International Journal of Strategic Property Management
ISSN: 1648-715X / eISSN: 1648-9179
2018 Volume 22 Issue 2: 143–156
https://doi.org/10.3846/ijspm.2018.445

MANAGEMENT OF CAPITAL ASSETS BY LOCAL GOVERNMENTS: AN ASSESSMENT AND BENCHMARKING SURVEY

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Received 1 November 2016; accepted 8 June 2017

Abstract. There is a growing recognition of the importance of government-owned capital assets, both conceptually and in practice, in large part due to the 2008 global financial crisis. However, a sizeable gap remains between the academic and professional "universe of knowledge" surrounding government asset management, and the actual asset management practiced by governments. In particular, the majority of governments around the world are wholly uninformed when it comes to good asset management. The purpose of this paper is to reduce this gap and suggest an instrument specifically for local governments, for the evaluation of their asset management, in order to help them to identify the weakest elements of asset management and thus focus limited resources on improving these elements. The instrument consists of essentially a composite image of good asset management practices for three main asset types: buildings, land, and infrastructure. The instrument specifies each asset management practice by its key characteristics and then converts each characteristic into a survey question. Answers are scored and a total score for each asset type is calculated. The assessment instrument can be used by local governments, their advisers, and by researchers interested in comparative analysis of asset management in different jurisdictions or countries.

Keywords: government-owned property, asset management, assessment, local government, land management, infrastructure management.

Introduction

Management of government capital assets (buildings, land, and infrastructure) began emerging as a distinctive area of public management in the late 1980s in some countries, such as Australia, New Zealand, and the UK, as well as in selected cities in the US (Utter, 1989; Audit Commission (UK), 1988; Conway, 2006; Dow, Gilles, Nichols, & Polen, 2006). Today the field can be viewed as substantially developed, mainly by ad hoc efforts of numerous governments and their advisors at all levels (central, regional, and municipal). What can be called the "knowledge universe" in this area has been built through several, sometimes overlapping channels:

– In some countries, there are specialized membership organizations for government asset-managing entities, such as the National Executive Forum on Public Property in Canada or Asset Management Planning Network (AMP) in the UK, which facilitate the exchange of experiences and ideas among members and occasionally launch member-requested research. In addition, there are international membership organizations for government entities (e.g. PuRE-Net and The Workplace Network) that perform similar functions across borders for central government entities. Unfortunately, most knowledge and data accumulated within such membership organizations are for internal use only, because members are very sensitive to disclosing their data (or lack thereof) and their specific issues.
– Governmental audit and oversight entities in a number of countries, in the UK and US in particular, have played a crucial role in highlighting the importance of managing capital assets well. Such groups have not only investigated the state of affairs and identified problems, but also have suggested potential solutions, thus serving as catalysts for further reforms (Audit Commission (UK), 2000; General Accountability Office (US), 2003, 2012, 2015). Their work has also informed specialized asset management audits in other countries (Berahim, Jaafar, & Zainudin, 2015).

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– Professional associations and societies, such as the Royal Institution of Chartered Surveyors (RICS) in the UK, the American Society of Civil Engineers (ASCE) the Transportation Research Board of the National Academies in the US, and the Federation of Canadian Municipalities and National Research Council in Canada, provide some assessment, research, and guidance on various issues of asset management. Their work is typically specific to particular sectoral divisions of capital assets (such as real estate or roads or waterworks (American Society of Civil Engineers, 2013)), for specific sets of instruments (like public-private partnerships (RICS, 2013)) or for capital investment planning (Vanier & Rahman, 2004). International donor organizations have also sponsored research and guidance documents on various aspects or sectors of asset management, such as waterworks (Asian Development Bank, 2013) or land management (Peterson & Thawakar, 2013). Occasionally, researchers at "think tanks" or universities publish papers regarding government asset management, and early studies date back to the 1990s (Gibson, 1994; Bond & Dent, 1998; Kaganova & Nayaar-Stone, 2000).
– Finally, the private consulting industry increasingly recognizes government asset management as a business niche, with many companies positioning themselves by publishing policy and technical briefs, and sometimes more substantive research (e.g. Audier, Bard, & Robieux, 2014; Grant & Skilling, 2014; Palter & Shilson, 2014; Deloitte, 2011). However, most of the research, methodologies, and recommendations by private companies remain confidential.

Despite all the growth and development in the field of government asset management, a huge gap remains between the "knowledge universe", on one hand, and practical asset management by governments, on the other hand. In particular, the majority of the numerous local governments around the world (save for a very few countries) are largely unacquainted with good asset management and have no effective fiscal incentives to improve. Any attempt to help such governments do better needs to start with an assessment of their current asset management. However, there is currently no standardized (or at least conceptually consistent) approach to such evaluation, which would (i) be based on the best current understanding of what constitutes "good asset management," (ii) evaluate management of all three major groups of capital assets (buildings, land, and infrastructure) consistently, and (iii) be specific enough to directly inform local governments on needed asset management improvements.

The purpose of this paper is to reduce this gap and suggest an instrument for the evaluation of asset management at the local government level. It is based on what can be called a composite image of good asset management and is very practically oriented. The instrument can be used by local governments, their advisers, and by researchers interested in comparative analysis of asset management in different jurisdictions or countries. The paper starts with a literature review, and then presents the methodology (concept, survey, and ranking). It also discusses the practical issues of administering this survey and concludes with an illustration of its test in cities in China.

