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# **Procurement Innovation for Public Construction Projects: A Study of Agent-Construction System and Public-Private Partnership in China**

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## **Abstract**

Governments worldwide are searching for innovative procurement systems, such as Public-Private-Partnership (PPP), Private Finance Initiatives (PFI), and their variations, which can help materialize construction projects effectively, and thus truly deliver values to the society. With the success of these procurement systems in some projects, they have been introduced as innovations to other jurisdictions. However, current doctrine of procurement systems abounds with “one-way lecturing” without considering the jurisdictions’ particular Political, Economic, Social,

Technological, Environmental, and Legal (PESTEL) contexts. This research attempts to shed light on procurement innovation by skeptically examining two state-of-the-art procurement systems, an agent-construction system (ACS or in Chinese *Dai Jian Zhi*) and PPP, in China, with special consideration given to its particular and peculiar PESTEL background. It does so by using content analyses, semi-structured interviews, and a “PESTEL-Procurement Innovation” framework. It is found that PPP and its real instances have not received their popularity as expected, while the ACS, which is little known to the international construction management fraternity, is widespread in China. The study of ACS and PPP further reveals that congruence between a procurement system and its external PESTEL conditions is essential for procurement innovation. The “PESTEL-Procurement Innovation” framework could be a useful tool for devising procurement innovation although its many questions are yet to be answered by further research.

**Keyword:** Procurement innovation, Agent-Construction System, Public-Private-Partnership, Construction procurement, China

### **Introduction**

In the course of procuring public construction projects, no matter whether it is in developing or developed worlds, there have been widespread problems discovered such as cost overrun, late delivery, overstaffed organizations, and low efficiency (Latham, 1994; Egan, 1998; Egan, 2002; Bresnen and Marshall, 2000; Dubois and Gadde, 2002). To address these problems, governments worldwide are searching for innovative procurement approaches that can help procure projects in a more efficient way and thus truly deliver values to the society. The often-discussed approaches include, *inter alia*, Private-Public-Partnership (PPP), Private Finance Initiatives (PFI), and their variations. It is generally observed that there are two trends in these innovative procurement approaches. Firstly, public procurement is shifting from traditional state-led approaches to partnering between public and private sectors (Godfrey, 1996; Egan, 1998; Savas, 2000; Winch, 2000; Egan, 2002; Chan *et al.*, 2003; Cheung *et al.*, 2003). Secondly, integrated approaches are adopted to reduce the fragmentation and discontinuity by which the construction sector has long been plagued (Anderson *et al.*, 2000; Cheung *et al.*, 2010; Dubois and Gadde, 2002; Evbuomwan and Anumba, 1998; Leiringer and Green, 2006; Baiden *et al.*, 2006). Together with the trends is the systems view to construction procurement which emphasizes a procurement system including elements such as contract strategy, culture (e.g. trust and institutions), and finance, should deserve more attention of the construction and project management fraternity (Rowlinson, 1999).

With the success of these procurement systems in some projects, they have been introduced to other jurisdictions as innovations for procuring new projects (e.g. Wang and Tiong, 2009; Li *et al.* 2005). Nonetheless, prevailing doctrine of procurement systems seems being disconnected with the recipient’s Political, Economic, Social, Technological, Environmental, and Legal (PESTEL) backgrounds. “One size does not fit all”; a procurement system growing from a certain PESTEL background may not be of full applicability to others with different PESTEL settings. Adopting them slavishly may cause loss or even failure of a project. Likewise, Kumaraswamy (1994) discussed the appropriateness of developed countries’ procurement systems when applied to less-developed countries and argues that a sustainable and synergistic procurement strategy must be developed in such situations. It thus behooves the construction and project management fraternity to further look into a procurement system, and to shed lights on

how to devise innovative systems that can truly fit with a given PESTEL setting.

Notably, China is keen to introduce innovative procurement systems that can help tackle the ingrained problems in its construction sector, such as cost overrun, late delivery and poor quality. The challenge is even more acute in the face of the exponentially increased complexity associated with the huge demand of facilities driven by its unprecedented urbanization plan. According to National Bureau of Statistics (NBS) of China, the total fixed-asset investment reached 22,486 billion Yuan in 2009, making the government as the biggest client (NBS, 2010). The strategic imperative to materialize this huge demand by adopting effective procurement methods is apparent. After decades' continuous evolvement, an Agent-Construction System (ACS or in Chinese *Dai Jian Zhi*) is now widely adopted in the procurement of public projects. For example, 11 out of 31 new construction projects for the Beijing 2008 Olympic Games were carried out by using ACS (Project Management Union, 2010). By contrast, PPP and its real instances such as BOT and PFI are still stagnant in China irrespective of the overwhelming discussions that have been directed towards them. Why the two innovative systems have different destinies? It is intriguing to examine the two procurement systems in China, with the hope that procurement innovation can be better understood by putting them into China's particular PESTEL context.

The aim of this research is to shed light on procurement innovation by skeptically examining ACS and PPP within China's PESTEL background. The main proposition is that congruence between a procurement system and its external PESTEL conditions is essential for procurement innovation. The remainder of this paper is structured into three sections. Firstly, research design and methods are described – this is comprised of intensive content analyses of existing literature and interviews with practitioners by following an analytic framework. Secondly, discussions are conducted to elucidate the two key concepts: ACS and PPP, by connecting them to China's PESTEL context. Research findings are presented in this section. Finally, key conclusions are drawn together. The research provides useful insights into procurement innovation, particularly when governments worldwide are searching for innovative procurement systems to help deliver public projects and services.

