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Analysis of public-private partnerships for China's water service

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The private sector in China has been growing since economic reforms were launched in the late 1970s. The massive demand for new infrastructure and improved service levels have precipitated the growth of public-private partnership (PPPs) in the Chinese water urban sector. Although the number of water and wastewater infrastructure projects financed through PPPs had risen to over 130 by the 2004, with an investment commitment of over US\$4.8 billion, PPPs still accounted for less than 2% of total investments in the water sector. An institutional analysis was conducted in 2005 to find out how conducive PPPs are for provision of water services in Longgang, a coastal town in the Zhejiang Province of China. Although the operational performance indicators were generally above average, subjective assessment of the internal environment uncovered several gaps, which could be addressed by adopting an appropriate mode of PPPs. A scan of the external environment revealed conditions that are largely conducive to the introduction of PPPs in Longgang Water Utility. This paper showed how an existing institutional analysis framework could be adapted for assessing the suitability of introducing PPPs in water utilities.

I. INTRODUCTION

The world is entering a historical urban transition: for the very first time in history, the global urban population will exceed the rural population during the year 2007.¹ UN-HABITAT estimates that 95% of the world's urban growth in the next two decades will occur in the cities of developing countries, most of which will be absorbed by small cities and towns with populations of less than 1 million.¹ Yet, since the mid-1980s, the quality of municipal social services such as water, sanitation, health and education has been declining.² For instance, WHO/UNICEF estimated that the number of urban residents in the developing regions without access to safe water increased from 103.5 million in 1990 to 157.7 million in 2002, while for sanitation, the number increased from 459.1 million to 555.4 million in the same period.³ Subsequently, water professionals and policy makers have had to rethink how the efficiency and effectiveness of service provision could be improved in order to match the increasing urbanisation challenges. One of the options considered since the late 1980s is the role of the private sector in infrastructure development and service provision in the water sector.

The scope of private sector participation ranges from full privatisation-that is, complete transfer of assets and responsibility to the private sector-to public-private partnerships (PPPs) in which the assets remain with in the public sector, but government and the private sector collaborate to provide the services.⁴⁻⁶ Several modes of PPPs in water services management are to be found across the globe, under the following most common contractual arrangements.4,7,8

- (a) Service contracts. Private operators provide limited specialist activities for 1-2 years.
- (b)Management contracts. Private operators take over the operation and maintenance of part or all the system for about 2-5 years.
- (c) Lease contracts. Private operators take over operation and maintenance of the infrastructure for about 5-10 years, collect revenue and pay lease fees to the public utilities.
- (d) Concession Contracts. Longer-term rights (for 20-30 years) for the use of all assets are conferred on private operators, who invest in infrastructure development, and recover the costs through tariffs.

The global number of PPP projects in the urban water/sewerage subsector reaching financial closure increased more than tenfold between 1990 and 1997, reaching a cumulative capital expenditure of US\$25 billion in 1997.⁶ Latin American and Caribbean countries topped the list of beneficiary regions, with a share of 42% of the projects, which were valued at 48% of the total investment.9 In some developing countries, PPPs have been successfully applied to introduce private sector incentives and commercial management skills, which have precipitated into positive changes in management of public water services in developing countries.^{4,7,8} PPPs may provide the following benefits to provision of water and sanitation services.8

- (a) The private sector can bring better management and technical skills to the public sector, which would lead to higher cost-effectiveness and operational efficiency.
- (b) The private sector may more easily access funds from banking institutions to fill the financial gap for investment financing.
- (c) The partnerships may enable government departments to move out of management of service delivery and

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concentrate on the role of enabling environment and regulation.

- (*d*) The private sector is more flexible and has better capacity to respond quickly to the changing external environment, leading to better service delivery.
- (*e*) The private sector has a high level of customer focus, and higher capacity to provide customer satisfaction.
- (*f*) The private sector may have a higher propensity to develop the skills of the staff and give them better remuneration packages with built-in output-based incentives.

PPPs are not, however, a panacea for bailing out poorly-managed water utilities operating in unsustainable institutional environments where consumers are not required to pay realistic tariffs. There are two main requirements that need to be fulfilled for benefits to be realised from PPPs.⁴

- (*a*) The type of PPP adopted should be carefully selected to match the operating environment.
- (b) The government should provide an enabling environment and put in place effective regulatory systems and mechanisms that enable the private operators to perform effectively and efficiently, but also check their excesses, if any.

