

## **The Public-private Partnership in M-Government: The Case Study of M-Taipei Initiative**

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### **Abstract**

The “M-Taiwan” Project outlined by the Taiwanese government aims at establishing a mobile “Ubiquitous Network” to effectively respond citizens’ needs in the information age by providing comprehensive integrated governmental services. The Taipei city, among others, has initiated the “M-Taipei” project and employed a “build and operate” (BO) model tender project that tend to provide public access to outdoor wireless broadband in scale. The “M-Taipei” project has projected the 90% of the 134-square-kilometer city space will be covered and the city governmental services to 5 million users residing in the metropolitan Taipei area will be provided in 2006.

During the implementation of “M-Taipei” project, more complicated problems have generated in the complex public-private partnership (PPP). In general, the BO model without transfer has been recognized for better fits of the IT technical characteristics. It ensures the funding, construction, renovation, management or maintenance of the Wi-Fi infrastructure used to deliver public services and fulfill public-policy goals. Nevertheless, lack of killer application and the innovative public services jeopardize the operation of a successful business model. Without convenient devices and lack of immediacy in content services, the number of actually users in the network is limited. This study explores the critical factors that determines the success of PPP and intends to generate practical strategies for a successful business model. In addition, the public-private partnership in terms of political, economic, and technical aspects of the “M-Taipei” network will be analyzed in order to evaluate the optimum BO model in building public infrastructure. The study of “M-Taipei” project provides the first hand pilot experience to other municipalities that adopted BO approach in technological development to achieve the goal of m-Government.

***Keywords: m-Government, Ubiquitous Network, M-Taipei, BO,  
public-private partnership (PPP)***

## 1. Introduction

In recent years, there has been a growing trend for government to allow private participation in some major public investments, especially for infrastructure projects. Since the wireless broadband is widely used to indicate the next-generation of people's daily life and the applications are available in many homes and businesses, the Taipei city initiated a "build and operate" (BO) model to tender "M-Taipai" project with Q-ware Corp. that provides public access to outdoor wireless broadband in August, 2004. In fact, the project becomes the first Wi-Fi network city around the world, and the plan is the largest in scale among many ambitious municipalities in ubiquitous network, such as New York, San Francisco, Philadelphia, Jerusalem, and Amsterdam.

To achieve the goal of m-Government and transform the Wi-Fi technology from the hot spot application to the hot zone coverage, it is unlike the traditional way in BOT approach, the project was proceed with BO approach due to the technological characteristics. As the Mayor of Taipei City, Dr. Ma Ying-jeou said, the use of BO approach makes the municipality in a way that they do not have to pay a penny but can get the required infrastructure. Besides the construction of infrastructure, the Chairperson of the Research, Development, and Evaluation Commission (RDEC), Dr. Chou Yun-Tsai, who is taking charge of M-Taipai Initiative considered that the idea can improve the quality of life for residents while making it easier to do business in Taipei, so the entry of private sector is also encouraged to deliver quality and cost-effective, value-added services throughout the long-term project lifecycle to get potential profit. (The Q-ware Corp. expresses break even within 5 years.) In short, this plan is a very ambitious venture for Taipei city to provide more convenience lifestyle of citizen, and hope it can also benefit two join parties in a win-win scenario.

In the past few decades, deregulation policies were introduced to import market mechanism in reforming the governance structure in public service. In recent years, Taiwan government is also engaged in efforts to drive privatization policies that could cut costs and make things more customers friendly. Different from BOT approach has been adopted in the development of a few major infrastructures, this case adopted other form-BO of PPP but it is not similar to the traditional way. The main purpose of privatization is establishing "comparative advantage" by the concept of "cost-effectiveness" (Hall and Soskice, 2001), so the policy makers and investors should require information about the market. In this case, both parties have no sufficient information about the "market" in the future, how can the government make choice on this approach? The authorities of city government have strong ambitious and predominate in the starting stages of the project, can the mechanism run successfully under a strong willed hierarchy? The long-term relationship involved in this case is a pilot experience to other municipalities in their adoption of the Wi-Fi technology.

The research method employed is a case study. This research adopts a qualitative approach to obtain data which involves literature review, documentation analysis and interview with relevant authorities. Accordingly, this paper discusses and analyzes the critical factors that determine the success of public-private partnership (PPP) of the M-Taipai project in order to evaluate the optimum BO model in building public infrastructure. In addition, this study can provide some practical strategies for a successful business model through the whole process of the project.

