JOURNAL OF PUBLIC PROCUREMENT, VOLUME 17, ISSUE 4, 483-524 WINTER 2017

PUBLIC CAPITAL ASSET MANAGEMENT: A HOLISTIC PERSPECTIVE

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ABSTRACT. U.S. state governments own a large array of fixed assets and lease a great number of parcels of private real properties for public uses. The purpose of this paper is to explore the public asset management system of the U.S. state governments. First, this paper analyzes the major, current public asset management systems and the public procurement systems created by the Organization for Economic Co-operation and Development and the U.S. Government Accountability Office. Based on the analysis, this paper constructs a comprehensive public asset management system that consists of six cornerstones. Second, this paper verifies the comprehensive public asset management system using the data collected from thirty-seven surveyed state governments. The data analysis demonstrates that the comprehensive public asset management system is supported. However, each cornerstone of the comprehensive public asset management system presents different strengths. Third, this paper suggests that further research may delve into particular areas of capital asset management at the state government level to identify critical issues and to provide appropriate resolutions.

INTRODUCTION

In the United States, each state government owns, uses, and controls large quantities of capital assets. According to Governmental Accounting Standards Board (GASB) Statement 34, all tangible and intangible assets that are used in government operation with initial useful lives over a single reporting period are considered capital assets (GASB, 1999). Although each state defines capital assets by setting different capitalization thresholds, major capital assets in

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each state include motor vehicle fleets, buildings, improvements other than buildings, construction in progress, lands, equipment, and infrastructure. Capital assets have vital functions because they maintain state government operations and provide public services. State office buildings are venues where hundreds and thousands of state employees provide services and the public accepts services. Other buildings, improvements, and facilities directly or indirectly provide utility of service delivery and goods production. Equipment, machinery, vehicle fleets, and software are tools that during their useful life help employees provide service. Infrastructure assets, such as transportation and communication systems, drainage systems, water supply and sewer systems, dams, road networks, and lighting systems, combine multidisciplinary strategies to provide sustainable public services for significantly longer years than do other capital assets.

Sadly, capital asset management in the last three decades has witnessed, issues - such as loss, waste, misuse, obsolescence, failure, break, collapse that keep occurring within all categories of capital assets. Serious accidents that occurred with building, improvements, construction in progress, and infrastructure assets have caused damage, injuries, and loss of human lives. From 1980 to 2012, fifty-eight bridges of all types collapsed throughout the United States because of construction problems, striking of external forces, substructure failure, overload, material fatigue, fire caused by traffic crashes, river scour, inadequate maintenance, improper repair operation, and natural disasters, among other reasons (Barbaccia, 2012). From January 2005 through June 2013, failures of 173 dams occurred due to overtopping, foundation defects, slope instability, structural failure of the materials used for dam construction, inadequate maintenance, piping, and other causes (Association of State Dam Safety Officials, 2016). Since 1980, about 50 building and facility failures and collapses have occurred in the United States because of construction problems, operation defects, corrosion, material fatigue, and natural causes such as earthquake and snow load on roof (Lememmurier, 2016). The occurrence of these disasters and failures demonstrates that an appropriate management system is needed for public capital assets to provide desirable performance.

These facts of catastrophic failures and accidents prove that defects and problems exist in the practice of public asset

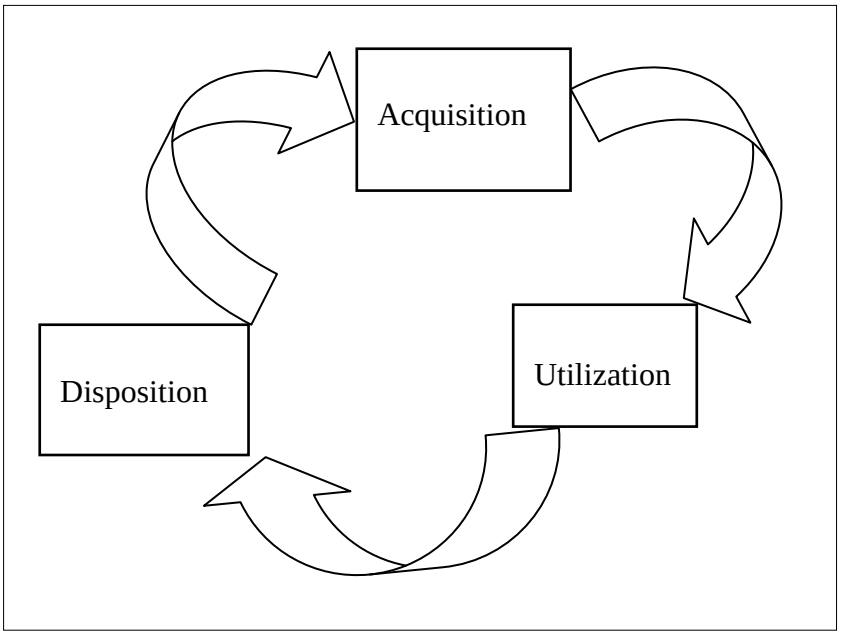
management. Appropriate management systems ensure that capital assets are inventoried according to accounting standards and function well at lower cost, that they contribute to efficient and effective provision of goods and service, and that they are maintained regularly to avoid safety issues and failures. This paper undertakes a comprehensive review of public asset management systems of U.S. state governments. It identifies the importance, objectives and goals of public assets. It then thoroughly analyzes the major systems and frameworks of current public asset management and public procurement management. The purpose of this analysis is to identify the common factors or cornerstones in these systems and establish a new comprehensive public capital asset management system. The paper tests the new public asset management system by analyzing data collected from major public asset management departments of U.S. state governments and presents a number of suggestions about further research that may help improve fixed asset management and attain its goals and objectives.

PUBLIC ASSET MANAGEMENT AND ITS OBJECTIVES AND GOALS

Public asset management is the process of making and implementing decisions regarding the acquisition, utilization, and disposal of capital assets that a government owns, uses, and controls (Kaganova, McKellar, & Peterson, 2006). This definition identifies the major activities of public asset management. Acquisition includes purchase, construction, leasing, and inventorying. In the cases of large-scale equipment, buildings and infrastructure assets, acquisition is a complicated process that involves planning, solicitation and selection of sources, award of contracts, and contract administration (Thai, 2007). Utilization includes not only regular maintenance, inspection, and repair, but also valuation, portfolio review, financial auditing, and asset reporting (Fernholz & Fernholz, 2007). Asset disposal is a process in which an asset is sold, redistributed, donated, discarded, or demolished. This process involves estimate of the gain or loss from the disposal, recording of the actual gain and loss, or recording of the new asset cost for the accounting purpose if there is a trade-in. Figure 1 shows the process of public asset management. For the purpose of this paper, public assets management refers to public capital asset management because capital asset management focuses on maximizing value to a property or portfolio of properties (Builta, 1994) while management of

current assets focuses on generating financial information for decision making that falls into the domain of financial management (Finkler, 2005).

