

Building Smarter Cities

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Future Cities Smart Solutions Background and Objectives

Overview of the Engagement

Overview

The ADB aims to enhance its operations in five selected cities under the **Future Cities Program** (FCP) by **identifying**, **conceptualizing** and preparing **pre-feasibility studies** for innovative pro-poor and smart approaches to integrated urban development.

Outputs

The key outputs of the assignment are:

- Identify 25 smart city investment proposals
- Feasibility study on 3 investment opportunities
- Facilitation of 3 bilateral twinning exchanges
- Preparation of knowledge products
- Submission of interim and final reports

Tbilisi, Georgia Bandung, Indonesia Suva, Fiji

Timeline for Project

Phase	Timeline		
Phase I	March – June 2017		
Phase II	June 2017 – June 2018		



Project Overview

Objectives and Outputs of the Assignment

- 1 **Undertake diagnostics** to ensure that the city is engaged in understanding, identifying and sharing best practice pathways towards smart infrastructure
- 2 Identify smart solutions to improve the living standards of city residents, with a focus on the urban poor and women
- 3 Establish and support **smart city user groups** and innovation centres
- 4 Develop management improvement plans
- 5 **Perform a pre-feasibility study** and prepare a detailed submission on identified projects, including costing, proposed outputs and methodology
- 6 Identify and conduct bilateral **twinning exchanges**
- 7 Pilot public-private partnership information and communication technology investment
- 8 Prepare knowledge products



Submission of interim, progress and final reports

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Findings

Scoping Results for Bandung

Bandung, Indonesia: Findings of Scoping Mission



CITY INITIATIVES

- □ Introduced **300 software programs** to address different aspects of city-wide problems such as education to traffic control, under the **e-governance initiative SMARTCITY**
- □ Open government initiatives include full budget transparency online and citizen interaction through social media and a government YouTube channel
- ❑ An app called Gampil introduced to facilitate licensing and business registration for SMEs with businesses under USD 50,000, only a report needs to be submitted on the app; 30,000 new businesses have already been established
- Plans to install up to 10,000 Wi-Fi hotspots over 2017, eventually reaching 40,000
- □ GPS tracking system is used to monitor traffic, or track city assets such as public buses, ambulances or fire trucks
- Bandung Command Centre to manage city operations
- □ Have CCTV cameras set up on some streets but limited coverage of the city

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Suva, Fiji: Smart Initiatives



SMART INITIATIVES

- Emerging online payments system
- □ FijiPay card issued at the national level to make welfare payments as well as used for bill payments and e-ticketing
- □ SMS' on mental health sent by the Fiji Council of Social Services, in partnership with Vodafone, to 25,000 recipients
- Deliver File Pilot for e-ticketing for public transport was conducted
- □ **Telecentres** set up in schools to provide internet access and education to students, and to adults after hours
- □ At the national level, e-services such as business registration and a single investment window are provided
- □ Vodafone is providing smart meters for energy, prepaid meters for rural households, and mWoman portal for reporting domestic violence

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Ulaanbaatar, Mongolia: Smart Initiatives





SMART INITIATIVES

- □ Smart Police project uses a centralised database to assist police officers across districts in monitoring pawn shops for stolen assets
- □ 1,140 CCTV cameras set up under 14 different systems across the city to monitor traffic
- Bus Rapid Transit and e-ticketing undertaken
- □ Pre-school registration is being done online
- □ A **shared data repository** is being developed for access by citizens and government agencies
- □ The Water Supply and Sewerage Authority has implemented **GIS** to gather water and waste data, and **SCADA**, and converted 120 of 320 pumping areas into smart pumps to increase the smart usage of water in Ger areas
- □ A **UB Master Plan 2030** was approved in 2013 with proposals for improved infrastructure networks, flood protection and groundwater management



Tbilisi, Georgia: Smart Initiatives





SMART INITIATIVES

- □ The city has initial GIS mapping and an **interactive web portal** to view land use according to criteria
- Residents can access real-time bus location on a mobile app journey planner
- □ An e-ticketing system, Metromoney, is used on the metro, bus and cable car networks, and is in transition to an ABT system
- Digital payments are gaining traction; FINCA Bank is offering credit to farmers through a digital application used by a network of agricultural dealers
- □ Innovation hubs such as GITA develop smart solutions
- □ Credit Bureau provides access to online database on loans
- An e-prescription was piloted in Tbilisi and will be scaled up
- □ EMR is a central database of medical records, with birth, death and epidemiological data, which will be integrated with hospital systems in 2-3 years. It is accessible by patients
- □ There are **mobile apps for vaccination** and apps for anti-natal care are planned
- □ The National Centre for Disease Control has an **e-health program** and manages data on diseases electronically
- □ Energy efficiency for buildings
- □ ERP for City Hall

