



# Classifying influential for project information to discover rule sets for project disputes and possible resolutions

Jui-Sheng Chou<sup>a</sup>, Shu-Chien Hsu<sup>b,\*</sup>, Chih-Wei Lin<sup>a</sup>, Yu-Chen Chang<sup>a</sup>

<sup>a</sup> Management Division, Department of Civil and Construction Engineering, National Taiwan University of Science and Technology, Taipei, Taiwan  
<sup>b</sup> Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, Kowloon, Hong Kong

Received 22 July 2016; received in revised form 28 September 2016; accepted 3 October 2016

## Abstract

Public–private partnership (PPP) is a strategy where governments encourage private institutions to financially support public construction projects, by providing proper incentives based on collaboration with private institutions. However, disputes may occur during a contract management. This paper investigates various public–private partnership (PPP) disputes and their critical influential factors for associating fundamental project information and dispute resolutions. In this study, knowledge is extracted from the association rules so that dispute handling patterns can be identified from historical database. Analytical results show that the rule sets achieve 83.92% confidence level. By applying the results in practice, project managers can determine the likely method for dispute resolutions with known project attributes, dispute items, and the phase in which a dispute occurs. This research demonstrates an effective application and valuable reference for early notice of dispute handling methods in public infrastructure projects.

© 2016 Elsevier Ltd, APM and IPMA. All rights reserved.

*Keywords:* Project management; Public–private partnership; Project dispute; Data mining

## 1. Introduction

Public–private partnerships are intended to inject private capital and dynamism into public infrastructure projects, thus reducing the financial burden on the government, accelerating construction schedules and improving the quality of public services, thus enhancing the effectiveness of government operations and promoting economic growth. The promotion of private participation in public works, also known as public–private partnerships (PPP) entails a partnership between private enterprises and government agencies, where the government provides appropriate incentives to attract private funding for the construction and operation of public works projects (Budaus, 2006; Chou et al., 2012).

Therefore, the content of investment contracts emphasizes the composition of private investment groups, along with their

expertise, financial resources and other factors related to the quality of infrastructure construction and operation. PPP projects allow the government to improve the service efficiency and functionality of public works projects while redirecting funding to other investments. PPP helps reducing capital costs, increasing access to expertise, creating needed facilities, reducing operating costs, and improving service quality, but the motivation for private participation will vary with the type of public works project.

PPP can provide access to needed expertise in areas such as engineering, law, finance, operations management and administration, and allows the lifecycle to be divided into three stages: preparation, construction, and operations. In the preparation stage, the Public Construction Commission (PCC) plays a guiding, supervisory, and inspection role in the construction and operation stages. With the assistance of the PCC, the competent authority will spend the majority of its time discussing feasibility assessments or contractor status. Only when the investment contracts are signed does the partnership between the competent authority and the private institutions begin.

\* Corresponding author.

E-mail address: [mark.hsu@polyu.edu.hk](mailto:mark.hsu@polyu.edu.hk) (S.-C. Hsu).

In Taiwan, PPP has been playing a major part in the social and economic development, which creates a positive impact on the expansion of public services and construction. However, the wide range of PPP projects will inevitably give rise to controversy (Budaus, 2006; Chou et al., 2012). Thus, to improve conflict resolution in such cases, Article 22 of the Promotion of Private Participation in Infrastructure Projects Act (hereinafter the “PPP Act”) of Taiwan states that “investment contracts should specify the timing, manner and operating mechanism of the coordination committee handling contract negotiations and disputes” (Anon., 2010). Therefore, when the competent authority and private institutions sign investment contracts in accordance with the PPP Act, they must specify the formation of a joint committee to negotiate the handling of disputes over contractual matters (Budaus, 2006; E. Commission, 2003).

To attain effective control of diverse projects, and to design proactive dispute resolution management strategies and knowledge, such as rule sets before disputes occur, it is essential to providing the governmental PPP Taskforce with information about future countermeasures. Additional preparation is generally beneficial since the effort, time, and cost to multiple parties can be reduced during dispute settlement once a dispute occurs.

