

- Smart City supported by Japan ASEAN Mutual Partnership –  
**Smart JAMP**

**APPLICATION FORM for Smart City Project Formulation Study**

1. Project digest

(1) Project Title: Feasibility study and Pilot project for Enhancement of Sungai Skudai River Management and Monitoring Tool (RMMT)

(2) Name of the city: Johor Bahru, Malaysia

(3) Category of the study: C and E

\*Choose one (or more, if item D and/or E included) from below

A) Masterplan (M/P) study

To formulate a masterplan for an entire smart city or a partial area of the target city, including the direction, comprehensive plan, and individual projects.

B) Pre-feasibility study

To determine priority among several alternatives on a particular field or part of an entire smart city project.

C) Feasibility study

To examine the feasibility or concrete details of an individual project composing the smart city project.

D) Capacity building program

To build the capacity of the stakeholders including government officials or municipal staff through training programs or seminars (may be done online).

E) Experimental implementation

To confirm applicability of a particular solution or technology for the smart city project in cooperation with Japanese solution provider(s).

(4) Justification of the Project

\*Provide detailed information of the project regarding the items below.

-Present condition of the smart city project in the target city:

Johor Bahru City (Iskandar Malaysia (hereinafter referred to as “IM”)) is one of Malaysia’s economic growth corridor covering a total area of 2,217 sq km (12% of Johor State), and contribute to more than 70% of the State’s economic development to date.

In year 2012, IM has been selected as a pilot region for the smart city model for Malaysia. Accordingly, to achieve a smart city in the region, an overall framework so called “Smart City Iskandar Malaysia (SCIM)” was formulated and Iskandar Malaysia Regional Authority (IRDA) plays a role as an implementing agency for this framework.

The SCIM includes 3 areas, 6 dimensions, 28 characteristics and 35 programs shown in the right.



Figure: SCIM Framework

From 2012 to 2020 the six dimensions of SCIM has been translated into many individual projects and programs undertaken by various government agencies, local municipalities, private stakeholder and the communities.



Figure: SCIM projects in IM to date

There are five different municipalities in IM and each have taken different SCIM projects related to their priorities and readiness. Other stakeholders such as private developers subscribed to the SCIM guideline to implement specific projects relating to their development as means to be noticed as recognized. IRDA acts as the coordinator to streamline these projects and facilitate the knowledge sharing among the stakeholders to encourage synergy, inter agency collaboration and innovation.

Successful SCIM project developments, coupled with the positive branding, recognition and support from international groupings such as ASEAN Smart City Network (ASCN) encouraged the State and Federal government to fully embrace the Smart City dimensions.

-Sectoral development policy of the local government / municipality on the smart city project in the target city:

1) IMUO As one of the important approaches to realize SCIM, the region’s Comprehensive Development Plan II (CDPii, 2014-2025), the top policy in the region, proposes Iskandar Malaysia Urban Observatory (IMUO). IMUO is a data centre to harvest, update, analyse, manage and disseminate data and information on IM. The IMUO acts as a knowledge centre to enhance the knowledge of cities of the whole Iskandar Malaysia. The figure below shows key components of IMUO.

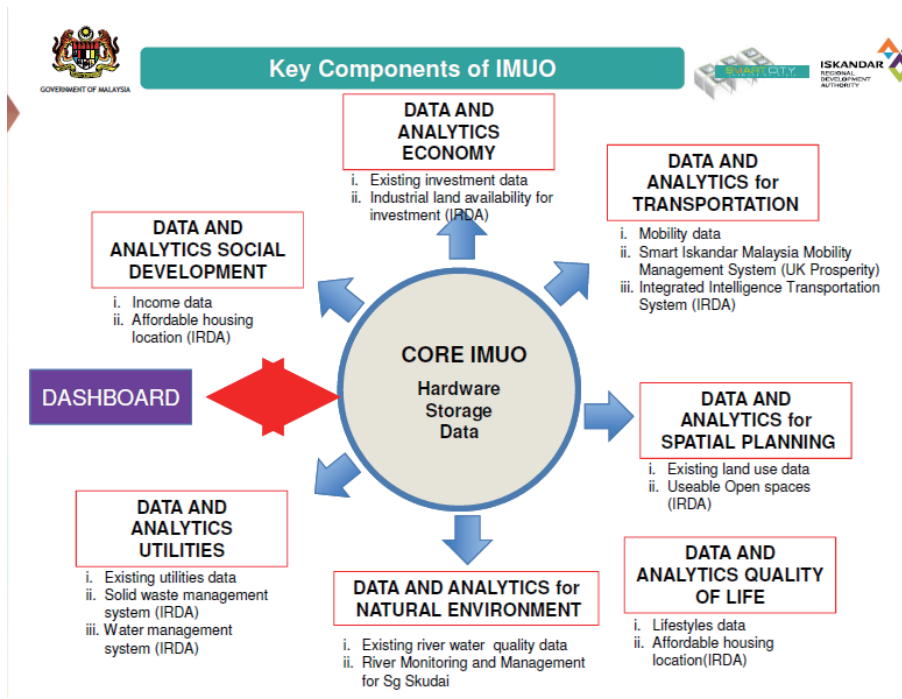


Figure: Key components of IMUO

The IMUO contributes to realize SCIM by aiming the following objectives:

