Chapter 80
Advancing Performance Measurement of Smart City: Compare China and the United States

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ABSTRACT

Smart city initiatives are thriving around the world. However, measuring the performance of a smart city becomes a critical challenge partially due to the lack of agreement on the concept and on the components that define a city as being "smart." The primary purpose of this study is to propose a scheme of performance measurement on smart city, based on the understanding of smart city as an ICT-enabled complex governance system in the urban context. The measurement scheme is composed of five factors: institution, actors, interactions among the actors, ICT enactment, and outcomes. Each factor is further developed into a series of indicators. As a tentative effort, this study further utilizes the proposed scheme to make a brief comparison between two existing performance measurement frameworks in the United States and China. The comparison demonstrates the power of the set of measures in gauging and guiding the practice. Meanwhile, the authors recognize that the scheme should be understood as heuristics instead of a road map, as smart city is still an emergent phenomenon.

Nowadays more than 50% of the world population lives in cities, and this ratio might be reaching 70% by the middle of this century (United Nations, 2011). The staggering expansion and huge size raise critical challenges to contemporary cities on the globe: they have to face extremely complex problems related to demographical, ecological, economical, developmental and spatial aspects of social life.

To handle the seemingly unsolvable challenges effectively, various initiatives aiming to ensure cities smartness are gaining popularity around the world. In China, a most populous country, the central government has started a nation-wide smart city pilot project, choosing 193 trial cities in the first stage to develop into "smart cities." Official data from the central authority showed that a few financial institutes,

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including the country's policy bank, have promised to loan no less than 440 billion Yuans ($72 billion) to fund this project (Xinhua News Agency, 2013). In the United Sates, Intelligent Community Forum (ICF) annually announces award-winning cities for excellent performance in five factors that define a successful intelligent community. There have been dozens of cities around the country selected for this award. In Europe, an initiative called Smart Cities and Communities (SCC) has been launched since 2011. The 2013 budget for this initiative reached 365 million Euros ($450 million) (European Commission, 2012).

However, there is a lack of agreement on the concept of smart city and the components that define a city as being "smart" (Nam & Pardo, 2011). Accordingly, various projects have been implemented based on diversified understandings. The lack of consensus and the diversity in implementation make the performance measurement of smart city become a critical challenge. There is a great deal of emphasis on performance measurement today as a way of providing accountability and the means to a results-oriented management strategy. Without appropriate measurement of the performance, it is impossible to get to know whether the investment on smart city is worthy, whether the claimed goals have been realized, and whether progress has been made over time. To summarize, there will be no way to justify various smart city projects in the absence of performance measurement.

Despite the importance of performance evaluation on smart city, there is a dearth of academic works in this regard. Some practical evaluation metrics advocated by private companies lack the input from the field of public administration. To fill this research gap, this study proposes a performance measurement framework based on literature about e-government, governance, and performance measurement. In addition, this study tentatively utilizes the framework to conduct an empirical comparison between two evaluation metrics implemented in the U.S. and China. Both countries are marked by ambitious smart city initiatives or projects, but they are remarkably different in administrative system and IT strategies. The comparison will be of practical importance, helping to illustrate what aspects of performance measurement on smart city have been met and what can be further improved.

SMART CITY: ICT-ENABLED URBAN GOVERNANCE SYSTEM

A variety of different working definitions of a smart city has been proposed (Chourabi et al., 2012). Although the lack of a widely accepted definition of a concept is not unusual in social science, this status seems to be especially prominent in smart city. This can be explained by the fact that it is still an emerging research subject, but the more important reason may be attributed to its complexity. On one hand, urban governance can be thought of as a sub-system of a broader governance system. On the other hand, city governance itself includes a number of sub-systems such as transportation, housing, electronic power grid, and garbage collection, just to name a few. These systems are intertwined with each other, consisting of a system of systems (Dirks & Keeling, 2009).

The concept of smart city is also strongly correlated with the utilization of information and communication technology (Hollands, 2008). It is hard to call a city featured by a good number of resource-intensive industries a "smart" one. For most observers, a city becomes smart when it transforms towards an information-based society with much more resource-efficient knowledge industries, which supports sustainable development (Deakin, 2010; Vasseur, 2010). ICT exploitation in the public sector has long been a research subject of e-government studies. E-government literature has identified the ICT enactment framework for a better understanding of ICT-enabled governance. Put simply, enactment means