### **Theoretical framework and research methods**

The basic premise in this paper is that a procurement system should be skeptically examined in terms of its suitability to a certain PESTEL setting. This is not entirely new; it can be retrospectively linked to an earlier line of thought in the research works which investigated procurement systems in a social-technical framework (e.g. McDermott and Jaggard, 1991; McDermott, 1996; Newcombe, 1994). This is also in accord with “systems thinking” which came into vogue across a wide range of areas including procurement in construction. In line with this thought, construction procurement was deemed to be an open system that dynamically interacts with its external environment (Rowlinson, 1999). The PESTEL, standing for Political, Economic, Social, Technological, Environmental, and Legal, is a framework of macro-environmental factors that are normally used as an environmental scanning component in strategic management. In comparison with the social-technical framework, the construct of PESTEL adopted here, provides a wider framework through which the different macro-environmental factors and their impacts on a procurement system can be thoroughly examined.

Secondly, another construct, the innovativeness of a procurement system can be analyzed by following a framework contributed by Hughes *et al.* (2006). They suggest a conceptual way of distinguishing the various procurement methods from the following six aspects: (1) ownership, initiation and funding, e.g. owner-financed, public sector-financed, developer financed, PFI; (2) selection method, e.g. negotiation, partnering, frameworks, selective competition, open competition; (3) price basis, e.g. work and materials as defined by bills of quantity, whole building, a fully-maintained facility, performance; (4) responsibility for design, e.g. architect, engineer, contractor, in-house design teams; (5) responsibility for management, e.g. client, lead designer, principal contractor, JV; (6) amount of sub-contracting, e.g. 0-100%. In addition to these aspects, (7) risk allocation and reward is critical for the success of a procurement system, and thus it was also adopted for analyses. Innovation could take place in one or more of the aspects. By integrating the PESTEL and the aspects of innovativeness of a procurement system, a new analytic framework, named “PESTEL-Procurement Innovation” can be derived, as shown in Fig. 1.

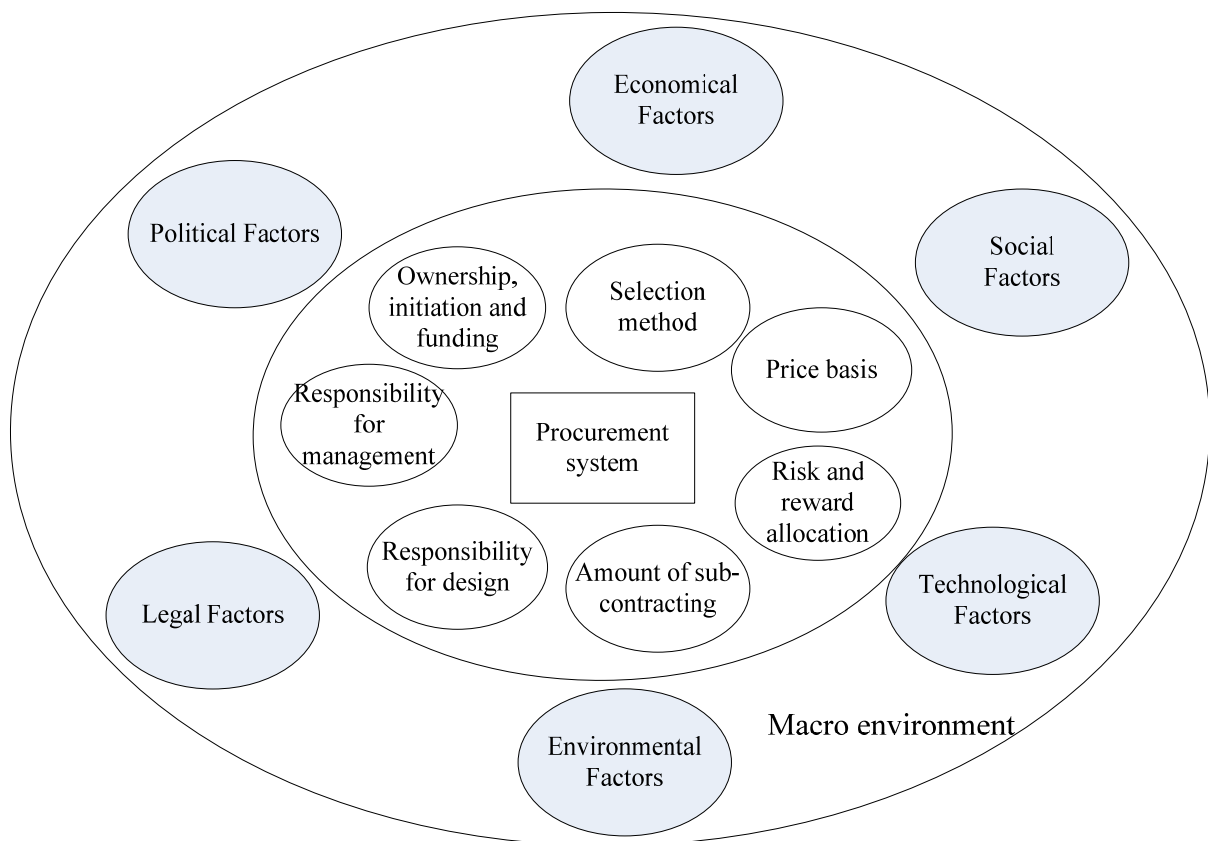


Fig. 1 The “PESTEL – Procurement Innovation” framework for understanding procurement innovation in construction

Bearing in mind the analytic framework, the authors investigated three streams of literature: Chinese PESTEL background for procurement, ACS, and PPP in China. The past three decades have witnessed a gradual yet fundamental evolvement of the PESTEL background and a plethora of literature can be identified. For PPP, there is also plenty of literature in books, journal papers,

and reports (e.g. Akintoye *et al.*, 2003a; Kumaraswamy and Morris, 2002; Shen *et al.*, 2002), which provide a good basis for understanding it although not all works have paid due attentions to the PESTEL background. In total, 149 papers, articles, and books hit the target in search for the literature relating to PPP and 39 are particularly relevant to China. For ACS, there are three prevailing books (Zhang, 2008, Yin and Yan, 2006, Hou, 2006). The understanding of ACS was triangulated by a body of 64 articles published on different journals but organized under a Project Manager Union (2010) website. Archived papers, presentations and in particular keynote speeches by governmental officers in the First National Summit on “Agent-Construction System: theories and practices” provide very useful literature for this study. The search of the literature was further enhanced by using a China National Knowledge Infrastructure (CNKI) database for research papers. At the end, the body of literature on ACS comprised of 102 articles.