These two requirements may not have been carefully considered for many PPPs that were initiated in the mid-1990s, a situation which may have resulted in a subsequent sharp decline of private sector investment inflows and reduced scope of the PPPs' taxonomy, as well as the fewer number of countries taking on the partnerships.⁹

According to the Private Participation in Infrastructure (PPI) project database maintained by the World Bank, the private sector investment commitment in water/sewerage projects in developing countries dropped from a record high of US\$8 billion in 1997 to less than US\$2 billion in 2003, but recovered by 36% in 2004.⁹ However, 90% of the PPP investment activities in 2004 took place in three countries—Chile, China and Mexico—and most of these activities focused on construction of water/sewerage treatment plants, in the form of smaller projects.⁹ Not only has the scope, level and geographical spread of PPPs in the water/ sanitation sector reduced, but some water infrastructure PPP projects have suffered contract disputes. Whereas many contracts were renegotiated, 20 projects were cancelled or became distressed in 1990–2004, accounting for 37% of the investment commitments during the same period.⁹

Further analysis shows that 80% of the PPP contracts that attracted disputes or were cancelled were in sub-Saharan Africa.¹⁰ One of the major reasons advanced for this dismal failure in Africa is the unwillingness of the private operators to inject investment funds into distribution extensions to the massive numbers of unconnected households.¹⁰ Experience in the past decade has shown that there are risks for involving the private sector (whose primary objective is profit making) in water service provision. These risks can be managed by developing appropriate forms of PPPs, ensuring competitive bidding, and developing effective poverty-aware regulatory and contract monitoring systems.⁴ This paper reports on a case study conducted in the coastal town of Longgang, in China in which an institutional analysis was conducted to assess the need for, and suitability of, introducing PPPs in the provision of urban water and sewerage services.

2. THE GROWTH OF PPPS IN THE CHINESE URBAN WATER SECTOR

The private sector in China has been growing since economic reforms were launched in the late 1970s, but private sector participation in public utility services could be traced from the early 1980s.⁵ Several factors have led to a massive demand for new infrastructure and improved service levels in the water/sanitation sector. A key factor is the increasing demand for freshwater supply for domestic and industrial consumption in China, which is predicated to rise by 60% over 50 years, up to 800 billion cubic metres per year.⁵ Other significant factors are the demand for increased service levels accompanying China's high economic growth rates, and the country's attraction of world events such as the 2008 Olympic games.¹¹ The Chinese government has recognised the limitations of the public sector to cope with the increasing service gap. As a result, the government has not only strived to create an enabling environment for the local and international private sector, but has gone further to invite transnational corporations (TNCs) to contribute to improvement of water supply and sewage treatment services in China.⁵

In response to the opening up of business opportunities in the Chinese public water sector, water TNCs such as Vivendi, Suez, Thames Water and Anglian Water have, since the 1980s scrambled to bid for various projects in China, although significant engagement started in the early 1990s.⁵ At the beginning, the most common strategy used by the TNCs to successfully penetrate the Chinese market was to set up joint ventures with Chinese private enterprises. Thereafter, the TNCs organised a series of international conferences and workshops, through which they gained more insight into the Chinese political, economic and socio-cultural environment.¹² Most local private enterprises engaged in the Chinese water sector participate in the management of the water supply and sewerage services as subcontractors for water TNCs. Of late, some of these local firms have emerged as principal contractors, as exemplified by the Youlian Consortium's success in winning the Build-Operate-Transfer (BOT) contract in 2002 for construction of Shanghai's No. 1 Sewage Treatment Plant.⁵

Apart from joint ventures between Chinese private/public enterprises and TNCs, private sector participation is being extended to other modes of PPPs as the Chinese Government removes more legal, administrative and tariff-setting restrictions on foreign involvement in public service delivery.⁵ BOT contracts have become a popular option of PPPs in China, mainly because investment risks can be transferred to the private sector and public debt can be reduced.¹³ According to the PPI database, China accounted for 40% of total investment flow to treatment plants (which was half of the 46 treatment plants built) during the period 2001-2004.⁹ Although the number of water and wastewater infrastructure projects financed through PPPs had risen to over 130 in 2004 with an investment commitment of over US\$4·8 billion, PPPs still accounted for less than 2% of total investments in the water sector at the end of the same year.¹⁴

One of the reasons for a slow uptake of PPPs by the Chinese public sector is the time lag between changed policy objectives and societal acceptability. Generally, Chinese society still considers provision of water/sanitation services a responsibility of the government.⁵ The inflated role of government in provision



of social services during the communist era consolidated the state–society relationship, and discouraged the involvement and growth of the private sector. As a result, despite the gradual shift of government policy towards private sector participation in the provision of water and sanitation services in China, many sections of society, including some technocrats, have been slow to embrace the PPPs.⁵ The next section provides background information on Longgang, a town in the Zhejiang Province, where the case study was carried out.