FIGURE 1
Public Asset Management Process



Decision making regarding public asset management aims to attain the objectives and goals of public asset management, which are determined by the purposes of an asset. Generally, government agencies do not own capital assets only for economic profits. Nor do they produce goods and deliver service for the pecuniary purpose. Instead, government agencies own and lease capital assets to fulfill governmental missions, to provide direct service for the public, and to provide workplaces for their employees (National Research Council, 1998). Based on these purposes, government defines the major objective of capital asset management as promoting efficient and economical use of government-owned properties (GAO, 2008; Executive Order 13327). Specifically, when capital assets are

considered as an assisting mechanism with which government maintains operation and provides services, the cost capital assets is actually part of the costs of government operation and service provision (Edwards & Ellison, 2004). Therefore, capital asset management intends to reduce the cost and provide for better utilization of assets. Meanwhile, when capital assets are utilized as financial investment, capital asset management is to maximize the financial return. When they are utilized as social investment, the objectives of capital asset management are to minimize governmental subsidy and maximize the social value, cultural value, convenience value, and ecological value of assets (Fernholz & Fernholz, 2007; Simons, 1993b).

The goals of public asset management fall into two categories: traditional and non-traditional (Kaganova & Nayyar-Stone, 2000). The traditional goal is to supply appropriate properties for provision of public goods and services at the least cost based on market valuation (Kaganova & Nayyar-Stone, 2000; Fernholz & Fernholz, 2007; Dent & Bond, 2007). If a government adopts a central asset management approach, its goals of asset management are to help government agencies on asset management issues and to support agency missions and strategic goals through life-cycle cost-benefit analysis and implementation of public and commercial benchmarks (GAO, 2007). Government agencies may decide to use asset services that private businesses provide if quality and costs of the asset services that the central asset management agency provides are not acceptable. Typical non-traditional goals of public asset management include supporting economic development, promoting social development, and developing governmental revenue sources (Simons, 1994; National Research Council, 1998; Dent & Bond, 2007; Kaganova & Nayyar-Stone, 2000; Kaganova, Nayyar-Stone, & Peterson, 2000). These non-traditional goals relate to particular asset management programs, such as land lease and other financial investment programs, environmental projects, public housing programs and other social investment programs, and disposition of surplus public assets (Kaganova et al., 2000; Simons, 1993b). They address government strategic planning that focuses on productive use of public assets and capital investment in social development.

LITERATURE ANALYSIS

Current Research on Public Asset Management Systems

Researchers have attempted to establish a public asset management system (or framework) based on their examination of public asset management functions, practices, and experiences. Owing to differences in research purposes and in focus of public asset categories at a certain level of government, all the public asset management systems ever developed contain distinct components.

Simons (1993a, 1993b) surveyed corporate real estate managers and public real estate managers in the Cleveland, Ohio, metro area. He had explored the status of public real estate management in the early 1990s and compared it with corporate real property management. Although based on a survey in a relatively small region, he identified a number of deficiencies of government real estate management in organization of real estate, information management, formalization of objectives and rules, and specific approaches of real estate management (Simons, 1993b, 1994). The comparison between corporate and public real property management demonstrates that, in a number of specific areas, government may adopt certain decision-making strategies and management practices that private businesses have implemented. Simons (1993b, 1994) recommended various approaches to real estate management in the public sector. The major measures encompass the following elements:

- establishing a centralized real estate authority to direct control over acquisition, management, and property disposition functions,
- devising policies and decision rules appropriately,
- creating a property-by-property accounting system,
- creating a management information system (MIS),
- developing expertise to derive maximum financial return, and
- evaluating asset holdings like a portfolio (Simons, 1993b, pp.651-652).

These measures are crucial components that may help resolve the current issues in public asset management. The approaches to real estate management constitute an operating mechanism at the local government level (Simon, 1993a, 1993b, 1994), but they are far from constituting a comprehensive system of public asset management, which is rather complex and involves a variety of components and complicated processes.

Based on the Denver Model of real property management, the corporate real estate asset management prototype, and their literature review of approaches to public asset management, Kaganova and Nayyar-Stone (2000), Kaganova (2008), and Kaganova, Nayyar-Stone, and Peterson (2000) established a framework of municipal fixed asset management. The framework is composed of components for inventory, property management and accounting, portfolio management, and strategy implementation. Each component consists of specific factors of requirements or procedures for different stages of asset management. Overall, the factors constitute a "menu" that contains major activities to make public asset management more effective (Kaganova & Undeland, 2006). According to its specific political and administrative priority needs, a local government can establish its own real property management framework by selecting particular factors from this menu (Kaganova, 2008).

Fernholz and Fernholz (2007) identified seven components and established an asset management system for local governments. The seven components include a political, legal, and regulatory framework; inventory and information system; registration of municipal assets; the financial reporting system; administrative and organizational considerations; technology and asset management; and strategic views of asset management. This framework of public asset management encompasses a broad range of essential components that are functional in different phases of management. Comparatively, this framework may serve as a useful toolkit for asset managers in local government. However, the framework fails to address the process of management from asset acquisition to asset disposition. In addition, since most local governments do not have large quantities of capital assets and they hardly possess appropriate expertise of asset management in certain aspects, the problem was not addressed in the management framework.

The three frameworks/systems elaborated public asset management from different perspectives and with distinct components. The public asset management approach created in Simons (1993a, 1993b) focused on the feasibility to adapt corporate real estate management approaches to public asset management. The suggested management approach highlighted the organization of a real estate function that combined the primary strategies used in

both public and private sector asset management. The public asset management framework established by Kaganova and Nayyar-Stone (2000) examined public asset management from a portfolio perspective. The framework emphasized attainment of asset management goals and objectives based on classification of all real properties a government owns and controls. The public asset management system created in Fernholz and Fernholz (2007) dealt with asset management from an administrative and organizational perspective. Different from the two frameworks previously discussed, this system required attention to legal and regulatory components, auditing and transparency components, and regular reviews of options. In addition, the system was a practical toolkit that provided detailed guidance regarding how to check if current asset management approaches were reasonable and how to use the management approaches included in the system.

Obviously, the three frameworks/systems previously discussed have a number of components in common (see Table 1). In more general terms, these common components include legal and regulatory (or policy) framework, a management information system, financial and accounting report, performance evaluation, and portfolio management. Other major conceptual components are pinpointed by one or two asset management systems. These individual components are centralization of authority, in-house expertise and incentive for better management, auditing and transparency, acquisition, rental, use, and sales of assets, technology mechanism, and strategic review. These particular elements can be either a categorical component or an item in a categorical component. For example, strategic review is generally considered a categorical component; and acquisition, rental, use, and sales of assets are actually specific elements in life-cycle management, which is a broad categorical component.

