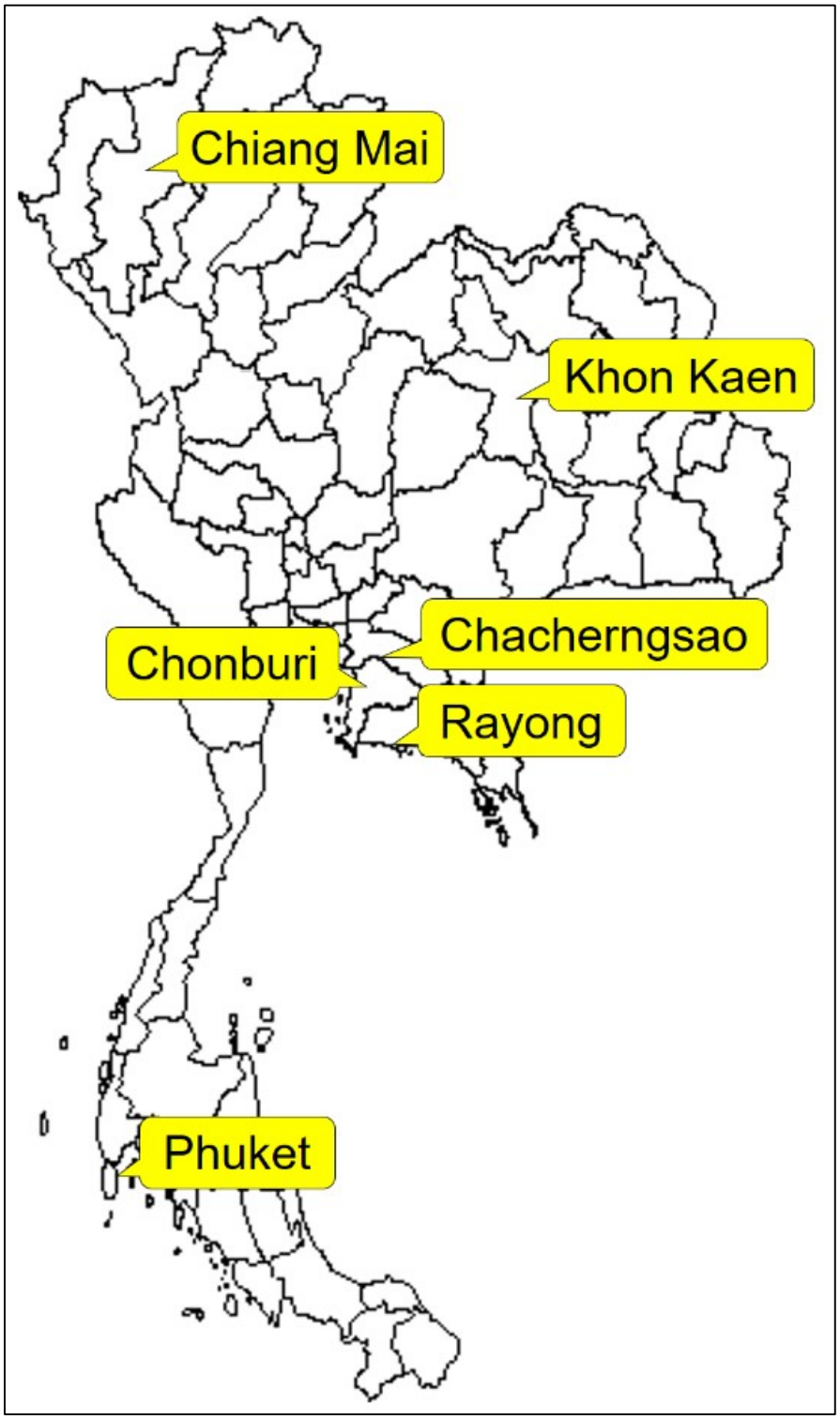

Figure 4.18: Early selected smart cities in Thailand

4.6 Summary

In summary, this chapter have discussed the characteristics, needs, requirements, and deployment of the policy making regarding the smart city application by using the operational model, which is simple but powerful model that can address well the process of implementation and operation in the smart city application. The operational approach also can help to deepen understanding of the implementation and operation of the smart city application in terms of vision-embodied type, problem-solving type, and integrated type. Especially, through the study on the integrated type, we could understand that governments' role in the cases like Malaysia and Thailand. The governments exclusively determine the smart city vision and initiatives internally, and they ask for feedback from citizens and businesses. Lastly, it is concluded that adaptation of explicit and efficient operational model and approach on the policy making regarding the smart city application with stakeholder consensus and active participation from citizens, businesses and governments is the key to successful smart city implementation and operation.

5 Conclusion

5.1 Contributions and Recommendations

The contributions of this research report firstly has introduced smart city concept and its related international standard activities. Second, this report has shown an assessment of survey and workshop on the case studies of ongoing smart city application to the countries of Asia Pacific region, which are starting/promoting the smart city policy making by sharing the information of other pioneering countries in Asia Pacific region for guiding future directions of policy making on smart city application. Third, this report has presented an efficient and comprehensive guidance of the implementation and operation procedures on the policy making regarding the smart city application.

The recommendations of this research report are as follow:

- Future research work is required to collect more number of responders from the APT members, associate members and affiliate members in order to ensure the value of the statistical figures is reflected to the actual relative frequency of all the schematic themes;
- The KPIs of smart city that are used in the survey framework are specified by the ISO 37120 standard, in which those KPIs are intended to be specified generally and broadly. Perhaps the KPIs from the ITU-T Y.4901/L.1602 standard should be also considered for investigating an efficient and effective guidance on the technique and evaluation of smart city application; and
- In order to improve accountability and to increase awareness and participation of the APT members, associate members and affiliate members, dissemination through promoting this guidance of implementation and operation on the policy making regarding the smart city application is required.

5.2 Concluding Remarks

This research report has focused on the introduction of smart city concept and its related international and national standardization activities. Since the urban policy development of smart city is assumed to be commonly applied within each country in Asia Pacific region, useful and gainful information based on the actual activities in the starting/promoting countries about the implementation and operation know-how on the smart city application have been collected and analyzed in this research report. As a result, this research report has achieved its primary objective in providing an efficient and comprehensive guidance on the future smart city policy making of municipalities or governments in the rural areas of Asia Pacific region.

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Annex A

List of Responders of the Questionnaire

A.1 Iran (Islamic Republic of)

Entry Number: A.1

Smart City Case Study Suggestion

1. Primary Contact Information

Date	May 3, 2017	*Country*	Iran (Islamic Republic of)
Organization	Communications Regulatory Authority (CRA)	*Name*	Adib Kamrani
Email	a.kamrani@cra.ir	*Telephone*	+98-21-89661528

2. General Information

Name of Smart Cities	Tehran
Population (est. year)	13.27 million persons (2016)
Main Source	• http://trafficcontrol.tehran.ir/Default.aspx?tabid=108&ArticleId=82 • http://bus.tehran.ir/ArticleView/tabid/82/ArticleId/7/-1800000-BRT.aspx

3. Current themes for building smart cities (choose more than one if necessary)

☐	Economy	☐	Education	☐	Energy
☐	Environment	☐	Recreation	☐	Safety
☐	Shelter	☐	Solid Waste	■	Urban Planning
☐	Finance	☐	Fire and Emergency Response	☐	Governance
☐	Health	■	Transportation	☐	Telecommunications and Innovation
☐	Wastewater	☐	Water and Sanitation		

4. Standard(s) or Standard Project(s) for Smart Cities

Standard(s) or standard project(s) to be developed over the next 3 to 5 years for smart cities at the system of systems (city) level. Example:

Reference No.	Title	Standard/ Approved	Date for Publication	Reference to International Standards
None				

5. Case Study Information

Title	Bus Rapid Transit (BRT)
Abstract	Developing Special bus lanes and bus organized are one of the main strategies for the short-term, low-cost and efficient means of improving the traffic situation in Tehran. BRT is one of the ways to organize public bus transportation.

Details (optional)

Assumptions	One of the main weaknesses of the passenger transportation system with buses is slow movement and low efficiency of the system. Factors such as the lack of easy access, overcrowding of passengers at the station and buses, lack of correct information about routing, irregular departure time of buses, lack of exact Schedule for bus stops at the station, long wait times and other similar problems caused citizenry don't use public transportation.
Procedures	Implementation kind of transportation with new technologies what have accuracy and speed of rail transport systems and the flexibility transportation tradition bus lines.
Results	More than 1 million 800 thousand passengers by 5 BRT line will be moved.
Issues	None

6. Additional Information (e.g., table, picture)

Please attach the best picture(s) in describing your idea(s) using diagrams, pictures, flow charts, architectures or relevance.

Figure A.1.1: Map of BRT lanes

Figure A.1.2: Example BRT station

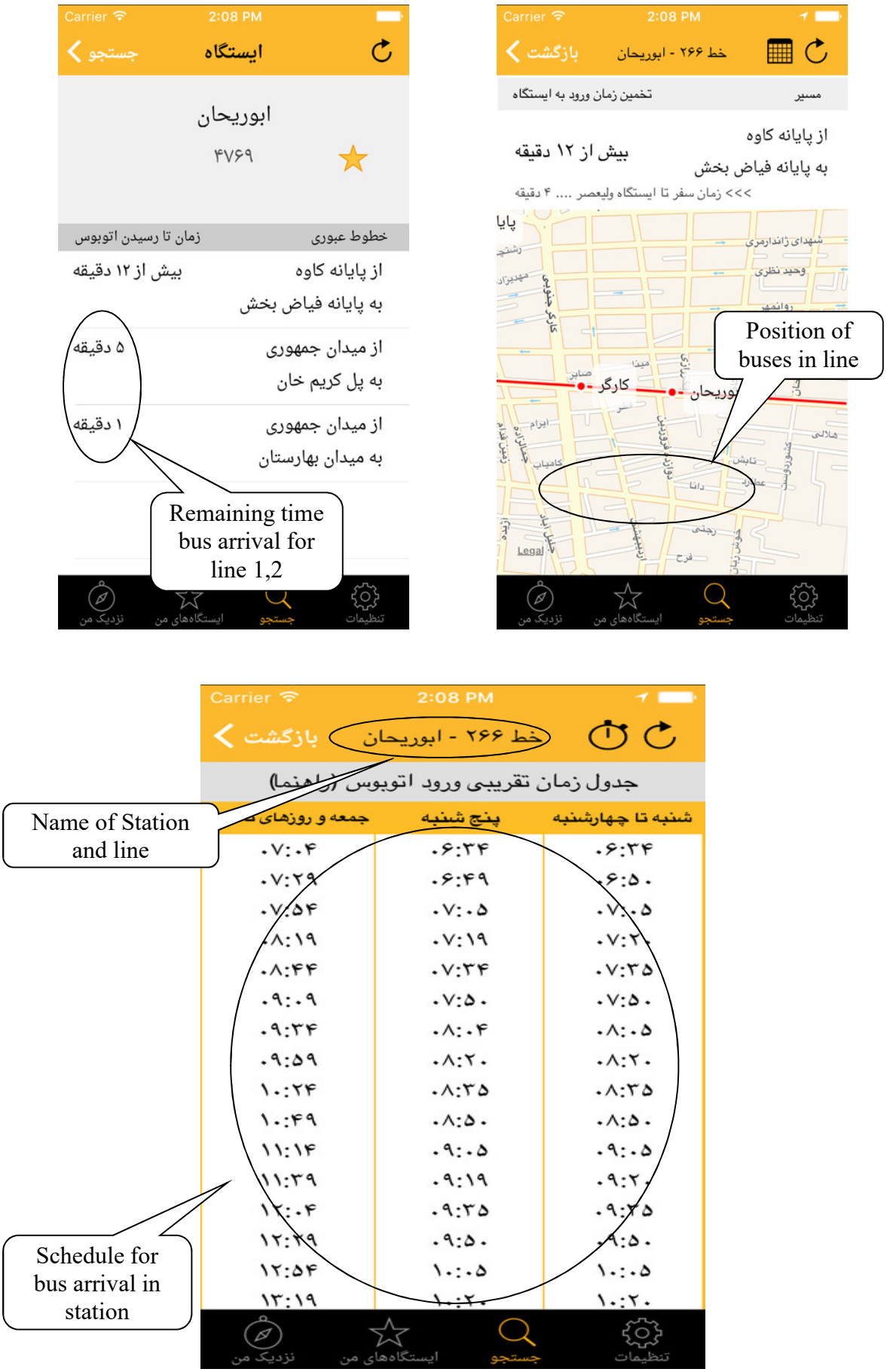


Figure A.1.3: Bulletin board for bus arrival timing at each station

A.2 Malaysia

Entry Number: A.2

Smart City Case Study Suggestion

1. Primary Contact Information

Date	August 14, 2017	*Country*	Malaysia
Organization	Malaysian Technical Standard Forum Berhad (MTSFB)	*Name*	Gopinath Rao
Email	gopinath@favoriot.com	*Telephone*	+6012-3760579

2. General Information

Name of Smart Cities	Iskandar Malaysia
Population (est. year)	1.95 million persons (2015)
Main Source	• Iskandar Malaysia (http://iskandarmalaysia.com.my/) • Iskandar Malaysia 10 years Progress Report

3. Current themes for building smart cities (choose more than one if necessary)

■	Economy	■	Education	■	Energy
■	Environment	☐	Recreation	☐	Safety
☐	Shelter	☐	Solid Waste	☐	Urban Planning
☐	Finance	☐	Fire and Emergency Response	■	Governance
☐	Health	■	Transportation	☐	Telecommunications and Innovation
☐	Wastewater	☐	Water and Sanitation		

4. Standard(s) or Standard Project(s) for Smart Cities

Standard(s) or standard project(s) to be developed over the next 3 to 5 years for smart cities at the system of systems (city) level. Example:

Reference No.	Title	Standard/ Approved	Date for Publication	Reference to International Standards
None				

5. Case Study Information

Title	Towards Low Carbon Lifestyle
Abstract	The project uses the Carbon Society Blueprint, which was launched in 2012, to slash Iskandar Malaysia's carbon intensity emissions by half by 2025 that will create a greener, more sustainable yet economically dynamic environment, and was established on Iskandar Malaysia's three pillars of the Economy, Community and Environment.

Details (optional)

Assumptions	There are Five Actions advocated by the Blueprint to fulfill a green economy vision, i.e.: • Integrated Green Transportation • Green Industry • Low Carbon Urban Governance • Green Building and Construction • Green Energy Systems and Renewable Energy One of the main actions is to have an integrated public transportation system in Iskandar Malaysia, with the objective of increasing the public transport modal share in Iskandar Malaysia from the current 18% to 40% in 2025.
Procedures	Based on the five actions listed above
Results	Not yet available (expected results as in diagram below)
Issues	• Lack of specific policy and strategy • No mandatory regulations • Lack of stakeholder participation

6. Additional Information (e.g., table, picture)

Please attach the best picture(s) in describing your idea(s) using diagrams, pictures, flow charts, architectures or relevance.