3. THE STUDY SETTING

The town of Longgang is the economic nerve-centre of Changnan County of Wenzhou City, which is located in Zhejiang Province, in south–eastern China. Following its establishment as an urban authority in 1984, Longgang has expanded in area to 80·7 km² and its population has increased from 6000 to the present estimated 235 000 people, and is administratively composed of nine districts.^{15,16} Since its establishment, Longgang has been one of the forerunners in China for carrying out several economic reforms that have led to the smooth urbanisation process of villages, acceptable to the residents, to the extent that it has been labelled 'China's first peasant city'.¹⁵ In recognition of this successful programme, Longgang has been classified by the United Nations as a town for piloting sustainable urban development.^{15,16}

Water supply services to the town of Longgang are provided by the Longgang Water Authority (LWA), which is a semi-autonomous water utility wholly owned by the Longgang Local Council Authority. LWA was established by the Peoples' Government of Longgang as a semi-autonomous organisation. The bylaws under which it operates are enacted by the Peoples' Congress of Longgang. The operations of the utility are governed by the national legal framework that includes the 1988 Peoples' Republic of China (PRC) Water Law and the 1984 PRC Pollution Prevention Law, which were amended in 2002 and 1996 respectively.^{5,13} Further information on the legislative framework has been included in section 6.

The water utility, headed by a general manager, employs 105 staff to produce an average of about 50 000 m³ per day. Water is drawn from Wu Jiayuan reservoir, and is treated through a conventional water treatment plant comprising processes of pH adjustment, coagulation and flocculation, sedimentation, slowsand filtration and chlorination. Although the utility recovers all its operation and maintenance costs, it relies on government subvention for all its capital investment requirements. Staff to the utility are seconded from other public service departments, and the management does not have the autonomy to hire or fire its rank and file. Fig. 1 shows how the utility service departments were clustered as of July 2005.

4. STUDY OBJECTIVE AND METHODOLOGY

This paper is based on a study conducted for partial fulfilment of a Masters degree, which sought to address the following main research questions.¹⁶

- (*a*) Is there a need for introduction of PPPs in provision of urban water services in Longgang?
- (*b*) How conducive is the operating environment for the introduction of PPPs?

An institutional analysis was conducted to explore these research questions. Professor Grigg of Colorado State University has suggested a framework for institutional analysis of public infrastructure, which comprises a systematic way of critically studying constituent elements of the institution.¹⁷ One way of conducting this analysis is to ask questions in each category of institutional elements such as the following.¹⁷

- (*a*) What are the laws and controls—that is, legal framework and control mechanisms?
- (*b*) Who has the control-that is, designated authorities and stakeholder organisations?
- (c) What are the roles and responsibilities of the stakeholder organisations?
- (d) What are the incentives and disincentives for performance?
- (e) What is the existing management culture?

Grigg's institutional analysis framework briefly described above was adapted to carry out an assessment of Longgang Water Authority. Data for the analysis were collected using the following methods

- (a) review of policy documents
- (b) observations
- (c) survey questionnaires sent to staff members
- (d) focus group discussions with a few staff members and
- *(e)* key informant interviews with utility managers and local authority leaders. The principal researcher spent two months

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Operational indicator	Definition	Value			
Target population	Total population in designated service area	235 952			
Daily water production	Cubic metres of water produced per day	50 000			
Number of connections	No. of active customers' connections drawing water from the distribution network	37 542			
Service coverage	Ratio of population served to total population	100%			
Continuity of supply	Average No. of hours supply is available to consumers per day	24 h			
Metered connection	Ratio of No. of connections fitted with meters to total number of connections	100%			
Unaccounted-for water	Fraction of water produced, but NOT sold (i.e. not billed)	16%			
Employees per 1000 connection	Average No. of employees serving every 1000 connections	2.8			
Table I. Key operational performance indicators for Longgang Water Utility in 2004 ¹⁸					

in mid-2005 working with the water utility to collect data required for the analyses. The collected data were used to analyse the internal environment of Longgang Water Authority, as well as the macro environment in which the utility operates. The findings are presented in the following sections.