- To be developed as an effective and sustainable Urban Observatory development model.
- To enhance collaboration and information sharing among agencies through ‘shared performance target’.
- To transform government agencies to make ‘informed decision’ using big data analytics on ‘authoritative data’.
- To utilize Sustainable Development Goals (SDGs) and Iskandar Malaysia Region monitoring indicators which have been identified as effective and principled.

One of the important pilot projects proposed in IMUO is River Management and Monitoring Tool (RMMT). The RMMT includes a Core of IMUO and can become a model of data platform, then accordingly will contribute to realize SCIM in the future. This will be described below.

## 2) RMMT

IM has a serious problem on water deterioration and shortage for domestic, industry and irrigation purposes, due to:

- Rapid development and urbanization have created an imbalance in the development of water supply utilities and infrastructures.
- Global weather changes have accelerated signs of water related problems within this region.



As a matter of fact, water demand in the region can be met until Mid 2019 and water shortage continues without any solutions. (see the figure right)

To address this issue, a river rejuvenation program, in consideration with river as a main water resource, is being implemented in the region.

However, the rivers in the region have serious problems as:

- Serious pollution, for example in River Skudai, with Class II/III at mid-stream (COD 5-26 mg/L) and <sup>1</sup> Class III-V at downstream (COD 28-78 mg/L) (Year 2015) (Though River Skudai is one of the important water resources, it cannot be utilized well due to the quality of water);
- Pollution may be caused by discharge from the factories (incl. illegal ones), farming, domestic wastewater etc. Due to high concentration of Ammonia nitrogen contained in the factory discharge, water intake for supplying is sometimes stopped;
- Accurate identification of pollutions and causes is integral to formulate countermeasures;
- Lack of inter-agency data sharing and coordinated responses to incidences of pollution presented opportunities to for improvement. Example Department of Irrigation and Drainage (DID) manages the river while Department of Environment (DoE) monitor discharges into the river and busines licenses issued by local municipalities.

To address above, IRDA has established and commenced RMMT. IM RMMT is a monitoring and management tool for river environment to consolidate data, analyse issues and formulation of necessary actions and monitoring. In addition, due to the nature of RMMT, it is to be integrated in the Urban Observatory, and plays role as a core and model of data platform for IMUO. RMMT also is expected to improve natural resource management, rejuvenation, and unlock economic potential of waterways (see the figure in the right).

Currently, a measure to one of the main rivers in the region, so called "Sungai Skudai Rejuvenation", is being implemented with RMMT, but no significant improvement is seen to date due to;

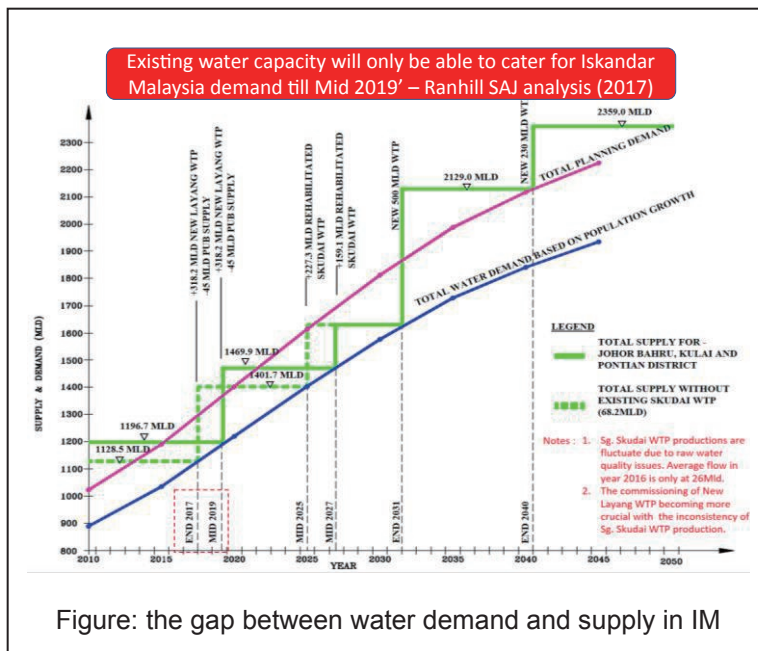
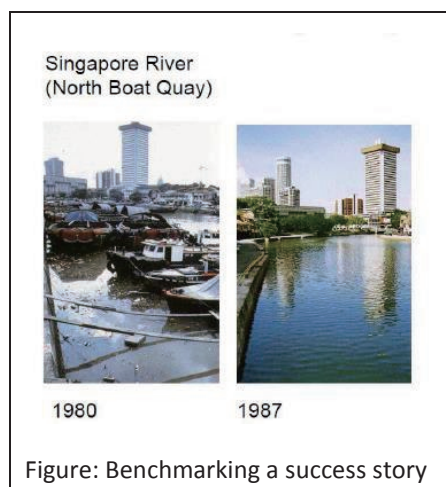