Considering the fact that current research on public asset management has not tapped a number of key factors in public asset management, the author analyzed two widely-used public procurement management systems to seek the factors that current asset management research had missed. There are two reasons for this analysis of public procurement management systems. One is that the way public procurement is conducted can be used as reference

TABLE 1
Public Asset Management System Comparison

Common Factors	Simons Framework	Kaganova & Nayyar-Stone Framework	Fernholz & Fernholz System
Organization of Management	Centraliza-tion of acquisition, management & disposition	Strategy implementation component: centralized authority,	
Legal and Policy Factors, Operation and Capacity Building	Policy & decision making	Strategy implementation component: policy & decision, in-house expertise, incentive for better management	Political, legal, & regulatory framework
Operation & Information	Property-by-property accounting system	Property management & accounting component: management & accounting system on property-by property basis, value report	Financial reporting system: accounting standards, methods of valuation and appraisal
Management throughout Life Cycles	Maximum financial return, evaluating asset holdings like a portfolio	Asset management component: role of real estate based on municipal goals, portfolio management, approach class-specific financial tools and performance standards, policy for rationing property demands and consumption	Administrative and organizational considerations for property management: organization, audit mechanism, transparency, efficiency, acquisition, rental& sale of assets, contracting

TABLE 1 (Continued)

Common Factors	Simons Framework	Kaganova & Nayyar-Stone Framework	Fernholz & Fernholz System
Information Management	Management information system	Inventory component	Inventory and information system & registration: classification & registration of assets, organization of registry
Technology			Technology & asset management
Monitoring & Integrity			Strategic review & valuation: review of costs vs. benefits, mission, objective, and performance of assets, portfolio reviews for major assets, promoting synergies & accountability

for public asset management; the other is that the essential elements of public procurement are indispensable in public asset management because the two areas are interrelated. The two public procurement management systems are the national public procurement system created by the Organization for Economic Co-operation and Development (OECD) and the procurement framework established by the U.S. Government Accountability Office (GAO).

The OECD's national public procurement system requires four pillars: legislative and regulatory framework, institutional framework and management capacity, procurement operations and market practices, and integrity and transparency (OECD, 2006). Each pillar is composed of a number of components and sub-components. Similarly, GAO's procurement framework includes four cornerstones: organizational alignment and leadership, policies and processes, human capital, and knowledge and information management (GAO, 2006). Each cornerstone encompasses a number of elements, each of which, in turn, is supported by several critical factors. Table 2 compares these two systems.

TABLE 2
OECD and GAO Standards of Public Procurement System

Common Factors	OECD Procurement System	GAO Procurement Framework
Laws and Regulations	Legislative & regulatory framework: (a) achievement of the agreed standards and compliance with applicable obligations; (b) existence of implementing regulations & documentation	
Organization of Management	Institutional framework and management capacity: (a) integration of procurement system into public governance system; (b) normative or regulatory body; (c) institutional development capacity	Organizational alignment & leadership: (a) aligning acquisition with agency's missions; (b) commitment from leadership
Management Process	Procurement operations and market processes: (a) efficient procurement operations; (b) functionality of the public procurement market; (c) contract administration & dispute resolution	Policies & processes: (a) strategic planning; (b) effective management of the acquisition process; (c) promoting successful outcomes of major projects
Integrity and Transparency	Integrity & transparency: (a) control & audit system; (b) appeals mechanism; (c) access to information; (d) ethics & anti-corruption mechanism	
Human Resources Strategies		Human capital: (a) valuing & investing in the acquisition workforce; (b) strategic capital planning; (c) acquiring, developing & retaining talent; (d) creating results-oriented organizational culture
Knowledge and Information		Knowledge & information management: (a) acquisi-tion data & technology; (b) safeguarding the integrity of operations & data

Comparison demonstrates that both OECD and GAO focus on distinct requirements of a procurement structure. The OECD's national public procurement system is a comprehensive mechanism that emphasizes administrative factors. The system does not have separate pillars of human capital and knowledge and information management as the GAO procurement framework does. However, sub-indicators in two pillars of the OECD's system—"institutional framework and management capacity" and "procurement operations and market processes"—require procurement information management, procurement knowledge, training, performance evaluation, capacity development of procurement staff, and procurement competence. These requirements are akin to most of the functions of "human capital" and "information management" in the GAO framework. Likewise, the GAO procurement framework focuses more on operation requirements and guidance that help assess an agency's procurement function and contribute to the attainment of organization goals and objectives. It does not include legislative and regulatory facets and integrity and transparency facets as the OECD procurement system does because all government agencies are obliged to comply with laws, regulations, and policies regarding operations and professional ethics. This does not mean that legislative and regulatory standards and integrity standards are of minor importance.

The Comprehensive Public Asset Management System

The analyses above demonstrate that the current main public asset management system and the public procurement management systems have a number of essential components in common (Fernholz & Fernholz, 2007; Kaganova & Nayyar-Stone,2000; Kaganova, 2008; Kaganova, Nayyar-Stone & Peterson, 2000; Simons, 1993a, 1993b). Legal, regulatory, and policy components constitute a foundation on which public asset management is instituted and organized. Generally, a legal framework serves as an instrument that regulates activities, procedures, and administration of government agencies (Moe, 1997; Stanton, 1995; Wright, 2011). This applies to public asset management in that public asset management depends on laws, regulations, and policies for authority, organization, responsibility definition, and management strategies, among other things. Organization of management is another component in the current public asset management system. Establishment of an

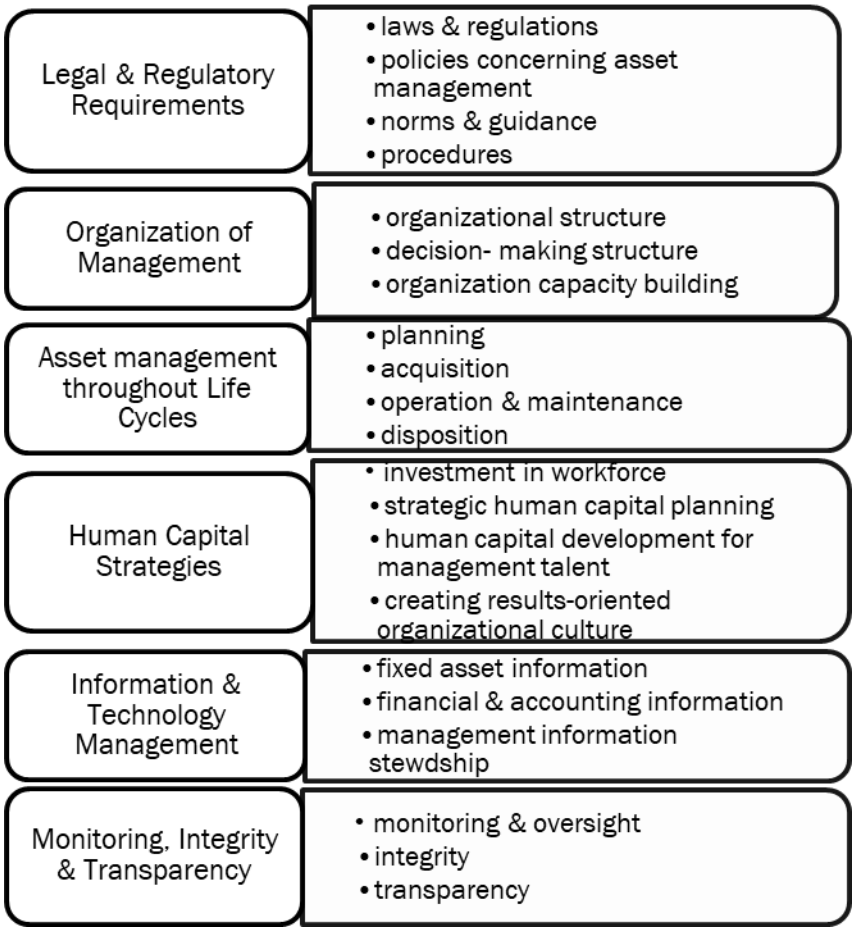
organization structure involves a number of external and internal factors, such as environment, size of an agency, workflow, technology, strategy, and organizational culture (Daft, 2004; Hitt, Middlemist, & Mathis, 1989; Slocum & Helriegel, 2007; Tung, 1979). Organization of management determines how decisions are made and how capacity is built throughout the asset management process which relates to a wide variety of stakeholders, management operation, and organization objectives (Cummings & Worley, 2009; Daft, 2004; French & Bell, 1995). A number of components have been adopted in current public asset management systems to deal with specific activities and strategies throughout the life of assets. These components can be categorized into a framework of asset management throughout the life cycle of assets. The life cycle consists of asset planning, acquisition, operation and maintenance, and disposal (Christian & Pandeya, 1997; Gish, 1994; Harris, 1994). Each phase of an asset's life cycle involves various operations based on an agency's functions and responsibilities. Also, information management is a key component in current public asset management systems. Public managers have to obtain necessary data and process the data into usable information (Hitt et al., 1989) to understand the current status of asset management and make subsequent decisions to attain management goals and objectives. Decision-making tools have been improved to solve complicated problems and technology is an important component that works together with information management.