1. Literature review

New Public Management (NPM), which became a worldwide phenomenon in the 1990's, had an impact on government asset management. In particular, many governments introduced practices such as cost efficiency measures, generating a governmental balance sheet, and performance management, all as a part of their asset management policies and practices (Peterson, 2006). However, some reforms associated with NPM did not resolve the underlying issues and continue to be debated. This is particularly true in regards to the introduction of accrual accounting in governments, and in terms of the merits of market valuation of government assets (Christiaen, 2004; Wynne, 2008; Kaganova, 2012).

Government capital assets came into sharp focus, both conceptually and in practice, as a result of the 2008 global financial crisis. The crisis hit many central and local governments hard, and forced them to re-examine their capital assets as part of their search for new savings and revenues (Kaganova, 2010/2011). Meanwhile, economists started placing these assets into the broader macroeconomic and macro-finance context, which resulted in a number of high-profile publications. In particular, the authors of the IMF paper *Another Look at Governments' Balance Sheets: The Role of Nonfinancial Assets* (Bova, Dippelsman, Rideout, & Schaechter, 2013) assembled available data on the value of non-financial government assets in 32 countries. The data became highly cited and revealed the magnitude of the value of non-financial government assets, including land and buildings, at a full 67% of GDP (on average, for 30 countries). The paper also made an important conclusion that compatible data for cross-country comparisons is often not available. This paper triggered a number of extrapolations of the estimated value of governmental non-financial assets to all countries (Overlaet-Michiels & Potoms, 2015; Detter & Folster, 2015).

The latter authors, in their book *The Public Wealth of Nations*, also argued that better management of government owned capital assets requires (i) better governance, (ii) asset management settings distanced from direct influence by politicians, and (iii) consolidation of various portfolios (e.g. buildings and infrastructure) under a single managing entity, implying assets owned by a central government. The last suggestion apparently ignores the fact that such one-size-fits-all institutional models usually do not work well. A single managing entity could suit relatively small countries quite well, such as Finland or Sweden or provinces like Ontario (Canada), but would be impractical and potentially disastrous in large countries like Canada or the US. A unified policy, combined with incentives, and imposed on all asset managing entities, is

a more feasible solution, as in the case of Canada (McKellar, 2006).

There is a growing body of research focusing on evaluation of asset management at all government entities within a country (or region of a country), or even in two or more countries. The most detailed and in-depth study found is by Overlaet-Michiels and Potoms (2015). They assessed real estate portfolio management in Flanders (Belgium) through analysis of responses to their formal online survey, answered by 493 government entities, including 236 municipalities. The authors also used follow-up in-depth interviews. The conceptual framework was based on seven elements of asset management (explicit policy, recognition of asset costs and value, information systems, accountability, centralization / decentralization of asset management, privatization, and accounting) that Conway, Kaganova, and McKellar (2006) drew from the practices of the central governments of Australia, Canada, France, and New Zealand. For their survey, Overlaet-Michiels and Potoms (2015) populated this framework with specific, quite detailed elements and questions. They also analyzed survey results according to the size of asset portfolio under management and found that for most of the seven elements of the framework, the bigger the size of the portfolio, the better the asset management. Finally, they benchmarked performance of government entities against five Belgian REITs that responded to the survey.

Phelps (2011) assessed property asset management in 12 local governments in the UK and 6 in Russia. His analytical framework included two levels, with three components on the top level, and each being further specified by characteristics at the second level: (i) rationale (including statutory requirements, external advocacy, financial imperatives, etc.), (ii) practice (including culture, governance, policy, information, etc.), and (iii) outcomes (including costs, conditions, value, client satisfaction, etc.). The author used in-depth structured interviews that allowed ranking of all municipalities along each characteristic. However, he encountered difficulty in measuring asset management outcomes, because they were rarely monitored by local governments. In general, performance matrices were exploratory in nature and not aimed at guiding improvements in a particular jurisdiction.

Gross and Źróbek (2013) assessed public real estate management systems, in terms of applied procedures, in Poland, Lithuania, Latvia, and Ukraine. They introduced two groups of characteristics, with several characteristics in each, assigned ranks to each country for each characteristic, and then calculated a composite rank of a country within each group. However, in our opinion, their methodology has a number of substantial weaknesses. Specifically, the first group of characteristics deals with real estate generally, not just government-owned real estate, and therefore has limited relevance. The second group of eight characteristics, which is supposed to focus on government property, includes two characteristics that are not relevant to government asset management per se (e.g. existence of a cadaster). The other six characteristics appear to be either too generic, prone to biased responses, or too complex to generate reliable and useful responses in the survey.

Based on interviews with regional officials, Hanis, Trigunarsyah, and Susilawati (2010) considered public asset management at local governments in Indonesia and outlined the most typical problems. Similarly, Shardy, Razak, and Pakir (2011) studied real estate asset management practices in the Malaysian federal government. They used detailed semi-structured interviews with qualified representatives of 12 ministries, with a framework for the interviews built upon thorough reviews of international literature on the subject. The results revealed both specific strength and weaknesses of asset management in the ministries.

Schulte and Ecke (2006) surveyed and analyzed asset management practices and method in 116 municipalities in Germany. They found that conceptual approaches, frameworks, and practices (including organizational settings) varied widely among municipalities. Operational inefficiency was found in many cases, due to fragmentation of responsibilities and functions. At the same time, at the time of the research, the sector was in transition, driven by a recognized need to improve real estate operations and by a broader modernization of the German public sector.