5. THE INTERNAL ENVIRONMENT

5.1. Objectively-verifiable performance indicators

The authors analysed the objectively-verifiable performance indicators of LWA so as to assess whether there is justification for introduction of PPPs. Table 1 shows key operational performance indicators as extracted from the utility's 2004 annual report. The data show that Longgang Water Authority (LWA) fulfils its mandate and provides services to all consumers residing in its area of jurisdiction. Furthermore, the water services are provided to the customers on a 24/7 basis, fully continuous, and therefore highly reliable. However, no customer surveys had been carried out in recent times, to provide information on other aspects of service quality such as functional quality (i.e. how a service provider's contact staff relate to customers) and corporate image (i.e. the overall image formed by customers about a service provider), which have been found to make a very highly significant contribution to customer satisfaction and subsequent loyalty to the service provider.¹⁹

Operational data also indicate that all water supply connections are fitted with service meters, which enable the service provider to bill according to volumetric rates, and foster the customers' willingness to pay for the services. Unaccounted-for water (UFW) is one of the performance indicators that are used to compare overall costeffectiveness among urban water utilities. UFW is the ratio of water not sold to total water produced, which is computed as 16% for LWA. This figure falls in the range that is acceptable for water utilities in low-income countries operating distribution systems that are relatively old (over 30 years).²⁰ However, in view of the high technological level of the Chinese economy, the small size of the distribution network, and the relatively new distribution network in Longgang (a maximum of about 20 years of age), the guidelines produced by the Department of Construction require Longgang to have not more than 12% of UFW.²¹

Another indicator that is important for measuring operational efficiency is the number of employees per 1000 connections, which for Longgang was computed as 2·8. This level of productivity is considered efficient in the region, and compares favourably with the ratio of 3·6 for Bangkok (Thailand), a city with higher economies of scale: Bangkok had1·44 million service connections in 2001 compared with 37 542 for Longgang in 2004.^{16,22}

To assess the in-depth performance and get a feel of the longterm sustainability of an organisation, it is not sufficient merely to read key financial statements such as the balance sheet and income statement: it is useful to evaluate the trend of key financial performance indicators over a considerable period of time. Table 2 shows five key financial indicators of Longgang Water Utility for the period 2000–2004.

The return on fixed assets (ROFA) is a ratio that is considered by financial analysts to be a primary measure of profitability, which is in turn important for an organisation's survival and sustainability.²³ For public urban water utilities, it is recommended that ROFA ranges between 0.06 and 0.08 to enable replacement and renewal of plant and equipment during the infrastructure life cycle.²⁰ The ROFA figures for LWA are considered to be on the low side, and may not foster sustainability of services. The current ratio is a measure of whether sufficient liquid resources are available to meet maturing obligations, which for a water utility are usually in the form of purchase of chemicals, payment of utility services such as electricity and telephone bills. The current ratio for LWA improved from 1.34 in 2001 to 2.80 in 2004, the later figure being appropriate for a public water utility.²⁰

The operating ratio improved from close to 1 in the first four years to 0.577 in 2004. This is a good trend—an operating ratio

Ratio	Definition	2000	2001	2002	2003	2004
Return on fixed assets Current ratio Operating ratio Bill collection efficiency Domestic and industrial tariff	Ratio of profit before interest and tax to net fixed assets Ratio of current assets to current liabilities Ratio of operating expenses to operating revenue Percentage of bills collected US\$ per cubic metre (US\$ $I = 8.2$ yuan)	0 4·30 0·999 0·98 0·28	0.013 1.34 0.939 0.99 0.28	0.08 1.74 0.966 0.99 0.30	0·013 1·72 0·948 0·99 0·30	0.019 2.80 0.577 0.99 0.30

Table 2. Key financial ratios for Longgang water utility during the period 1999-2004¹⁸

that is close to unity is not desirable as it points to an inefficient use of resources to provide services. It is recommended that the operating ratio for a public water utility should be below 60%.²⁰ The bill collection efficiency is very good, close to 100%. However, the high efficiency may be a reflection of a low tariff for consumers with a high ability to pay for services, which is a small fraction of tariffs charged by water utilities in some less developed countries. The objective of the current tariff is partial cost recovery: whereas it is intended to cover operation and maintenance costs computed on historical costs, it does not cater for replacement costs, and may not even cover the marginal costs of production. Such tariff levels do not foster financial, let alone economic or environmental sustainability.

Although the technical performance indicators are generally good, some of the financial indicators are below average, a situation which does not promote economic and environmental sustainability. Some of these performance indicators are typical of a water utility that engenders a public goods model, in which supply-driven services are delivered at highly subsidised costs.⁴ Introduction of a suitable PPP would give the service provider the necessary autonomy to make operational decisions, and provide a strong incentive for increased performance.²⁴

5.2. Subjective performance assessments

Objectively verifiable performance indicators are an important ingredient but are not in themselves sufficient for institutional analysis. Subjective performance evaluations have been found to add value to overall performance assessment,²⁵ as subjective assessments are capable of analysing 'software' aspects of an organisation which may not be measured from objectively verifiable numerical indicators. Subjective performance assessments should cover aspects such as human resource management, employees' attitudes towards the organisation, teamwork, inter-group relations, and attitude towards change.^{17,26} This study adapted a measurement instrument designed and widely tested by the Water and Sanitation for

Health (WASH) Project as a guideline for institutional assessment of water utilities.²⁷

The WASH guidelines provide a number of performance indicators in the form of statements, contributing to each of the multi-scale performance themes shown in first column of Table 3. Statements listed under each performance theme elicit the respondent's perceptions of organisational performance in individual aspects, which contribute to that specific theme, as described in the second column of Table 3. Based on the data collected, the principal researcher classified each of the indicator statements as very high (5); high (4); medium (3) or low (2), or very low (1). The mean scores for performance themes were worked out, which are shown in the fourth column of Table 3.

