

Chapter 9

Performance Evaluation on the Intelligent Operation and Maintenance Mode of Public–Private Partnership Urban Infrastructure Projects

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ABSTRACT

With the participation of social capital, the operation and maintenance performance of Public-Private Partnership (PPP) urban infrastructure is becoming the key value-added point. This chapter summarizes and analyzes the problems of traditional urban infrastructure operation and maintenance (UIOM), and innovatively proposes the UIOM mode under the PPP background. Combined with the characteristics

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of the new generation of information technology, this chapter puts forward an efficient and intelligent UIOM mode with the features of intelligent decision-making, fine maintenance, technical optimization, capital saving, resource integration, and sustainability. This chapter takes the Highway Tunnel as the example, propose the Evaluation Index System for Intelligent UIOM Mode and implement the evaluation process using the AHP. The proposed intelligent UIOM Mode provides a scientific solution to the improvement of the subsequent evaluation system and the optimization of operation and maintenance decisions in PPP urban infrastructure projects.

1 INTRODUCTION

Due to the rapid development of China's urbanization process, the demand for urban infrastructure is dramatically increasing, however the government is facing huge financial pressure. Since 2012, Public-Private Partnership (PPP) projects has become popular in China. By the fourth quarter of 2016, a total of 11,260 PPP projects have entered the database, with a total investment of 13.5 trillion yuan, of which 1,351 projects entered the implementation phase, with a total investment of 2.2 trillion yuan. Using PPP in infrastructure construction will become the mainstream (Cui, 2017).

With the development of science and technology and the enhancement of people's awareness of service, many issues have gradually attracted the attention of managers in the operation and maintenance process of urban Infrastructure. For example, how rational is the operation and maintenance of urban Infrastructure, what is the value status of urban Infrastructure assets, how are the facility status and service performance, what are the weak links, how are the effects of urban Infrastructure operation and maintenance mode evaluated, how are multiple projects managed in different regions, what measures do managers need to take to ensure the efficient operation and maintenance of the urban Infrastructure, and so forth. Through investigation of existing infrastructure maintenance modes, it is found that PPP projects continue to have problems after entering the operation period using the traditional infrastructure operation and maintenance mode. Problems can be listed as failure to accurately grasp the status and life cycle of facilities, insight into the value of fixed assets, low operational risk, equipment failure predictive control capabilities, poor synergy, serious waste of resources, and low levels of informatization. The traditional infrastructure maintenance mode cannot well match the operation and maintenance requirements of PPP projects, so it is necessary to adopt the intelligent operation and maintenance mode to fine-tune the existing PPP projects and improve the informatization level.

However, China has not yet formed a complete and mature intelligent operation and maintenance mode. The specificity of the operation and maintenance in the PPP infrastructure project involve many factors, such as risk identification, assessment and sharing, project return model and taxation distribution. Only through in-depth investigation and analysis of the current status of the operation and maintenance mode, clarifying the problems early, identifying the new intelligent operation and maintenance mode that match PPP infrastructure projects, it can better meet urban development needs and provide residents with quality services.

As a matter of fact, the intelligent operation and maintenance mode of the PPP urban infrastructure is quite different from the traditional one. The purpose of the operation and maintenance is not to cre-

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