## 2. Literature

### 2.1 M-Taipei Project Scheme and Theoretical Basis

For modern governments, the major objective in public affair is achieving political goals with low costs and risks. In the past few decades, some theories or practical approaches were mentioned after the public sector reform to solve the problems in sharing costs or risks with private sectors under the base of reducing X-inefficiency of governments (Weimer and Vining, 1992: 30-2). Generally, the item “managerialism” (Osborne and Gaebler, 1993; Hughes,1998) indicates the changing trends in reinventing government, market restructuring and private involvement in constructing infrastructure, and some practical approaches were begun after the “new public management” view, such as decentralization, deregulation, privatization(Table 1).

Table 1. The transformation of public administration

<b>Managerialism in Public Administration</b>	<b>Traditional Public Management</b>	<b>New Public Management</b>
<b>Mechanism</b>	<b>Hierarchy</b> ←————→ <b>Market</b>	
<b>Spirit / Goal</b>	Scientific management Impersonalization	Businesslike governance Banishing bureaucracy Reinventing government
<b>Theoretical Basis</b>	Cost-benefit analysis Strategy behavior theory	Public choice theory Transaction-cost theory Principal-agent theory
<b>Framework</b>	Big government	Deregulation / Privatization
<b>Approaches</b>	Government control	Contracting out / Outsourcing BOT etc.

(Source : summarized by this research)

In order to push public affairs with low transaction cost, the organizations with particular technology or managerial capacity in private sectors are adopted in government’s projects. For the adoption of a private sector management model traditionally, which most used for privatization are build-operate-transfer(BOT), build-transfer(BT), build-own-operate(BOO), while the BOO approach is more dominant in infrastructure. Although many governments may wish to build much of their infrastructures through private financing, not all projects are suitable for privatization. The basic principle for promoting the construction of wireless internet access for residents and providing useful services to citizens is the cooperation between government’s leadership and private sectors’ initiatives. It is estimated that the “M-Taipei” plan adopts the Wi-Fi technologies and identifies the major issues in constructing and operating to reach the policy goal of “*Wireless Taipei, the City of Infinite*”.

Although the competition mechanism have introduced successfully in Taiwan, the public sector and private sector take it serious to build comparative advantage in the implementation

of this plan. The government cannot be fully free from risk, and some new risks derived from the context of this new scheme. The government also has to assume some of them in order to carry out projects successfully. So the city government provides public facilities (lamp posts, traffic signs, public buildings) to the winning bidder (the tender was won by Q-ware Corp. of Uni-President) under the principle of “No government expenditure, no transfer of city property” to build the infrastructure for Taipei’s wireless network along with a 9 year franchise. However, the differences between privatization and public private partnerships are difficult to detect, which depending on the level of government participation in it. In this project, the private sector entity is responsible for delivering the defined services, while the public agency is involved in regulation and procurement of such services. According to the definition and common characteristics of PPP (Lee, 2005), this study follows the definition of Research, Development, and Evaluation Commission of Taipei City Government, address the scheme as a BO approach. This approach was first initialed as principal-agent model with concession.

## 2.2 BO Option in Public Private Partnerships (PPP)

Under the public-private partnership approach, a cooperation relationship between government and private sector is achieved to provide for public requirements. A PPP can be established in one of the various forms, including build-operate-transfer, build-own-operate, buy-build-operate, design-build-finance-operate (or private finance initiative, PFI) and design-build-operate, etc.(Table 2).

Table 2. Basic options in PPP

Model	Option	Capital Investment	Operation and Maintenance	Asset Ownership
<i>Privatization</i>	Divestiture and BOO	Private	Private	Private or Public and Private
<i>Concession</i>	BOOT/BOT/DBFO	Private	Private	Private or Public and Private
	Concession	Private	Private	Public
	Lease	Private	Private	Public
<i>Operation and Maintenance</i>	Management Contract	Public	Private	Public
	Service Contract	Public	Public and Private	Public

(Source: Jones, 2001)