It should be noted that that all of the above assessments did not include infrastructure; rather, they focused only on real estate. Furthermore, while real estate should presumably include both land and buildings, the above studies apparently omit land, despite the fact that it can constitute a substantial share of the national wealth: in fact, as of 2010, the value of government land constituted 20% of GDP in Australia, 22% in Japan, 38% in France, 50% in Korea, and 98% in Costa Rica (Bova et al., 2013).

Regarding municipal infrastructure, several authoritative reports have demonstrated that even in such developed countries as Canada and the US, the sustainability of assets and related services are at risk, due to underfunding of the assets during their life cycle, thus indicating that life cycle management is crucial for good asset management. In particular, deferring proper operations and maintenance (O&M) of fixed assets can lead to a premature decline of the assets' condition and their ability to function and deliver services. It can also result in an accelerated need for capital investment in asset repair and replacement, which implies large future public liabilities. Thus, the American Society of Civil Engineers (2013) estimated overall conditions of US public school facilities as "poor," and that the investment needed to modernize and maintain them is at least $270 billion or more. Research launched by the Federation of Canadian Municipalities (2007) estimated the total additional investment needed to repair and prevent deterioration in existing, municipally owned infrastructure assets (water, wastewater, transit, transportation and other public infrastructure) at 123 billion (Canadian Dollars) in 2007. Similarly, the first Canadian Infrastructure Report Card (2012) assessed the overall condition of four primary as-

set categories of municipal infrastructure (drinking-water systems, wastewater networks, storm water networks, and municipal roads) based on data obtained through a voluntary survey of 123 Canadian municipalities. On average, about 30% of the municipal infrastructure ranked between "fair" and "very poor," with the replacement cost of these assets alone totaling $171.8 billion.

How "good practices" in local infrastructure management emerge is exemplified by the City of Portland (Oregon, USA). Its specialized reports (City of Portland 2010, 2015) show that the process of asset management evolved from separate efforts of various bureaus to a unified citywide approach and practices based on a coherent policy, long-term strategic planning, and consistent performance measurement and management.

McGraw Hill Construction (2013) identified good practices, and their benefits, within the water infrastructure sector in Canada and the US by conducting an online survey of 451 qualified respondents employed at water companies in these countries. The survey results were supplemented by confidential in-depth interviews and four case studies of water companies. Fourteen elements of asset management identified by survey designers were estimated by respondents in terms of use, effectiveness, and benefits. This led to an identification of the five most effective elements (e.g. asset condition assessment for renewal / replacement planning, development of asset management policy, strategic asset management planning, etc.).

Finally, it should be noted that there are international initiatives that attempt to bring some basic discipline and good practices to the management of non-financial (i.e. capital) assets – typically from an accounting viewpoint. For example, a group of multilateral and unilateral donors has been supporting the *Public Expenditure and Financial Accountability (PEFA)* program, which is built upon the principles outlined in the International Monetary Fund's statistics manual (PEFA, 2016). PEFA's protocol includes assessing elements such as the existence and completion of inventory records for nonfinancial assets, as well as procedures and rules for their transfer or disposal. Reporting on transactions with such assets is also assessed. Similarly, the Council of Europe's Local Finance Benchmarking Tool has a section on non-financial assets that is similar to PEFA's. Often such assessments are conducted in the wake of a country's accounting and public finance reforms, which introduce new asset accounting, valuation, and reporting requirements.

In general, the fundamental government asset management issues identified both in the literature and gleaned from the authors' practical experience on about 20 countries include the following:

(i) Common systemic deficiencies in asset management. Many local governments do not even realize the full extent of what assets they own or how much these assets cost them to operate and maintain. Institutional fragmentation and duplication among various departments and municipal enterprises is quite typical (Kaganova, 2008). Basic elements of good governance, such as transparency and reporting, are often lacking.

(ii) As already mentioned, threats to the sustainability of municipal assets exist even in developed countries, and in developing countries they are substantially higher.

(iii) A common lack of unified methodologies and approaches to asset management, even within a single local government. As a result, the three major groups of immovable capital assets – buildings, land, and infrastructure – are rarely managed with an equal measure of attention. For example, some infrastructure systems (e.g. water systems) are often managed using more advanced approaches than general public buildings. Furthermore, land is often managed even more poorly than public buildings.

(iv) Often, public accounting reforms do not lead to better management of capital assets, even when substantial resources are allocated to asset valuation, defying the high expectations commonly-held for these reforms ten to twenty years ago.

Rapid urbanization in many developing countries creates additional urgency for improving government asset management, because construction of new fixed assets takes place on such a large scale. Often such construction is done without proper planning and budgeting of future life cycle costs of existing and new assets, thus setting the stage for future problems.

2. Methodology

The concept

In order for governments to understand what to improve in their asset management and how, they must start by knowing exactly how they are currently performing. In public asset management, performance has two distinctly different components: (i) *system performance* (i.e. policies and practices of asset management), and (ii) *portfolio performance* (e.g. space consumption per municipal employee in government office buildings, or total annual cost of O&M per square meter in public buildings). System performance creates the foundation for portfolio performance, and therefore should be the first component to be addressed.

Our proposed methodology suggests a reasonably brief yet well-rounded performance evaluation and includes universal elements of good asset management, which makes the methodology applicable to nearly any country. It is purposefully designed to be an initial assessment that requires modest time and effort; the results of this concise evaluation can be used immediately to plan asset management improvements. It is presumed, however, that as a part of a comprehensive process of improving asset management, this assessment should eventually be complemented by in-depth assessment of various ele-

ments of the asset management system and an analysis of asset portfolios and their performance.