A literature survey using content analysis was conducted to understand the three sets of literature. The method of content analysis, often included under the general rubric of “qualitative analysis,” is a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding (Stemler 2001). It enables the researcher to include large amounts of textual information and systematically identify its properties. In analyzing the literature on Chinese macro-environment for construction procurement, the PESTEL itself can serve as a coding scheme (Miles and Huberman, 1994), but time dimension was added. The analyses of this part of literature can be illustrated in Fig. 2. Key milestones in this evolvement were identified as the footnote on the time axis to understand the major changes which can be categorized into the PESTEL taxonomy. Human coders (the authors) were used in this content analysis. Over the past decade, the authors have closely monitored this evolvement in their research and teaching. Their prior knowledge certainly facilitated this analysis. Content analyses were also conducted to understand ACS in China. In view of the many variations of ACS, the first challenge is to understand it, and generate a generic model if that is possible. Next, analyses were centered on the evaluation of its innovativeness by following the inner part of the analytic framework as shown in Fig. 1. The third step is to relate the innovativeness, if any, to the external PESTEL environment. Given that ACS was not created over night, the analyses have been connected to the Fig. 2 which has a time dimension. Similarly, the content analysis approach was applied to the literature of PPP. The ACS literature is in Chinese while other literature, including procurement systems and PPP, is in English. This presents a possibility that information will be lost in the translation but it also provides a chance for cross referencing the information by perusing it in two languages. To reduce the potential bias underlying the content analyses, the coding process was conducted by two of the authors. Agreement of the coded contents has to be made through a lot of interactions between the two coders. This literature survey took 5 weeks’ intensive work.

<b>Political</b>	Political system reform							Death of DengXiaoping,	Reform of State Council Organs Plan	
<b>Economic</b>	Open Door Policy	Competitive bidding and tendering	Speeding up Economy system reform	Socialist market economy	Tax system reform, finance system reform,					
<b>Social</b>	Land Contract in Rural Areas									
<b>Technological</b>						Speeding up R&D and technology advancement				
<b>Environmental</b>							Environment protection			
<b>Legal</b>								Construction Law		Property law, Law on Enterprise Income Tax
<b>Year/Event</b>	<b>1979</b>	<b>1984</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>2007</b>

Fig. 2 Milestones of PESTEL evolvement for public construction procurement in China

Through the literature survey, the three subject areas, namely, PESTEL environment for construction procurement, ACS, and PPP are elucidated respectively. However, the latent meaning and implications, in particular the connection between the procurement systems and their macro-environment, are not apparent. The next stage of this research thus adopted interview as the main method for interpreting ACS and PPP in China. Interviews allow for an in-depth analysis of the two procurement systems. Fifteen interviews have been conducted over a relatively long period from December of 2009 to July of 2011. The basic information of the interviewees can be seen from Table 1. They can be roughly categorized into three groups, which are main parties involving in a procurement system: (a) government officers from the procurement policy side, (b) practitioners acting as clients, financiers, or contractors of construction projects, and (c) scholars in the field of construction procurement. Each interview started with a brief introduction of this research project. Interviewees were then encouraged to discuss the two procurement systems with three basic questions: (i) pros; (ii) cons; and (iii) why it was adopted? The last question enables us to link the procurement systems with the PESTEL backdrop against which they have been initiated. Altogether, the questions allow for an evaluation of the congruence between the two constructs. The time for interviews lasted from 40 to 60 minutes. All interviews were recorded and transcribed for future analyses. Content analysis was applied again to triangulate the understanding from the previous literature survey with the data from the interviews. The two parts of data will be indicated differently, e.g. to use a referencing system for the former, while using italic fonts for the latter. However, the two sets of data were triangulated and delineated together to ensure an uninterrupted reading journey in understanding the PESTEL, Procurement Innovation, and their nexus.

Table 1 Basic information of the interviewees

Code	Description	Language	Code	Description	Language	Code	Description	Language
1	CEO of an English international company	English	6	Government investment officer in a Works Bureau	Mandarin	11	Professor in a department of construction and real estate, Nanjing, China	Mandarin
2	Vice President for International Business of a SOE in Hong Kong	Cantonese	7	Government officer from a provincial Development and Reform Commission	Mandarin	12	Asso. Professor in a department of construction management, Tianjin, China	Mandarin



3	Director for International Business of a SOE based in Beijing	Mandarin	8	Government officer from a provincial Development and Reform Commission	Mandarin	13	Professor in a department of construction and real estate, Beijing	Mandarin
4	General manager of a collective construction enterprise listed in Hong Kong	Mandarin	9	Officer from a government project investment company	Mandarin	14	Associate professor in a department of engineering management, Chongqing	Mandarin
5	General manager of a collective construction enterprise based in Guangdong	Mandarin	10	Government officer from the State Development and Reform Commission	Mandarin	15	Professor in a department of construction and real estate, Hong Kong	Mandarin

## Analyses, discussions, and findings

### *General PESTEL Background for project procurement in China*

China is known as a socialist country adopting a Marxism-Leninism ideology, based on which a centrally planned economy system has been developed. Since 1979 when the country adopted the “open-door” policy, China has been reformed from the traditional planned economy to a market economy. Gradually, economic activities and factors of production are configured by the market as “the invisible hand” instead of a central plan. Whilst Western economists argue that these two are not natural partners, it is generally accepted in China that “government planning and market regulating are two integral parts of the socialist market economic system”. It should allow the market to allocate factors of production and to increase efficiency while the central planning is indispensable in ensuring healthy development of the whole economy. Although the market is now dominant, the whole economy system still has a strong “planning” culture. For example, the economic goals have been achieved through its “Five-Year Plans”, which are a series of economic development initiatives shaped by the National People’s Congress to map strategies for economic development, set growth targets, and launch reforms. As a result of a series of economy reforms, China has kept a remarkable economic growth for the last two decades. According to the world development indicators released by the World Bank, from 1989 to 2010 China's average quarterly Gross Domestic Product (GDP) growth was 9.31%, reaching a nominal GDP of \$5.87 trillion in 2010, becoming the world's second largest economy after the United States.