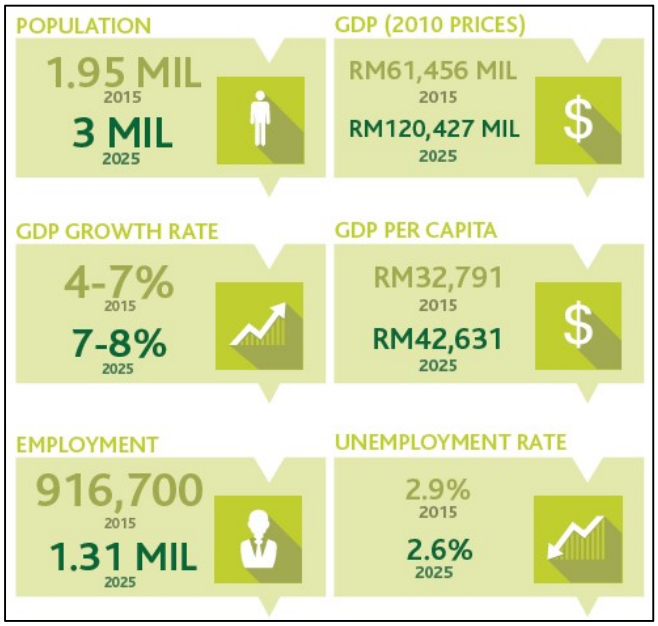


Figure A.2.1: Iskandar Malaysia statistics

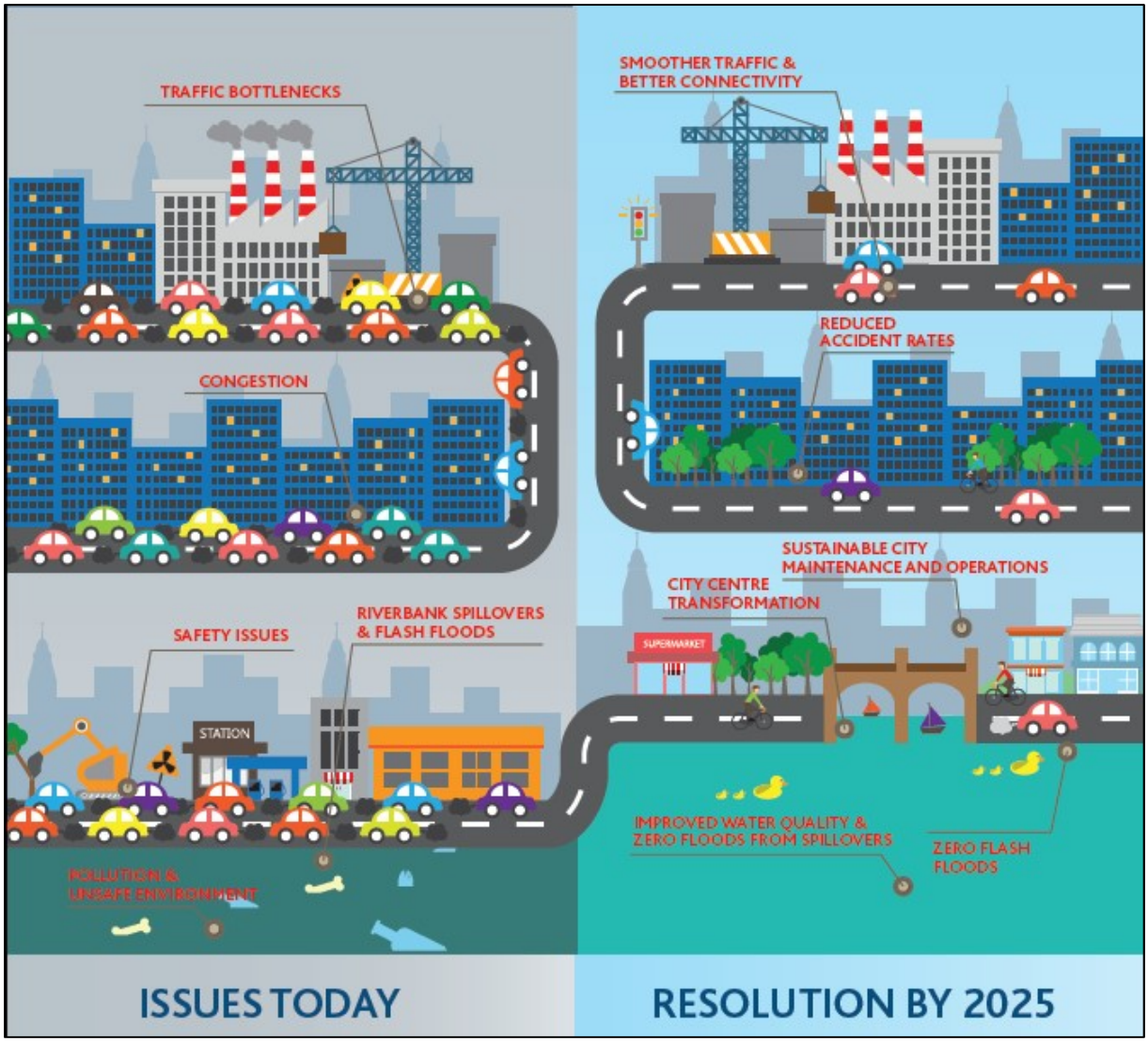


Figure A.2.2: Increasing connectivity and accessibility

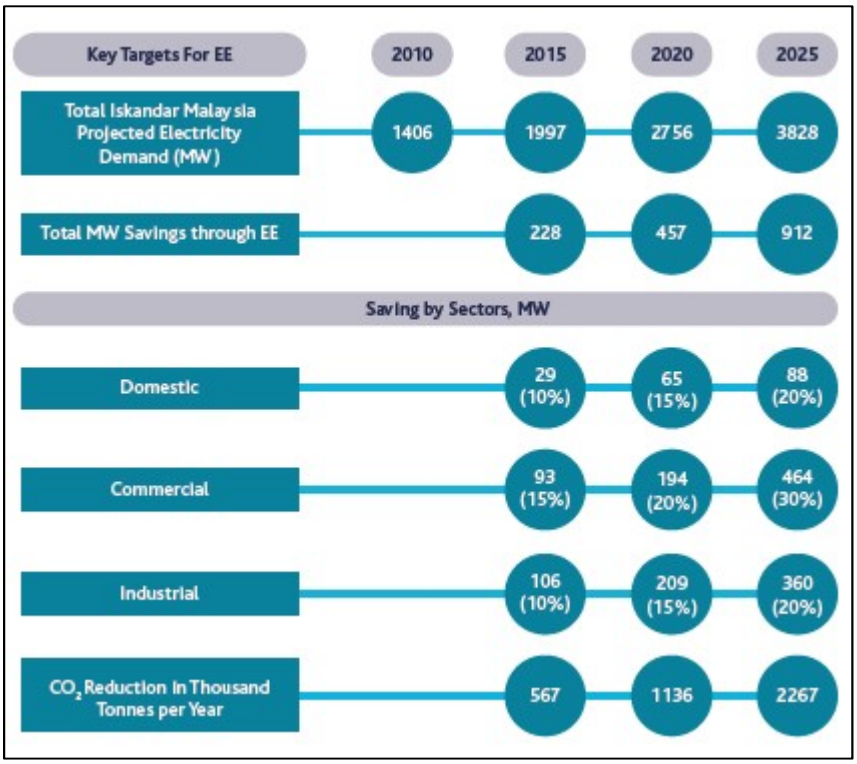


Figure A.2.3: Energy efficient target for Iskandar Malaysia (MW)

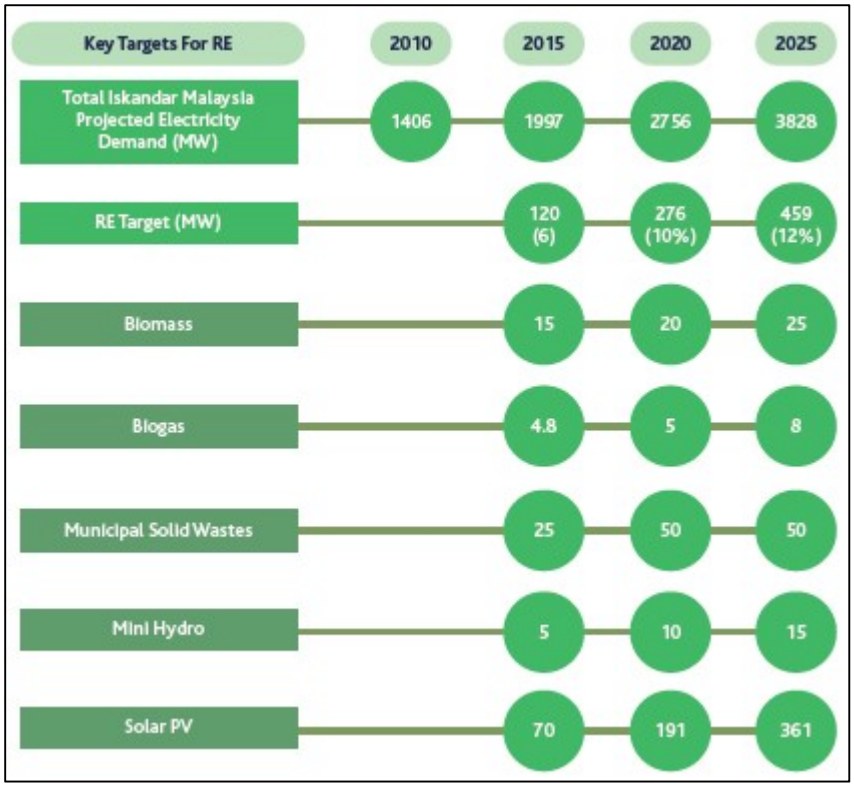


Figure A.2.4: Renewable energy targets for Iskandar Malaysia (MW)

A.3 Myanmar

Entry Number: A.3

Smart City Case Study Suggestion

1. Primary Contact Information

Date	May 31, 2017	*Country*	Myanmar
Organization	Posts and Telecommunications Department	*Name*	U Zarne Aung
Email	uzarne@yahoo.com	*Telephone*	+95-95400056

2. General Information

Name of Smart Cities	Entire Myanmar
Population (est. year)	50.21 million persons (2014)
Main Source	Road Transport Administration; MOTC

3. Current themes for building smart cities (choose more than one if necessary)

☐	Economy	☐	Education	☐	Energy
☐	Environment	☐	Recreation	☐	Safety
☐	Shelter	☐	Solid Waste	☐	Urban Planning
☐	Finance	☐	Fire and Emergency Response	☐	Governance
☐	Health	■	Transportation	■	Telecommunications and Innovation
☐	Wastewater	☐	Water and Sanitation		

4. Standard(s) or Standard Project(s) for Smart Cities

Standard(s) or standard project(s) to be developed over the next 3 to 5 years for smart cities at the system of systems (city) level. Example:

Reference No.	Title	Standard/ Approved	Date for Publication	Reference to International Standards
None				

5. Case Study Information

Title	Vehicle Registration by RFID
Abstract	To register and enforce motor vehicle throughout the country

Details (optional)

Assumptions	https://consult-myanmar.com/2017/02/06/expression-of-interest-for-developing-vehicle-registration-by-radio-frequency-identification-rfid-system-closing-date-10-march-2017/
Procedures	Feasibility study, Tendering, Implementation & Supervision, System Integration
Results	Expected all motor vehicle control by RFID
Issues	ICT awareness and enforcement

6. Additional Information (e.g., table, picture)

Please attach the best picture(s) in describing your idea(s) using diagrams, pictures, flow charts, architectures or relevance.

Table A.3.1: RFID of system integration in Myanmar

Consultant ဌားရမ်းရန်အတွက် တင်ဒါလုပ်ငန်းဆောင်ရွက်မှု လုပ်ငန်းအစီအစဉ်

Sr. No	Subject	2016-2017 Budget Year			2017-2018 Budget Year												2018-2019 Budget Year								
		Jan	Feb	Mar	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec
1	Prepare EoI for Consultant																								
2	EOI Annouance																								
3	EOI Received																								
4	EOI Selection																								
5	Annouance Short List																								
6	RFP Preparation																								
7	RFP Request																								
8	RFP Received																								
9	Review RFP																								
10	Contract Consultant Service																								
11	Fearbility Study																								
12	Tendering	12 Month Period																							
13	Implementation & Supervision	24 Month Period																							
14	System Integration																								

A.4 Papua New Guinea

Entry Number: A.4

Smart City Case Study Suggestion

1. Primary Contact Information

Date	September 13, 2017	*Country*	Papua New Guinea
Organization	National Information and Communications Technology Authority (NICTA)	*Name*	Felix D. Rupokei
Email	frupokei@nicta.gov.pg	*Telephone*	

2. General Information

Name of Smart Cities	Paga Hill, Port Moresby
Population (est. year)	390,000 persons (2016, source: World Bank)
Main Source	Urban planning / development

3. Current themes for building smart cities (choose more than one if necessary)

☐	Economy	☐	Education	☐	Energy
☐	Environment	☐	Recreation	☐	Safety
☐	Shelter	☐	Solid Waste	■	Urban Planning
☐	Finance	☐	Fire and Emergency Response	■	Governance
☐	Health	☐	Transportation	☐	Telecommunications and Innovation
☐	Wastewater	☐	Water and Sanitation		

4. Standard(s) or Standard Project(s) for Smart Cities

Standard(s) or standard project(s) to be developed over the next 3 to 5 years for smart cities at the system of systems (city) level. Example:

Reference No.	Title	Standard/ Approved	Date for Publication	Reference to International Standards
None				

5. Case Study Information

Title	Building smart city in Paga Hill
Abstract	The Government's PNG Vision 2050 sets the overall direction for. Papua New Guinea to attain the nation's dream to be a smart, wise, fair, healthy and society by 2050

Details (optional)

Assumptions	None
Procedures	No
Results	No
Issues	Current work in progress. No specific policy regarding smart city

6. Additional Information (e.g., table, picture)

Please attach the best picture(s) in describing your idea(s) using diagrams, pictures, flow charts, architectures or relevance.