The “M-Taipei Project” was formulated with a private partner to build a public wireless area network. Due to the risks of past BOT projects can be identified in the five categories: political risks, construction completion risks, operating risks, finance risks, and legal risks (Baker, 1986), the government pays more attention in the fast changing technology cycle and legal concerns. Private investors take on the long-term risks of financing, developing, and managing an infrastructural facility based on potential commercial returns. In order to minimize risks to both parties in the project, BO option was adopted under a dynamic **concession contract**. Academically speaking, "*Build-Operate*" (**BO**) method is very similar to the "BOT" method except that does not involve the transfer of the facility to the government at

the end of concession period. BO methods are normally accompanied by a grant of a concession. During the concession period, the private sector is allowed to get revenue directly from the users of the facility or indirectly through an intermediary, usually a government institution. Although the Taipei government directs Q-ware Corp. in construction and operation, it is not a hybrid organization or quango (Koppell, 2003: 1-2); instead, it is more like an agency-based contracting out approach without asset ownership. Traditionally, the public sector should have asset ownership; hence there is no conflict between two parties in the concession. Moreover, BO without transfer means that the private sector has the asset ownership, but they can not deploy their assets with their thought or will. That brings tricky interactions in the process.

### 3. The process of M-Taipei project

#### 3.1 Technological Characteristics of Wi-Fi and Political Goals

Among the developed countries, Japan is perhaps the most successful country in developing wireless services. More than 70% of its internet users can access the web wirelessly. Moreover, the technology to offer the wireless services is the upgrade from mobile (PHS) system. Since the third-generation (3G) mobile communication technologies and markets are not expected well performance in Taiwan, some medium-range wireless communication technology such as wireless fidelity (i.e., Wi-Fi) is then used to provide wireless broadband services as a substitute.

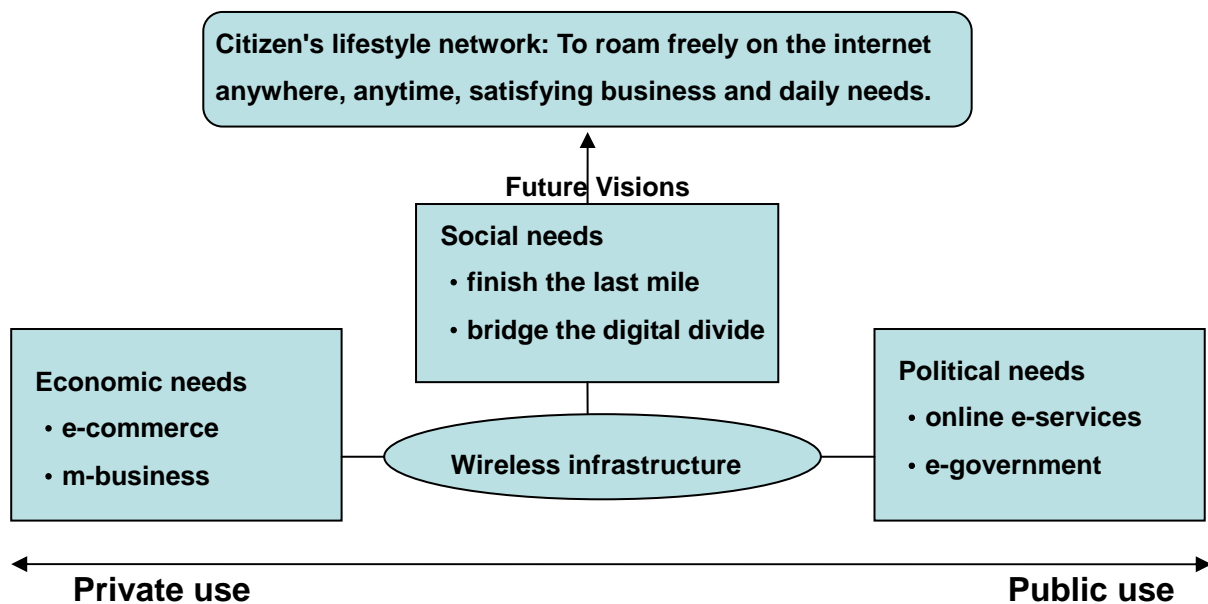


Figure 1. The goals of M-Taipei project (Source: summarized by this research)

There are some merits in tendering this project by adopting Wi-Fi technology. For instance, Taiwan is the world's largest wireless equipment manufacturer, and there are still increasing numbers of firms participating in the development of wireless devices through rapid advancements in wireless network application techniques. In addition, there are some important firms of the industry, such as E-TEN, Microsoft, FarEastTone, BenQ, SONY and HP can deliver related applications to citizens. That means there will be minimum

asymmetric information situations, which reduce the opportunity costs and risks in the technology adoption process.