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Mandalay, Myanmar: Smart Initiatives





SMART INITIATIVES

- □ 100 CCTV cameras installed on 26 streets to increase safety
- □ Maymay app provides health tips and a list of doctors to 1,000 users
- UNDP's iWomen app helps set up rural women groups, is the source for loans and self-help groups, and provides market price information. Women can also use it to report instances of domestic violence
- □ Master Plan for Mandalay was developed with JICA assistance

GAPS

- □ The city does not have a **digital land use plan** and **data on land use**
- □ There is no city-level authority responsible for the transport sector, and **overall institutional structure is lacking**, which limits planning and implementation of projects
- □ The **Budget** is only sufficient to maintain the current system but inadequate for new developments
- □ There is an absence of a **centralised data system** for education, health and other sectors
- □ E-government is at an early stage; most government processes, applications and land use maps are manual
- □ Institutional capacity is relatively low
- □ The population has a low technological awareness

Summary: Relative Level of Smart Maturity Across Cities

Sector	Bandung	Mandalay	Suva	Ulaanbaatar	Tbilisi	
City Area	167.7 sq. km	118.4 sq. km	1,059 sq. km	4,704 sq. km	726 sq. km	
Population	2.5 mn (2014)	1.2 mn (2014)	0.24 mn (2007)	1.4 mn (2015)	1.1 mn (2015)	
GDP per capita	USD 4,120 (2014)	USD 870 (2014)	USD 5,480 (2015)	USD 5,474 (2015)	USD 5,343 (2015)	
Traffic and Transport	•	•	•		•	
Water Supply		•				
Waste Management		•	•			
Health			•		•	
Informal Settlements	ents		•	•	•	
E-government		•	•		•	
Relative Maturity	•	•	•	•	•	
(●= high, ● = medium, ●= low)						



Smart City

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Technologically advanced, with sensors and data analytics with information that is gathered in real time by thousands of interconnected devices.

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A better relationship between citizens and government through mechanisms that empower citizens to provide feedback to improve service delivery.



Smart City - Evolution

	Definition		Examples		
Technology	nology A necessary precondition for smart development, technology to collect, store and analyse data, and deliver		 Sensors for data collection Centralised data storage and analytics system Smart surveillance cameras 		
Institutions	Government institutions need to be properly designed to support smart city development, and have the necessary staff and financial capabilities		 Chief Digital Officer to drive smart initiatives across city departments Capacity development 		
Digitisation	The conversion of analogue and paper-based processes to digital for improved efficiency and cost-effectiveness		 Online information systems E-payments Apps Digital records 		
Integration	Analysing data from a range of areas (e.g. land use, innovation, water, housing, energy, health, sanitation) and developing cross-sector solutions to challenges		Centralised data repositoryComprehensive city master planning		
Community	Supporting an engaged community of citizens and private partners for continuous feedback and contribution to smart development		 Feedback mechanisms Business partnerships including PPPs Two-way communications, where citizens can notify the city of problems 		

Smart City Development



Smart City - Examples



Breathing Activity ECG and Heartbeat S Insulin Pump S Blood pH, Glucose, Temperature Disolved Oxygen, Carbon Dioxide

London, UK - Digital patches that allow wireless patient monitoring, with information being downloadable into a smart phone or integrated directly into electronic records



Baltimore, USA – Johns Hopkins Hospital has a Capacity Command Center to better manage patient safety, experience, volume, and admittance/discharge





Singapore – Countrywide *Smart Nation* strategy to use networks, data and info-comm technologies to improve living, economic opportunity and communities



Dubai, UAE – open data laws, made 95% of services available on mobile phones and created CloudOne to automate IT resource approval for government

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Smart City - Examples





Estonia - Smart-metering to allow end users to monitor consumption, compare billing packages and choose how much energy comes from renewable sources.