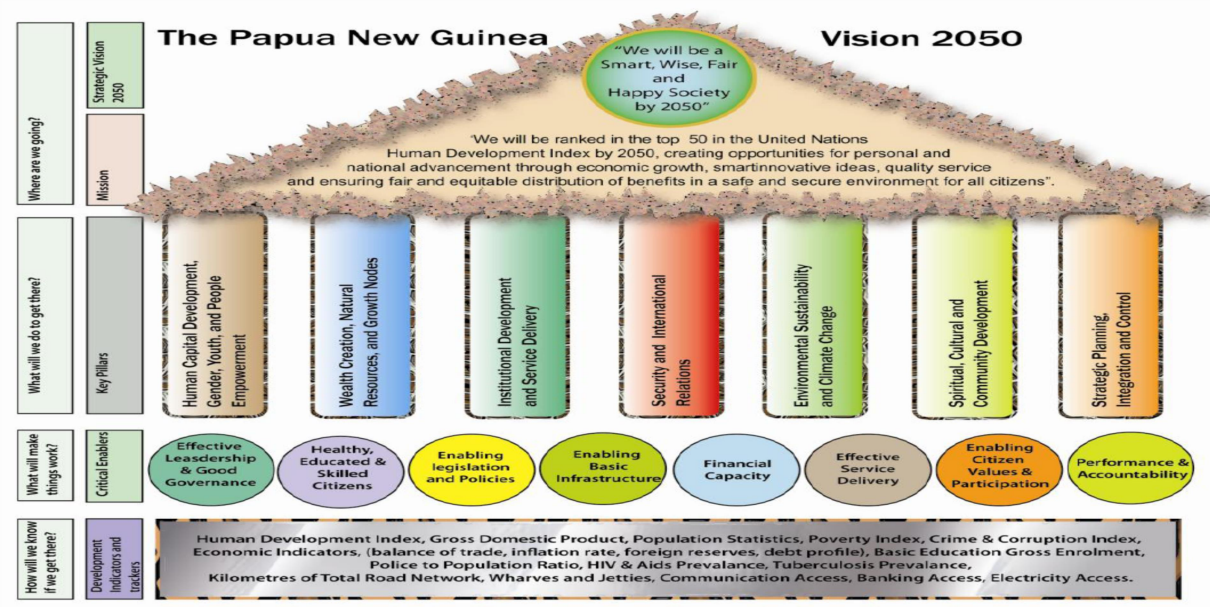


Figure A.4.1: Vision 2050 of Papua New Guinea

Figure A.4.2: Paga Hill development project

A.5 Thailand

Entry Number: A.5

Smart City Case Study Suggestion

1. Primary Contact Information

Date	May 26, 2017	*Country*	Thailand
Organization	Digital Economy Promotion Agency (DEPA)	*Name*	Pracha Asawateera
Email	phuket@depa.or.th	*Telephone*	+66-81-693-2606

2. General Information

Name of Smart Cities	Phuket Island
Population (est. year)	392,508 persons (September 30, 2016)
Main Source	Phuket City, http://www.phuket.go.th

3. Current themes for building smart cities (choose more than one if necessary)

■	Economy	■	Education	■	Energy
■	Environment	☐	Recreation	■	Safety
☐	Shelter	☐	Solid Waste	☐	Urban Planning
☐	Finance	☐	Fire and Emergency Response	■	Governance
■	Health	☐	Transportation	☐	Telecommunications and Innovation
☐	Wastewater	☐	Water and Sanitation		

4. Standard(s) or Standard Project(s) for Smart Cities

Standard(s) or standard project(s) to be developed over the next 3 to 5 years for smart cities at the system of systems (city) level. Example:

Reference No.	Title	Standard/ Approved	Date for Publication	Reference to International Standards
None				

5. Case Study Information

Title	Smart Tourism
Abstract	The objective is to make free individual travelers (FITs) convenient

Details (optional)

Assumptions	The number of FITs to Phuket continues to grow year-on-year
Procedures	High speed public free WiFi along the tourist attractions
Results	200 points
Issues	None

6. Additional Information (e.g., table, picture)

Please attach the best picture(s) in describing your idea(s) using diagrams, pictures, flow charts, architectures or relevance.

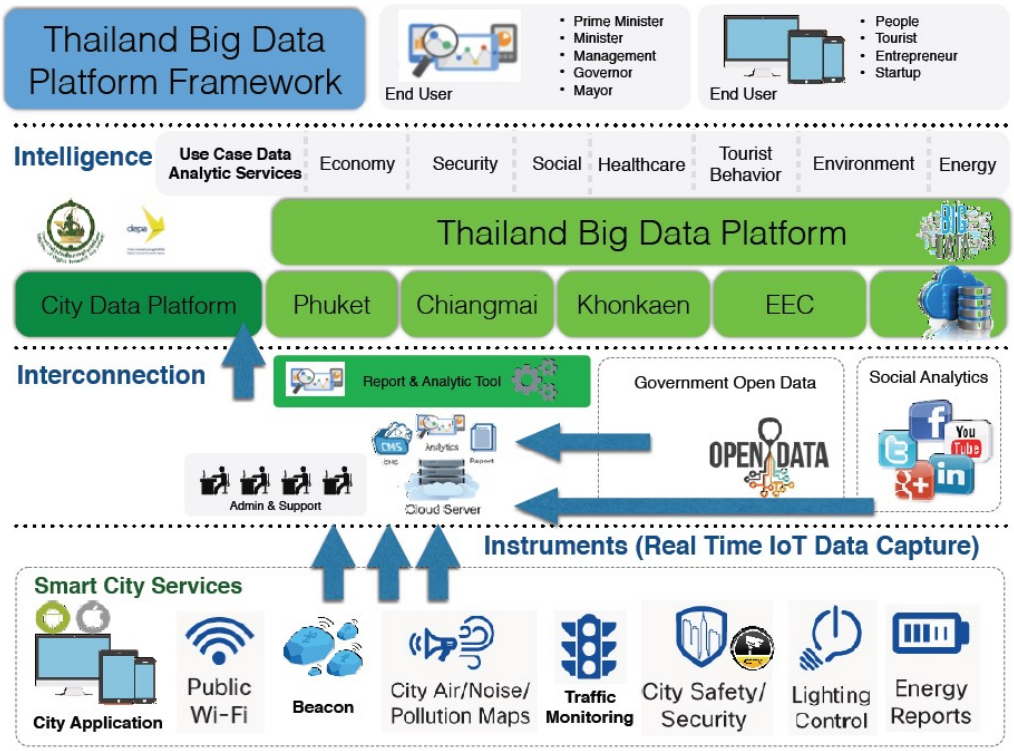


Figure A.5.1: Thailand big data platform framework

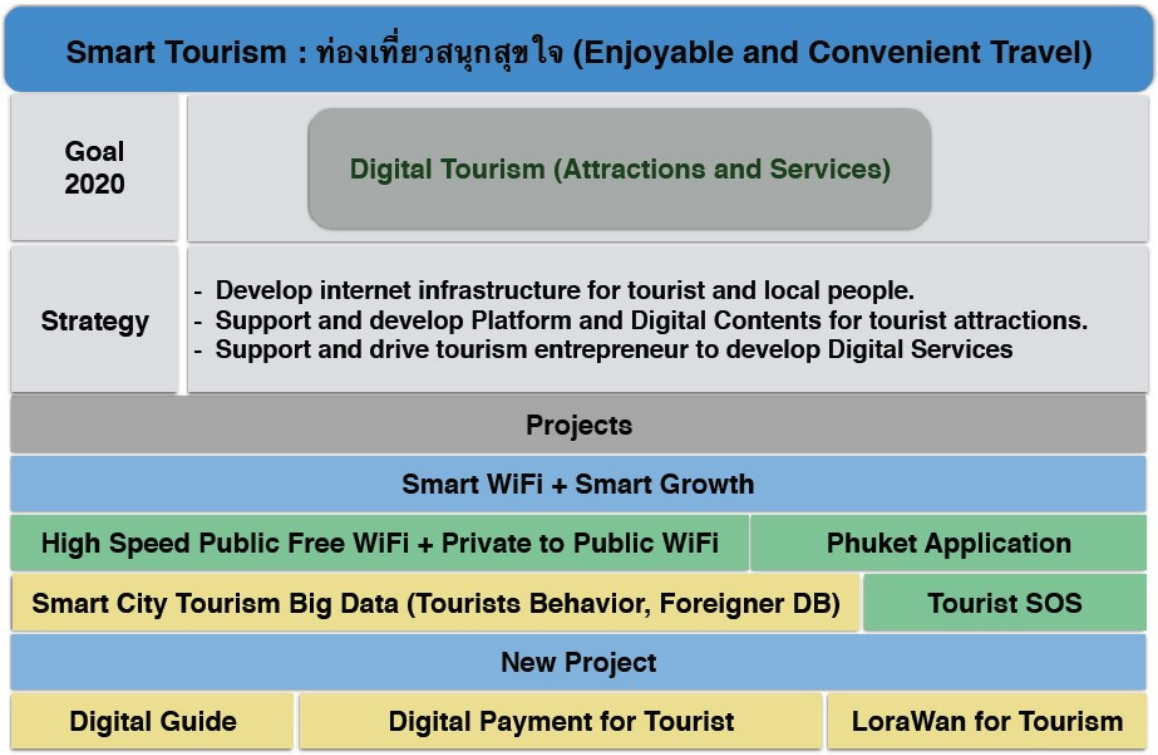


Figure A.5.2: Smart tourism in Phuket

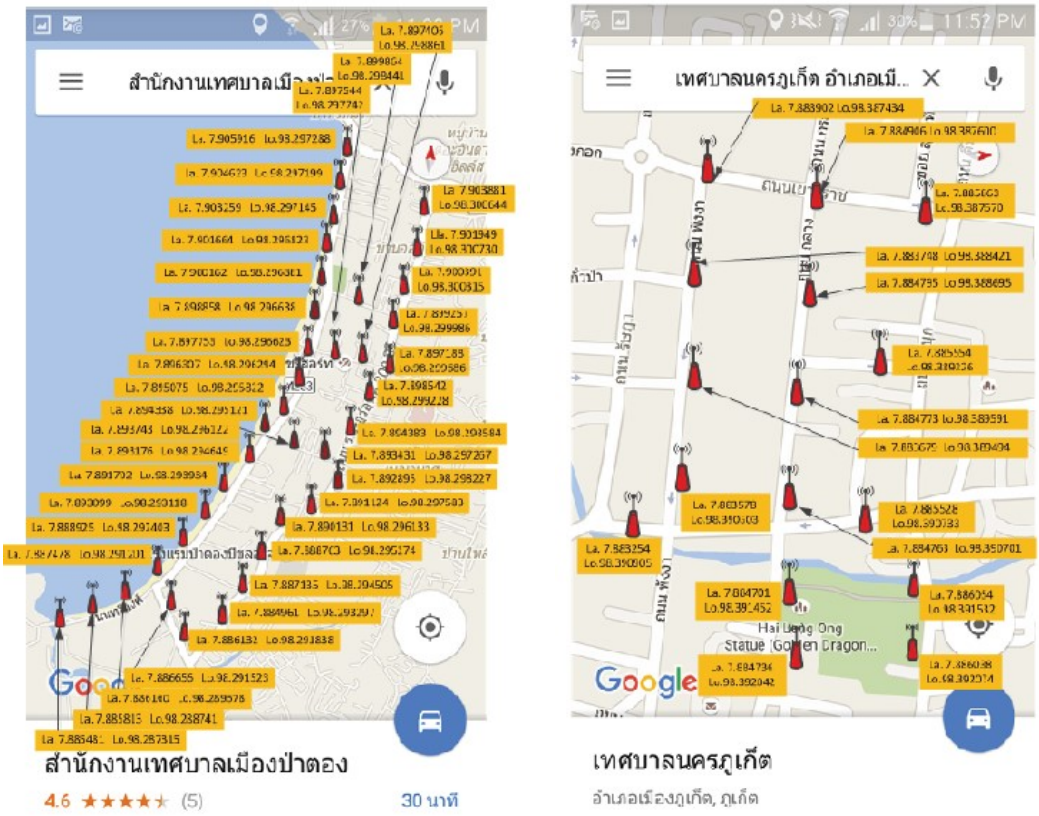


Figure A.5.3: Smart tourism sites

Figure A.5.4: Smile smart and sustainable Phuket

A.6 Viet Nam

Entry Number: A.6

Smart City Case Study Suggestion

1. Primary Contact Information

Date	11 June, 2017	*Country*	Viet Nam
Organization	Hiep Hoa city, Bac Giang province	*Name*	Mr Luong (Hiep Hoa Police)
Email	none	*Telephone*	+84-98-7802338

2. General Information

Name of Smart Cities	Bac Giang province
Population (est. year)	198,579 persons (2016)
Main Source	According to the report of Hiep Hoa district police

3. Current themes for building smart cities (choose more than one if necessary)

☐	Economy	☐	Education	☐	Energy
☐	Environment	☐	Recreation	☐	Safety
☐	Shelter	☐	Solid Waste	☐	Urban Planning
☐	Finance	☐	Fire and Emergency Response	☐	Governance
☐	Health	■	Transportation	☐	Telecommunications and Innovation
☐	Wastewater	☐	Water and Sanitation		

4. Standard(s) or Standard Project(s) for Smart Cities

Standard(s) or standard project(s) to be developed over the next 3 to 5 years for smart cities at the system of systems (city) level. Example:

Reference No.	Title	Standard/ Approved	Date for Publication	Reference to International Standards
None				

5. Case Study Information

Title	Traffic Enforcement System via Camera
Abstract	The objective is to penalize traffic violations (redlight violation, wrong lane, speed over violation…) via the camera

Details (optional)

Assumptions	Currently, the administrative sanctioning process for traffic is still relatively manual, police officers are assigned to monitor traffic violations at traffic hot spots, at intersections, when they see traffic violations they will inform the patrol force at the latches to stop the vehicle and sanction..
Procedures	After analyzing the evidence of the violation, the image extraction department of police will send a report of the violation to the owner of violation via local police and post.
Results	Only 1 moth since the time using TES (traffic enforcement system). The police of Hiep Hoa town already got 117 million VND for "State Treasury" by sanctioning traffic violations through camera images.
Issues	None

6. Additional Information (e.g., table, picture)

Please attach the best picture(s) in describing your idea(s) using diagrams, pictures, flow charts, architectures or relevance.