The subjective performance assessments displayed in Table 3 point to low ratings for most performance themes. The organisational autonomy is mainly undermined by the lack of flexibility on tariff setting/adjustment; and inadequate authority/control over utility staff. Leadership is ranked low mainly because many of the staff interviewed did not display adequate understanding of the utility's mission, and there was hardly any downward delegation of responsibilities. Although the commercial orientation is ranked as high, the customer orientation is perceived to be low, mainly because the views of the government officials are valued higher than those of customers in the strategic direction of the utility.

The technical capacity of the staff does not match the highly sophisticated plant and equipment installed. Whenever there is need to make highly demanding technical decisions, consultants are outsourced. This scenario is partly because the utility has not attracted highly skilled staff, nor has it invested in the skills development of staff. The organisational culture is ranked as very low mainly because staff do not portray any sense of ownership of the organisation, but focus on individual rather than team achievements.

Organisational autonomyThe organisation's degree of independence from the national government or other government bodies in making vital decisions affecting organisational goals such as tariffs, budgets, personnel etc.102-4 (Low)LeadershipAbility to inspire others to understand the organisation's mission, to commit themselves towards that mission, and to work towards its fulfilment14(2-4) LowManagement and administrationThe capacity to organise people and other resources to accomplish the work of the organisation14(3-4) MediumManagement and administrationThe degree to which actions in an organisation are driven by cost-effectiveness and operating efficiency8(3-8) HighCustomer orientationOrganising and directing the resources and services of an organisation towards total satisfaction of its customers7(2-3) LowDevelopment and maintaining staffActivities directed at recruiting staff, providing skills to do the jobs required and grow professionally, and providing adequate remuneration and job satisfaction to retain competent staff7(1-4) Very low an organisationOrganisational culture external stakeholdersA set of values and norms that inform and guide everyday actions in an organisation7(1-4) Very low an organisationInteractions with key external stakeholdersThe organisation's capacity to influence positively and strategically to work towards its mission5(2-6) Medium	Performance theme	Definition	Number of indicators	Mean score
Leadershipaffecting organisational goals such as tariffs, budgets, personnel etc. Ability to inspire others to understand the organisation's mission, to commit themselves towards that mission, and to work towards its fulfilment14(2-4) LowManagement and administrationThe capacity to organise people and other resources to accomplish the work of the organisation14(3-4) MediumCommercial orientationThe degree to which actions in an organisation are driven by cost-effectiveness and operating efficiency8(3-8) HighCustomer orientation organisation towards total satisfaction of its customers0(2-3) LowTechnical capacityThe level of the organisation's capacity to carry out the technical functions required to fulfil the organisational mandate10(2-1) LowDevelopment and maintaining staffActivities directed at recruiting staff, providing adequate required and grow professionally, and providing adequate required and norms that inform and guide everyday actions in an organisation7(1-4) Very low an organisationInteractions with key external stakeholdersThe organisation's capacity to influence positively and strategically to work towards its mission5(2-6) Medium	Organisational autonomy	The organisation's degree of independence from the national government or other government bodies in making vital decisions	10	2·4 (Low)
Management and administrationThe capacity to organise people and other resources to accomplish the work of the organisation14(3-4) MediumadministrationThe degree to which actions in an organisation are driven by cost-effectiveness and operating efficiency8(3-8) HighCustomer orientationOrganising and directing the resources and services of an organisation towards total satisfaction of its customers7(2-3) LowTechnical capacityThe level of the organisation's capacity to carry out the technical 	Leadership	affecting organisational goals such as tariffs, budgets, personnel etc. Ability to inspire others to understand the organisation's mission, to commit themselves towards that mission, and to work towards its fulfilment	4	(2·4) Low
Commercial orientationThe degree to which actions in an organisation are driven by cost-effectiveness and operating efficiency8(3.8) HighCustomer orientationOrganising and directing the resources and services of an organisation towards total satisfaction of its customers7(2.3) LowTechnical capacityThe level of the organisation's capacity to carry out the technical functions required to fulfil the organisational mandate10(2.1) LowDevelopment and maintaining staffActivities directed at recruiting staff, providing skills to do the jobs required and grow professionally, and providing adequate remuneration and job satisfaction to retain competent staff10(3.2) MediumOrganisational culture an organisationA set of values and norms that inform and guide everyday actions in an organisation's capacity to influence positively and strategically to work towards its mission5(2.6) Medium	Management and administration	The capacity to organise people and other resources to accomplish the work of the organisation	14	(3·4) Medium