This assessment tool covers buildings, land and infrastructure that local governments own or control, directly or indirectly, including the assets of all their entities (such as government departments, budgetary institutions, and city-owned enterprises). Capital assets leased from other owners are not included in this instrument. Usually, buildings, land, and infrastructure are managed at the local government level by separate entities and teams. Therefore, the assessment has three independent parts: 1 – Buildings (or parts of buildings when they are separate properties), 2 – Land, and 3 – Infrastructure. Accordingly, this assessment can be applied in full, to all three categories of assets, or partially, to only one or two categories. The fact that the instrument covers all three major groups of assets within a single methodology distinguishes it from other attempts that usually focus on just one asset type.

The methodology combines four elements. *First*, it defines a set of current good practices based on international literature, professional debate among managers of municipal assets in a number of countries (primarily Canada and the UK), and broad empirical knowledge of international experiences in asset management that the authors have assembled. Then, each good practice is converted into one or more "characteristics." For example, the good practice of knowing what the government owns translates, for buildings, into such characteristics as "Level of completion of building inventory," and "Level of inventory computerization."

Secondly, each characteristic is converted into a question for local governments. Questions are formulated according to the principles of professional surveys (e.g. double-barreled questions are not permitted). Response options for each question are defined in the survey (e.g. the questions are predominantly close-ended) and reflect levels of advancement for each characteristic. In sum, the set of good practices and their associated characteristics are transformed into a survey instrument.

Thirdly, the answers are scored, in order to convert them into a comparable qualitative measurement of local government's advancement in applying the good practices. The scoring for each characteristic is immediately informative, as it identifies the stronger and weaker elements of asset management at a particular government, and thus provides decision-makers and asset managers with information about which elements may need improvements first and foremost.

Forth, in order to provide an integrated measurement of overall system performance, the methodology also introduces a summary (composite) score for each of the three groups of assets. Finally, to provide additional practical insights and guidance for decision-makers, the good practices and related summary scores for buildings and infrastructure are also split in two sub-components: one summary score for "basic asset management" and one for "advanced asset management".

The details: good practices and their characteristics

As indicated above, "good practices" are not always clearly agreed upon or articulated by either governments or experts within the domain of international public asset management. There are approaches, such as life-cycle costing, which are broadly recognized as good practices. However, overall, systems of asset management vary a great deal, and often differ even within one government (for example, between managing building portfolios and infrastructure systems). Further, some advanced government asset management entities use multi-dimensional performance matrixes for public property or infrastructure, e.g. the "balanced scorecard reporting" of the Canadian Land Company (McIvor, 2015). However, the approaches used by specific entities or at specific jurisdictions in one country would not be universally applicable to assessment in the international context, for a number of reasons. For example, approaches developed in the UK for public property are very advanced, but clearly tailored to the specific British situation, both regulation-wise and in the sense that their approaches are advanced well beyond what would be relevant for most local governments internationally (CIPFA Property, 2014).

One of the methodology's central ideas is to calibrate the depth of assessment for local governments with medium capacity, such as in many cities in Eastern Europe or China and to the improvements that can be realistically expected in the foreseeable future. At the same time, the methodology incorporates details that are critical for distinguishing truly good practices. In addition to drawing on numerous empirical works, the methodology builds upon several key sources that present elements of good practices (Kaganova & Kopanyi, 2014; McGraw Hill Construction, 2013; City of Portland, 2010, 2015; Peterson & Kaganova, 2010; Federation of Canadian Municipalities, 2002). Additional important sources included David Bentley (2014), Peterson and Thawakar (2013), Canadian Infrastructure Report Card (2012), Deloitte (2011), Olga Kaganova (2011), Audit Commission (UK) (2009), and the Federation of Canadian Municipalities and National Research Council (2006).

Table 1 presents the good practices and their characteristics that are included in this instrument. The good practices encompass knowing what assets a local government owns and controls; knowing why these assets are needed; market valuation of these assets for decision making and transactions; elements of good governance (such as transparency, use of auctions for asset al.ocation to the private sector, and how revenues from allocating assets are used); existence of a unified city-wide framework; strategic asset management planning; training opportunities for staff; life-cycle costing and management; and capital investment planning. Table 1 also displays the variations in applicability of good practices among the three asset types (buildings, land, and infrastructure), as determined by the nature of the assets in each of these groups. For example, land management does not include life-cycle costing and