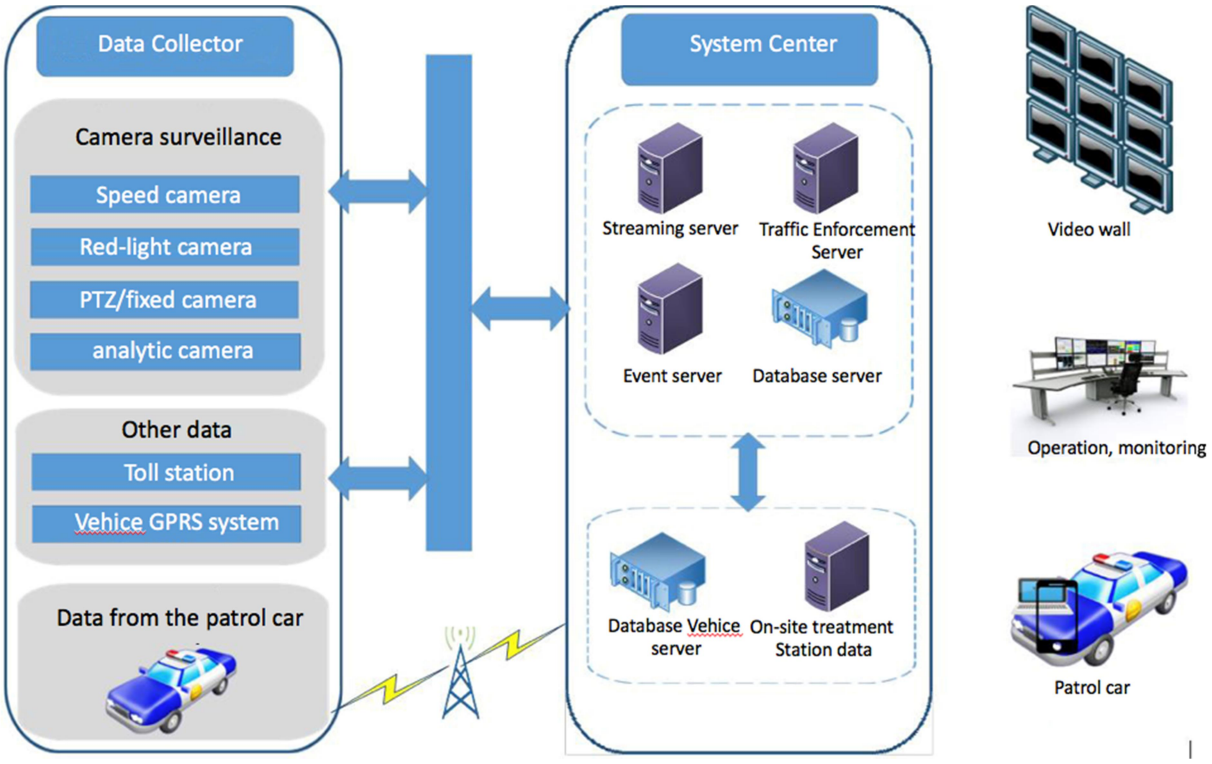


Figure A.6.1: TES system architecture

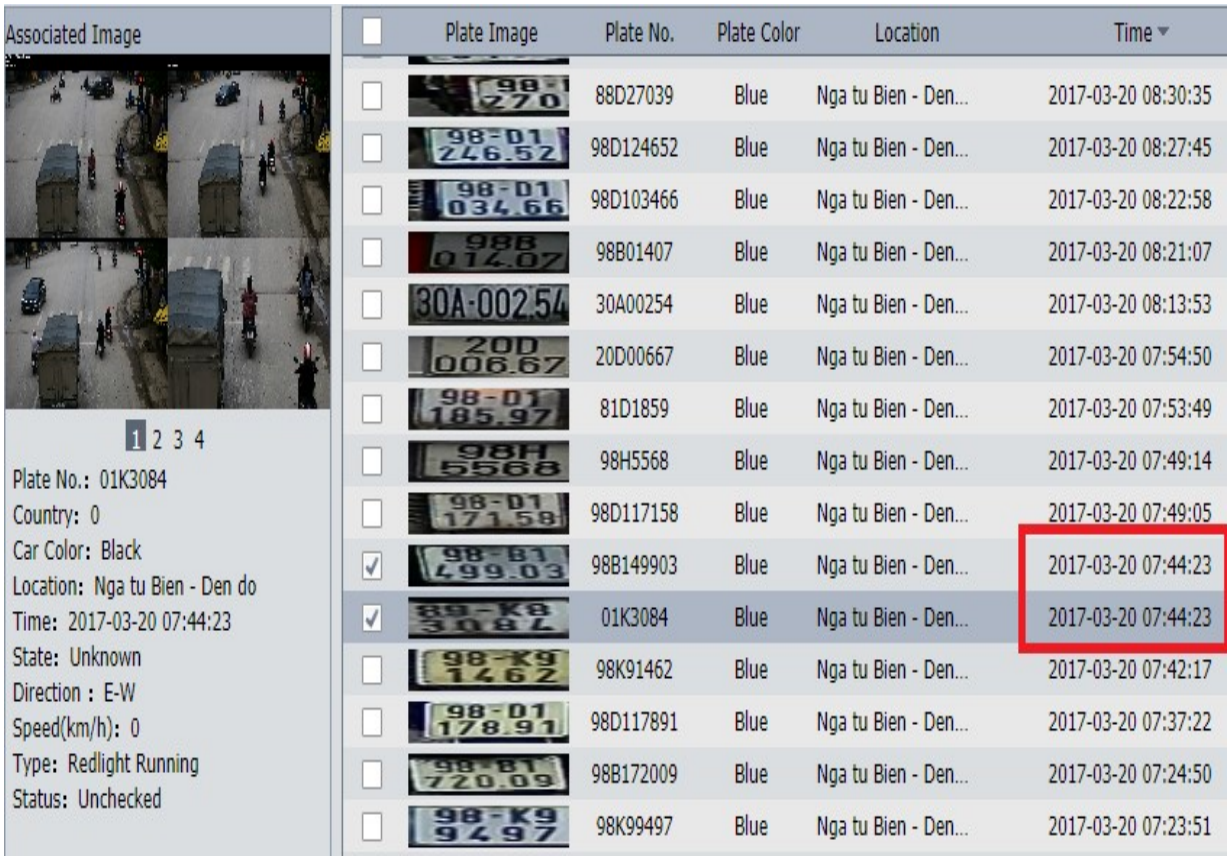


Figure A.6.2: Ability to detect multiple vehicles violation at the same time of the TES system

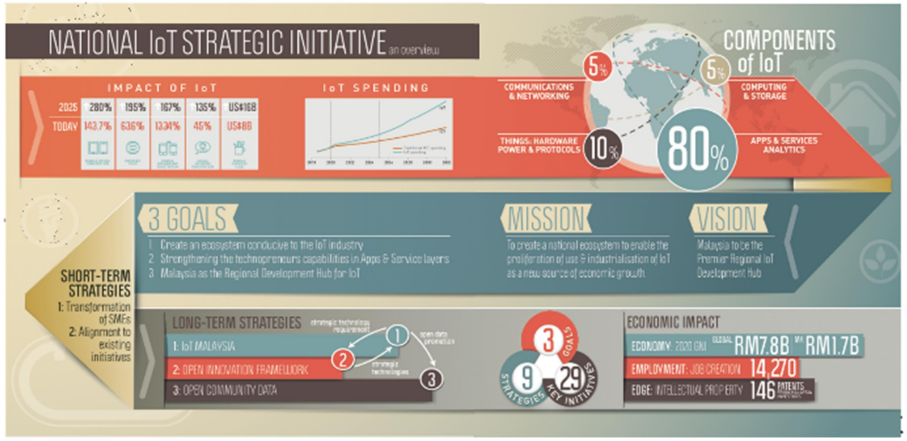
Annex B

List of Invited Presenters of the Workshop

B.1 Malaysia

Entry Number: B.1 Malaysia
Presenter Name: Gopinath Rao Sinniah (Ph.D.)
Title: Smart City Initiatives in Malaysia

NATIONAL IOT STRATEGIC ROADMAP – AN OVERVIEW



SMART CITY INITIATIVES EARLY ADOPTERS

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11TH MALAYSIA PLAN (2016 – 2020) – STRENGTHENING INFRASTRUCTURE FOR SMART CITIES

will be placed on addressing major pain points related to urban services such as providing better transportation as well as utilities and waste management through the adoption of digital infrastucture and applications. To enable connectivity and seamless integration of services, focus will be on developing pervasive broadband, sensor networks and applications. Data will also be made available on an open basis to support analytics and planning as well as create opportunities for open innovation by businesses and individuals.

During the Eleventh Plan, a framework will be developed to prioritise areas of focus in the development of smart cities. A fundamental initiative to realise the migration to smart cities will be the development of smart communities.

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CYBERVIEW | Tech Hub Enabler

CYBERJAYA

CYBERJAYA - QUICK FACTS

			MSC Malaysia Companies in Cyberjaya
7,000 Acres	5 Colleges/ Universities	815 Companies	RM9.04 bn Revenue generated in 2015
88,000 Total population	24,500 Students	470 MSC Status companies	RM5.2 bn Export revenue generated in 2015
60% Aged 20 - 49	37,820 Knowledge workers	429 Startups	RM6.35 bn Investment in 2014

1st to implement Low Carbon Strategies

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CYBERJAYA SMART CITY: THE OBJECTIVES

Objectives

Cyberjaya as a Smart City involves the development and testing of intelligent technologies to provide valuable solutions and services aimed at:

- #1 Increasing efficiency of public services and city living
- #2 Improving quality of life and creating a safe city
- #3 Improving standard of environmental sustainability, in line with Cyberjaya's Low Carbon City Framework.

The testing of smart solutions in Cyberjaya also enhances the Living Lab proposition of Cyberjaya, i.e. using Cyberjaya as a test bed for new and innovative technologies

IoT as the main driver for the development of smart city

4 Focus Areas

- **Smart Infrastructure** — Improving efficiency and [illegible] infrastructure in Cyberjaya
- **Smart Environment** — Providing [illegible] as well as [illegible] solutions
- **Smart Economy** — Improving [illegible] using smart and innovative technology
- **Smart Social** — [illegible] the community and enhancing [illegible] with technology

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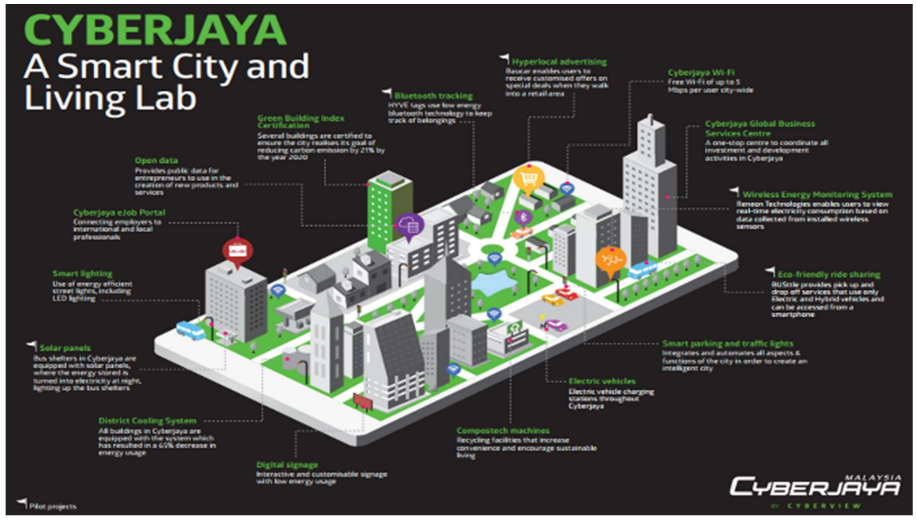
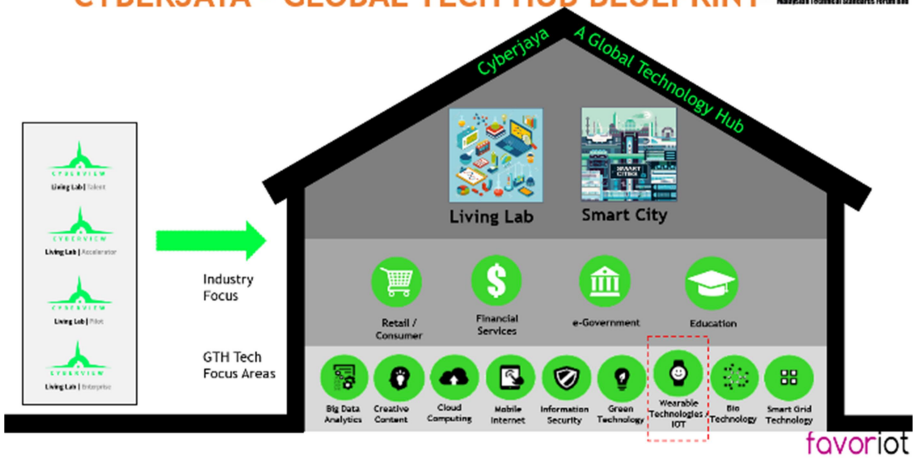


CYBERJAYA - GLOBAL TECH HUB BLUEPRINT



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CYBERJAYA SMART CITY ROADMAP: 2015 - 2020

	Phase 1 (2015) Introduction of smart city foundation	Phase 2 (2016) Promoting consumption of smart city solutions	Phase 3 (2017-2018) Integrating solutions for control and monitoring	Phase 4 (2019-2020) Promoting widespread access and adoption
Infrastructure	• WI-FI infrastructure • Smart traffic management • Smart parking • Smart street lighting	• WI-FI infrastructure expansion in newly developed areas • Smart traffic management • Smart street lighting	• WI-FI infrastructure expansion in newly developed areas • Integrated Township Management System	• *New smart infrastructure applications*
Environment	• Wireless energy management • Eco-friendly ride sharing • Electric vehicles	• Smart sensors for environmental monitoring (e.g. water, heat, carbon sensors)	• Energy Monitoring & Control • Facility Management • Waste Management	• *New smart environment applications*
Economy	• Hyperlocal advertising • Cyberjaya e-Job portal	• Digital retail lifestyle • Connected community	• *New smart economy applications*	• *New smart economy applications*
Social	• IP Network CCTV: - Security Surveillance - Traffic Monitoring	• Cyberjaya open data (at least 3 data categories) • City info kiosk • Digital signage • Interactive map	• Cyberjaya open data (at least 5 data categories) • Integrated Security Management System	• *New smart social applications* • Cyberjaya open data (10-20 data categories)
Operating Platform	• Identification of possible systems for integrated platform	• Evaluation & selection of operating platform	• Implementation of integrated platform	• Continued adoption of integrated platform

Pilot projects

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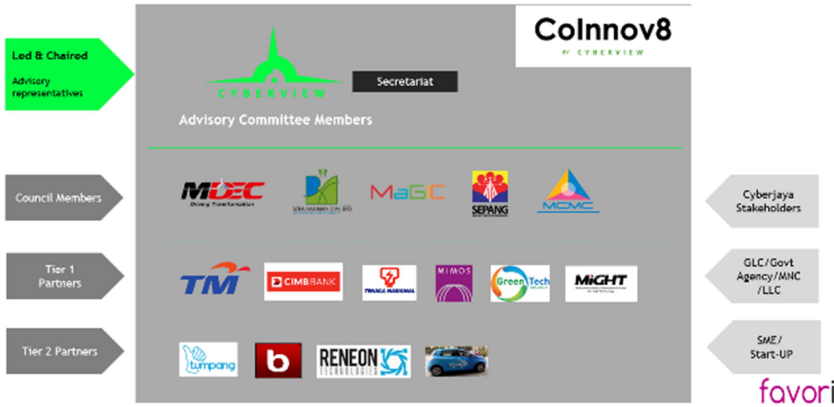
ISKANDAR MALAYSIA

ISKANDAR MALAYSIA

CITY INNOVATION COUNCIL: GOVERNANCE STRUCTURE



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ISKANDAR MALAYSIA SMART CITY

Smart City Iskandar Malaysia was endorsed by Malaysia Prime Minister, on 1st November 2012, in the 2nd inter session GSIAC meeting in KL

HOW we focus, think and implement

Attract economy through smart investment	Smart governance that focus on 'rakyat' needs
Manage environment through smart collaboration	Provide smart mobility and connectivity
Produce smart people and mindset	Provide smart living quality

Chapter 7 Strategy C4 : **Eleventh Malaysia Plan 2016-2020** acknowledges the necessity of smart city development
Focusing on infrastructure strengthening to support economic expansion and quality of life.