Comparatively, two components are not as common as the other components, but both are quite fundamental in the current public asset management systems. One is human capital management; the other is monitoring and integrity. Human resources are an essential part of investment that helps improve efficiency and effectiveness of asset management to provide expected service. In the realm of public real property management, operation and maintenance costs account for 60%) to 85% of a facility's total ownership cost; and costs of human resources require more than 60% of total ownership cost (Christian & Pandeya, 1997). Strategic human capital planning aligns decisions on human capital with decisions regarding the missions of asset management and organization goals (GAO, 2006; U.S. Office of Personnel Management, 2006). The planning takes into account workforce requirements and addresses critical skills, development needs, and human capital challenges such as diversity, retention, and

leadership capacity (Conover, 1996; GAO, 2006; Hayles, 1996; Rummler, 1987). In addition, human capital management involves human sustainable investment in different facets of human resources and creation of a results-oriented organization culture to improve performance and build operation capacity (Sylvia & Meyer, 2002). With regard to monitoring and integrity, government activities must be monitored and overseen both internally and externally; government must be accountable to its electorate for its actions; and civil servants need to act visibly, predictably, and understandably (Piotrowski, 2007). In the realm of public asset management, public managers need to be accountable to the public for asset property planning, acquisition, operation, and disposal. Generally, monitoring and oversight highlights compliance with laws, effectiveness of policies and procedures, contract management, performance measurement, and financial accountability. Integrity and transparency emphasize consistent honesty and impartiality of government agencies in fulfilling their responsibilities. Integrity and transparency require that public asset managers make major decisions in an open forum, and communicate important asset management information to all inside and outside stakeholders (Hentschel & Utter, 2006). Government needs to take effective measures to establish a mechanism of integrity and transparency in the public asset management system. Particular measures may include information release, an effective control and audit mechanism, an efficient appeals mechanism, and an anti-corruption mechanism.

Based on the analyses of current public asset management systems and public procurement systems, a comprehensive public asset management system could be suggested. This system should consist of six cornerstones, including legal and regulatory requirements, organization of management, asset management throughout life cycle, human capital strategies, information and technology resources management, and monitoring and transparency of asset management. These cornerstones are not separated from each other. They are correlated and work together to provide services directly or indirectly for the public. Table 3 is a visualization of the structure and components of this system. In the light of the size of state fixed assets and the importance of fixed assets in the finance of state governments, this framework may apply to public asset management in U.S. state governments.

FIGURE 2
The Comprehensive Public Asset Management System



RESEARCH METHODS

This research used two ways to obtain information regarding fixed asset management at U.S. state governments. One way was a mail survey; the other way was website content analysis. The mail survey questionnaire was constructed following the structure of the comprehensive public asset management system previously elaborated. The survey questions covered the major component of the comprehensive public asset management system. The

questionnaire was reviewed by two capital asset managers of local governments and then revised in language and structure. The revised questionnaire was sent through regular mail and email to the chief executives of state departments in charge of major categories of fixed assets of a state government. To encourage a high response rate and complete work on each question, a message was included in the survey questionnaire to promise that respondents would receive a copy of survey result analysis. The surveyed executives were supposed to complete the survey and send back the questionnaire in four weeks. Two weeks after the survey questionnaire was sent out, follow-up cards were sent to those who received the questionnaire to remind them that the questionnaire needed to be completed and sent back by the deadline. A thank-you letter was sent to the email address provided at the end of each questionnaire or the address provided on the envelope. All questionnaires sent back were considered effective no matter how many questions were answered. Thirty-seven responses were received — a response rate of 74%. This response rate does not affect the validity of the research on the state level of capital asset management because the population data from 50 states does not affect variance on the state level (Gill, 2001). Table 3 presents regional distribution of the respondent states.

TABLE 3
Regional Distribution of Respondents

Region 1 (Northeast)	**9 states/6 respondents (Underlined)**
Division 1 (New England)	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut
Division 2 (Mid-Atlantic)	New York, Pennsylvania, New Jersey
Region 2 (Midwest)	**12 states/8 respondents (Underlined)**
Division 3 (East North Central)	Wisconsin, Michigan, Illinois, Indiana, Ohio
Division 4 (West North Central)	Missouri, North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa
Region 3 (South)	**16 states/12 respondents (Underlined)**
Division 5 (South Atlantic)	Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida
Division 6 (East South Central)	Kentucky, Tennessee, Mississippi, Alabama
Division 7 (West South Central)	Oklahoma, Texas, Arkansas, Louisiana

TABLE 3 (Continued)

Region 4 (West)	**13 states/11 respondents (Underlined)**
Division 8 (Mountain)	Idaho, Montana, Wyoming, Nevada, Utah, Colorado, Arizona, New Mexico
Division 9 (Pacific)	Alaska, Washington, Oregon, California, Hawaii

After the mail surveys were sent out, website content analysis was conducted for two purposes. One purpose was to understand the organization structure of capital asset management at state governments. The organization structure would display how different categories of capital assets are managed and how management activities are organized. The other purpose was to find out how decisions are made to allocate public resources for capital assets, to utilize current capital assets, and to dispose of surplus capital assets.