Intertwined with the political and economic development is an unprecedented urbanization, which is as much a social process as it is an economic and territorial process. Urbanization has been the major drivers of China’s GDP growth over the past decades and it will become even

more so over the next 20 years. It is adopted as the major policy for dealing with the remarkable disparities between China's urban and rural development, solving the tough problems of Agriculture, Rural Areas, and Farmers (also *San Nong* Problems in Chinese), and achieving a compatible development of urban and rural areas (NDRC 2005). According to the UN World Urbanization Prospects (UN, 2009), the level of urbanization in China is 46.1%, with a population of 620 million living in urban areas, while this level will be 73.2% in 2050 and the urban population will be 1 billion. A McKinsey report (2009) even forecasted that 1 billion people will live in China's cities early in 2030, and 5 billion m<sup>2</sup> of road will be paved, 170 mass-transit systems could be built, and 40 billion m<sup>2</sup> of floor space will be built in 5 million buildings by 2025. These have been reflected in China's fixed-asset investment on property, roads, and other infrastructures to sustain the economic growth as well as its urbanization ambition. Urbanization has significantly impacts on public project procurement, although the real effects on the society at large (e.g. demographic change, and demand for social infrastructure) are yet to be fully seen in China.

At a strategic level, there is a "rejuvenating China country through science and education" signifying the importance of technological development in China. According to the National Bureau of Statistics (NBS, 2010), the R&D investment in China is 99.59 billion Yuan in 2009, 3.9 times that of year 2000. Many writers stress the need to raise the level of technological development of the construction industries of developing countries (Ofori, 1994). R&D, as an indicator of this technological development, is perceived as impetus to sustain growth in the Chinese construction sector. However, the NBS (2010) statistics show that the R&D investment in the construction sector is 166.6 million yuan in 2009, taking only 0.17% of the nation's total R&D. Another characteristic is the imbalance development in various construction technologies. On the one hand, Chinese engineers can solve most difficult technical problems in the world, such as the ones in Three Gorge Project, and Qinhai-Tibet Railway project. On the other hand, it still demands advanced technologies from outside. The industrial long-time prosperity coincides with an unflinching inflow of foreign investment, advanced technologies and managerial approaches from developed countries (Ling et al. 2005). For technological sophisticated construction projects, technology is still a significant criterion for awarding contracts in China (Shen et al., 2006; Lu, 2006).

Environmental consideration is emerging as another notable factor in construction procurement. This, on the one hand, is because construction by nature has compelling reasons to deal with environment. Researchers have suggested that construction products such as buildings are the major energy consumer, e.g. accounted for 38.9% of total U.S. energy consumption in 2005 (EPA, 2009). The construction and demolition waste is the major pollutants, e.g. accounted for 23% of the total municipal solid waste in Hong Kong (EPD, 2005). On the other hand, the Chinese industries, including construction, are notorious in terms of their energy efficiency and carbon emission. China's economic development come at a significant environment cost. China is now the world largest emitter of greenhouse gases (GHGs), responsible for over 20% of annual CO<sub>2</sub> emissions from the burning fossil fuels (CGTR, 2009). For example, China produced about 44% of the world's cement in 2006, and cement production produces more carbon emissions than any other industrial process, accounting for around 4% of global carbon emissions (The Netherlands Environmental Assessment Agency, 2006). The China National Accounting Study Report published in 2006 calculated that the economic loss caused by

environment pollution in China was RMB511.8 billion. According to the recently approved 12th Five-Year Plan covering 2011 to 2015, China has targeted that energy intensity by 2015 will improve by 18% from 2010 level and non-fossil fuel energy will increase to 11.4% of the total generation. Environment is set to be one of the corner stones for initiating and procuring construction in China.

Several studies (e.g. Chen, 1998; Lam and Chen, 2004) have narrated the development of a legal system in China, with special considerations given to its construction sector. Guided by a national strategy called “ruling the country by law” since 1997, the development of a civil law system has sped up in China, although its problems such as fragmentation of regulatory authorities, ambiguity in legal drafting (Lam and Chen, 2004) are yet to be dealt with. A construction legal system consisting of the laws and regulations at three levels is in presence. However, truly ruling the country by law is yet to be in vogue in China, with no exception of its construction sector. One explanation, according to Trade Council of Denmark, is the cultural traditions and norms rooted in Confucianism. Researchers have reported that Chinese tend to using *guanxi* to subvert the formal system. Combating corruption is an enduring challenge ahead.

The above general PESTEL background, by no mean an exhaustive description, is characterized by in high-speed transition, which presents extra uncertainties and challenges to construction procurement in China. The situation has been further exacerbated by internal and external factors such as globalization, entry to WTO, financial crises, and climate change. Under this circumstance, the paramount importance to materialize the huge demand of construction in China using effective procurement methods is apparent.

### ***Public Project procurement in China***

Based on the content analyses of the literature, a genealogy of typical government public procurement systems adopted in China over the past decades can be drawn.