http://iskandarmalaysia.com.my/blueprint-agendas/

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ISKANDAR MALAYSIA PUBLIC VERSION BLUEPRINTS

Urban Planning	Infrastructure and utilities	Environment	Others
• Planning & Design Guidelines for Housing, Neighborhood and Facilities • Area Character Statement • Integrated Land use • Housing Management • Maintenance & Operational Plan	• Integrated Solid Waste Management • Electricity Blueprint • Transportation Blueprint 2010-2030 • Road Layout Design • Rain and Stormwater Management • ICT Blueprint 2020	• Shoreline Management Plan • Environmental Planning • Renewable Energy & Energy Efficiency	• Social Development Intervention Strategy & Implementation Plan • Safety & Security • Enterprise GIS Roadmap • Investment and Marketing Strategic Roadmap • Human Capital • Tanjung Puteri – Tourism

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OUTCOMES OF ISKANDAR MALAYSIA'S SMART CITY IN 2025

AS OF 2016
49.5%
OF THE
80
SMART CITY PROJECTS IN ISKANDAR MALAYSIA HAVE BEEN COMPLETED

SOURCE: http://iskandarmalaysia.com.my/downloads/IMA10%20Progress%20Report_V5.pdf

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SMART CITY: 6 DIMENSIONS & 28 CHARACTERISTICS

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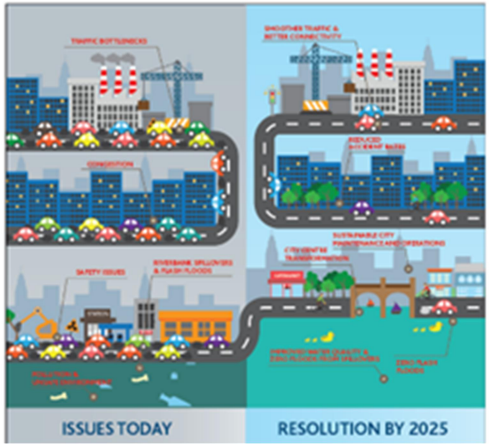
INCREASING CONNECTIVITY AND ACCESSIBILITY



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CHALLENGES IN DRIVING SMART CITY

Strenghten the institutional framework	Provide conducive business environment	Intensify human capital development
• Lack of specific policy and strategies • No mandatory regulations • Lack of stakeholders participation	• Limited incentives and financial support • Uncompetitive product cost	• Few research and educational institutions focus on smart city agenda • Limited technical capability • Limited skills and knowledge workers

1. Establish :
  • Steering committee
  • Energy unit for IM
  • Standards and guidelines for recognition
2. Review legal mechanisms
	1. Explore monetory and fiscal measures
	2. Knowledge sharing
	3. Promote foreign direct investments
	4. Capacity building
		1. Financial grants and assistance
		2. Centre of excellence or research institutes
		3. Smart partnership between gov, industries, research institutions
		4. Capacity building

ot

#SmartSelangor

SMART SELANGOR

CHALLENGES IN DRIVING SMART CITY

Intensify Smart City Research and Innovations	Promotion and public awareness

• Limited funding to encourage R&D – Local grant
• Lack platform for networking of related R&D
	• Lack awareness on smart city
	  • Accessible info
	  • Effective promotion
	  • Involvement of media, NGO and individual

1. Smart partnerships gov, industries and research institute 2. Encourage link between local, regional and international centres of excellence	1. Comprehensive roll-out programmes to increase public awareness 2. Partnering with developer for experiential centre

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SMART SELANGOR ASPIRATIONS

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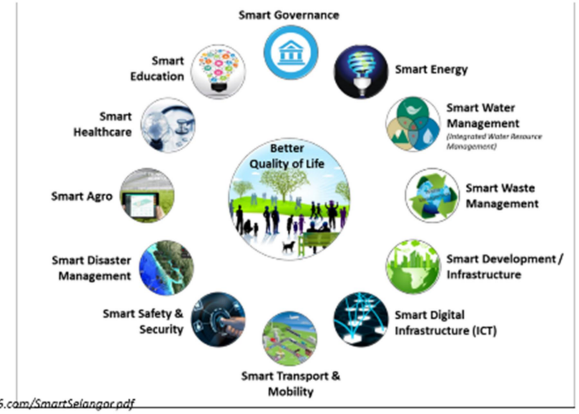
SMART SELANGOR: 12 SMART DOMAINS



www.selangorsmartcity2016.com/SmartSelangor.pdf

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SMART WASTE COLLECTION – PILOR PROJECT

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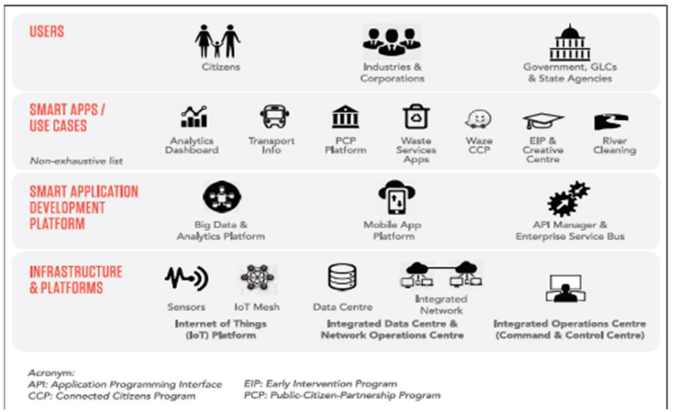
PILOT INITIATIVES



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IOT & SMART CITY STANDARD INITIATIVES: MTSFB IOT WG

MTSFB IOT WG ROLE IN SUPPORTING IOT

- The identification and presentation of the major activities undertaken in the SDOs that have a focus on IoT and IoT technologies
- Map out the most significant IoT standardization initiatives from the SDOs
- Initial Focus on Smart City (Including Transportation under Malaysia IoT Strategic Roadmap)
- Smart City solution deployment

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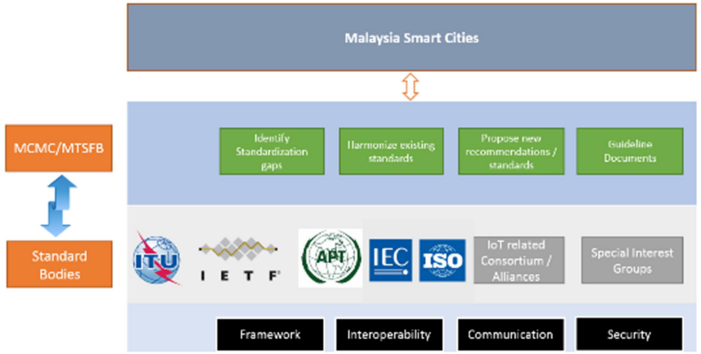
FAVORIOT FAVORWATCH

STANDARD ECOSYSTEM FOR THE GROWTH OF SMART CITIES



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As population around the world continue to grow and health care becomes more widely available, people are living longer than before.

The percentage of the global population that is 65 or older will double from 10% to 20% by 2050

However, living longer doesn't mean they will continuously live healthier. Many will suffer chronic diseases and memory loss issues.

Notify their whereabouts

Connect with their loved ones

Alert when detect fall or emergency cases

Monitor their vital signs

Healthcare costs keep on increasing. Costly time and money due to frequent visitations. Hospitals and elderly care centers unable to cope with the number of elderly people.

Thus, the trend is now about "Aging in Place" where elderly will live at home either with family members or alone.

How do we ensure the elderly people live alone with a healthy life, safe and secure but with constant supervision?

How do we let them "Live Alone But Not Left Alone"?

favorwatch

- Wearable device to monitor the elderly people vital signs such as heart rate, steps, Blood Pressure*, ECG, location*, fall cases and others
- Offered with Favorwatch mobile application to monitor the elderly
- Optional features* will include but not limited to:
  - Health professionals*
  - Pharmacy*
  - Care givers*
  - Elderly care centers*
  - Hospitals*

*Coming Soon

CONCLUSION

- Smart City Ecosystem comprises of many components and integration of many technologies and involvement of many organisations
- It must be an effort to create a better livable and sustainable city

"Smart Cities for a Better World"

THANK YOU

B.2 Papua New Guinea

Entry Number: B.2 Papua New Guinea
Presenter Name: Felix Diou Rupokei
Title: Policy Making Regarding Smart City in Asia Pacific Region

National Information and Communications Technology Authority

National Information and Communications Technology Authority

Urban Development-Paga Hill

PAGA HILL DEVELOPMENT PROJECT
- Turn Paga Hill into a modern city-smart city

National Information and Communications Technology Authority

Building a Smart city

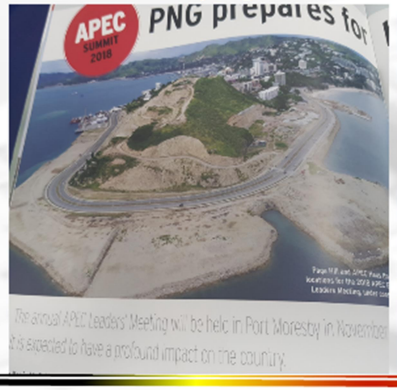
NATIONAL CAPITAL DISTRICT COMMISSION-CAPITAL CITY-PORT MORESBY

- URBAN PLANNING/DEVELOPMENT

PAGA HILL DEVELOPMENT PROJECT
- Turn Paga Hill into a modern city-smart city

National Information and Communications Technology Authority

Current work in progress



National Information and Communications Technology Authority

Future Look

National Information and Communications Technology Authority

- NO SPECIFIC POLICY REGARDING SMART CITY

National Information and Communications Technology Authority

Future Look

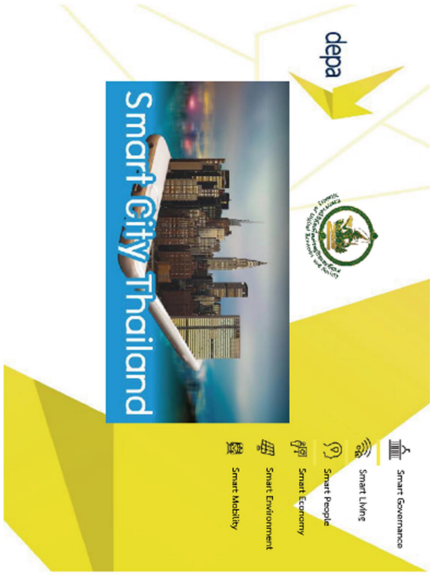
National Information and Communications Technology Authority

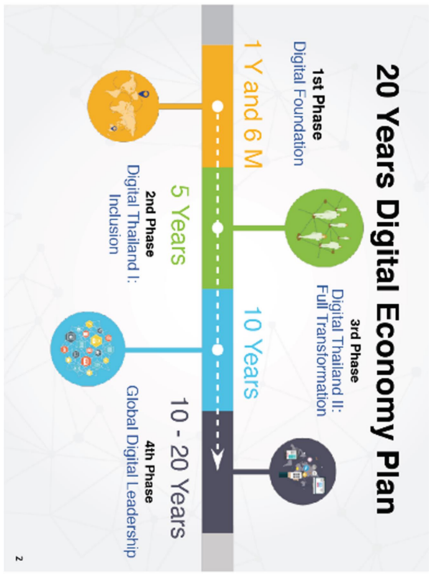
END

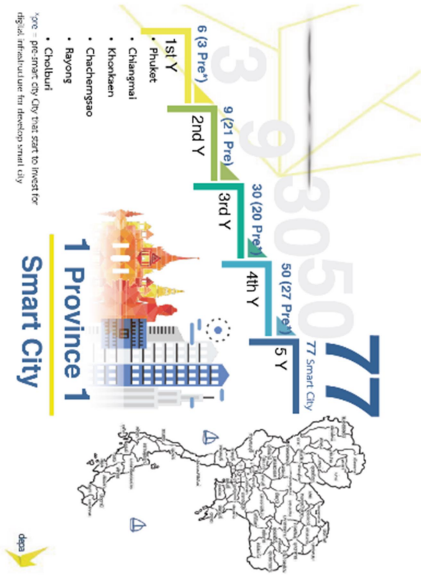
THANKYOU

B.3 Thailand

Entry Number: B.3 Thailand
Presenter Name: Pracha Asawateera
Title: Smart City Thailand