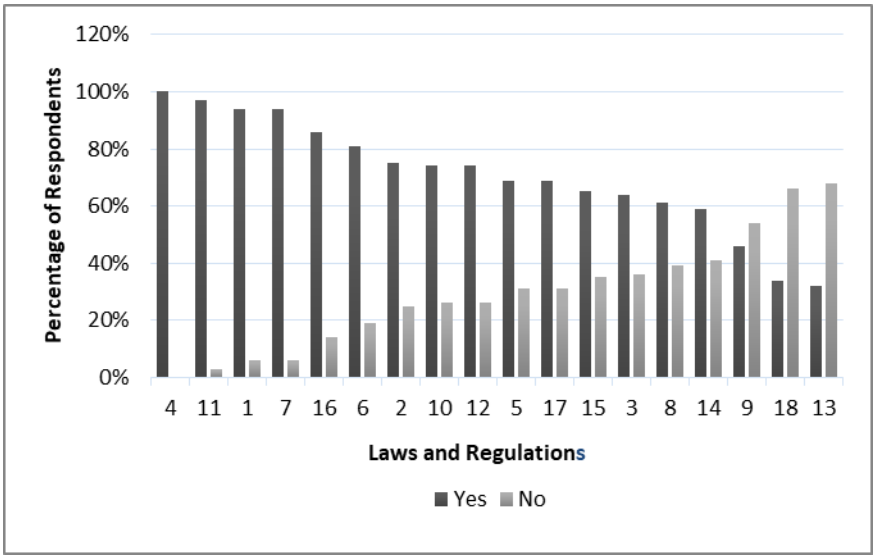
THE SURVEY RESULTS OF CAPITAL ASSET MANAGEMENT AT STATE GOVERNMENTS

This section analyzes the data collected through the mail survey and website content analysis. Descriptive statistics, including number comparison, percentages, means, charts, tables and figures, were used to summarize the main characteristics of each cornerstone of public capital asset management at state governments. Analytical statistics also led to conclusions about public asset management and revealed trends in public asset management.

Legal and Regulatory Requirements

The mail survey questionnaire addressed legal and regulatory requirements in eighteen areas (see Note 1) of capital asset management, which involve each cornerstone of the proposed comprehensive public asset management system. Specifically, six areas including fixed asset disposal, leasing real property from the private sector, fixed asset acquisition, regular reporting of fixed assets, audit and control, and fixed asset valuation were managed pursuant to laws, regulations, policies, norms, and guidelines in more than 80% of the respondent states. Only three areas including centralized registration (legal title), performance evaluation, and fixed asset supply were regulated in less than 50% of the respondent state governments. Figure 3 presents the status of legal and regulatory

FIGURE 3
Legal and Regulatory Status of the Respondent States



construction of the respondent states. Overall, of an average of 35 respondents to each identified legal and regulatory requirement, an average of 25 respondents, i.e. 71% of the average total, reported that they had the legal and regulatory requirements (see Table 4). By cornerstones of the capital asset management, 83% of respondents had the identified legal and regulatory requirements in the area of Asset Management throughout Life Cycle while 58% had the identified legal and regulatory requirements in the area of Organization of Management. In the other areas, about 70% of the respondents had the identified legal and regulatory requirements.

This research intended to explore the effects of legal and regulatory requirements - including laws, regulations, policies, norms, and guidelines - on performance of capital asset management at the U.S. state government. Considering the wholeness of legal and regulatory requirements, the researcher did not separate laws and regulations, which are more enforceable, from norms and guidelines, which are expected stands and indicators. It is not easy to assess the effects of legal and regulatory requirements for fixed asset

TABLE 4
Legal and Regulatory Requirements for Fixed Asset Management

Regulated cornerstones of the capital asset management system with specific requirement in brackets	Total Valid Cases[1]	Yes[2]	%	No[3]	%
Organization of management (8, 9, 10, 12, 13)	175	101	58	74	42
Asset management throughout life cycle (1, 2, 3, 4, 5, 11)	215	179	83	36	17
Human capital strategies (15, 17)	69	46	67	23	33
Information and technology resources (6, 7, 18)	106	74	70	32	30
Monitoring, integrity and transparency (14, 16)	69	50	72	19	28
Average of all legal and regulatory requirements	35	25	71	10	29

Note: [1] Total valid cases: the total number of questions that were answered.

[2] Yes: the number of respondents that have legal and regulatory requirements for this area.

[3] No: the number of respondents that do not have legal and regulatory requirements for this area.

management. When asked to make an estimate of how much effect legal and regulatory requirements had produced on performance of their capital asset management, 10% of respondents did not answer this question. Based on the perception of respondents who answered this question, an average of 71% assumed that legal and regulatory requirements produced “moderate” or “much” effect on their capital asset management in 15 of the 18 identified areas. The five areas for which legal and regulatory requirements were the most effective included anti-corruption, fixed asset disposal, professional ethics, fixed asset acquisition, and capitalization policies. In contrast, fixed asset use, fixed asset performance evaluation, and fixed asset operation & maintenance were the three areas where legal and regulatory requirements were least effective.

Organization of Management

The content analysis of websites revealed that in each state there was no one department responsible for management of all fixed assets the state owns, controls, and leases. Usually the department of transportation accepted responsibility for construction, maintenance, and repair of highways, bridges, tunnels, and other affiliated properties, which accounted for the majority of state-owned fixed assets. One or more of the other departments managed

additional fixed assets, such as buildings, equipment, improvements other than buildings, infrastructure, fleets and vehicles, and land. Website information showed that every U.S. state government had adopted a management system to take care of the major capital assets it owned, used, and controlled. Besides the department of transportation, 45 of 50 states had one department that was mainly responsible for management of major capital assets. In these states, the capital asset management responsibilities usually lay in divisions of a comprehensive department such as the Department of Administration/Administrative Services (in 33 states), or Department of Finance/Budget/Accounting and Administration (in 10 States), or Department of Administration and Information/Personnel (2 states). Five states, including Alabama, Arkansas, Connecticut, Georgia, and Texas, had two departments that were mainly responsible for management of their states' capital assets. Apart from a department that took charge of general capital assets, these states had a particular department in charge of building authority, or public works, or land. The major responsibilities of the capital asset management divisions included facility operation and management, fleet management, building and planning services, construction services, surplus property disposition, leasing and space management, risk management, and state procurement.

For the purpose of this research, centralization of fixed asset management is defined as an approach by which one agency takes charge of all properties (or a property category), or by which a central agency is responsible for policy oversight, monitoring, and evaluation of state properties while other agencies are delegated authority to own, lease, and manage the properties. Decentralization of fixed asset management is an approach by which individual agencies have delegated authority from the chief executive to own and manage properties for service delivery. A mixed approach is a combination of centralization and decentralization. The mail survey results demonstrated that these three approaches were employed throughout state governments. Of 37 respondent states, two states employed a centralization approach to manage all major categories of fixed assets; two states utilized a decentralized approach to manage all five major categories of fixed assets; and six states had adopted a mixed approach to manage their major categories of fixed assets. The features of fixed asset management forms are summarized in Table 5.