#### *Centrally planned economy (1949-1978)*

For building projects, (a) *self-build model*, in which public entities (i.e. a university, or a hospital), more precisely, their internal project organizations, are fully in charge of the projects. They define project scopes, obtain approval from government, and procure the projects by themselves;

For infrastructure projects, (b) *Government construction commanding unit model*, in which a temporary governmental unit was set up to command the procurement of a given project, e.g. a road committed by a local government. The unit may neither have professional experiences in construction nor be responsible for budgets or construction time. The project will be transferred to end users after completion. Another model (c) *State-owned construction enterprises (SOEs) model* was also popular, particularly for materialising the national-level infrastructure projects. For example, for Ministry of Railway (MOR), Ministry of Transportation (MOT), Ministry of Construction (MOC), they all had their affiliated SOEs in charge of the materialisation of specific types of projects (i.e. railway, road infrastructure). Particularly, the model in MOR is so ingrained that it was even extended to today, which stands accused of the recent appalling Wenzhou high-speed train crash leading to 40 deaths.

### *Economic transition period (1979-2000)*

For building projects, the *self-build model* was still dominant.

For infrastructure projects, (d) *the legal person model* was introduced and became popular, in which a project company will be set up as a legal entity to take charge of the procurement and also the operation of a public project.

### *Post transition period (2001 - )*

Public projects were classified into two categories: (i) non-profit-making, i.e. urban roads, schools, hospitals, libraries, museums, government offices, Olympic Games stadiums, and (ii) profit-making utilities, i.e. water, gas, telecom, sewage facilities, tolling roads, bridges and tunnels.

For non-profit-making projects, (e) *Agent-construction system (ACS)* was introduced as the main procurement system since 2004 when a regulation named *Circulars on Investment Modes Reform* (hereafter *the Circulars*) was promulgated by the Chinese State Council.

For profit-making projects, (f) *Public-Private Partnership (PPP)* was also encouraged in the *Circulars* in 2004 while the (d) *legal person model* was still popular, particularly when the project is mainly funded by government.

The following sections will focus on the two recent procurement systems: (e) ACS and (f) PPP, in China's PESTEL contexts.

### ***Agent-Construction System (ACS or Dai Jian Zhi)***

The main background for introducing ACS was that problems in the public construction procurement such as cost overrun, late delivery and poor quality were ubiquitously discovered; they have reached to a point that more effective systems have to be introduced. For example, poor quality cases in public projects were reported every now and then, i.e. Rainbow Bridge Collapse in Chongqing (People's Daily Online, 1999), Phoenix Bridge Collapse in Hunan Province (XinhuaNet, 2007), and JiaShao Bridge Collapse in Zhejiang Province (DEMOTIX, 2010), caused the death of 40, 64, and 2 respectively, and more injured. Construction in China probably can be ranked as the second most dangerous industry, right after its mining industry. A more ingrained problem is the cost overrun prevalent in procuring public projects, ranging from provincial projects, i.e. Shi'an Highway Project in Hebei Province (Yin, 2008) to prestigious national projects, i.e. Beijing National Stadium (Pennay, 2009). There are some notorious "phishing projects" which were set up at a low budget to get endorsement but then gradually enlarge the project scope and seek extra investment from government. The problems were ascribed to the outdated investment modes and chaotic relationships amongst the parties, which were deeply rooted in the old PESTEL background. The 2004 *Circular* and ACS were introduced to solve the problems.

It is generally agreed that ACS was firstly piloted in Xiamen in 1993 and introduced nationwide in 2004. The term firstly appeared in the *Circulars* in which it was stated that "for procuring government investment non-profit-making projects, professional construction management units are selected through competitive bidding and tendering to conduct the construction projects, to control project cost, quality, and time, and to turn over the projects to the future users or

operators after they are successfully constructed.” Fig. 3 illustrates the relationships amongst the parties involved in ACS. A construction management unit (CMU) is selected by the government investment body as an agent to undertake a certain or all stages of construction projects, i.e. feasibility study, design, contracting, construction and handover after completion, meanwhile to strictly control project cost, quality and time. The CMU receives a fee plus some previously agreed incentive bonus for the professional service it rendered. ACS, therefore, is considered as the construction management (CM) system originated in the U.S. by many researchers (e.g. Yi, 2006) as well as our interviewees. This view places an emphasis on that the CMUs, which possess more professional knowledge than the government investment body or end users, can help overcome the problems in procuring public projects.

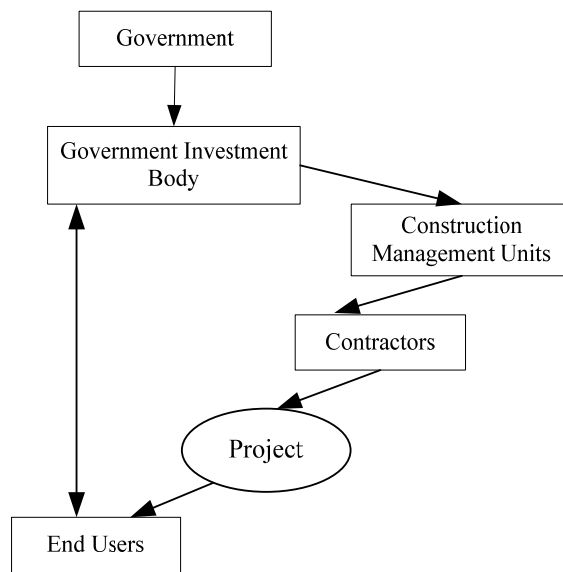


Fig. 3 The relationships of government, construction agents, contractors, and end users in Agent-Construction System

The *Circular* only addressed a general principle (Yan *et al.*, 2009), while applicable procurement systems are subject to detailed elaborations by individual provinces, autonomous regions and municipalities. For example, the government investment body as shown in Fig. 2 could be provincial Development and Reform Commissions (DRC) themselves (e.g. in Beijing), or their authorized institutions (i.e. in Shanghai Chengtou Corporation as a professional industrial investment group company engaged in the construction and operation of the city’s infrastructure facilities), or ender users (i.e. the model in Chongqing). According to Zhang (2008), the last mode should not be regarded as ACS. The professional CMUs could be professional project management companies which are complete legal entities, or extended government executive arms (e.g. Bureau of Public Works in Shenzhen). With different combinations of government investment bodies and CMUs, a variety of procurement options are generated and all claimed to be ACS. Yin (2008) summarized there are three models of ACS in China: Beijing Model consisting of Beijing DRC as the investor and professional CMUs as the construction agent,

Shanghai Model with project investment corporation and professional CMUs, and Shenzhen Model with government as the investor and the Works Bureau as the agent.