Figure: the gap between water demand and supply in IM



CLASS	USES
Class I	Conservation of natural environment. Water Supply I - Practically no treatment necessary. Fishery I - Very sensitive aquatic species.
Class IIA	Water Supply II - Conventional treatment. Fishery II - Sensitive aquatic species.
Class IIB	Recreational use body contact.
Class III	Water Supply III - Extensive treatment required. Fishery III - Common, of economic value and tolerant species; livestock drinking.
Class IV	Irrigation
Class V	None of the above.

1 Water class and usage (Skudai river has been rated at II and IV for many years)

- Data collected by related agencies are not shared (many agencies get involved in RMMT);
- Data collected in various forms -GIS maps, drawings, physical maps, spreadsheets;
- Ineffectiveness of implementation and monitoring of outcome (data is collected in conventional ways (e.g. staff go to the site and take samples manually) and devices are not connected with the platform).

Now, IRDA needs this RMMT to be improved with Japanese experience and technologies to manage the river environment accurately in order to solve issues stated above, and eventually RMMT contributes to IMUO and SCIM as well.

-Outline of the Study:

Targeting River Skudai, the river environment monitoring will be implemented and countermeasures will be formulated. River Skudai is one of the main rivers in the region with 47 km long, and has the following features:

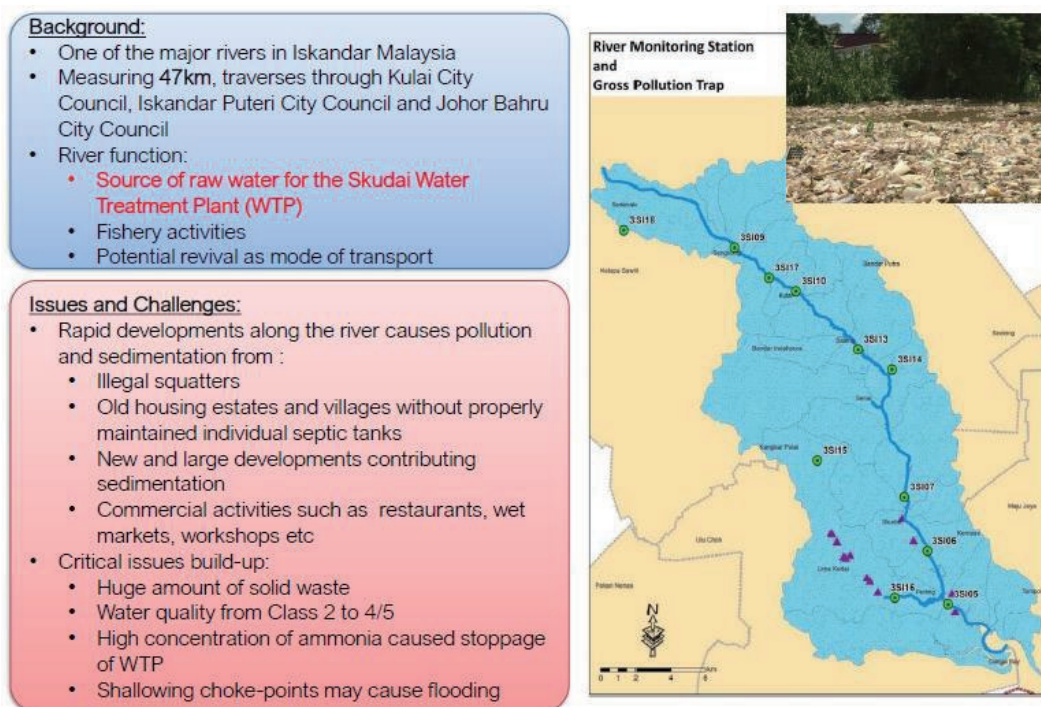


Figure: River Skudai

The scope of the study includes:

<Understanding the current situation>

- Study on the actual situation (pollution, stakeholders, policy/strategy/plan etc.);
- Identifying pollutions and causes in the river;

<RMMT improvement design>

- Consideration of RMMT users (river administrators, residents, public space to be installed (digital signage, notice board etc.), computers and smartphone as monitoring devices);
- Deciding monitoring items (WQI (Water Quality Index), temperature, EC etc.);
- Setting monitoring areas and points;
- Designing monitoring equipment in consideration of specifications, cost, easy maintenance, durability, theft prevention, easy procurement of spare parts, easy repairing, communication ability etc.)
- Consideration of operation and maintenance structure;
- Estimating budget required;

- Setting a framework of system (communication method, server etc.);
- Consideration of easy and understandable user interface for stakeholders (citizens and private companies) to get them involved into the project.

