Chapter 11
Smart City Service

Gang Yu
SILC Business School,Shanghai University, China

Min Hu
SILC Business School,Shanghai University, China

Zhenyu Dai
Shanghai Urban Operation (Group) Co. Ltd., China

Wei Ding
Shanghai Urban Operation (Group) Co. Ltd., China

Ying Chang
Shanghai Urban Operation (Group) Co. Ltd., China

Yi Wang
SILC Business School,Shanghai University, China

Zhiqiang Li
SILC Business School,Shanghai University, China

ABSTRACT

Urban infrastructure, a crucial part of the city, is being developed on a large scale under the rapid development of smart cities. The operation and maintenance (O&M) phase is increasingly complex, and the information to be processed is cumulatively massive. So, the significance of urban infrastructure O&M is gradually being realized by the public. Recently, research in Building Lifecycle Management (BLM) and Building Information Modeling (BIM) has partly improved technological innovation and management level of urban infrastructures O&M. However, there are still deficiencies in the research of BIM, VR/AR, internet of things, pervasive computing, big data, and other emerging technologies applied in urban infrastructure O&M, as well as the realization of intelligent service functions. Therefore, based on existing research and oriented to the development need of smart city, this chapter takes "intelligent service for urban infrastructure under the concept of lifecycle" as core to conduct a discussion on how to solve practical problems in the urban infrastructure O&M.

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1 INTRODUCTION

Over the years, research in Building Lifecycle Management (BLM) and Building Information Modeling (BIM) has provided a theoretical base for and promoted technological innovation and management level of urban infrastructures operation and maintenance (O&M). However, the research in such emerging technologies as BIM, VR/AR, Internet of Things, pervasive computing, and Big-data as well has been very limited, and thus restricting the overall improvement of urban infrastructure O&M, and failing to realize the complete intelligent service functions. The main problems existing in smart city infrastructures O&M are as follows:

(1) The inefficient information management due to the traditional information exchange method and paths

Current information exchange channels of urban infrastructure O&M is limited to conferences, telephones, faxes, E-mails, express delivery, etc. It tends to result in management efficiency issues such as cost increase, decision delay, ignored or missing information, and unclear requirements. At this stage, Peer-to-peer remains the common. This makes the information interaction path between the participants very long and hierarchical relationship extremely complicated, which could cause interaction time delay, information distortion, poor information exchange, and information loss. Finally, these lead to low information management efficiency.

(2) Failure to realize the urban infrastructure lifecycle O&M management owing to "Information Island"

"Information Island" means no effective data sharing among different participants, with each possessing the information exclusive to another, as a disconnected sea. There are many participants involved in the lifecycle of urban infrastructure, such as the owner, the designer, the constructor, the operator, etc. In the traditional management process, participants do not actively participate in the information management of facilities, but passively accept the information provided by other participants, and then manage the information according to the needs. They cannot achieve coordinated and effective information interaction. It makes inefficient information management of each participant and the increasing cost of information management. And such excessive low-quality information will directly affect the timeline and accuracy of decisions.

(3) Low degree of information processing, fatal information error, and loss of information

As the urban infrastructure-related information is initially cluttered, disordered, scattered, and full of unstructured information, it cannot be directly used and managed. Information processing is a key step in information management and requires the assistance of computing, transmission and storage devices. However, the insufficient application of information tech and the incompetence of information personnel causes the ineffectiveness of the information processing, which is unluckily attended by construction personnel. And many construction personnel do not pay enough attention to this. In addition, being the long cycle, large scale, multi-stage and numerous participants of urban infrastructure projects may result