

# Smart Cities and Service Integration

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## ABSTRACT

E-government advancements have not fully resolved the challenge of providing citizens with a single entry point for services that involve different government entities. The Smart Cities and Service Integration project (hereafter, SmartCities) aims to establish a framework for smart city service integration that would assist in the management of large scale projects related to the integration of services across governments. By using comparative case studies of six cities (New York City, Seattle, Quebec City, Mexico City, Macao, and Shanghai), the project aims to develop a theoretical framework to guide smart cities service integration. The project will highlight integration of public services and cross-boundary information sharing by focusing on specific policy domains. An additional goal of this project is to develop research capabilities of graduate students who participate in the research. The research project is funded by the Social Sciences and Humanities Research Council of Canada.

## Categories and Subject Descriptors

H.4.2 [Information Systems Applications]:  
Type of systems – *e-government applications*

## General Terms

Management, Performance, Human Factors, Standardization

## Keywords

Smart city, Service integration, E-government

## 1. PROJECT DESCRIPTION

The term *smart city* has recently emerged to describe the use of smart technologies to build and integrate critical infrastructures and services of a city. The concept of smartness in the urban

context denotes the efforts to garner various benefits from technology use, such as increases in efficiency, effectiveness, convenience, and sustainability. Smart city initiatives envision smart living, smart environment, smart mobility/transportation, smart energy saving, and smart health care.

The concept of smart city and its defining characteristics is a subject of ongoing discussions in a number of academic disciplines and practical areas. A majority of working definitions stress smart use of digital technologies to make cities more livable [1,2,3,4]. Such smart use of technologies foster smart economy, (sustainable development of urban economy), smart people (creative class and social learning), and smart governance (citizen engagement and participation), which are necessary for success of a smart city initiative [1]. Smart city is viewed as a larger system overarching diverse subsystems, which act as a linked, seamless network. Smart city integrates elements of all of its critical infrastructures: physical and technological infrastructures enabling ubiquitous use of mobile and virtual technologies, and human infrastructures nurturing social capital.

Given the fact that the concept of smart city emerged only recently, research focusing on the operations of smart cities in particular policy domains has been sparse. Most studies highlight only a very limited set of factors from a variety of common components underlying a smart city [1,2,3,4]. However, the integration of city services enabled and mediated by information technology requires an integrative approach because success of such efforts depends not only on technological factors but also on non-technical ones such as management, governance, and policy. Though the study of service integration in smart city initiatives raises cross-disciplinary concerns, very limited interdisciplinary research has been conducted to date.

The SmartCities project, entitled *Smart Cities and Service Integration*, aims to fill this gap by exploring the concept of smart city and its various components from multiple perspectives using comparative case studies of six cities. The multi-disciplinary project team brings together different sets of expertise, knowledge backgrounds, and research experiences allowing for a richer approach to studying service integration of a smart city. The project team consists of six research organizations from four countries: Canada, US, Mexico, and China. Each organization is represented by a senior faculty member and a graduate student

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*Dg.o'11*, June 12–15, 2011, College Park, MD, USA.

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working on independent comparative studies of six cities: New York, Seattle, Mexico City, Quebec, Macao, and Shanghai. The team members have complementary (both technical and non-technical) skills and expertise, and come from three academic disciplines: computer science, public administration, and informatics. Research fields of participant researchers also vary, including e-government, e-governance, information sharing, and enterprise architecture.

**Table 1. Participant Institutions**

Country	City focused	Institutions
Canada	Quebec City	Department of Information Systems, Université Laval
Mexico	Mexico City	Department of Public Administration, Centro de Investigación y Docencia Económicas
United States	New York City	Center for Technology in Government University at Albany, SUNY
	Seattle	The Information School, University of Washington
China	Macao	Center for Electronic Governance, United Nations University
	Shanghai	Department of Public Administration, Fudan University

**1.1 Research Goals**

The SmartCities project has two primary goals. First, the project aims to develop a theoretical framework to guide smart cities service integration as a final product of the research. The framework will highlight success factors, major concerns, challenges, and barriers in cities’ use of smart technologies for service integration. In order to avoid overgeneralization of results from a single case, the project will explore how smart city initiatives are operated in the contexts of six different cities by conducting in-depth interviews with government officials (in IT and each policy domain) who are in charge of the smart city initiative. From these interviews, the team will produce a set of comparative case studies of the six cities in specific policy domains such as environmental issues, health, and transportation.

Second, the project provides a critical opportunity for graduate students to learn how to work collaboratively with a team of international researchers trying to solve complex global problems. The project allows the participating students to gain new research skills and advance their knowledge. The students will collaborate with each other as well as the faculty members to develop a final report and papers that will be submitted to key conferences on digital government—International Conference on Digital Government Research (dg.o), IFIP eGov Conference, Hawaii International Conference on System Sciences (HICSS), and International Conference on Theory and Practice of Electronic Governance (ICEGOV).

**1.2 Research Processes**

Establishing sound collaborative processes is crucial to a research project involving multi-national research team focusing on different practices in multiple cities. Frequent communication via teleconferences and a number of face-to-face two-day workshops are key to successful research collaboration of distant regional teams.

The project consists of three distinct phases. In the first phase, each sub-team reviews relevant literature based on its own area of expertise, and creates interview questions drawing on the resulting

literature review. The phase will culminate in the first face-to-face meeting in Mexico City with the goal of discussing findings from the individual literature reviews and developing a final version of a complete interview protocol to be used by all six teams in subsequent phases.

**Table 2. Project Timeline**

Phase	Agenda
<b>Phase 1</b> (Nov 2010 to Jan 2011)	Literature review, Interview protocol * Workshop at Mexico City on Feb, 2011
<b>Phase 2</b> (Feb 2011 to Jun 2011)	Data collection by interview, Data analysis * Workshop at Quebec City on Jun, 2011
<b>Phase 3</b> (Jul 2011 to Jan 2012)	Final activity report, Proposal to further research * Workshop at Albany on Nov, 2011

The second phase of the project is dedicated to data collection by each regional sub-team in their respective cities. Each sub-team will conduct a number of interviews with government professionals from various city departments using the common interview protocol developed in phase 1. This will involve contacting city officials, arranging and conducting the interviews, and making the data available to the full team. Target interviewees are public officials in city governments who lead smart city initiatives in selected policy domains. Each team will then conduct an initial analysis of their interview data and write up a case study of their city. The results of these individual analyses will then be discussed by the whole team at the second workshop in Quebec City.

The third phase consists mainly of writing the final activity report. The goal of the last face-to-face workshop at Albany will be to finalize the activity report and develop a proposal for further research on other topics related to smart cities.

**2. ACKNOWLEDGEMENT**

This work is partially supported by a grant from the Social Sciences and Humanities Research Council of Canada. The project is being conducted by researchers from Université Laval, Centro de Investigación y Docencia Económicas (CIDE), University at Albany (SUNY), University of Washington, United Nations University (UNU), and Fudan University. North American teams use the grant for two purposes: 1) partial stipends for graduate students, and 2) travel expenses for researchers to come together in three workshops.

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