TABLE 5
Fixed Asset Management Approaches in States

Mategories of fixed assets	Capital Asset Management Approaches			
	# of Valid Cases	Centralized	Mixture	Decentralized
Buildings	36	5 cases: ID, IN, MA, OH, ME	24 Cases: AK, AZ, AR, CT, GA, LA, MI, MS, MO, NE, NC, OR, RI, SC, TX, WV, MN, WA, NM, WY, VT, UT, IA, CA	7 Cases: HI, NV, NH, ND, OK, FL, VA
Fleets & Vehicles	35	12 cases: AK, ID, IN, MI, MS, NV, NC, SC, UT, IA, OH, ME	19 cases: AZ, AR, CT, LA, MO, NE, NH, OK, OR, RI, TX, WV, MA, WA, NM, VT, TN, CA, VA	4 cases: HI, ND, WY, FL
Office equipment	35	5 cases: ID, IN, NV, TN, IA	12 cases: LA, MS, MO, NE, OR, RI, TX, MA, WA, UT, CA, OH	18 cases: AK, AZ, AR, CT, HI, MI, NH, NC, ND, OK, SC, WV, NM, WY, VT, FL, VA, ME
Land	34	6 cases: ID, IN, MS, MA, IA, OH	23 cases: AK, AZ, AR, CT, GA, HI, LA, MO, NE, NV, NC, OK, OR, RI, SC, TX, WV, WA, NM, WY, UT, CA, VA	5 cases: NH, ND, VT, FL, ME
Infrastructure	33	6 cases: ID, IN, OR, RI, MA, OH	21 cases: AK, AZ, AR, CT, LA, MS, MO, NE, NV, NH, NC, OK, SC, TX, WV, WA, NM, WY, UT, IA, CA	6 cases: HI, ND, VT, FL, VA, ME

The survey results showed that about two thirds of respondent states manage their buildings, land, and infrastructure in a mixed approach. The other two categories presented different situations of management. Fleets and vehicles are managed by a mixed approach in more than half of the respondent states, and by a centralization approach in more than one-third of the respondent states. However, office equipment is managed by a decentralization approach in more than half of the respondent states and by a mixed approach in about one-third of the surveyed states.

With regard to management capacity building, over 75% of the respondent state governments had measures to manage risks and emergencies and to encourage high efficiency and effectiveness. Only 44% of the respondents established asset management partnerships

with private businesses; and 53% of the respondent states had organizational measures to attain effectiveness of fixed asset management and to maximize property value.

Asset Management throughout Life Cycles

As previously stated, public asset management throughout the life cycles of various items is a complicated process that involves a variety of factors. Budgeting and acquisition are indispensable factors in fixed asset management throughout the life cycles of the assets. Both budgeting and acquisition involve particular procedures and need specific elaboration. This paper does not focus on exploration of these two factors in current fixed asset management. Rather, discussion of asset management throughout life cycles focuses on capital asset planning, operation and maintenance elements, current composition of fixed assets, and disposition of surplus properties.

With regard to capital asset planning, the mail survey results demonstrated that most of the respondents had implemented need analysis (84%), acquisition method analysis (71%), priority ranking (74%), and life-cycle costing analysis (71%). Comparatively, less than 50% of respondents had determined the mission of capital asset acquisition (48%) and measurement of capital asset management performance (47%) when they made plans for capital asset management.

Considering the complexity of operation and maintenance and the wide variety of state-owned fixed assets, the mail survey questions focused on real properties to understand what operation and maintenances were undertaken by government and what operations and maintenances were outsourced. Survey results demonstrated that hazardous waste disposal, pest control, trash disposal, and custodial cleaning were outsourced in 71% or more of the respondent states. On the other hand, utility management, repair and maintenance, restructuring property for users, concierge services, and green property management were performed by government agencies in 56%-87% of the respondent states.

The mail survey found that state governments leased from private businesses roughly 59% of total building space although there existed a large discrepancy between the respondent states. Of 32 respondents, 15 leased from private businesses 70% or more of their total building space while 9 states had 30% or less of their total

building space leased from private businesses. The respondents utilized their leased building space for various purposes. On average, they used 53% of the leased building space for short-term purposes (less than five years) and 47% for long-term purposes (more than five years). Eight outlier respondents replied that 80% or more of their leased building space was designated for long-term use.

With regard to excess capital assets, the survey results revealed that in terms of square feet, the respondent states held an average of 5% of their real properties as surplus. Very few states reported zero percent of excess assets and the highest surplus rate was 12%.

Website content analysis found that 25 states had one or more divisions that were responsible for disposition of surplus properties. One state agency was appointed to identify the properties a state department claimed to be surplus. The surplus properties are mostly movable, such as equipment, vehicles, office furniture, building materials, and motors, among other items that were no longer needed by the state department that purchased them. The surplus properties also included land and other real properties. In most states, surplus properties were first redistributed or transferred to other state agencies or local governments, if applicable, to extend the life of the property and save tax dollars. Personal surplus properties could also be donated to eligible non-profit organizations. Surplus properties that could not be redistributed or donated were sold through public auctions (usually online) and sealed-bid sales to maximize the value of each sale. When a property was in scrap condition, it was recycled by the government agency that filed the disposal claim.

Human Capital Strategies

Based on the perception that human capital management provides services for efficient and effective fixed asset management, human capital planning addresses these five elements: (1) position description, (2) employee talent development, (3) innovative workforce practice, (4) employee involvement in goal setting and planning, and (5) team development. The survey results revealed that more than 81% of the respondent states had included the first, the second, the third, and the fifth elements in their human capital planning. In addition, 74% of the respondents reported their coverage of the fourth element in their human capital planning. About 93% of the respondents estimated that their human capital planning had a

"moderate" to "much" effect on the achievement of asset management goals and objectives.

With regard to employment development training, only 78% of the respondents reported that they had implemented such programs to achieve their goals and objectives of capital asset management. Table 6 illustrates the implementation of the five identified sustainable employee development programs in the respondent states.

TABLE 6
Employee Development Training

Sustainable employee development training programs	Do you have the programs?			
	Yes	%	No	%
Programs to increase employee performance	26	93	2	7
Programs to meet new work requirements	25	90	3	10
Programs to satisfy long-term need for qualified employees	22	81	5	19
Programs to meet customer satisfaction	26	93	2	7
Programs to align with agency goals & objectives	24	86	4	14

Information and Technology Resources Management

Information and technology resources management is a dynamic and continuous process that consists of acquiring information, storing information, analyzing information, and utilizing information. Information must always be complete, accurate, timely, and accessible to serve decision making for asset management (GAO, 2006; Hitt et al., 1989; Fernholz & Ferholz, 2007). The mail survey demonstrated that 26 identified components of fixed asset inventory are respectively adopted by the respondent states at high or low extents. Fixed asset category and location of real properties are the two identified components adopted by every respondent state. Other most often adopted components in the capital property inventory of the respondent states include age, acquisition cost, size, current status, date of occupancy, legal ownership, estimated current value, rent of leased property, transfer history, cost of leasehold improvement, total value of fixed assets, and original useful life. The

survey results also reveal that elements regarding life cycle costing are not considered by most respondent states. Four components, including insurance, annual operating cost, annual cost of ownership, and remaining useful life, have been adopted by 34% to 50% of the respondent states.

In addition, components regarding land management, such as hazards, flood conditions, environmental services, and soil mechanical conditions, are used by 24% to 34% of the respondent states in the inventory of their real properties. Even though each state government owns large areas of land, land management covers mainly the size of land area, locations, and use rather than particular features of the land owned by state governments.

Taking into account the data provided by their inventory database, state governments may make decisions regarding acquisition, disposition, financial input and financial reporting. Sixty-eight percent to 79% of the respondent states assumed that the information database had been helpful in decision making in these four identified areas.