#### <Prototyping>

- Prototyping with real sensors and systems.

#### <Mid-long term roadmap formulation>

- Consider countermeasures for the river environment improvement;
- Formulate a plan and roadmap (pilot project planning, fund raising, incorporating Japanese companies etc.).

#### -Purpose (short-term objective) of the Study:

\*A path to improving urban services through digital solutions like robotics, IoT, AI or big data, is expected.

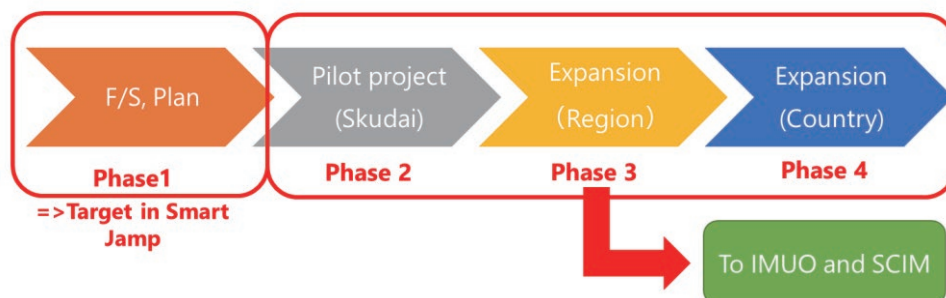
#### In a short term, the project aims to the following:

- Visualize water pollution by the sophisticated RMMT and Identify pollutions and causes accurately. It results in formulating effective countermeasures;
- RMMT to be used as a tool to promote effective water quality management, collaboration among the government/ stakeholders (outreach program);
- By improving water quality, it results in stabilizing intaking for water supply, decrease the cost for WTP, and improvement of supplied water (cost saving);
- In parallel with water quality improvement, the issues on water resources, flooding, illegal squatters, and solid waste would be solved;
- Bad water quality damages the value not only of around the river, but also the city of Johor Bharu. Water quality improvement will increase the value of the city, and lead IM project to success;
- Expand effective river management methods using RMMT to other rivers and also to the entire country.

#### -Goal (long-term objective) of the Study or entire project:

\*The applicant may choose from two layers of the goal of the Study including a) an entire urban development goal with a nexus of concrete construction, transport and infrastructure projects with ICT solutions, or b) a specific goal with a certain solution or technology in a particular field such as public health, disaster risk reduction, urban safety and security, mobility service (e.g. MaaS), energy solution, circular economy, advanced administrative services like public facility management or tourism promotion, as well as other fields like education, agriculture or supply chain management.

The project consists of the following phasing which includes Phase 1 as a F/S and planning.



Overview for Mid-Long term goal

After F/S completes with a concrete pilot project planning, it will move to phase 2 for pilot project which expands the outcome of the F/S to the entire River Skudai. Then it goes entire all rivers in the region in Phase 3, and Phase 4 expects the success will be disseminated to the whole country.

The success of RMMT will give a model of data platform of all IMUO projects, and will contribute realizing SCIM in the region.

Though Phase 1 is now considered as an F/S which will be targeted in Smart JAMP, fund raising for after phase 2 is necessary. IRDA is now considering the budget for these phases using;

- USD300,000 project budget for international bidding competition
- Matching grant from either State or Federal government (or both) will be sought upon successful bid for international grant.
- State and Federal annual budget can also be applied to expand the project scope for the same river or other rivers in the State or in Malaysia
- Funds from specific ministries such as **Ministry of Environment and Water** (both DID and DoE are under this ministry), **Ministry of Housing and Local Government** (in charge of municipal governments) and **Ministry of Science, Technology and Innovation** can be sought to fund different aspects or components of the same pilot project based on the feasibility study
- CSR fund contributed by private companies based along the river Skudai
- Other, if any.

-Other relevant projects, if any.

We expect the following structures for this F/S

- F/S to be led by an experienced engineering entity on river monitoring
- The team to include vendors/suppliers/manufactures for monitoring systems
- The future plan after phase 2 to be proposed by the team shall be feasible and reasonable cost.