Since Wi-Fi has almost become synonymous with WLAN (802.11 system standard in the 2.4GHz low powered and unlicensed frequency band), the project's wireless AP hardware operates just like the common wireless AP used at home. Since this hardware is installed outdoors, it just needs extra protection against water and sunlight. Because all necessary software and hardware facilities are relatively well developed, the cost of building an infrastructure for WLAN has also been greatly reduced. Besides, it is easy to find public agency from well-prepared firms.

The Taipei City Government's ambition and vision is becoming an international seamless metropolitan and one of the pioneering wireless cities in the world. There are also preparedness of Taipei city (Table 3). To achieve the vision of wireless communications, and roam freely on the internet anywhere, anytime, satisfying their business and daily needs, the authorities cooperate with Q-ware Corp. to provide economic, stable and multifaceted wireless network service. The government wants to fulfill the needs of people on the basis of social improvement, and make the life of our citizens even more convenient in business, academic, public service, even the establishment of new lifestyle (Fig.1).

Table 3. The Preparedness of Taipei City

<b>Aspects</b>	<b>Conditions</b>
<b>Optimum size and density</b>	average 9,663 persons per square kilometer (a total of 2.62 million in 272 km <sup>2</sup> )
<b>High cellphone ownership rate</b>	Taiwan reached a 95% penetration rate of mobile telecom, second only to Hong Kong in the whole of Asia.
<b>Mature social conditions</b>	1) Taiwan is the primary manufacturer and exporter of Wi-Fi products (The market share is about 90% of the world & output value is more than US\$ 17 billion). 2) Taiwan is one of the three major IT production bases. 3) As the municipality, Taipei is well-reputed in terms of fast IT development. 4) PC usage penetration rate: 88%.
<b>Facts of Broadband Communications (Sep. 2005 Survey)</b>	1) Households / Connected to broadband: 79.3% Internet penetration rate: 83.6% 2) Individual / Wireless usage: 31.8% Wireless campus coverage rate: 100% in 280 schools
<b>Easy Card</b>	1) Multi-functional and value-added transport ID 2) Seven million EasyCards have been issued to date 3) Used in to MRT subway, bus and taxi, public parking fees, and self- service libraries 4) Inscribed in the consumer products such as mobile handsets, MP3 players, and wristwatches

(Source: The Taipei City Government)

### 3.2 Phases of the Project

The Taipei Government began this plan since 2003. The concessionaire Q-ware said that it is investing about US \$100 million (the highest ever in the world) to build the network. Since the involvement of the two parties concerned with a BO project is much different than that in a traditional project, the major phases can be described in Table 4.

Under the position at the center of the world's high-tech supply chain, Mayor Ma wants the Wi-Fi effort a centerpiece of his "Cybercity" campaign to give Taipei an edge over other Asian cities. Although the wireless network cannot exist without end-user device and content, this study focus on the main activities (or events) happened in the process of infrastructure deployment in order to analyze some critical factors to PPP and discuss complicated problems between the two parties.

Table 4. The major phases and events in M-Taipei project

Phases	Selection process	Project implementation	Construction	Operation
<b>Time Period</b>	2004.02 →	2004.08 →	2004.09 →	2006.01 →
<b>Procedure</b>	Selection of consultative team.	The government approved Q-ware Corp., which beat out another local company in bidding.	1) Stage 1 is the implementation for Taipei MRT. 2) Stage 2 is the implementation for Taipei's main axis. 3) Stage 3 is the implementation for high population density areas in Taipei.	Announcing formal commencement of business operations held on December 20, 2005.
<b>Important Events</b>	HP was the selected consultant of the project.	The plan's contract was signed on September 7 2004.	The city government provides public facilities (lamp posts, traffic signs, public buildings) with one stop window. 1) To negotiate with the state-owned power company to supply 24-hour power. 2) Use trimming or chopping down trees to make signals clearer.	Marketing activities (2006.05) for attracting more subscribers.
<b>Future Development</b>	x	x	The wireless network's construction to be completed in the first half of 2006.	More contents and applications on it. <sup>1</sup>

(Source: Authorities of TCG and Manager of Q-ware Corp., summarized by this research)

<sup>1</sup> There are four major applications in trial: In conjunction with the Taipei City Dynamic Bus Information System, In conjunction with the Schoolchildren RFID Personal Safety System, In conjunction with the telemedicine system, and In conjunction with the Taipei City Culture Express Monthly.

