Smart City supported by Japan ASEAN Mutual Partnership

[Smart JAMP]

APPLICATION FORM for Smart City Project Formulation Study

1. Project digest

(1) Project Title: **Proof of Concept (PoC) on ICT Solution for Overloaded Vehicle Control**

(2) Name of the city: **Kuala Lumpur – Johor Bahru and Kuching – Kota Kinabalu**

(3) Category of the study: **E (Experimental implementation)**

*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:**

Trucks or heavy vehicles are dominant in transporting goods or materials in Malaysia. The maximum permissible gross weight varies depending on the axle of the vehicle. It could range from 16.8 tons for 2-axle vehicle to 39.9 tons for 5-axle truck. Section 19 (4) of the Commercial Vehicle Licensing Board (CVLB) Act 1987 states that anyone who fails to comply with any condition stipulated under the CVLB license, which includes the maximum weight permissible for a lorry to carry, shall be guilty of an offense and shall, upon conviction, be liable to a fine of not less than MYR1000 (USD330) but not more than MYR10,000 (USD3300) or to imprisonment for a term not exceeding one year or both.

Vehicle overloading has been identified as one of the major contributors to road pavement damage in Malaysia. A study by International Road Dynamics Inc. found that 10% increase in weight can accelerate pavement damage by over 40%[1]. Furthermore, overload could cause the main part of the vehicle to be damaged and malfunction. According to Jacob and La Beaumelle[2] there were several adverse consequences that may occur when the heavy vehicles exceed the maximum permitted limit, i.e.:

i. truck instability because of the increased of height at the center of gravity and more inertia of the vehicle bodies;

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[1] A. Kishore, R. Klashinski, **Prevention of Highway Infrastructure Damage Through Commercial Vehicle Weight Enforcement**, International Road Dynamic Inc., Saskatoon, Saskatchewan, Canada (2000)

[2] B. Jacob, V.F. La Beaumelle, **Improving truck safety: potential of weigh-in-motion technology,** IATSS Research, 34 (2010), pp. 9-15

ii. braking default because besides the system itself, it depends on the tire and suspension performance which is designed for the maximum allowable weight indicated on the vehicle documents;
iii. loss of motivity and maneuverability since the vehicles is under-powered, which resulted in lower speeds on up-hill slopes as well as the risk of congestion, inefficient engine braking and over speeding on down-hill slopes;
iv. overheating of tire and high risk of tire blowouts; and
v. accident or loss control of the vehicles will result in higher risk and severity of a fire, especially when transporting flammable goods.

Determination of overloaded vehicles/trucks in Malaysia are currently determined by static weighing at designated weigh stations. Currently, there are 52 static weigh stations in operation along the country's road network. Vehicles/trucks that appear to be overloaded are first identified through manual observations by the Road Transport Department officials on patrol along public roads and these vehicles/trucks are asked to go to the specified static weigh station for the actual vehicle weight (Gross Vehicle Weight, GVW) to be determined. The driver of vehicle found to be overloaded will be fined accordingly.

Note: this excerp is extracted and adapted from research paper titled "**Effectiveness of vehicle weight enforcement in a developing country using weight-in-motion sorting system considering vehicle by-pass and enforcement capability**" published by Mohamed Rehan Karim, Nik Ibtishamiah Ibrahim, Ahmad Abdullah Saifizul and Hideo Yamanaka in International Association of Safety and Traffic Sciences, 2013.
[link: ***https://www.sciencedirect.com/science/article/pii/S0386111213000174***]

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

  Regulation and enforcement on overloaded vehicle is under the purview of the Land Public Transport Agency (LPTA) and Road Transport Department (RTD), both of whom are agencies under Ministry of Transport (MOT). Both agencies work closely with local authorities in ensuring vehicle operator's compliance to the law when using urban and intercity road network.

  For implementation of this PoC, LPTA and RTD will be supervised by MOT with cooperation from Kuala Lumpur City Hall, Johor Bahru City Council, Kuching South City Council, Kuching North City Hall and Kota Kinabalu City Hall. Also, engagement with other local authorities along the PoC routes will also take place when necessary.

- **Outline of the Study:**

  1. Operation test of vehicle weight estimation system using smartphone/on-board-unit device

     1.1. Preparation of operation
     - assignment of logistics company, route selection
     - system requirement / operation requirement

     1.1. Implementation of device on the truck with support of logistics company

     1.2. implementation of overloaded vehicle detection monitoring system/road status monitoring system on control center

     1.3. operation test of overloaded vehicle detection monitoring system/road status monitoring system for certain period

     1.4. Extract system function to be improved or enhanced for real operation system

     1.5. Draft system implementation plan
     - draft of system configuration plan considering current system
     - work plan of system implementation
     - schedule plan

2. Research and planning

   2.1. Research
   - current system environment
   - law and regulation
   - current situation

   2.2. Through operation test, the plan of raw and regulation for overloaded detection system implementation is drafted.

   2.3. Draft roadmap plan of implementation of raw and regulation

- **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.

  1. To establish feasible system implementation plan with AI and bigdata technology on IoT through system pilot operation test toward large scale operation system.
  2. To make feasible raw and regulation implementation plan.

- **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.

  1. To achieve the improvement of road traffic safety by ensuring compliance to applicable law specifically in reduction of overloaded vehicle;
  2. Improve road damage mitigation in city area and inter-city roads.

- **Other relevant projects, if any.**