The mail survey also explored measurement of real property management. The survey results indicate that "cost per square foot" was the most used measure to evaluate the performance of real property management. Ninety-two percent of the respondent states used this measure to determine how well they managed the real property they owned or leased. Other most often used measures include operating cost per square foot, deferred maintenance, vacancy rate, current replacement value, customer satisfaction, usable square feet per employee, and facility condition index. About 54% to 77% of the respondent states, respectively, used these measures. Other identified measures were least used by the respondent states. These measures include percent of tenant renovations on time & budget (44%), number of utility trouble calls (35%), number of emergency contacts (32%), average cost per employee (31%), savings from audits (28%), percent of leases not to be renewed (24%), and real property disposal time (23%).

Monitoring, Integrity, and Transparency

The mail survey explored monitoring and oversight in five areas, including contract, financial accountability, performance measurement, effectiveness of policies, and compliance with laws

and regulations. The mail survey results revealed that most respondent states had implemented contract monitoring (79%), financial accountability monitoring (63%), and monitoring of compliance with laws and regulations (76%). In addition, 47% and 48%, respectively, of the respondents had implemented performance measurement monitoring and monitoring of effectiveness of policies and processes.

In the areas of integrity and transparency, the survey results show that most of the responding states had established mechanisms of internal control (97%), anti-corruption (90%), professional ethics (84%), and external oversight (71%). On the other hand, the survey results reveal that fifty-six percent (56%) of those states had released information regarding capital asset management. In addition, only 34% of respondents had established an efficient appeals mechanism.

DISCUSSION

The survey results reveal a variety of characteristics of current capital asset management by state governments. Statistics suggest that current capital asset management has strengths as well as weaknesses in each of the identified cornerstones.

Analysis of Cornerstones

The survey results prove that current laws, regulations, policies, norms, and guidelines regulate most of the identified areas of capital asset management at state governments; and that they produce the expected effect on capital asset management. Specifically, current legal and regulatory requirements lay much emphasis on fixed asset acquisition, fixed asset disposal, leasing real property from the private sector, regular reporting of fixed assets, audit and control, and fixed asset valuation. The reason for this status is that these elements relate to budgeting and financial factors, key life-cycle management factors, and government integrity, which are indispensable in capital asset management. Since the cornerstone of asset management throughout the asset's life included most of the factors mentioned above, most of the respondent states had legal and regulatory requirements for this cornerstone (see Table 4 above).

Comparatively, the legal and regulatory requirements produce considerable effect on capital asset management. This explains why

more 81% of respondents had legal and regulatory requirements to regulate capital asset management in these six major areas. However, legal and regulatory requirements were least significant for the state governments in three areas of fixed asset management: centralized registration (legal title), performance evaluation, and fixed asset supply. One reason is that centralized registration could be considered unnecessary because practices demonstrated that in most cases capital assets were not managed in a centralized manner (see Table 5). Another reason is that fixed asset performance evaluation might be an academic term that the respondents could not understand because survey results show that most of the respondents used more than five measurements of real property management. A third reason is that the respondents did not understand the connotation of "fixed asset supply," or very few respondents have legal and regulatory requirements for fixed asset supply. These reasons help explain why there was no higher percentage of the respondent states that had the identified legal and regulatory requirements for the cornerstone of organization of management.

With regard to organization of management, website content analysis indicates that state governments concentrate responsibilities of capital asset management in a few departments. From an administrative perspective, this approach ensures that management policies are consistent throughout state government agencies (Denhardt, 2004) and that management expertise meets appropriate needs from individual end users (Thai, 2007). On the other hand, considering the large variety of capital assets that state governments own and control, a combined approach of centralized and decentralized management provides flexibility in managing buildings, land, infrastructure, and fleets and vehicles to satisfy the needs of state agencies that have distinct missions. In addition, since there were large quantities of office equipment, office equipment was mostly managed in a decentralized approach at state governments. The benefits of such an approach include easier adjustment of management priority allocation, easier coordination within the using agency, prompt decision making, prompt service delivery, and sensitivity to unique requirement of services (Osborne & Gaebler, 1992).

Management capacity can be built up by adapting to external changes and creating changes to prepare for the future (Farazmand, 2009). In addition, organizational management capacity can also be built through organization development and advancement (French & Bell, 1995). Most state governments exerted efforts to mitigate against and prepare for risks and emergencies. However, they had not done enough to expand their vision of risk and emergency management. That was why most of state governments had not established collaboration with private businesses and neglected to involve private business in risk mitigation and preparation. On the other hand, most state governments adopted measures to encourage high efficiency and effectiveness in their daily operation. However, about half of them did not take measures for organization improvement because they did not have the initiative to achieve sustainable development in capital asset management.

Capital asset planning is the first phase of life-cycle management. It starts with determination of the mission of capital asset acquisition (Edwards & Ellison, 2004). Only 48% percent of the respondents had determined the mission of capital asset acquisition. This is because determination of the mission was deemed less important than need analysis that more than 84% percent of respondents implemented in capital asset planning. Similarly, measurement of capital asset management performance had not received much attention because the respondents did not completely understand the term, or because they preferred to pay more attention to property acquisition rather than to performance evaluation. Most state governments focused on need analysis, acquisition method analysis, priority ranking, and life-cycle costing analysis because these are the indispensable elements (Province of British Columbia, 2002).

With regard to delivery of capital asset service, about 30% of respondents did not have green property management, restructuring property for users, and concierge service because these services were most frequently considered either unnecessary or outdated based on the needs of property users. However, the states that had these service programs mostly preferred government agencies to provide the services. Hazardous waste disposal, pest control, trash disposal, and custodial cleaning were usually outsourced because these services are either professional and technical or regular and constitute scale economy. Government agencies undertook utility

service and repair and maintenance of real properties because utilities were part of government enterprise and property repair and maintenance were regular services that kept real properties in normal operation.

Generally, the respondents leased more than half of their building space from private business; and they utilized more than half of the leased space for short-term purposes. This means that their state government preferred to lease rather than own buildings. Most state governments under financial pressure elected to spend less money on an annual basis by leasing facilities and other needs. However, in the long term, the total money for leasing will cost more money than would ownership of the necessary buildings (National Research Council, 2004). In addition, most state governments had large quantities of surplus real properties. They need to liquidize the surplus properties and adjust the composition of capital assets they own and control.

Human resource management integrates the planning and development of the workforce aligned with an organization's mission and management goals. It fosters collaboration between management and employees and encourages employee involvement (GAO, 2007). State governments emphasized position description, employee talent development, innovative workforce practice, and team development when they implemented strategic human capital planning. However, they did not place sufficient emphasis on employee involvement because they preferred a vertical management style. In addition, an overwhelming majority of state governments had implemented sustainable development programs to address employee performance, new work assignments, long-term needs for qualified employees, customer satisfaction, and agency goals and objectives. According to Sylvia & Meyer (2002), the elements addressed in in-house training are of supreme importance for developing the needed skills to meet organization goals and objectives.

The mail survey investigated the information of capital assets and financial and accounting information. Most of the respondents had the information such as asset category, location of real properties, age, acquisition cost, size, current status, date of occupancy, legal ownership, estimated current value, rent of leased property, transfer history, cost of leasehold improvement, total value of fixed assets,

and original useful life. These items are the fundamental elements in a capital asset inventory that contributes to capital asset management (GFOA, 2010). However, most respondents did not have sufficient accounting information regarding life cycle costing, such as insurance, annual operating cost, annual cost of ownership, and remaining useful life. This is consistent with the survey results of planning for life cycle costing and combination of life cycle costing with real property ownership. It is possibly because the life-cycle costing approach is not a mandatory requirement; or because there is no guarantee of required annual budgets for maintenance and repair of real properties in state governments.