#### 4. Discussion

The term NPM was coined because some generic label seemed to be needed for a general, though certainly not universal, shift in public management styles (Hood, 1990). The NPM reforms occur prior to the technological changes; so it is risky to the public sector to tender a BO project in a long period because of the uncertainty inherent in technology, finance and the complex interaction of the project scheme. This study discusses the PPP through the interaction (key activities) in the BO scheme (Table 5).

Table 5. The interaction between public and private sectors in BO scheme

Phases	Selection process	Project implementation	Construction	Operation
Public sector	Public initiative	Empower	Provide public facilities	Marketing guidance
Key activity	↓ <i>negotiation</i> ↑	↓ <i>concessionaire</i> ↑	↓ <i>co-ordination</i> ↑	↓ <i>start getting revenues</i> ↑
Private sector	Be an appropriate agency	Active participation	Build infrastructure	Management / Maintenance
Leading Role	Public	Public	Public and Private	Public and Private

(Source: summarized by this research)

1) In the phase of selection process, it is a very long and there are many occasions for decision making.

*...there were only 3-4 months for us to do evaluation in marketing that is not enough...  
(from interview of the manager in Q-ware)*

Traditionally, the process of pre-contract, which involves preliminary study, detailed study, bidding process, and negotiation needs more time.

2) For concessionaires in the project implementation phase, the winning bidder must comply with the contract and guarantee that its facilities meet requirements in categories such as service coverage, connection quality and level of maintenance.

*...the consultant of this project (HP) evaluated that the concessionaire will have revenue since 5th to 9th year...(from interview of the authority in TCG.)*

*...for example, we can not deploy AP with our business strategy, we have to match up policy decisions immediately, although it may be inefficiency...(from interview of the manager in Q-ware)*

It seems much more risky and expenditure than traditional project schemes from the viewpoint of private participant, because the government tend to transfer more risk (Palmer, 1996) to private sector. Thus, the decision before bidding is more difficult and important, because the bidding process in this BO project is much more expensive and time-consuming.

3) Problems are very complicated in the BO project because of the uncertainty inherent in the

complexity of different bureaucracy.

*...the city government provides public facilities (lamp posts, traffic signs, public buildings), and negotiate with the state-owned power company to supply 24-hour power.... even coordinate the Ministry of Transportation and Communication's Directorate General of Telecommunications has requested the Electronics Testing Center of Taiwan (ETC) to certify the wireless AP hardware for low power transmission...(from the authority in TCG)*

*...we solved many problems in the installation of APs, such as the special permission of construction, the problem of power, noise interference...the government integrated public services and resources to one-stop window, and it is convenient for us to collaborate with public bureaucracies...(from the manager in Q-ware)*

Bureaucracy in the power relation remains in place, but it does not take place in so many levels. The collaborative action of public sector frees up hierarchical authority to concentrate on higher level management tasks. In addition, keeping abreast of changes and ensuring the availability of the technological and human resources is necessary to achieve organizational goals (Fountain, 1999). The two parties perform a tacit understanding interaction for the common goal in the construction phase.

4) There are different thinking between public and private sectors. Since the infrastructure is almost completed, there are problems in attracting customers.

*...we held some programs to announce the commencement of business operations...(from the authority in TCG)*

*...we are seeking for killer applications based on the Wi-Fi infrastructure, such as VoIP, other value-add services, etc.... (from the manager in Q-ware)*

Risk and uncertainty are inherent in all construction work no matter what the size of the project (Quayle, 1999), even the deployment of AP is tuned by the dynamic contract. When the construction was finished, researchers suggest developing a practical road map to identify problems and implementing timely corrective actions (Czuchry and Yasin, 2003).

## 5. Conclusion

In the last year, Wi-Fi plans have been announced for some of world's biggest cities. For instance, Google has proposed a similar plan that would be available to residents at no cost in San Francis Corp. There are similar plans pursued in Philadelphia, Minneapolis and Chicago, etc.

Under the dynamic social system, the knowledge in solving problems of public administration is distributed over many actors. Due to a premised uncertainty, "govern itself" is a genetic evolution process of a society (Kooiman, 1993). In this case, Taipei opted to let the private sector build and run the wireless network so that the government does not have to pay a penny. The public management reforms that have occurred under the appellation of new public management can be considered, above all other characterizations, as changes in theory, from a public interest model of administration to a management model based on economics and private management. In the process, we observed "public service privatization" and "public management socialization", and then conclude it in T (technology), O (organizational) and P (political) dimensions (Fig.2).