Table 1. Good practices and their characteristics

		Part 1: Buildings	Part 2: Land	Part 3: Infrastructure
Good practice	Characteristics of the good practice			
Basic asset management				
Know what you have	Inventory of assets, level of completion	X	X (4)	X (5)
	Level of inventory computerization	X	X (4)	X (5)
	Breadth of inventory information	X		
Know why you need these assets	Existence of specialized asset management classification	X	X (4)	
Market valuation of assets for decision making and transactions	Existence of regulations requiring market valuation of buildings and/or land before transactions are conducted	X	X	
	Use of market valuation in practice, for decision-making	X (1)	X (1)	
	Use of market value (or market rent) in practice, in transactions	X	X	
Good governance: transparency	Transparency of documents and procedures related to this asset type	X (2)	X (2)	
	Transparency of transactions with assets of this type	X (3)	X (3)	
	Periodic reporting to decision-makers on this group of assets	X	X	X
	Periodic reporting to the public on this group of assets	X	X	
Good governance: use of auctions for allocating assets to the private sector	Use of auctions for allocating assets of this type to the private sector	X	X	
Good governance: how revenues from allocating assets are used	Regulation on using revenues from the transfers of assets for capital investment or debt repayment	X	X	
	Practice of using revenues from the transfers of assets for capital investment or debt repayment	X	X	
Advanced asset management				
Unified city-wide framework	Established responsibility for a common city-wide framework and approaches to management of assets of this type	X	X	X
Strategic asset management planning	Existence of strategic asset management plan (SAMP) or a similar specialized strategic document covering an asset type	X	X	X
Training opportunities for staff	Training and professional development opportunities for staff managing assets of this type	X	X	X
Life-cycle costing and management	Use of proactive maintenance / preventive repair plans and schedules for assets	X		X (5)
	Use of condition records about assets for repair and replacement planning	X		X (5)
	Updating condition records	X		X (5)
	Monitoring and recording annual operating and maintenance (O&M) costs for each building /part of buildings or major components of infrastructure systems	X		X (5)
Capital investment planning	Use of norms and standards for service provision and service levels for planning building and/or infrastructure needs	X		X
	Projecting long-term investment needs for main building groups and/or infrastructure	X		X (5)
	Existence of government-wide multi-year capital investment plan (as a part of the budgeting system) that covers buildings and/or infrastructure	X		X
	Considering future life-cycle costs while planning technical solutions for capital investment in particular buildings and/or infrastructure	X		X

End of Table 1.

		Part 1: Buildings	Part 2: Land	Part 3: Infrastructure
Good practice	Characteristics of the good practice			
	Assessing impact of future operation and maintenance (O&M) costs resulting from planned capital investment on the future operating budget	X		X
	Existence of special protected funds or accounts for accumulating funding for buildings' and/or infrastructure capital repairs and replacement	X		X

Notes: Numbers in parentheses indicate that a related question has further details as summarized below:

(1) Applied to allocation of buildings or land to four types of users: the private sector, social users, government users, and contribution to municipal enterprises or PPPs.

(2) (a) Applied to three types of users (private sector, NGO, and municipal enterprise) and (b) identifies four potential ways (public website, local newspapers, TV, etc.) of publicizing the information for each type of user.

(3) (a) Applied to three types of users (private sector, NGO, and municipal enterprise) and (b) identifies five elements of transaction information to be published (e.g. name of buyer, characteristics of the asset, etc.)

(4) Applied to four types of land: parcelized land held by a local government and its budgetary entities; non-parcelized land held by a local government and its budgetary entities; parcelized land held by city-owned companies; and non-parcelized land held by city-owned companies.

(5) Applied to each infrastructure system under municipal ownership/control.

management, because the latter is applicable only to improvements such as buildings and infrastructure.

It should be noted that Part 3 (Infrastructure) requires answering some questions for each infrastructure system separately, and the list of systems included in the survey is as follows:

Water systems; wastewater systems; storm drainage systems; solid waste collection and disposal facilities; parks & public spaces; cemeteries; streets and roads, power generation and distribution systems; and others (if such exist, they should be specified).

The details: the scoring system

As mentioned, each characteristic associated with each good practice shown in Table 1 is converted into a survey question for local governments to answer. For example, the characteristic "Use of condition records about assets for repair and replacement planning" becomes, for Part 3 (Infrastructure), the question "Do you have records of the conditions of the components of your infrastructure systems (for repair and replacement planning)?" This question must be answered for each infrastructure system under local government's ownership and/or control.

Each question has a finite list of potential answers. For example, the characteristic "Use of auctions for allocating buildings and/or land to the private sector" translates, for Part 2 (Land), into the question "How often do you use auctions as a form of allocating municipal land to the private sector?" which is answered by choosing one of following response options:

– Almost always (more than 95% of the times).
– Majority of cases (50–95% cases).
– Minority of cases (5–50%).
– Almost never (less than 5% of the times).

Then, each answer is scored on a scale from 0 (the lowest advancement) to 1 (the highest advancement): in the above example, "Almost never" will generate a "0" score, while "almost always" will generate a score of "1." For questions that apply to more than one asset holder/user or to sub-portfolios, or have other details (i.e. the questions for the characteristics marked in Table 1 by note numbers), a score is calculated on the same scale (0 to 1), as a simple average of the scores for individual answers to these questions. For example, if a city owns only two infrastructure systems, water and roads, and for the question about the level of inventory computerization the water system scored 0.67 and roads scored 0.33, the overall score for this question will be their average, 0.5. There is one exception to this equal-weight rule: for the characteristic "Use of market valuation in practice, for decision-making," the overall score is calculated as a weighted average, with the following weights: 0.5 to allocation of assets to the private sector, 0.25 to social uses, and 0.25 to municipal enterprises.

Finally, scores for all answers are summed in sub-totals and totals for Parts 1, 2, and 3 and presented as a scorecard, as shown in the Appendix (for the combined scorecards of two cities in China where the survey was tested). When the sub-total and total scores are calculated, all individual scores are summed with equal weights of 1, because at the current stage of asset management introduction of a weighted index would be premature and not based on any strong evidence or reasoning.

The scoring algorithm stipulates a possibility of some questions not being answered. Such an event leads to (i) assigning zero as a score for such a question (i.e. the lowest achievement), and (ii) counting and reporting on the scorecard the number of questions that were not answered (see the last row in the illustrative scorecard in Appendix).

Finally, on the scorecard, the scores for each characteristic are not only quantified on the zero-to-one scale, but also color-coded with a traffic-light theme: the best possible score of 1 is indicated by bright green, the worst score of 0 by bright red, the middle score of 0.5 by yellow, and the rest are in respective shades of light green, pink, and orange.