Amsterdam, Netherlands – Currently testing a virtual power plant by enabling households to store and share energy from solar power



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San Francisco, USA - a joint effort between public health and juvenile services used data to identify youth at risk of committing crimes, enabling intervention.



Singapore – under the PolCam initiative, over 60,000 cameras have been installed, some with facial recognition software, to detect and deter crime

Smart City - Examples



Mobility



Chicago, USA - Smart traffic lights, Smart parking sensors, Street lights and citywide sensors



Singapore – Operations Control Centre **to** monitor traffic, deploy ground recovery crew to assist motorists, provide real-time traffic advisory information





Rotterdam, Netherlands- Sensor-equipped waste containers, smart plan software that enables optimised route planning system



Singapore – Battery operated sensors detect if a bin is filled and communicate this to improve productivity by preventing unneeded trips made to empty bins

Smart City - Examples





Vienna, Austria – implemented building recycling, and applied standards for ventilation, air exchange, lighting, renewable energy to reduce energy use



Shanghai, China – buildings incorporate cloud-based platforms for building monitoring to support efficiency in building automation, energy, lighting, safety and security





London, UK – hosts **hackathons** to develop new ideas and technologies for council services, digital economy, water, financial inclusion and robotics.



Singapore –SMART Innovation Centre to develop innovative solutions for cities through collaboration between universities, government and industry



Smart Cities - Singapore

Some examples





Singapore Payments Roadmap

Payments Roadmap

A successful payment system has some key components that drive enhancements and foster collaborations to support a faster transition to a world-leading ecosystem.





Payments Roadmap: Benchmarking Social Costs as a % of GDP

Benchmarks

In benchmark countries, social costs for payment systems range from 0.48% to 0.97% of GDP. Individual countries in the European study had costs of payment systems as high as 1.20% of GDP.

% of GDP	Australia	Norway	Sweden	Europe (ECB) - weighted average ¹	Denmark
Total	0.54%	0.48%	0.56%	0.96%	0.97%
Cash	0.19%	0.15%	0.28%	0.49%	0.33%
Cards	0.19%	0.23%	0.28%	0.21%	0.23%
Debit Cards	0.05%	0.10%	0.19%	0.10%	0.04%
Credit Cards	0.14%	0.04%	0.09%	0.09%	0.03%
BankAxept (Norway) / Dankort (Denmark)		0.14%			0.16%
Cheques	0.02%	n.a	n.a	0.03%	n.a
Electronic transfers / Giro	0.14%	0.10%	n.a	0.22%	0.42%

Note:

1. Weighting done by the EC based on the GDP of the individual countries in 2009. Denmark, Sweden, Finland, Netherland, Estonia, Portugal, Spain, Greece, Italy, Ireland, Romania, Hungary and Latvia. Results for individual countries have not been published yet.

Source:

- 1. The evolution of payment costs in Australia, Stewart et al (2014), Reserve Bank of Australia
- 2. Costs in the Norwegian Payment System, Gresvik & Haare (2009), Norges Bank
- 3. Cards or cash. How should we pay?, Segendorf & Jansson (2012), Sveriges Riksbank
- 4. Cost of payments in Denmark, Danmarks Nationalbank (2012)
- 5. The social and private costs of retail payment instruments, A European perspective; Schmiedel, Kostova and Ruttenberg (2012), ECB





Account Based Ticketing Systems

Transit Charging Framework

The rapid evolution of payment systems combined with the high level of adoption in integrated ticketing has given rise to advanced transit charging systems like account-based ticketing



Source: Asia Pacific Smart Card Association; KPMG Analysis



Transit Charging Framework: Future Benefits of Account-based Ticketing

Benefits to be gained from account-based ticketing systems include improved commuter convenience, reduced cost for operators and additional revenue streams for financial institutions



Financial Institutions (Banks, Visa and MasterCard)



- Increases streams revenue as commuters are more likely to use their cards for retail purchases in addition to their daily commute
- Expands transaction frequency for debit and credit cards



- Empowers commuters through "selfservice" capabilities to conveniently manage accounts "anytime, anywhere"
- Enables the use of multiple media **platforms**. linked to the same travel account, including smartphones and nontraditional tokens

Source: Global Mass Transit Research; KPMG Analysis





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Smart Logistics Systems









Thank you



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