Although numerous studies (Chou, 2012b; Chou et al., 2013a; Chou and Lin, 2013; Chou et al., 2013b; Chou and Yang, 2013; Jui-Sheng et al., 2014) demonstrated that an efficient, effective, and fair dispute resolution process is essential for PPP project success, this study focuses on identifying potential handling methods by associating project information with dispute resolutions. The proposed association mining technique can provide project stakeholders with the information needed to implement proactive measures during project preparation.

To achieve this objective, this study applies classification techniques to identify critical project attributes and association algorithms to extract rule sets from data. First, this study acquired historical dispute data for PPP projects which store fundamental project information and their corresponding dispute resolutions. Differing from conventional construction project disputes, PPP project disputes may occur during the building phase, as well as the operating, renting, or transfer phases. Thus, association mining approach with only dispute cases was implemented to identify the rule sets of dispute resolutions with known project attributes, dispute items, and the phase in which a dispute occurs.

The rest of this paper is organized as follows. Section 2 comprehensively reviews PPP development trends, promotion experience and challenges in major countries in addition to applications of data mining for dispute prediction, and compile factors which could potentially impact PPP case characteristics and the occurrence of disputes. Section 3 then explains the research methodology, providing a theoretical basis for classification and association models adopted in subsequent investigations. Section 4 presents the project dispute data descriptions. Section 5 describes the modeling process and interprets the analytical results. Conclusions are finally drawn in Section 5, along with recommendations for future research.

## 2. Literature review

Public works projects provide the infrastructure needed for a country’s overall economic development while also raising residents’ standards of living. Therefore, expediting such projects is a key national goal. Policy formulation and resource allocation must further consider the use of expertise and resources from the private sector, and many countries are now encouraging private enterprises to participate in public works (Budaus, 2006; Chou et al., 2012; E. Commission, 2003). In most of the democratic countries, raising taxes to fund the public infrastructure projects is no easy task. However, with the public’s continuous demand on various types of basic infrastructure, this conflict often puts the national governments in financial difficulties which can lead to unsustainable debt levels and financial crises.

To solve this problem, private investment in public works construction is introduced, which is commonly known as PPP. PPP refers to public agencies acting under their respective authority to engage in all processes entailed in a given public investment project, including negotiating and signing contracts, planning private investment in public works, design, construction, operations, and management. This practice is able to bring in business ideas and capital, while significantly reducing the financial burden of the government, increasing the quality of public services, and accelerating the construction process. Thus, the PPP model is common and widely used all over the world (Hwang et al., 2013; Yang et al., 2016).

According to the Article 8 of the PPP Act, private participation in public infrastructure projects includes government-planned cases and privately-developed cases. In government-planned cases, private investment and participation are solicited for public works after the evaluation by the competent authority. While for privately-developed cases, private operators respond to a request for proposal on the part of the competent authority by submitting plans for the construction or operations of public works, along with financial plans and other relevant documents (Anon., 2001).

To expand the scope of private participation in public works, the PPP Act provides 14 incentive items in 20 categories including industrial and commercial facilities for transportation, culture, education, social welfare, and tourism and recreation. These incentives include relaxed land use, financing, and legal restrictions, providing financing concessions, tax breaks and others, and regulates the rights and obligations of the government and private entities, stipulating the authority and supervision of the validation process.

To date, PPP and public work construction is being actively pursued to help push social and economic development in Taiwan, and is providing positive results for public services and infrastructure. However, disputes inevitably arise from restrictions imposed by traditional administrative procedures and modes of operation, along with different levels of knowledge and understanding among participants. PPP systems are novel and complex, and some may be under the impression that such cases are entirely funded by private enterprise with no investment required from the government. At the same time,

Download English Version:

<https://daneshyari.com/en/article/4922271>

Download Persian Version:

<https://daneshyari.com/article/4922271>

[Daneshyari.com](https://daneshyari.com)