There emerges a new form of ACS which is probably more familiar to the international construction management researchers and practitioners alike. Some SOEs, with their relatively strong financing, architecture, engineering, and construction capabilities, acted as government's agents in procuring projects. They work with government and undertake financing, architecture, engineering, and construction of a project. Instead of operating it for a long period of time, the project will be completely purchased back by the Government after 2 to 5 years. By ways of example, companies like China State Construction, and Vanke are now building low-rent or public-rent houses for the Chinese government through this specific ACS model, which can be perceived as the Building and Transfer (BT) or turnkey model.

Although there is no consensus on what ACS is, it has become a widespread procurement system for government investment non-profit-making public projects in China. According to Yan *et al.* (2009), by the end of 2008, 45 out of 47 regions including provinces, municipalities and special provincial-level cities in the Mainland China have issued their guidelines on how to conduct the ACS in line with the *Circular*. In many regions, ACS has been made as a mandatory system, while in other the system is promulgated with greater flexibility. According to Yin (2008), by the end of 2005, there were 153 completed, 164 ongoing, and 85 planned projects adopting ACS. The Beijing 2008 Olympic Games Committee also adopted this procurement system to carry out 11 out of 31 its newly built stadium projects.

By following the "PESTEL-Procurement Innovation" framework, the innovativeness of ACS and its link with the macro-environment can be examined:

*Ownership, initiation and funding:* The adoption of ACS has not changed the fact that the public sector is dominant in initiating, funding, and owning public projects. On the contrary, it aims to solve the problems of public procurement in China, through streamlining the unclearly defined rights, responsibilities, and relationships amongst government (as both a market regulator and a client), project deliverers (state-owned or private enterprises), and end users. In this model, an end user will seek project endorsement from the government investment body. The CMUs, on behalf of the government, will execute the project and transfer it to the user. An interviewee, who is a government officer, reflected that:

*Through this way, it is hoped that budget overrun can be reduced since end users can no longer enlarge project scope arbitrarily and have a finger in the budget. The loopholes such as the "phishing projects" can hopefully be closed.*

An academic interviewee comment cynically:

*While integrated procurement approaches in other economy advocate more considerations for end users, this ACS tries to limit their bad influence on a project.*

*Selection method:* ACS clearly stated that competitive bidding and tendering will be adopted in the selection of construction agents. However, this has not been fully implemented in some forms of ACS, for example, the Shenzhen model.

*Responsibilities for design and management:* ACS is superior to other traditional procurement systems (e.g. Design, Bid, and Building, DBB) for shifting the design and management from government or its executive arms to professional CMUs. It is believed that through professional design and management the problems of budget overrun, poor quality, and late delivery can be circumvented. Government, on the other hand, can focus on regulating efficient market rules instead of managing individual projects.

*Price basis and sub-contracting:* The issues were left to the professional CMUs or the private contractors. The much-denounced excessive subcontracting problem has not been addressed in these procurement systems. It is still possible that construction works will be subcontracted to different levels of contractors and thus problems associated such as risks, safety, and low quality remain a serious concern.

*Risk sharing mechanism:* The ACS, particularly for the forms similar to the BT or turnkey models, creates a win-win situation by considering the risks bore by each party. A CEO, whose company has successfully undertaken a road project in Jiangxi province, reflected in our interview that:

*We were approached by the government. It is straightforward. We signed the contract, not a very complex one. We are state-owned company and we have mutual trust with government. We built the road and afterwards the government paid us fully in one go.*

In answering our question about the rationale for the government to adopt the model, he elaborated:

*In this project, the government has secured the project budget from NPC. They got the money. But they used this BT model. An officer told me that they still saved money after paid the cost and the bonus; using traditional design, bid, and build (DBB) model is doom to be budget overrun.*

However, it is not clear why the government had the incentive to save money. Interestingly, the interviewee gave other cases:

*Sometimes a local government may not have enough money to develop urban infrastructure, such as the road we just mentioned. But they have to develop it so they can sell land to real estate developers for a better price. Otherwise the local economy will be caught in a vicious circle. (As a non-Chinese CEO, he may not be aware of the 1994 tax system). Under this circumstance, a local government will adopt ACS. After 2-5 years, the government may have collected enough money to pay the road.*

He further elaborated:

*Instead of 30 years as some forms of PPP have promised, 2-5 years is a reasonable period for handling the risks by both the governments and ourselves. You know, everything is changing very fast in China.*

In summary, the innovativeness of ACS mainly lies in two areas. First, it endeavors to streamline the chaotic rights, responsibilities, and relationships amongst government, project deliverers, and end users. Secondly, it provides a reasonable risk sharing and reward allocation mechanism in a business environment where macro-environment factors are in high-speed transition. The system was created indigenously in China to deal with its particular and peculiar PESTEL setting. Thus, congruence between the system and its PESTEL setting is relatively high. This congruence will be further explored by examining Public-Private Partnership in China.

### ***Public-Private Partnership in China***

Public-Private partnership (PPP) has been loosely defined and thus led to varying interpretations. In the U.S. the National Council for PPP defines it as “a contractual arrangement between a public sector agency and a private sector entity. Through this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public. In addition to the sharing of resources, each party shares in the risks and rewards potential in the delivery of the service and/or facility”. In Canada, PPP was defined as a “corporative venture between the public and private sectors, built on the expertise of each partner, which best meets clearly defined public needs through the appropriate allocation of resources, risks and rewards”. Li and Akintoye (2003) conducted a comprehensive review of the concept of PPP and concluded that “the numbers and types of PPPs are overwhelming, making the definition of a PPP difficult”. Notably, according to the definition of PPP in UK, “PPP should be broad such that even the informal dialogues between government officials and local community-based organizations should be included”. Taking this broad perspective, PPP as a concept has been existing for long; traditional delivery models, either for profit-making projects or not, have involved the private sectors (e.g. private contractors) already (Godfrey, 1996). What is new is to place more emphases on partnership in the face of widespread criticisms of a low-trust culture embedded in the traditional procurement systems. Cowan *et al.* (1992) stressed that partnering is a philosophy; it represents a commitment of respect, trust, cooperation, and excellence for all stakeholders. If we accept this wide definition of PPP, for the time being, without doubt the ACS introduced above can be treated as one form of PPP.