3. Lessons from testing the survey and ways to use it

The instrument was initially envisioned as a survey that local governments could self-administer, given that each question is accompanied by instruction. A completed questionnaire would be processed at NORC where a scorecard would be produced. However, when the test was self-administered in three cities in China, two problems emerged: (i) staff assigned to complete the questionnaire misunderstood or misinterpreted some questions, and (ii) without at least some verification of answers by independent experts, responses about current asset management practices can present them as being less or more advanced than they actually are. Government asset management experts in Denmark and Kyrgyzstan who reviewed the instrument expressed similar concerns. Therefore, it is suggested that this instrument be administered, as a rule, as an adviser-facilitated self-assessment, and that instructions be extended to include a glossary of notions and terms.

This instrument can be used by local governments and their advisors in two independent but complimentary ways. *First*, it can be used by any given local government independently from other local governments in a given country or region. The scores for each characteristic allow the local government to see how close each characteristic is to a possible maximum (in other words, to full implementation of the feature within good practice) and on which characteristics it lags behind. For example, in the test cities (see Appendix) the leadership of City 1 can see that elements of good practices that fall short include: periodic reporting on buildings and infrastructure; strategic planning for buildings, land, and infrastructure; life-cycle tools for buildings; etc. In addition, the total score assesses the overall state of local asset management. Thus, in City 1, the total score for buildings reached 12.01 out of the maximum of 26 points, or 46% of a good practice level. Further, if the assessment is conducted for more than one type of asset, local governments can compare relative performance of asset management systems by asset types. This can inform decisions on priority investments to improve asset management. Thus, City 2 has 44% of the good practice level for buildings, 69% for land, and 31% for infrastructure, which indicates that improving infrastructure asset management may be given the highest priority.

Second, if several local governments conduct this assessment in the same country, results can be used for comparisons and benchmarking. The latter would be especially beneficial, given that benchmarking is becoming a part of mainstream good asset management (Bentley, 2014; Towers, 2013). In particular, cross-government comparisons and benchmarking can catalyze focused exchange of practices/experiences, whereby local governments that are more advanced on some particular characteristics of asset management share their experiences with others that are less advanced. For example, as the Appendix indicates, City 1 could learn from City 2 about forms of periodic reporting to decision makers and to the public on land. Likewise, City 2 could learn from City 1 how they project long-term needs for such infrastructure systems as storm drainage, solid waste collection and disposal, and streets and roads.

Finally, this instrument can also be used by outside entities assisting local governments, such as donor agencies, providers of technical assistance, and consultants, in order to assess local practices within a unified framework. In particular, this instrument provides invaluable opportunities for diagnosing and analyzing asset management in different countries within a unified framework that generates comparable data. For example, the fact that land in the test cities in China was revealed to be managed better than buildings and infrastructure appears to be very unusual internationally, given anecdotal evidence from other countries where land often is the most neglected asset type. However, this should come as no surprise, given that urbanization in China has been funded quite substantially by revenues from land sales (Ye & Wu, 2014).

Conclusion, limitations, and what can be next

The suggested instrument can serve as a powerful asset management assessment tool for both in-country and cross-country studies, and serve as a guide for practical improvements of asset management by local governments in many countries. Use of this instrument would facilitate asset management reforms, in particular in developing countries and those experiencing rapid urbanization.

This instrument has certain limitations. First, it does not have a section regarding the use of land or buildings that governments may rent from the private sector. This case is excluded because the use of rental property is not typical for governments in developing countries, and is rare for post-transitional countries as well. Secondly, in some countries local governments may not yet possess the authority assumed by some of the indicators in the "advanced asset management" section (e.g., the ability to create multi-year capital investment plans). To make cross-country comparisons in such cases, one would need to exclude the indicators that are not applicable to some countries from the scorecards of all countries in a sample.

What should come next? The suggested instrument covers performance of asset management systems, but not performance of the assets themselves. This raises the question of whether performance indicators for asset portfolios should be introduced. While Key Performance Indicators, including indicators on portfolio performance (e.g., annual operations and maintenance costs per square meter of office space) are the subject of active interest among government asset managers in developed countries, the

authors of this paper believe that more exploratory work is needed before reasonably universal and actionable indicators could be suggested for government portfolios. Meanwhile, a hypothesis and hope is that by improving asset management systems, governments will set the stage for better portfolio performance – and even improve their performance to some extent.

Finally, an entity – in each country or regionally or internationally – needs to "own" this instrument and help local governments to apply it.

Acknowledgement

NORC at the University of Chicago sponsored development of the survey (and copyrighted it). The authors are thankful to their colleagues at NORC Kareem Kysia, Aparna Ramakrishnan, and Benjamin Zimmermann for their contribution in shaping the survey instrument and to the World Bank team comprising Alessandra Campanaro, Joanna Masic, Hazem Abdelfattah, Dr Eddie Hum, and Hongye Fan for pilot testing in China. The authors thank three unanimous reviewers for very helpful suggestions.