Customer orientationOrganising and directing the resources and services of an organisation towards total satisfaction of its customers7(2·3) LowTechnical capacityThe level of the organisation's capacity to carry out the technical functions required to fulfil the organisational mandate10(2·1) LowDevelopment and maintaining staffActivities directed at recruiting staff, providing skills to do the jobs10(3·2) MediumOrganisational cultureA set of values and norms that inform and guide everyday actions in an organisation's capacity to influence positively and strategically 	Commercial	The degree to which actions in an organisation are driven by cost-effectiveness and operating efficiency	8	(3·8) High
Technical capacityThe level of the organisation's capacity to carry out the technical functions required to fulfil the organisational mandate10(2·1) LowDevelopment and maintaining staffActivities directed at recruiting staff, providing skills to do the jobs required and grow professionally, and providing adequate remuneration and job satisfaction to retain competent staff10(3·2) MediumOrganisational culture Interactions with key external stakeholdersA set of values and norms that inform and guide everyday actions in an organisation's capacity to influence positively and strategically to work towards its mission5(2·6) Medium	Customer orientation	Organising and directing the resources and services of an organisation towards total satisfaction of its customers	7	(2·3) Low
Development and maintaining staffActivities directed at recruiting staff, providing skills to do the jobs10(3·2) MediumMaintaining staffActivities directed at recruiting staff, providing adequate remuneration and job satisfaction to retain competent staff10(3·2) MediumOrganisational cultureA set of values and norms that inform and guide everyday actions in an organisation7(1·4) Very lowInteractions with key external stakeholdersThe organisation's capacity to influence positively and strategically 	Technical capacity	The level of the organisation's capacity to carry out the technical functions required to fulfil the organisational mandate	10	(2·I) Low
Organisational cultureA set of values and norms that inform and guide everyday actions in an organisation7(1.4) Very lowInteractions with key external stakeholdersThe organisation's capacity to influence positively and strategically those institutions that influence its financial, political and legal ability to work towards its mission7(1.4) Very low	Development and maintaining staff	Activities directed at recruiting staff, providing skills to do the jobs required and grow professionally, and providing adequate remuneration and job satisfaction to retain competent staff	10	(3·2) Medium
Interactions with key external stakeholders those institutions that influence its financial, political and legal ability to work towards its mission (2.6) Medium	Organisational culture	A set of values and norms that inform and guide everyday actions in an organisation	7	(1.4) Very low
	Interactions with key external stakeholders	The organisation's capacity to influence positively and strategically those institutions that influence its financial, political and legal ability to work towards its mission	5	(2·6) Medium

Table 3. Results of the subjective performance assessment

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Key activities	Longgang Water Authority (LWA)	onggang Local Authority (LLA)	stomers	ot of Construction (DOC)	of Environment (DOE)	of Health (DOH)	Control Board (PCB)	Planning and Development	bour & Social Security	er Resources
		Ľ	C	Dep	Dept	Dept o	Price (Dept of	Dept of La	Dept of Wate
Legislation										
Funding for capital investment										
Project planning										
Operation and maintenance costs										
Performance evaluation										
Tariff setting										
Water quality control										
Staff remuneration policy										
Water quality monitoring										
Water resources management										
Legend Responsible			Inv	olved			Inte	rested		

The low scores on the subjective performance assessments point to an internal organisational environment that is weak and vulnerable, should there be instability and uncertainty in the operating environment. It is anticipated that an appropriate mode of PPP could trigger change and transform an organisation to being customer- and business-oriented.

6. THE MACRO ENVIRONMENT

The authors assessed the organisation's external environment using the framework which examines political, economic, sociocultural, and technological factors (PEST analysis) that impact on utility. Over the years the Chinese Government has enacted laws and regulations that paved a way for adopting PPPs in the provision of public services. Typical examples of these laws are^{5,13}

- (a) the 1995 PRC Security law
- (b) the 1999 PRC Contract law
- (c) the 1995 Government build-operate-transfer (BOT) Circular that provides guidelines on the examination, approval and administration of experimental foreign-invested concession projects
- (*d*) the 1997 Interim Procedures on the administration of projects conducted outside China
- *(e)* the 1998 government procedures on administration of borrowing international credit loans.