There is another body of PPP literature emphasizing the private sector, in particular, its financial resources and expertise in undertaking and operating projects. This narrow definition is also the author’s take on PPP in this study. Linking back to the “PESTEL-Procurement Innovation” framework, the innovativeness of PPP, by and large, lies in almost every aspect ranging from ownership initiation and funding through to risk and reward allocation. It is expected that the private sector will be more actively involved in public projects to improve efficiency and deliver value (HM Treasury, 2000; Allen, 2001; Ernst & Young, 2002; Akintoye *et al.*, 2003b). Based on this premise, a series of integrated procurement systems (IPS) such as Build-Operate-Transfer (BOT), Private Finance Initiative (PFI), or Design-Building-Financing-Operating (DBFO), and their variations, have been devised. Fig. 4 illustrates a comparison of total investment and private participation investment (PPI) in infrastructure in China. Although merely emphasizing private finance cannot reflect the philosophy of PPP, it provides a measurable criterion to investigate the involvement of the private sector in public procurement. The data for total investment is from China Statistics yearbooks, and the data for PPI is derived from the PPI Project Database by the World Bank Group. The two sets of data are mainly for utilities such as energy, telecom, transport, water and sewerage. Irrespective of the datasets being actually compiled from different sources, some meaningful comparisons can be made by following the “PESTEL-Procurement Innovation” framework.



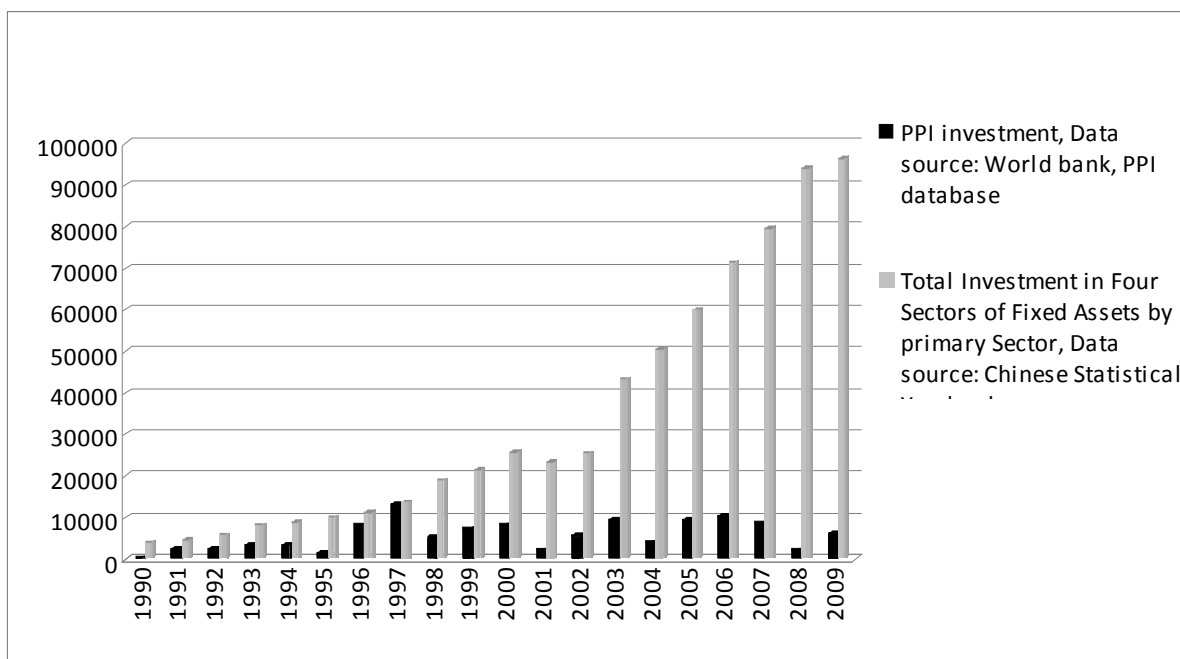


Fig.4 PPI and Total Investment in Four Sectors of Fixed Assets in China, 1990-2009 (Unit: US\$ million)

Firstly, PPP and its real instances such as BOT and PFI are not as widespread as expected in spite of the overwhelming discussions that have been directed towards them. This is probably owing to the government's preference. As mentioned previously, China has a strong central plan culture in procuring public projects. For project financing, the Government can use central government allocations, retained tax revenues, SOE revenues, local bank debt, or World Bank soft loans (Wang and Tiong, 2009). Unlike some governments which became insolvent for any reason, China adopts a centralized strategy to raise finance for fix-asset investment through taxation, indicated by the 1994 tax reform. Although it is stated in the 2004 *Circular* that various kinds of financing vehicles should be encouraged, it seems that the Government is not keen to introduce private finance. This is resonated with the English CEO, by emphasizing that his company is still doing traditional contracting business in Hong Kong and China, commented that:

*The promotion of PFI in UK has its particular background. They need the participation from private sector. The situation is different here in Hong Kong or Mainland China. The Hong Kong government got the money. It is also about local politics which I haven't fully captured. As long as all these factors are existing, PFI wouldn't happen widely here in Hong Kong or in Mainland China.*

An interviewee of this study, who is a government officer responsible for public project investment, might be a representative of this mind-set by manifesting:

*For some window-dressing projects, we may adopt BOT or PPP. But for the projects that matter the national economy and livelihood of the people, government should dominate.*

In interpreting the "window-dressing", the temptation is to say that the government is to maintain an open image, but there is no way to substantiate it. Nonetheless, it is clever to open a window

to these PPP projects so as to accumulate experience and keep abreast of their development. An interviewee from academia argued:

*Why should less popularity of PPP be perceived as a big problem? If a government can raise sufficient capital for its public projects, why have to go to expensive private finance? The big issue is to devise innovative procurements that can make public procurement more efficient and truly deliver values to the society.*

From a political point of view, PPP is not a highly favorable option in China. It is particularly true when PPP is arguably perceived as the disguised privatization (Rowlinson and McDermott, 1999), which is still a sensitive topic in China. Privatisation generally improves the output and efficiency of the organisations that are privatized (OECD, 2003). Notably, for improving the efficiency there was a socialization and modernization of the state-owned enterprises (SOEs) in 1990s. Privatization, a trend clearly witnessed in other Western countries over the past half century, has not been widely seen in China. On the contrary, there is a controversial recent phenomenon described as “State-Owned Enters and Private- or Collective-Owned Retreats” or “Guo Jin Min Tui”, where giant state-owned enterprises (SOEs) edge ahead of their private counterparts in many areas of the national economy.

In parallel with this is another form of PPP – Public-Public Partnership in China (Wang and Tiong, 2009). In recent years, many SOEs are becoming more active in delivering public projects, either profit-making or not. These SOEs are the public sector in effect although they operate as real companies responsible for their own gains and losses. Their senior management is appointed by the Central Government through the State-owned Assets Supervision and Administration Commission. The properties of the public sector and SOEs make themselves trust each other by nature, an essential factor for the success of PPP (Cowan *et al.* 1992; Akintoye *et al.*, 2003a). In addition, a reasonable risk sharing mechanism should be devised to reinforce this trust (Ke *et al.*, 2010). This Public-Public Partnership is expected to gain momentum in China, particularly in the face of the unprecedented urbanization and the social impacts it caused. Irrespective of the centralized project financing strategy, an interviewee reflected that

*This (PPP) will become more popular owing to the demand and supply: (a) provincial governments will be short of fund to sustain existing infrastructure development when their current financing strategy through selling land to real estate developers is widely criticized, and (b) SOEs, with its relatively excessive cash in hand, need to find proper investment channels.*

The support of PPP in the forms of legislations and policies fluctuated with the political, economic, and social development. For example, the Government changed the PPP policy and there is no more return of investment guarantee from government (The Ministry of Foreign Trade and Economic Cooperation, 1995). Irrespective of the *Opinion of the State Council Regarding Encouraging and Supporting the Development of Non-state-owned Economy* promulgated in 2005, Cheng and Wang (2009) reported that there is a fragmented regulatory regime, and the approval process for a PPP project is cumbersome. In view of the policy uncertainty and its associated risks, private capitals such as foreign equity, debt, institutional investors, and foreign commercial banks hesitate to enter this market.

However, in line with the environmental and technical change, there are some emerging niche markets for a closer partnership between the public and private sectors. In view of the serious environment degradation, the ongoing 12<sup>th</sup> FYP (covering 2011 -2015) has set to reduce carbon emission 18% of GDP output. Development of low carbon cities is one of the most preferred decarbonizing strategies. China is proactively engaging international calibrations in implementing the strategies. For example, EU and China set a low carbon zone development agreement to promote low carbon economy growth in 2008 (Chatham House and E3G, 2008). PPP and its variations have also been adopted in many technically or managerially sophisticated projects. For example, PPP is more preferred in power projects and water projects. The private sector, in particular foreign companies, shows competitive advantages by using their expertise in undertaking and operating these projects.

In summary, PPP and its real instances, as procurement innovation, have not travelled smoothly in China without contenders. Without a dearth of capital, the Central Government seems not keen to embrace private finance on the one hand. Owing to the various risks and political issues, private capitals hesitate to venture into this market on the other. The destiny of PPP in China is mainly related to its PESTEL conditions which are less conducive to the flourish of PPP. It again proves that congruence between a procurement system and its external PESTEL conditions is essential for procurement innovation.

## **Conclusions**

Problems in procuring public projects in China are mainly caused by its chaotic definition of rights, obligations, and relationship amongst involved parties. ACS presents a certain degree of innovativeness in two main aspects: (a) clearly defined rights, obligations, and relationship; and (b) appropriate allocation of resources and risks amongst involved parties. It is widely adopted in China. Comparatively, PPP and its instances such as BOT and PFI have not received their popularity as expected. On the one hand, without a short of capital, the Central Government seems not keen to embrace private finance. On the other hand, private capitals hesitate to venture into this market mainly because of the various risks and political issues in China. The different destiny of the two innovative procurement systems is understandable – in comparison with ACS which grows from an indigenous PESTEL background, PPP is more intrusive.

Furthermore, the cases of ACS and PPP from China suggest that a fit between a procurement system and its external PESTEL conditions is essential for the system as a key to realize public projects and truly deliver values to the society. Simply replanting a procurement system, in spite of its innovative in one economy, may not guarantee its effectiveness in another. “One-way lecturing” is futile to devise *bona fide* procurement innovations but sharing of experiences in different economies with different PESTEL conditions can encourage policy makers, practitioners, and researchers to pay due attention to the fit.

Although the “PESTEL-Procurement Innovation” framework exhorts the connection between procurement innovation and its external PESTEL conditions, there are many questions waiting for further research. For example, how the two constructs interact with each other is not clear. Will a certain PESTEL background catalyze procurement innovation? Will an innovation in procurement take place by passively adapting itself to the PESTEL background or can it change PESTEL in an active way? Can the systems view, which has been proved as sensible to construction procurement, be of further help in making sense of the interaction between

procurement innovation and its external background?

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