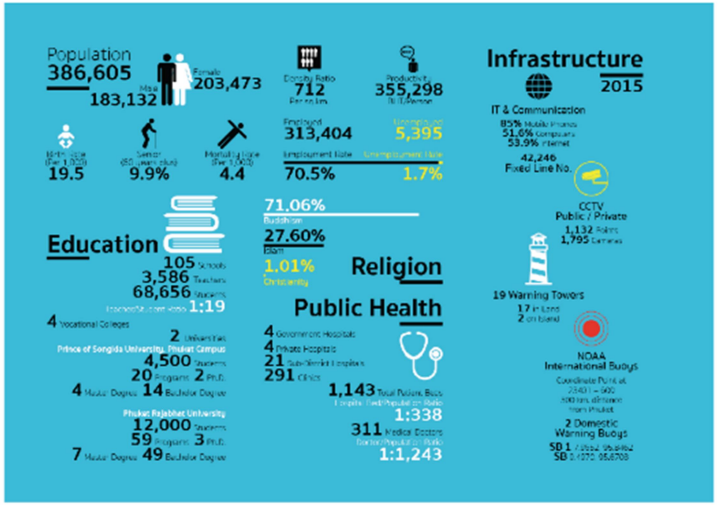




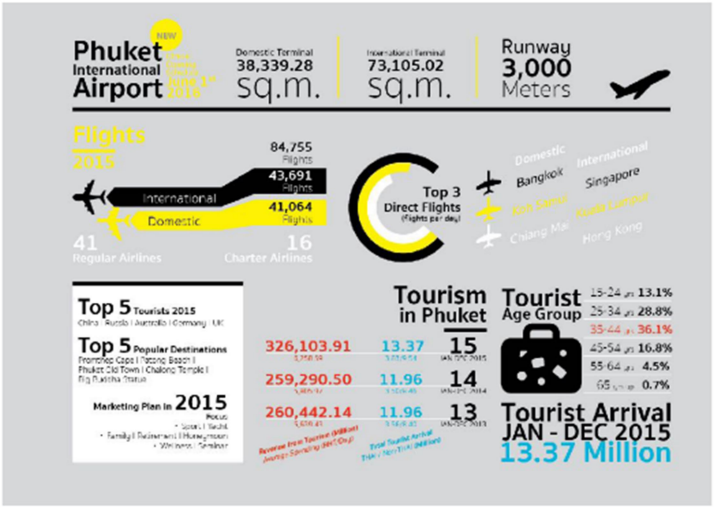


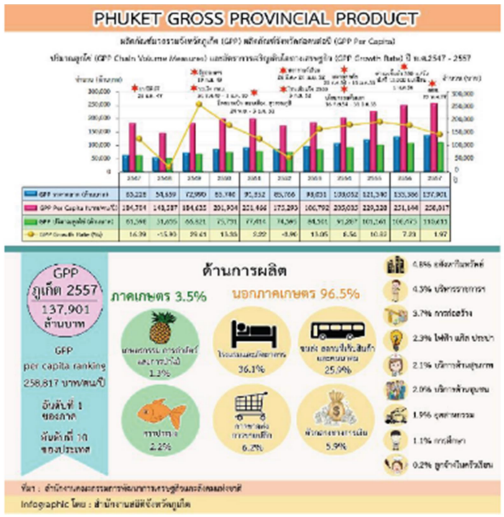
Phuket Smart City

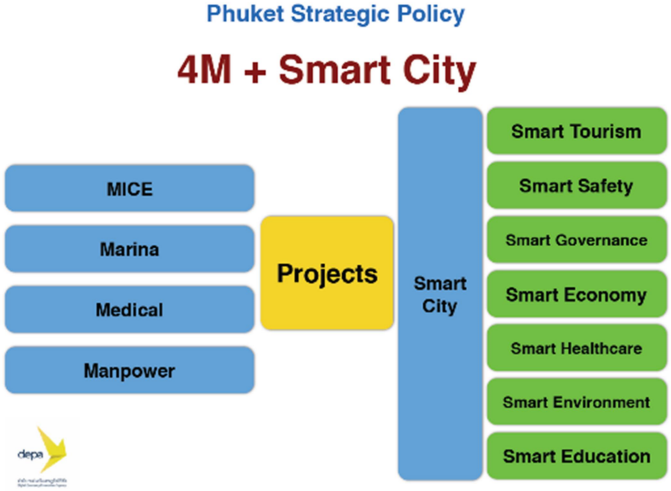
depa

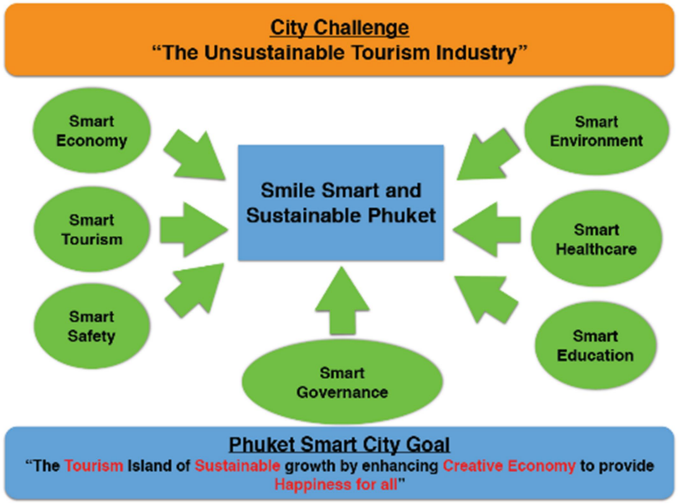


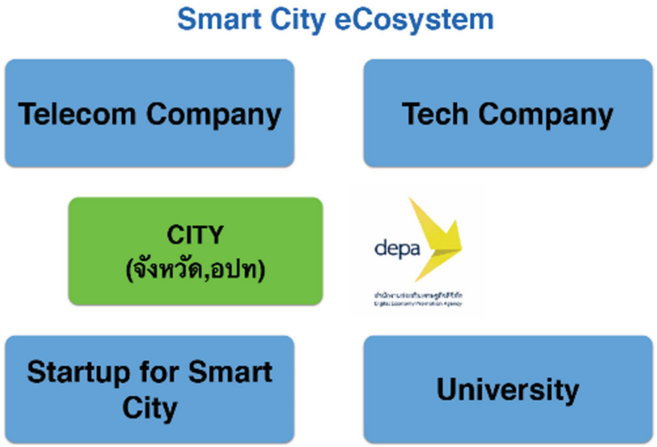
Dec 24th, 2015 Present Phuket Smart City Roadmap.

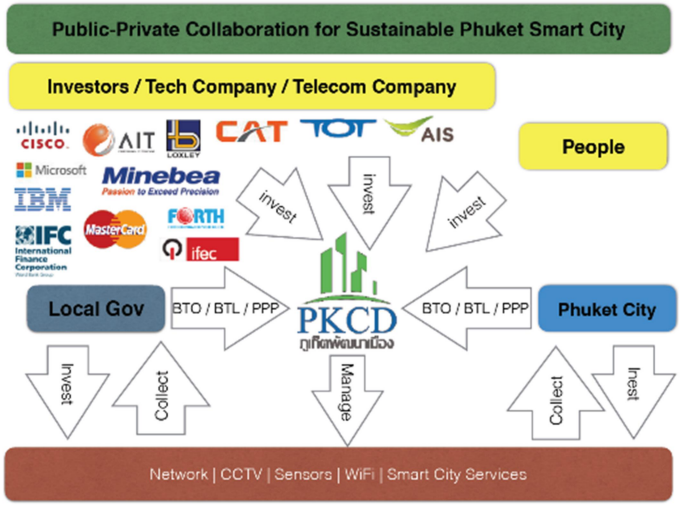


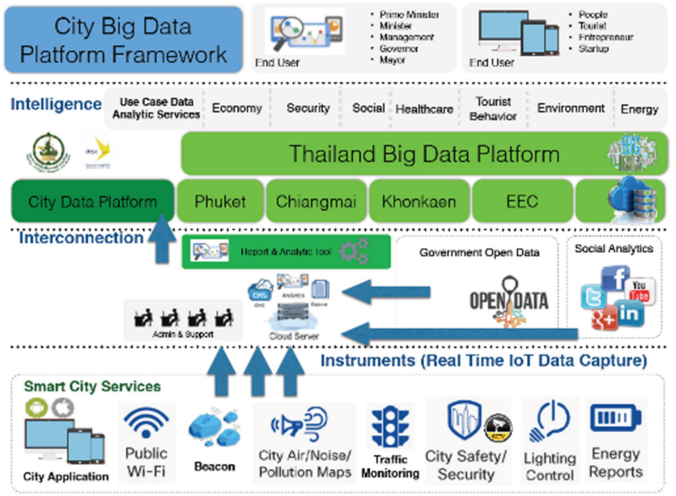

PHUKET GROSS PROVINCIAL PRODUCT
GPP
ภูเก็ต 2557
137,901
ล้านบาท
GPP
per capita ranking
258,817 บาท/คน-ปี
ด้านการผลิต
ภาคเกษตร 3.5%
นอกภาคเกษตร 96.5%
36.1%
25.9%
2.2%
6.2%
5.9%

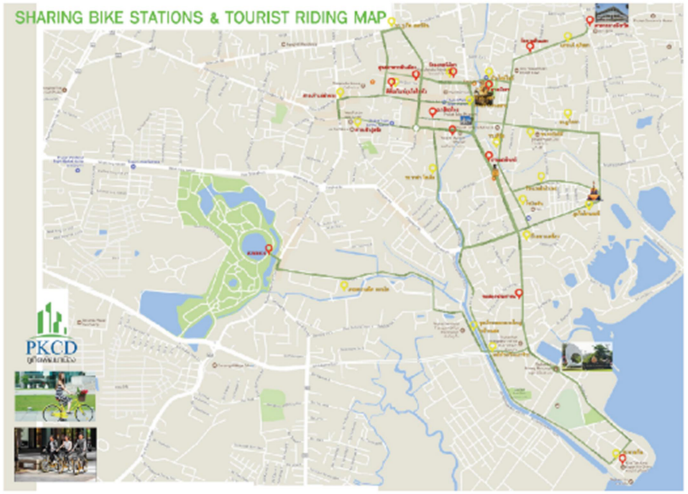

Phuket Strategic Policy
4M + Smart City
MICE
Marina
Medical
Manpower
Projects
Smart City
Smart Tourism
Smart Safety
Smart Governance
Smart Economy
Smart Healthcare
Smart Environment
Smart Education


City Challenge
"The Unsustainable Tourism Industry"
Smart Economy
Smart Tourism
Smart Safety
Smile Smart and Sustainable Phuket
Smart Environment
Smart Healthcare
Smart Education
Smart Governance
Phuket Smart City Goal
"The Tourism Island of Sustainable growth by enhancing Creative Economy to provide Happiness for all"

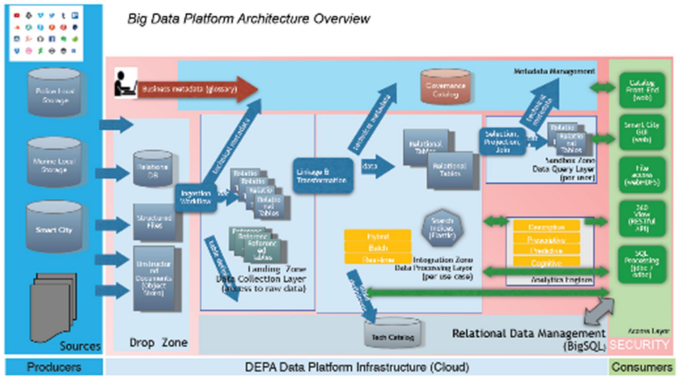

Smart City eCosystem
Telecom Company
Tech Company
CITY
(จังหวัด,อปท)
Startup for Smart City
University







The basic layered architecture of a Big Data platform is similar across almost all vendors



High-Quality Big Data presentation & provisioning is key to user acceptance

Overview Presentation & Provision Methods

Presentation

Raw Data

APIs
Web
Services

SQL
Processing

File
Access

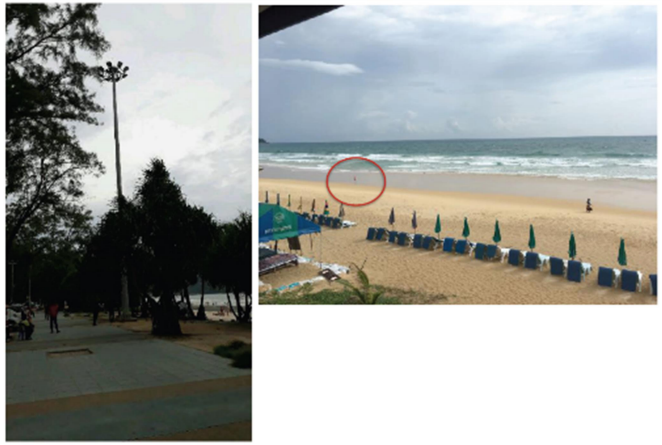
17

Project Status

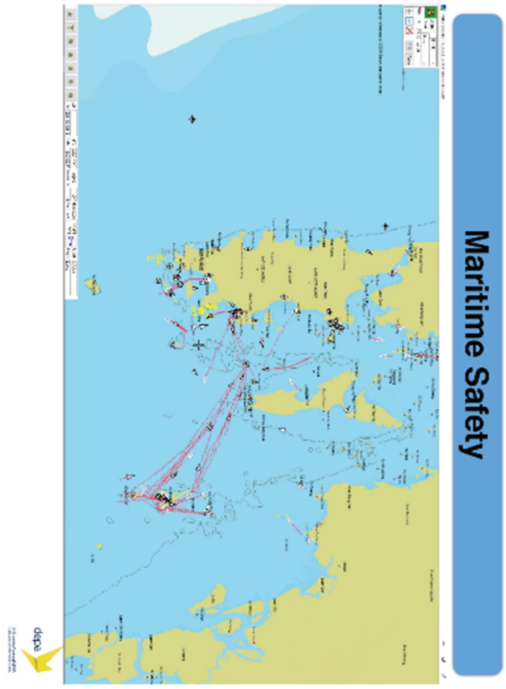
Smart Safety : ภูเก็ตเมืองปลอดภัย		
Goal 2020	Phuket Safe City	
Strategy	- Develop Disaster Command Centre and expand more CCTV 3500 camera - Develop Analytic CCTV for Prevent crime, traffic and public safety - Develop Maritime Safety	
Projects		
CCTV		
Integrate CCTV	CCTV Analytic	CCTV Command Centre
Disaster Command Centre	Invest 3500 CCTV	Setup CCTV management plan
Phuket Smart Gateway	Traffic Law Enforcement	
Maritime		
Maritime Tourist Safety	Expand Maritime Safety	

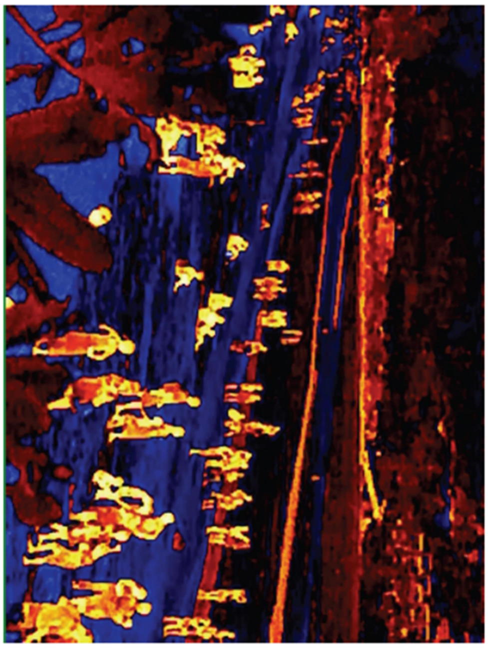
Smart Safety

Smart Beach

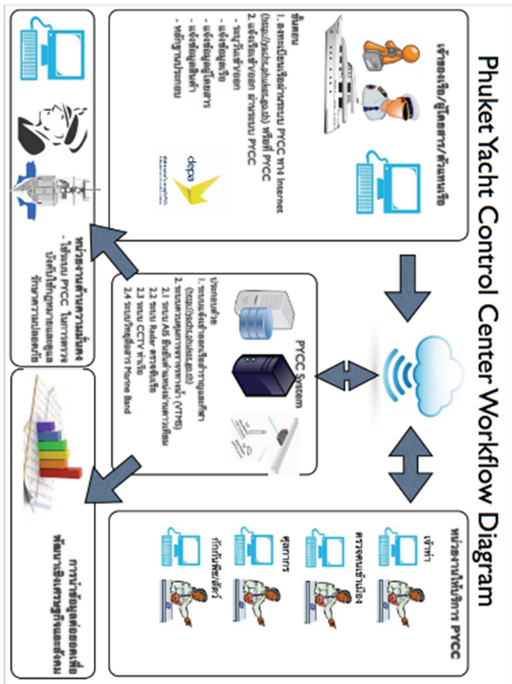


1) Draft Video Analytic (Intrusion and People Counting for Beach Swimming Boundary) Planform for Phuket Smart City


Maritime Safety




Smart Safety (Smart Growth)
Maritime Safety
RFID + Beacon Wristband
Reading Smart Card


Phuket Yacht Control Center Workflow Diagram
PYCC System

Smart Tourism : ท่องเที่ยวสนุกสุขใจ (Enjoyable and Convenient Travel)

Goal 2020	Digital Tourism (Attractions and Services)
Strategy	- Develop internet infrastructure for tourist and local people. - Support and develop Platform and Digital Contents for tourist attractions. - Support and drive tourism entrepreneur to develop Digital Services

Projects	
Smart WiFi + Smart Growth	
High Speed Public Free WiFi + Private to Public WiFi	Phuket Application
Smart City Tourism Big Data (Tourists Behavior, Foreigner DB)	Tourist SOS
New Project	
Digital Guide	Digital Payment for Tourist / LoraWan for Tourism