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APPENDIX. Combined scorecards for two cities in China

Asset Management Scorecard				
Part 1: Buildings (or Parts of Buildings if Separate Properties)				
Question No.	Characteristics of Good Practices	City 1	City 2	Maximum Score Possible
Basic Asset Management				
Q2	Inventory of buildings and parts of buildings, level of completion	1.00	1.00	1
Q3	Level of inventory computerization	1.00	1.00	1
Q4	Breadth of inventory information	0.44	0.56	1
Q5	Existence of specialized asset management classification of buildings and parts of buildings	1.00	0.00	1
Q6	Existence of regulations requiring market valuation of buildings and parts of buildings before transactions with them	1.00	1.00	1
Q7A	Use of market valuation of buildings and parts of buildings in practice, for decision making	0.50	0.00	1
Q7B	Use of market value (or market rent) of buildings and parts of buildings in practice, in transactions	1.00	0.00	1
Q8	Transparency of documents and procedures related to buildings and parts of buildings	0.50	0.70	1
Q9	Transparency of transactions with buildings and parts of buildings	0.92	0.96	1
Q10	Periodic reporting to decision makers on building assets	0.00	0.00	1
Q11	Periodic reporting to the public on building assets	0.00	0.00	1
Q12	Use of auctions for allocating municipal buildings / parts of buildings to the private sector	1.00	0.00	1
Q13	Regulation on using revenues from the transfer of buildings / parts of buildings for capital investment or debt repayment	0.00	1.00	1
Q14	Practice of using revenues from the transfer of buildings / parts of buildings for capital investment or debt repayment	0.00	0.00	1
Basic Asset Management, Subtotal Score (Q2 - Q14)		***8.35***	***6.22***	***13***
Advanced Asset Management				
Q15	Established responsibility for a common city-wide framework for and approaches to management of buildings (parts of buildings)	1.00	1.00	1
Q16	Existence of Strategic Asset Management Plan (SAMP) or a similar specialized strategic document covering buildings	0.00	0.00	1
Q17	Training and professional development opportunities for staff working on asset management of buildings (parts of buildings)	0.50	0.00	1
Q18	Use of proactive maintenance / preventive repair plans and schedules for buildings (parts of buildings)	0.00	0.33	1
Q19	Use of condition records about buildings (parts of buildings) for repair and replacement planning	0.00	0.33	1
Q20	Updating the condition records	0.33	0.67	1
Q21	Monitoring and recording annual operating and maintenance (O&M) costs for each building (part of buildings)	0.00	1.00	1
Q22	Use of norms and standards for service provision and service levels for planning building needs	1.00	1.00	1
Q23	Projecting long-term investment needs for main building groups	0.50	0.00	1
Q24	Existence of government-wide multi-year capital investment plan (as a part of the budgeting system) that covers buildings or parts of buildings	0.00	0.00	1
Q25	Considering future life-cycle costs while planning technical solutions for capital investment in particular buildings	0.00	0.50	1
Q26	Assessing impact of future operation and maintenance (O&M) costs resulting from planned capital investment on the future operating budget	0.00	0.50	1
Q27	Existence of special protected funds or accounts for accumulating funding for buildings' capital repair and replacement	0.33	0.00	1
Advanced Asset Management, Subtotal Score (Q15 - Q27)		***3.66***	***5.33***	***13***
	Total Score	**12.01**	**11.55**	**26**
	Questions Without Responses		**2**	

Part 2: Land		City 1	City 2	
Question No.	Characteristics of Good Practices	Score (for quantitative indicators the score approximates estimated actual levels)		Maximum Score Possible
Q2	Inventory of land, level of completion	1.00	0.50	1
Q3	Level of inventory computerization	1.00	0.50	1
Q4	Existence of specialized asset management classification of land	1.00	0.00	1
Q5	Existence of regulations requiring market valuation of land before transactions with it	1.00	1.00	1
Q6A	Use of market valuation of land in practice, for decision making	0.50	0.92	1
Q6B	Use of market value (or market rent) of land in practice, in transactions	1.00	0.00	1
Q7	Transparency of documents and procedures related to land	0.77	0.50	1
Q8	Transparency of transactions with land	0.83	0.92	1
Q9	Periodic reporting to decision makers on land	0.00	1.00	1
Q10	Periodic reporting to the public on land	0.00	1.00	1
Q11	Use of auctions for allocating land to the private sector	1.00	1.00	1
Q12	Regulation on using revenues from the transfer of land for capital investment or debt repayment	0.00	1.00	1
Q13	Practice of using revenues from the transfer of land for capital investment or debt repayment	0.00	0.00	1
Q14	Responsibility for establishing a common city-wide framework for and approaches to management of land	1.00	1.00	1
Q15	Existence of Strategic Asset Management Plan (SAMP) or a similar specialized strategic document covering land	0.00	0.00	1
Q16	Training and professional development opportunities for staff working on asset management of land	0.50	1.00	1
	Total Score	**9.60**	**10.33**	**15**
	Questions Without Responses		**2**	

Asset Management Scorecard				
Part 3: Infrastructure				
Question No.	Characteristics of Good Practices	City 1	City 2	Maximum Score Possible
Basic Asset Management				
Q2	Number of infrastructure systems under local government ownership and control (non-scoring characteristic)	5.00	7.00	-
Q3	Inventory of infrastructure, level of completion	0.74	0.33	1
S1	*Water*		*0.33*	*1*
S2	*Wastewater*	*0.67*	*0.67*	*1*
S3	*Storm dranage*	*0.67*	*0.33*	*1*
S4	*Solid waste collection & disposal*	*0.67*	*0.33*	*1*
S5	*Parks & public spaces*	*0.67*	*0.00*	*1*
S6	*Cemetaries*		*0.00*	
S7	*Streets and roads*	*1.00*	*0.67*	*1*
S8	*Power generation and distribution*			
S9	*Othe (specify)*			
Q4	Level of inventory computerization	0.30	0.43	1
S1	*Water*		*0.50*	*1*
S2	*Wastewater*	*0.50*	*0.50*	*1*
S3	*Storm dranage*	*0.00*	*0.50*	*1*
S4	*Solid waste collection & disposal*	*0.00*	*0.50*	*1*
S5	*Parks & public spaces*	*0.00*	*0.00*	*1*
S6	*Cemetaries*		*0.00*	
S7	*Streets and roads*	*1.00*	*1.00*	*1*