To assess the institutional profile in which LWA performs, the authors carried out an activity/responsibility analysis of key

functions of water service provision in Longgang. Fig. 2 shows a matrix of the allocation of the key roles and responsibilities. The matrix shows that the two main departments overseeing the management of water services in the area are Longgang Local Authority and Department of Construction. While the Department of Construction is responsible for performance monitoring and legislation, Longgang Local Authority provides funds for capital investment and is responsible for human resource management. Since the Chinese government departments are characterised by a high level of bureaucratic hierarchies,⁵ such an arrangement may not facilitate a strong linkage between investment planning and the performance monitoring function, which is vital for promotion of accountability.

The staff remuneration policy overseen by Longgang Local Authority may not provide a conducive environment for managers of the LWA to supervise their staff effectively. Furthermore, full participation by customers is reportedly limited to payment of tariffs, which does not give them adequate control over important functions such as tariff setting, utility performance monitoring and project planning. On the other hand, the final decision on tariff setting and adjustment lies with the Price Control Board. The Price Control Board acts as the economic regulator, and convenes annual review meetings attended by the officials from the utility and the Department of Construction, in which utility officials present justification for increase of tariff. For water quality regulation, the Department of Health is required to ensure that the utility supplies water conforming to minimum drinking water quality standards as specified in the water quality standards set by the Department of Construction.²⁸ However, the Department of Health does not have adequately trained staff to carry out water quality monitoring, and heavily relies on the utility's duty of care specified in the water quality guidelines to carry out internal monitoring and assessment.¹⁵

Economically, Longgang is one of the fastest growing towns in China, which, in 2004, realised a gross domestic product (GDP) of 5·27 billion Yuan.¹⁸ Like other cities, Longgang has benefited from the reform process initiated by the Chinese Government on the following major fronts²⁹

- (*a*) changing from communal land ownership to assigning land to individual households
- (b) attracting the private sector to invest in the industrial sector
- (c) the open door policy that attracts foreign investment into the economy
- (*d*) establishment of the macro-control mechanism to exercise monetary and fiscal policies as opposed to central planning
- *(e)* encouragement of the development of non-state sectors of the economy
- (f) reform of the legal and educational systems to match the economic reforms.

Since Longgang is a modern town, established in 1984 in the post-reform era, the leaders of the local authority have been more responsive to the reforms than their counterparts in older urban establishments. As a result, a large proportion of Longgang's economy is driven by private enterprises, leading to a higher GDP growth rate of about 19% per year for Longgang town, compared to the 2005 national annual rate of about 10%.^{15,16} Longgang's economy is comprised of the industrial sector (67%), services (30%) and agriculture (3%).¹⁸ International investment inflows have been encouraged by a stable exchange rate of the Yuan against international currency such as the US dollar and the pound sterling, which has remained stable since the end of the 1997 Asian Financial Crisis.¹⁶

Most of the residents of Longgang are employed in the flourishing industrial and services sector, with a negligible level of unemployment. The landline telephone coverage is 100%, with a mobile telephone and internet coverage of 23.8% and 9%, respectively. Furthermore, the technology used in the water production and distribution processes is advanced, in which modern machines and equipment are utilised, and are controlled by telemetric systems. Perhaps the shortcoming is the inadequate number of highly skilled staff to operate these systems. Nonetheless, Longgang Town has achieved the nine-year universal basic education, with 88% of the residents having completed junior secondary education.¹⁸

Most elements of the external environment presented above positively contribute to an enabling environment for introducing PPPs.⁸ These include China's economic stability, well-developed infrastructure, clear economic policies and effective legal mechanisms aimed at attracting the private sector as a partner to public service provision, and the consumers' high ability and willingness to pay for water services. However, there is need to clarify roles and responsibilities overseeing service provision at the sector policy level, and strengthen the regulatory mechanisms.

7. SWOT ANALYSIS AND OPPORTUNITIES FOR INTRODUCING PPPs

A SWOT (strengths-weaknesses-opportunities-threats) analysis was conducted to sum up the findings of the institutional assessment of Longgang Water Utility. A SWOT analysis is a simple framework for generating strategic alternatives from a situational analysis. The SWOT analysis classifies key internal aspects of an organisation as strengths or weaknesses and the external situational factors as opportunities or threats. By classifying and analysing these factors, an organisation can better leverage its strengths, correct its weaknesses, capitalise on the opportunities, and deter potentially devastating threats.³⁰ Table 4 shows the SWOT profile of Longgang Water Utility, as perceived by the researchers.