Smart Tourism

ถนนเรียบหาดป่าตอง

AP 250 Concurrent (out Door IP 67) ibeacon

Smart Tourism

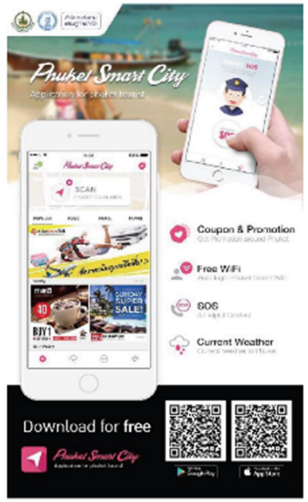
เมืองเก่าถนนถลาง,ถนนพังงา

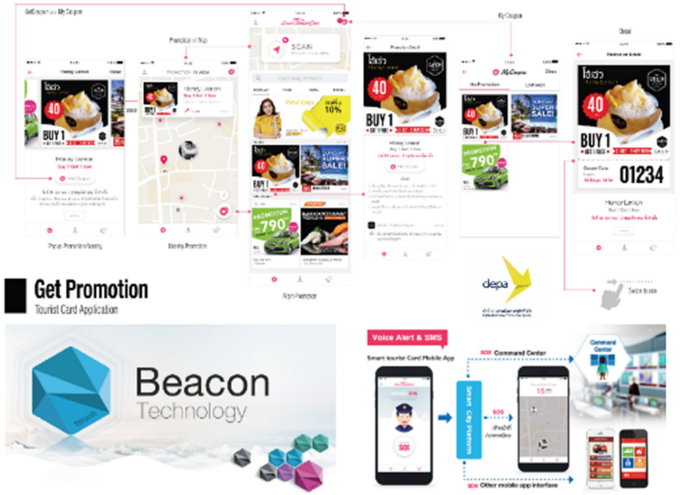
AP 250 Concurrent (out Door IP 67) ibeacon

เทศบาลนครภูเก็ต

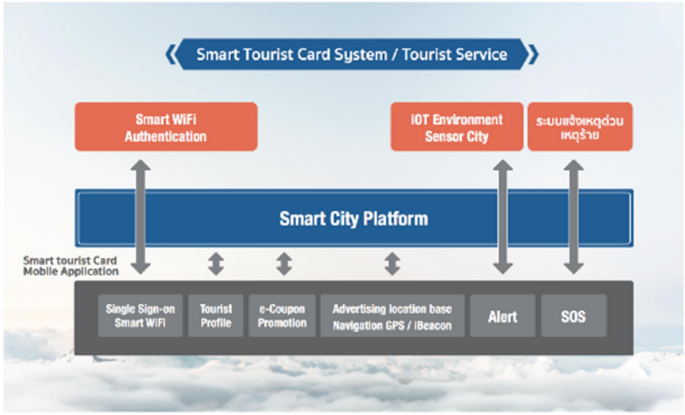
Phuket Application

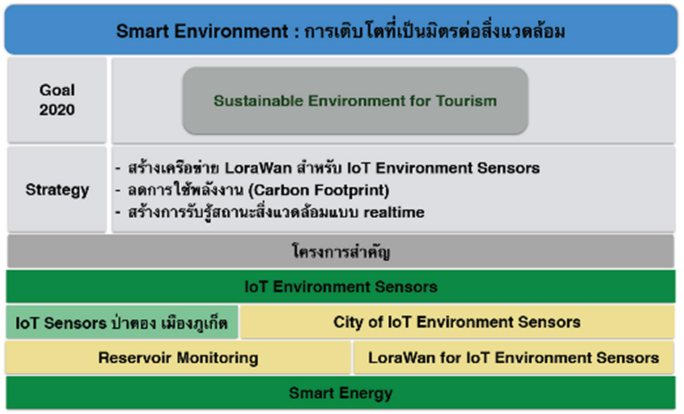
Smart Growth




Get Promotion
Tourist Card Application
Beacon
Technology
Voice Alert & SMS
Command Center
Smart tourist Card Mobile App
Smart City Platform
Other mobile app interface


NECTEC
การพัฒนาระบบรายงานสภาพจราจรแบบ Real-time และระบบบอกเวลารถเข้าป้ายในเขตเมือง
- -ระบบรายงานบริการรายงานตำแหน่งรถและเวลาเข้าป้ายรถโพล้อง อยู่ระหว่างปรับแอพพลิเคชั่นสำหรับรถโพล้องและผู้เดินทาง รวมทั้งโมเดลการทำนายเวลาของรถ
- การสกัดข้อมูลจราจรจากกล้อง CCTV เพื่อพัฒนาระบบตรวจนับจำนวนยานพาหนะด้วย Image Processing เพื่อวิเคราะห์ข้อมูลจราจร ได้กำหนดจำนวนและตำแหน่งกล้องที่จะสกัดข้อมูลเรียบร้อยแล้ว
A Driving Force for National Science and Technology Capability

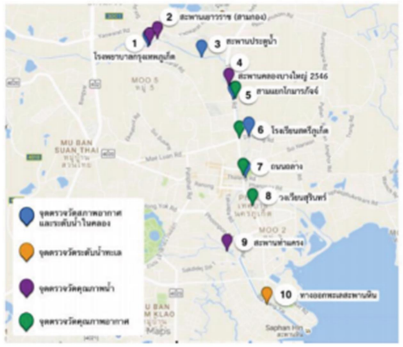

Smart Tourist Card System / Tourist Service
Smart WiFi Authentication
IOT Environment Sensor City
ระบบแจ้งเหตุด่วนเหตุร้าย
Smart City Platform
Smart tourist Card Mobile Application
Single Sign-on Smart WiFi
Tourist Profile
e-Coupon Promotion
Advertising location base Navigation GPS / iBeacon
Alert
SOS


Smart Environment : การเติบโตที่เป็นมิตรต่อสิ่งแวดล้อม
Goal 2020
Sustainable Environment for Tourism
Strategy
- สร้างเครือข่าย LoraWan สำหรับ IoT Environment Sensors
- ลดการใช้พลังงาน (Carbon Footprint)
- สร้างการรับรู้สถานะสิ่งแวดล้อมแบบ realtime
โครงการสำคัญ
IoT Environment Sensors
IoT Sensors ป่าตอง เมืองภูเก็ต
City of IoT Environment Sensors
Reservoir Monitoring
LoraWan for IoT Environment Sensors
Smart Energy

Smart Environment : การเติบโตที่เป็นมิตรต่อสิ่งแวดล้อม	
Goal 2020	Sustainable Environment for Tourism
Strategy	- Develop IoT Environment Sensors and Network - Reduce energy consumption (Carbon Footprint) - Create awareness for environment to People
โครงการสำคัญ	
IoT Environment Sensors	
Environment IoT Sensors	City of IoT Environment Sensors
Reservoir Monitoring	LoraWan for IoT Environment Sensors
Smart Energy	
One Map Solution	

Smart Environment (Smart Growth)

IoT Environment Sensors

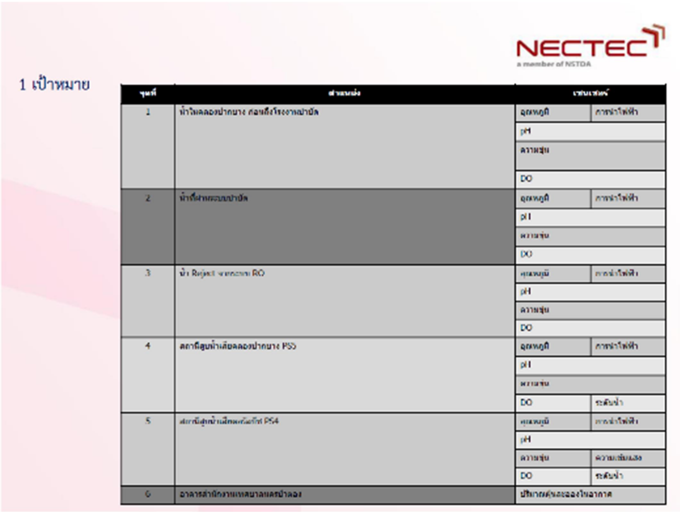


depa

การดำเนินงานที่ผ่านมา

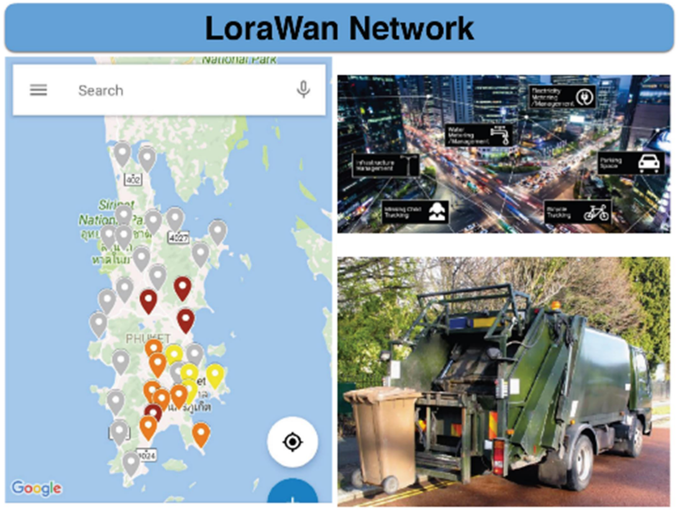
2 จุดติดตั้ง ภาพรวม

A Driving Force for National Science and Technology Capability


NECTEC
a member of NSTDA
1 เป้าหมาย


Traffy
ระบบจัดการการเก็บขยะอัจฉริยะ Traffy Waste
รถเก็บขยะอัจฉริยะ
• ระบุตำแหน่งรถ GNSS
• แจ้งเส้นทางการเก็บขยะ
ถังขยะอัจฉริยะ
• ตรวจวัดปริมาณขยะแบบ Real time
• แจ้งเตือนปริมาณขยะ
App พลังประชาชน
• แจ้งปริมาณขยะ
• เรียกเก็บขยะพิเศษ
ระบบจัดการการจัดเก็บขยะ
• บริหารจัดการเส้นทางเก็บขยะ
• แสดงปริมาณขยะแบบ Real time
• แสดงข้อมูลสำหรับผู้บริหาร

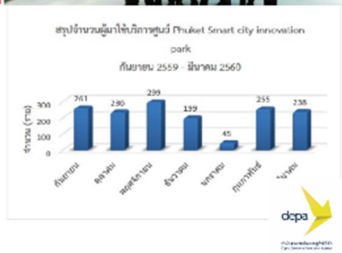

IoT Environment Sensors
85.20%
27.11 °C
0 mm
3.20 m
มาก
ปกติ
ไม่ตก
ปกติ


LoraWan Network
Search
PHUKET
Google

Phuket Smart City Innovation Park

กันยายน 2559 - มีนาคม 2560

เดือน	จำนวน (ราย)
กันยายน	261
ตุลาคม	236
พฤศจิกายน	299
ธันวาคม	199
มกราคม	45
กุมภาพันธ์	255
มีนาคม	238
รวม	1533



Smart Economy : Hub of Creative Economy		
Goal 2020	1,000 Creative Entrepreneurs	Digital Workers and Investors Paradise
Strategy	- Drive local SMEs to be creative entrepreneurs - Invite Digital Entrepreneurs, Digital Workers and Digital Investors to Phuket - Build Local Startup on IoT Smart City	
Projects		
Innovation Park		
Invest Phuket	Startup Ecosystem	Int Creative Ent Academy
Phuket Investment Info.	Compare eCosystem Study	จัดตั้ง International Creative Entrepreneur Academy
Roadshow	Boost IoT Startup eCosystem	
Investment Office	Boost Investors eCosystem	Transform SMEs to Creative Entrepreneur
Smart City Invest Model	Boost Digital Workers eCosystem	

Smart City Learning Cube (Smart Growth)

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IoT Labs and IoT Training Courses (Smart Growth)

depa

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ประกาศรายชื่อทีมที่ผ่านเข้ารอบอบรมและ Final Pitch
วันที่ 15-19 กุมภาพันธ์ 2559* ทั้งหมด 13 ทีม:

1. Travelism
2. PillPocket
3. PaiDuay
4. CoinEX
5. AIRPORTELs
6. Fak-Rod
7. MoonFoi
8. SmartQ
9. Freelance Hub
10. LareDoin
11. Mr. Phuket
12. Market Price
13. ParkLot

*เลื่อนจากเดิม 6-10 กุมภาพันธ์ 2559

Creative & Innovation Entrepreneurship (Smart Growth)

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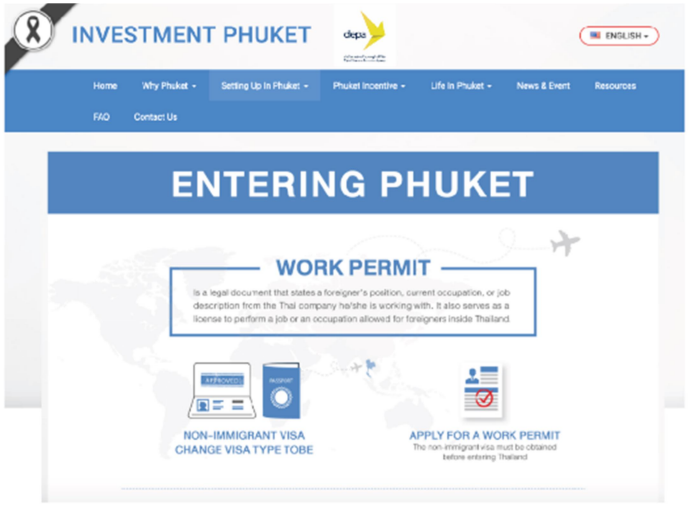


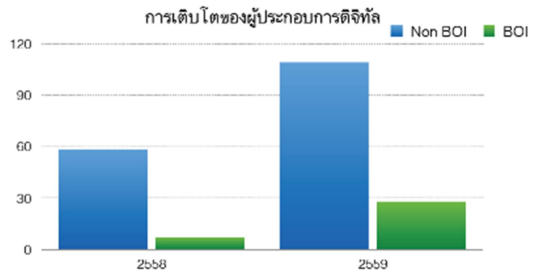
Smart Governance : การบริหาร Smart City อย่างยั่งยืน

Goal 2020	Smart and Sustainable City
Strategy	- PPP Smart City Investment Model - Smart City Data Platform

โครงการสำคัญ

- City Investment Model
- City Data Platform
- Smart City Incident Management Center
- People Driven Smart City Project
- Smart City World Congress 2020

Phuket Digital Industry Growth



- มีการเติบโตของผู้ประกอบการด้านดิจิทัลเพิ่มขึ้นในปี 2559 จำนวน 51 ราย คิดเป็น 87%
- มีการเข้าถึงสิทธิประโยชน์การลงทุนได้รับอนุมัติแล้ว 24 ราย จาก 28 ราย อยู่ระหว่างพิจารณา 7 ราย เพิ่มขึ้น 263% มูลค่าการลงทุน 158.3 ล้านบาท

Smart Education : เมืองแห่งการเรียนรู้

Goal 2020	Smart Learning Community
Strategy	- Develop Smart People for Smart City and Thailand 4.0 - Develop Infrastructure for Smart Learning Community