Moreover, the BO approach in this project is a dynamic but not a linear process; it can be influenced by multi stakeholders. To achieve the political goal-“*Wireless Taipei, Taipei Unlimited*” with inherent uncertainty condition, before government handle the legitimacy and resource to serve citizen, government is responsible to understand the demands of citizens.

Since privatization is originally to prevent government monopoly (government failure) in any political-economic activities and different public affairs; theoretically, it needs a transformation of hierarchical relations, and a deep cultural level, modernization of the nature of authority structures and systems(Fountain, 1999:139). The Taipei city authorities can handle popular technology to prevent high cost and high risk, then dealing with public demand needs by integrating multiple resources from public and private sectors. It puts transaction-cost theory (Williamson, 1981) and principle-agency theory in use market mechanism. But the uncertainty is increasing and the leading power is decreasing of public sector when the project goes to meet real customers in the market. When it is completed coverage more than 90% of Taipei, it seems a reform of NPM from government to governance (Adler and Kwon, 2002: 20-21). Hence, it helps to provide a new vision and deliberative arguments in public administration.

In fact, there are still some problem remains. For private sector, when will show the killer applications to citizens? Where Q-ware will be able to recover its investment? How to persuade the user that service can be stable to change their usual practices? For public sector, how to take implementation tool properly to the project? What performance level has to be accomplished? For what goal is the most citizens need? Practically, the public can coordinate several different departments in the dynamics of bureaucratic control (Pollitt and Talbot, 2004: 2-3), and it is not an unbundled government in present stage. Now that the concessionaire Q-ware has a vision and corresponding strategies to develop new applications on the wireless network, the authorities of city government can try to suspend the guidance of the marketing that may be an approximate way to achieve seamless city.

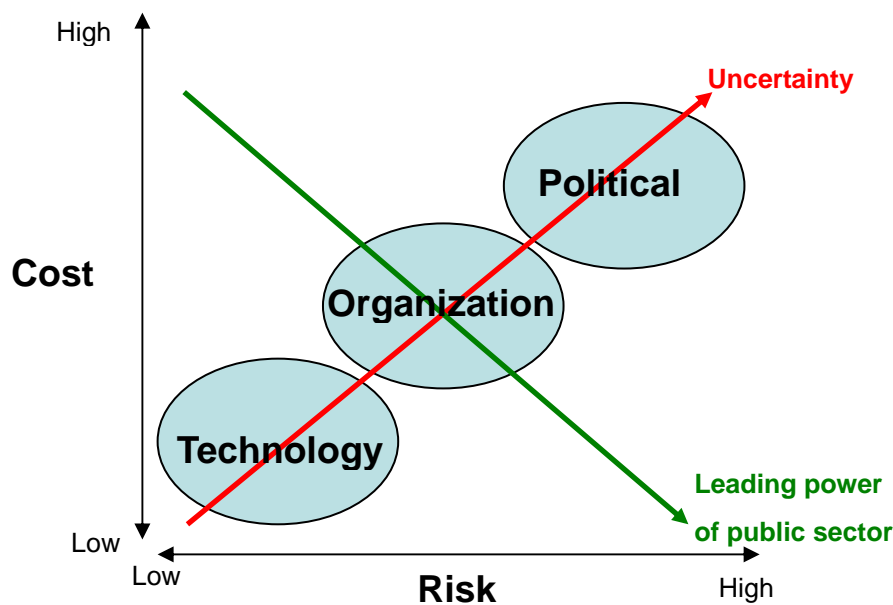


Figure 2. The “TOP” dimensions in this project (source: summarized by this research)

This study provides a snapshot of BO approach in tendering M-Taipei project, although the technological characteristics are the same, Wi-Fi plans have been announced for different cities around the world. It provides the first hand pilot experience to other municipalities that adopted BO approach in technological development to achieve the goal of m-Government. Although there are differences in environment, organization, culture to different cities, we hope it is helpful to other municipalities in their adoption of the Wi-Fi technology. In addition, the further studies can proceed to the agendas in PPP, such as the concept of institutional reform, risk management, trust relationship, social capital, etc.

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