Asset Management Scorecard				
Part 3: Infrastructure				
Question No.	Characteristics of Good Practices	City 1	City 2	Maximum Score Possible
S8	*Power generation and distribution*			
S9	*Othe (specify)*			
Q5	Periodic reporting to decision makers on infrastructure	0.00	0.00	1
Q6	Periodic reporting to the public on infrastructure	0.00	0.00	1
Basic Asset Management, Subtotal Score (Q3- Q6)		***1.04***	***0.76***	***4***
Advanced Asset Management				
Q7	Established responsibility for a common city-wide framework for and approaches to management of infrastructure	0.33	0.00	1
Q8	Existence of Strategic Asset Management Plan (SAMP) or a similar specialized strategic document covering infrastructure	0.00	0.00	1
Q9	Training and professional development opportunities for staff working on asset management of infrastructure	0.50	0.50	1
Q10	Use of proactive maintenance / preventive repair plans and schedules for infrastructure	0.53	0.67	1
S1	*Water*		*1.00*	*1*
S2	*Wastewater*	*0.67*	*1.00*	*1*
S3	*Storm dranage*	*0.33*	*0.33*	*1*
S4	*Solid waste collection & disposal*	*0.00*	*1.00*	*1*
S5	*Parks & public spaces*	*1.00*	*1.00*	*1*
S6	*Cemetaries*		*0.00*	
S7	*Streets and roads*	*0.67*	*0.33*	*1*
S8	*Power generation and distribution*			
S9	*Othe (specify)*			
Q11	Use of condition records about infrastructure for repair and replacement planning	0.80	0.48	1
S1	*Water*		*1.00*	*1*
S2	*Wastewater*	*0.67*	*1.00*	*1*
S3	*Storm dranage*	*0.67*	*0.33*	*1*
S4	*Solid waste collection & disposal*	*1.00*	*0.67*	*1*
S5	*Parks & public spaces*	*0.67*	*0.00*	*1*
S6	*Cemetaries*		*0.00*	
S7	*Streets and roads*	*1.00*	*0.33*	*1*
S8	*Power generation and distribution*			
S9	*Othe (specify)*			
Q12	Updating the condition records	0.60	0.38	1
S1	*Water*		*0.67*	*1*
S2	*Wastewater*	*0.67*	*0.67*	*1*
S3	*Storm dranage*	*0.67*	*0.33*	*1*
S4	*Solid waste collection & disposal*	*1.00*	*0.33*	*1*
S5	*Parks & public spaces*	*0.33*	*0.33*	*1*
S6	*Cemetaries*		*0.00*	
S7	*Streets and roads*	*0.33*	*0.33*	*1*
S8	*Power generation and distribution*			
S9	*Othe (specify)*			
Q13	Monitoring and recording annual operating and maintenance (O&M) costs for infrastructure	0.80	0.33	1
S1	*Water*		*0.00*	*1*
S2	*Wastewater*	*0.67*	*1.00*	*1*
S3	*Storm dranage*	*0.67*	*0.33*	*1*
S4	*Solid waste collection & disposal*	*1.00*	*0.33*	*1*
S5	*Parks & public spaces*	*0.67*	*0.00*	*1*
S6	*Cemetaries*		*0.00*	

Asset Management Scorecard				
Part 3: Infrastructure				
Question No.	Characteristics of Good Practices	City 1	City 2	Maximum Score Possible
S7	*Streets and roads*	*1.00*	*0.67*	*1*
S8	*Power generation and distribution*			
S9	*Othe (specify)*			
Q14	Use of norms and standards for service provision and service levels for planning infrastructure needs	1.00	1.00	1
Q15	Projecting long-term investment needs for infrastructure	0.70	0.07	1
S1	*Water*		*0.00*	*1*
S2	*Wastewater*	*0.50*	*0.00*	*1*
S3	*Storm dranage*	*1.00*	*0.00*	*1*
S4	*Solid waste collection & disposal*	*1.00*	*0.00*	*1*
S5	*Parks & public spaces*	*0.00*	*0.50*	*1*
S6	*Cemetaries*		*0.00*	
S7	*Streets and roads*	*1.00*	*0.00*	*1*
S8	*Power generation and distribution*			
S9	*Othe (specify)*			
Q16	Existence of government-wide multi-year capital investment plan (as a part of the budgeting system) that covers infrastructure	0.00	0.00	1
Q17	Considering future life-cycle costs while planning technical solutions for capital investment in infrastructure	0.50	0.50	1
Q18	Assessing impact of future operation and maintenance (O&M) costs resulting from planned capital investment on the future operating budget	0.00	0.50	1
Q19	Existence of special protected funds or accounts for accumulating funding for infrastructure capital repair and replacement	0.67	0.00	1
Advanced Asset Management, Subtotal Score (Q7 - Q19)		***6.44***	***4.43***	***13***
	Total Score	**7.47**	**5.19**	**17**
	Questions Without Responses		**2.29**	
TOTAL SCORE FOR PART 1 - PART 3		**29.09**	**27.07**	**58**
Total number of questions without responses			**6.29**	