Strengths	Weaknesses
Dedicated, efficient staff Modern plant and equipment 100% service coverage 24/7 reliability of water services High collection efficiency A high level of probity High level of commercial orientation of staff Utility management well linked up with key policy makers	Few skilled staff Tariffs do not cover capital replacement costs Poor customer orientation of staff Low technical capacity Poor management information system Low level of team spirit among staff Low willingness to change among staff Poor staff remuneration Low consideration for environmental sustainability
Opportunities	Threats
National economic reform process to embrace commercialisation High national economic growth rates Customers with a high ability to pay for services Customers' high willingness to pay for services Adequate raw water resources Investment funds from the central government A well-informed clientele	Low organisational autonomy with respect to —Setting/adjusting tariffs —Staff remuneration and control Inadequate regulatory mechanisms High environmental standards required
Table 4. A SWOT analysis as perceived by the researchers	

The SWOT profile shows that the strengths of LWA are a dedicated, efficient, accountable workforce that produces a service with a high technical quality. Since the primary business objective of private entrepreneurs is to make a profit, such good technical indicators are attractive for public-private partnerships. However, staff skills need to be improved in order to match the modern plant and equipment. The tariff is considerably low, and cannot even cover staff emoluments that adequately motivate the workforce. The utility benefits from massive subsidies in the form of investment funds: the resultant low tariff does not send the right signals to the consumers about the full costs of providing water services, and therefore does not promote the principle of water being considered as an economic good. Additionally, such low tariffs do not support the polluter-pays principle, which advocates that whoever causes any environmental pollution should be responsible for repairing the damage to the environment.³¹ Furthermore, utility staff need to abandon the supply-driven orientation that is characteristic of many civil servants, to become customer-focused. This transformation may be accomplished through improvement of staff conditions of service and training. Changes enumerated above could easily be introduced through partnership with the private sector, which is more commercial oriented and better placed to escape political interference, and use techniques of new managerialism.4

The SWOT analysis also shows that the external environment in which LWA operates may be conducive for introduction of PPPs.¹⁰ Not only is China the fastest growing economy in the world but the national government has carried out various economic and legislative reforms aimed at attracting private investment to the public sector. The consumers are not only well informed, but have a high ability and willingness to pay for water services. It is envisaged that the introduction of PPPs could reduce the threats faced by the utility. A partnership with the private sector could increase the utility's organisational autonomy, adopt realistic tariffs, which would promote economic and environmental sustainability, and require the government to strengthen regulatory mechanisms and systems. Such changes would bring benefit to staff (through improved working conditions), customers (through higher service quality), the government (through higher economic returns) and the environment. Such benefits can only be realised if the right type of PPP is carefully matched with the existing business environment in Longgang.

8. CONCLUSION

This paper has adapted Professor Grigg's institutional analysis framework to assess the suitability of introducing PPPs to Longgang City in China. This framework comprises '... a systematic and repeatable way to break elements apart so that they can be studied'.¹⁹ In this study, the following systematic steps were taken.

- (*a*) Analysis of the internal environment, which assessed objectively-verifiable performance indicators, as well as subjective performance indicators.
- (*b*) Analysis of the macro-environment that looked at the sociocultural, technological, economic and political factors that impact on introduction and performance of PPPs.

A SWOT analysis was then conducted to summarise and discuss the findings. This paper has provided an example on how to conduct an institutional analysis for assessing the suitability of introducing PPPs for improved service delivery.

Not withstanding the limited scope of the study, the two-months' fieldwork enabled the authors to carry out an institutional analysis which shows that consideration of common operational performance indicators classifies Longgang Water Authority (LWA) as a highly performing water utility. However, deeper analysis of the internal environment shows that the high level of service is being propped up by a heavy dose of subsidies from the central government, a situation which is neither economically nor environmentally sustainable, especially given the escalating high demand of water resources in China. The main deficiencies that could be addressed by introduction of an appropriate form of PPPs are (a) the low level of autonomy for LWA; (b) the low level of customer orientation; (c) low staff remuneration and inadequate skills in the organisation; and (d) low tariff levels. Addressing these aspects would increase the economic and environmental sustainability and bring the mission of the utility in line with the policy objectives of Longgang and the central government.

The external environmental scan shows that conditions in the macro-environment are largely conducive to the implementation of PPPs. The involvement of the private sector could contribute to improving the financial sustainability, produce more business-oriented strategic investment decisions, and trigger changes in the external environment that will strengthen policy making and implementation.²⁵ However, there is a need to carry out a deeper analysis to identify issues of prime importance to Longgang Municipality in relation to planning for the introduction of PPPs, and identify the form of PPP that could add value by providing the right incentives to improve the economic and environmental sustainability.

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