Projects

- Digital Manpower
- Creative and Innovation School
- Infrastructure for Smart Learning Community
  - Connect Students DB and open for Public
  - Smart Learning Platform

Smart Health : ประชาชนรักษาพยาบาลด้วยหมายเลขผู้ป่วยเดียว	
Goal 2020	Digital Healthcare
Strategy	- Connect 8 Hospitals DB - Develop Smart Healthcare Services - Develop Digital Hospital
โครงการสำคัญ	
Smart Healthcare Information	
Connect 8 Hospitals DB	Patients Transfer / Disease Map
Smart Healthcare Services	
Develop Digital Healthcare Services	
Smart Hospital	
Develop Digital Hospital	

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สำนักงานส่งเสริมเศรษฐกิจดิจิทัล
Digital Economy Promotion Agency

"ขอบคุณครับ"

–Mr. Pracha Asawateera
pracha.as@depa.or.th
081-6932606
Upper Southern Region Manager
Digital Economy Promotion Agency
Ministry of Digital Economy and Society

Ongoing Projects

Projects I Budget I Agency : งบประมาณปี 2559

Smart Economy		Smart Safety / Smart Environment
Total : 34.5 M	Cert Digital Workers, Investors I 8.2M I DEPA	CCTV Integration and Analytic I NSTDA
	Innovation Park I 9.6M I DEPA (CAT,PSU)	Traffic Realtime Info I NSTDA
	Ecosystem, Incentive Study and Roadshow I 10.65M I DEPA	Traffic Law Enforcement I NSTDA
	Smart WiFi I 6.05M I DEPA	City Operation Centre I NSTDA
Total : 44.5 M	Creative Entrepreneurship Academy I 6.59 M Smart Tourism & Marine Safety & Smart Environment I 37.94 M I DEPA	
High Speed Public Free WiFi I 240 M I MDE		
Total : 386 M	MDE 240M	DEPA: 79M / NSTDA : 67M

Creative & Innovation Entrepreneurship (Smart Growth)

Innovation Entrepreneurship	50 คน
Digital Entrepreneurship	20 คน

Smart City Framework

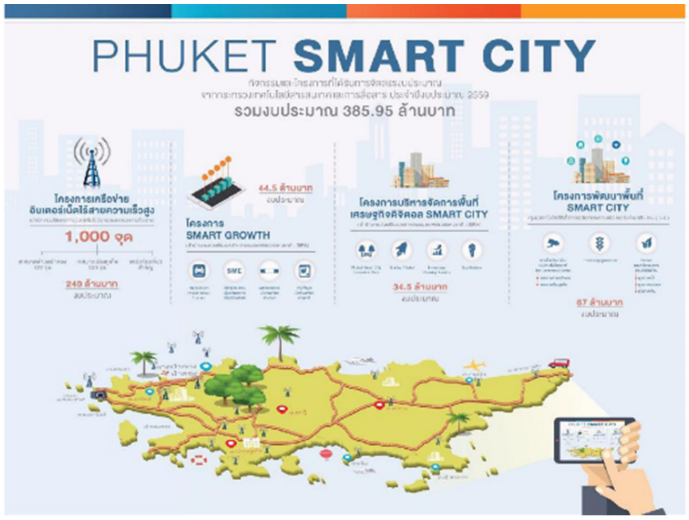
Smile Smart and Sustainable Phuket	City of Life and Prosperity by DE	Developing Plan
Smart Tourism	Smart Agriculture	Smart Mobility
Smart Safety	Smart Tourism	Smart Healthcare
Smart Environment	Smart Social & Healthcare	
Smart Healthcare	Smart Stability	
Smart Education	Smart Capability	

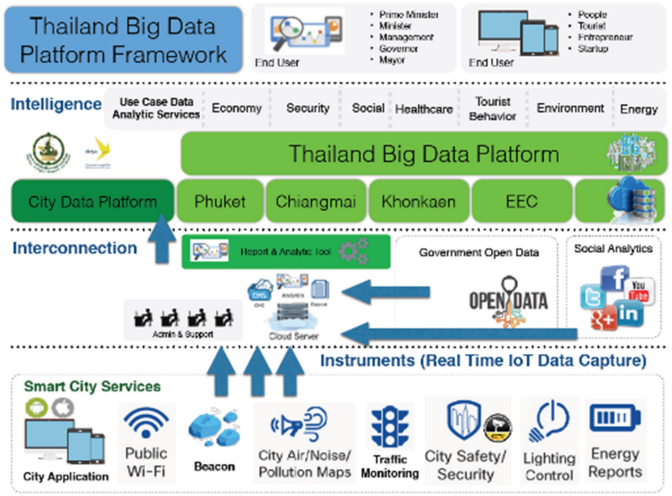
Smart Governance : Smart City Data Platform & Operation Center

Smart Economy

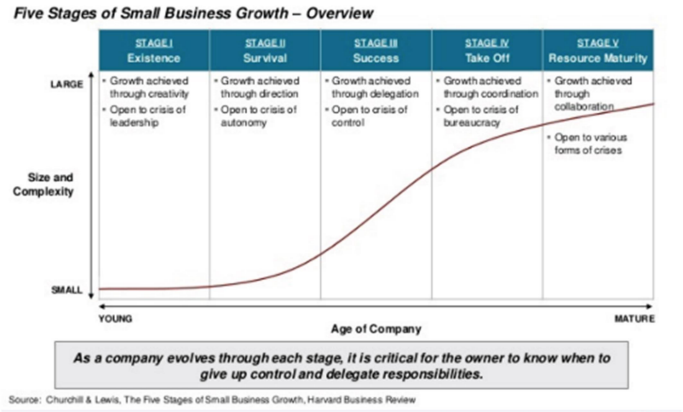
Smart City Innovation Park	Tech Startup Ecosystem	Investment Center	Innovation Entrepreneurship

Smart WiFi : High Speed Public Free WiFi + IoT Network

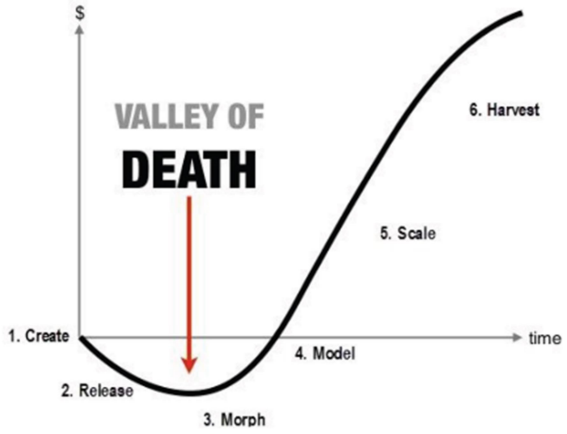


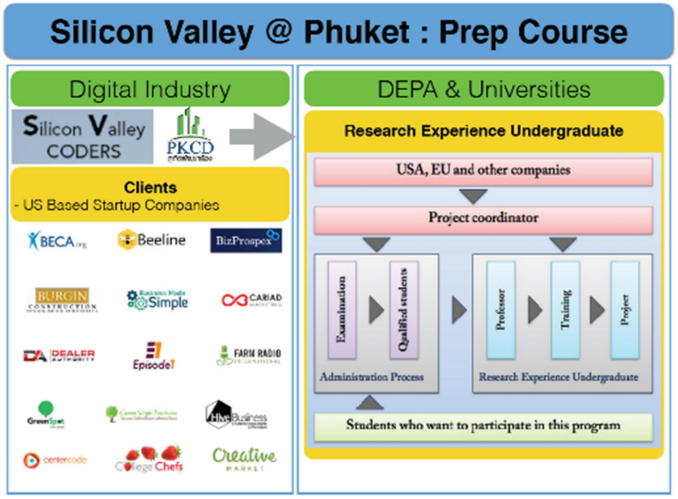


Smile Smart and Sustainable Phuket


Five Stages of Small Business Growth – Overview
STAGE I Existence
STAGE II Survival
STAGE III Success
STAGE IV Take Off
STAGE V Resource Maturity
LARGE
SMALL
Size and Complexity
• Growth achieved through creativity
• Open to crisis of leadership
• Growth achieved through direction
• Open to crisis of autonomy
• Growth achieved through delegation
• Open to crisis of control
• Growth achieved through coordination
• Open to crisis of bureaucracy
• Growth achieved through collaboration
• Open to various forms of crises
YOUNG
Age of Company
MATURE
As a company evolves through each stage, it is critical for the owner to know when to give up control and delegate responsibilities.
Source: Churchill & Lewis, The Five Stages of Small Business Growth, Harvard Business Review


Creative and Innovation Entrepreneurship Academy
WHY SURREY?
Entrepreneurship is a key skill for all businesses – start-ups, large organisations and SME's in a world increasingly driven by innovation. In this context, the MSc programme is designed to develop skills for those planning to set up their own businesses or apply them in large organisations to develop strategies for growth.
Skill development focuses on a combination of practice and theory where students are expected to learn by doing. Some key areas where students develop practical experience include:
• Business planning & modelling
• Digital skills (including app coding)
• Crowdfunding projects
• Business mentoring
Example module listing
depa
UNIVERSITY OF SURREY


$
VALLEY OF
DEATH
1. Create
2. Release
3. Morph
4. Model
5. Scale
6. Harvest
time


Silicon Valley @ Phuket : Prep Course
Digital Industry
Silicon Valley CODERS
PKCD
Clients
- US Based Startup Companies
DEPA & Universities
Research Experience Undergraduate
USA, EU and other companies
Project coordinator
Examination
Qualified students
Professor
Training
Project
Administration Process
Research Experience Undergraduate
Students who want to participate in this program

B.4 Viet Nam

Entry Number: B.4 Viet Nam
Presenter Name: Dinh Hai Dang
Title: Smart City Initiatives in Viet Nam

Smart city policies

- There hasn't been definition of smart city in Viet Nam; but it is understood as utilising ICT to optimise existing infrastructures in order to solve challenges and improve quality of administrative services for citizens in cities
- Vietnam leaders emphasise *Priority to develop some smart cities* in Viet Nam (Nov 2016)
- Prime Minister 's Decision No 1819 (Oct 2015) on IT application for administrative agencies set target to 2020:
  - Implementation of at least 03 smart cities under MIC's guidance
  - MIC is in charge of making criteria to evaluate and recognize smart cities
- Dec 2016, Prime Minister requested MIC shall collaborate with MOC to work out criteria to evaluate and recognize smart cities; making sure the efficient and effective investment of smart cities projects

Some typical cases (1)

- **Ho Chi Minh city** (~ 10 M people) set up technology framework for the smart city; also a Management Board and Consultant Board of the project "Building Ho Chi Minh smart city" (Sep 2016) focusing on objects of administration, citizen and business with smartness of transportation, urban planning, education, health, etc; but detailed projects are still under preparation
- **Ha Noi** (~ 8 M people): Hanoi smart city's vision consists of 6 smart dimensions (economy, life, government, environment, mobility, citizen); Ha Noi will be ready to become a smart city in 2020 (as said by Chairman of ICT application Management Board, 2016); ICT management center will be operated end this year; other projects are still under preparation
- **Quang Ninh** (~1.2M): Implementation plan for smart city in Quang Ninh 2017-2020 approved (May 2017) focusing on ICT technology framework and smartness in e-government, health, transportation, tourism...; all projects are named but still under preparation

Some typical cases (2)

- **Da Nang** (~1.5M): Project of Building smarter city in Da Nang approved (Mar 2014); set up Management Board for building smart city in Da Nang (2016); VNPT and Da Nang signed an agreement on building smart city in Da Nang with IBM as a consultant (Jul 2016); Viettel proposed ICT framework for smart city in Da Nang on the ITU recommendation basis (Oct 2016)
- **Kien Giang** (Phu Quoc, ~100K): Project of Building smarter city in Phu Quoc 2016-2020 approved (Apr 2017) with VNPT as a main partner (35mil. USD) with ICT framework and proposal projects focusing on safety city, environment, e-government, transportation, education...
- **Other cities** (< 1M): Local governments signed MoU with telcos to provide ICT infrastructures and services for building smart city projects

MIC's activities (1)

- MIC is in charge of guiding local governments in developing ICT applications and smart cities (Government's Decree No.17/2017/NĐ-CP)
- MIC is in charge of making guidelines for local governments in developing smart cities in cooperation with MOST, MOC, telcos and other association... as requested by the Prime Minister
- MIC is conducting some research projects relating to smart city (building KPIs, building ICT framework for smart cities, dashboard for smart cities in Vietnam...)
- MIC is continuing to build the system of standards/technical regulations in ICT sector, especially in data interoperability, open data in administrative agencies, information security, personal privacy...

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MINISTRY OF INFORMATION AND COMMUNICATIONS OF THE SOCIALIST REPUBLIC OF VIETNAM

MIC's activities (2)

- Principles to build KPIs:
  - Based on international standards such as ISO, ITU...
  - Best practices on building KPI from other countries; find out indicators that are relevant to cities in Viet Nam
  - Closed relationship, engagement among all stakeholders
  - The number of KPIs should be minimum (core), easy to collect and verify the data
  - Running some pilot projects to refine proposed KPIs before official release

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MIC's activities (3)

- Principles to build smart cities in Vietnam:
  - Build citizen-centric smart cities
  - Local governments play active role in building their smart city's master plan for 3-5 years with feasible and measurable objectives
  - Spend the first 1-2 years for pilot projects, find good models that are scalable to roll-out
  - Promote suitable PPP models
  - Vertical sectors (transportation, utilities, health, education, etc) are easily integrated via international & open standards; data is interoperable and shared physical infrastructures
  - Prioritize to introduce smart technologies
  - Cybersecurity shall be ensured

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Challenges

- Because there is no specific standards, no reference best practice; MIC is still looking for international best practices on:
  - Key performance indicators (KPI) for smart city (including methodology, guidelines and experiences)
  - Smart city assessment/benchmark model
  - Policies for developing healthy smart cities in local governments
  - PPP models
- Cooperation needs in:
  - Some research projects relating to smart city
  - Standardisation for ICT sector supporting for smart city in Viet Nam
  - Some pilot projects to refine proposed KPIs before official release and to find the best practices for smart city in Viet Nam

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MINISTRY OF INFORMATION AND COMMUNICATIONS OF THE SOCIALIST REPUBLIC OF VIETNAM

Thank you for your attention!

Contact:
Dinh Hai Dang
Department of Science&Technology
Ministry of Information and Communications
dhdang@mic.gov.vn

[note]

[note]

[note]

Title:	Research Report on “Smart City” in Asia Pacific Region
Authors:	Yuto Lim, Yasuo Tan, Hideyuki Iwata, Hideki Yamamoto, Kazunori Tanikawa, Masatoshi Mano
Year:	2018
Edition:	First Editon
Publisher:	Asia-Pacific Telecommunity Soi 5, Chaeng Watthana, Thungsonghong, Lak Si, Bangkok 10210, Thailand
Printer:	Telecommunication Technology Committee 1-1-12, Shiba kouen, Minato-ku, Tokyo 105-0011, Japan
ISBN:	978-616-91953-3-7

ISBN 978-616-91953-3-7