In the realm of land management, most respondent states did not have information regarding specific features of the land they owned and controlled. There are two possible reasons for this status. One is that the management of land focuses on value and physical existence of the land rather than use, conservation, and benefits of the land. The other is that some states do not own large areas of land. Therefore, they do not have a particular element for land inventory.

Because a capital asset inventory can provide a variety of information that includes amounts, physical characteristics, financial value, and useful life of capital assets, an overwhelming majority of state governments made decisions regarding acquisition, disposition, financial input, and financial reporting based on the information they needed from their inventory. A few states did not use any information their inventory provided to make essential decisions. One reason is that the related respondents, such as Wyoming and Massachusetts, did not understand the relationship between the capital asset inventory and decision making with regard to acquisition, disposition, and finance management. Another reason is that the related respondents, such as Louisiana, did not have sufficient information for them to use when making essential decisions related to capital assets.

The mail survey identified as many measurements as possible to see which ones were most employed; most of the state governments used half of the identified measurements while a smaller number used other measurements. The most often used measurements involved fundamental performance standards regarding management cost, using efficiency, management effectiveness, and facility conditions. These measurements align with objectives and

management goals of state governments (Beatty, Arnett, & Liu, 2005). However, the fact that most state governments did not pay appropriate attention to seven out of seventeen measurements suggested that state government hardly paid attention to emergency management because emergency management was not integrated into regular capital asset management. Nor did they emphasize savings from audit and real property disposal time since real properties sometimes are inappropriately perceived as "free goods" (Kaganova, 2006), and in most cases real property disposal is costly (Christian & Pandeya, 1997). In addition, some measurements, such as average cost per employee and savings from audits, are not often used (New York Office of General Services, 2005).

The survey results demonstrated that state governments emphasized contract monitoring, the monitoring of compliance with laws and regulations, and financial accountability monitoring because these elements were direct and demanding in management of capital assets. Comparatively, the state governments did not underscore performance measurement monitoring and monitoring of effectiveness of policies and processes. One cause for this fact is that state governments did not emphasize evaluation of management performance, which is obvious in other cornerstones such as legislative and regulatory requirements and information and technology resources management. Another cause is that asset managers did not consider it a responsibility to monitor the effectiveness of policies.

Moreover, most state government underscored control and audit systems, professional ethics, and anti-corruption measures. These elements are functions that governments need to fulfill and citizens show concern about. Survey results indicate that state governments did not exert efforts to make their management information accessible to the public as laws and regulations allow. They did not have an appeal mechanism to resolve issues with contractors. This means that they preferred to resort to legal means, which could increase management costs.

The analyses discussed in this paper demonstrate that state governments, though in high or low percentage, used the factors identified in the Comprehensive Public Asset Management System (see Figure 2), the cornerstones of which are summarized out of literature on public asset management and public procurement

management. Each cornerstone has strong factors that were used by an overwhelming majority of state governments. Survey results reveal that state capital asset management aligns with the framework and systems established by Simons (1993a, 1993b), Kaganova and Nayyar-Stone (2000), and Fernholz and Fernholz (2007); capital asset management also uses the management structure of public procurement created by OECD (2006) and GAO (2006). Obviously, analyses support the contention that the comprehensive public asset management system comprises the strong factors of other asset management frameworks/systems and that it presents its strengths in the practice of state capital asset management.

Cross-Region Analysis

Survey results presented the similarities of the respondents in different regions. As Table 7 shows, the respondents had similar situations in legal and regulatory requirements, capacity building, and objectives of sustainable employee development. The respondents by regions also had differences in capital asset management. Generally, states in the Northeast (Region 1) did not lease as much building space as did the respondent states in other regions. The respondents in the Midwest (Region 2) took into account more factors when planning acquisition and lease of fixed assets. Comparatively, they did not outsource as many service programs as states in other regions did. This fact suggests that they employed a traditional approach to manage their real properties, i.e., providing most property service by themselves. In addition, the respondents in both the Northeast and Midwest had addressed more of the identified issues in human capital planning than did the states in the South (Region 3) and West (Region 4). The states in Region 1 and Region 3 did not use as many factors for their inventory information and performance measurement as did states in other regions. With regard to monitoring, integrity, and transparency, the respondents in Region 2 took many more measures to monitor the process of capital asset management. However, they took fewer measures to maintain integrity and transparency of capital asset management than states in other regions did.

Analysis of Relationship between Cornerstones

The survey results revealed that legal and regulatory requirements regulated each area of capital asset management. In

TABLE 7
Capital Asset Management: Regional Comparisons

Cornerstones		R[2] 1	R2	R3	R4
C[1]1	Average % of legal & regulatory requirements the respondents had over the identified ones	73	66	73	71
C2	Average % of capacity building measures the respondents took over the identified ones	72	63	66	67
	Average % of leased building space over the total building space owned & controlled by the respondents	18	72	61	56
C3	Average % of fixed asset planning elements the respondents had over all identified ones	60	81	67	59
	Average % of the outsourced service items over all identified service items	63	30	52	45
C4	Average % of the issues in human capital planning the respondents addressed over all identified issues	90	87	78	78
	Average % of the objectives the respondents used in employee development over all identified objective	84	87	95	80
C5	Average % of the components the respondents used in information system over all identified components	46	69	51	62
C6	Average % of fixed asset management elements the respondents employed over all the identified ones	60	78	55	54
	Average % of measures the respondents took to maintain integrity & transparency over identified ones	70	58	67	76

Notes: [1] C = Cornerstone; [2] R = Region.

the areas where legal and regulatory elements had “moderate” and “much” effects, the respondent states generally had performed well in capital asset management. For example, the respondents considered legal and regulatory elements regarding “anti-corruption” and “professional ethics” “moderate” or “highly” effective. Survey results showed that under the cornerstone of Monitoring, Integrity, and Transparency, most respondents had measures for these management areas; and the measures produced “moderate” or “much” effect in practice. Moreover, in the areas where legal and

regulatory elements were counted as “low” effect, the respondents did not attain the expected performance in capital asset management. For example, roughly one-third of the respondents had legal and regulatory elements regarding fixed asset performance evaluation. Correspondently, more than half of respondents did not consider asset performance measures during fixed asset planning. In addition, about three out of ten respondents did not have measures for asset management performance.

Organization forms of management affected outsourcing programs and establishment of information systems. Centralized management more easily led to outsourcing of real property services. The feature of the mixture of centralization and decentralization made having a complete information system difficult. The low response rate to questions related to inventory and lower percentage of use of inventory elements explained this relationship. In capacity building, focus on risk management and emergency management was consistent with large amounts of properties leased from private business; encouraging high efficiency and effectiveness had a close relationship with employee training in that most valid respondents used this factor for employee development training. On the other hand, a low level of public-private partnership is consistent with the unwillingness of government to outsource some categories of public asset management programs.

The management process throughout the life cycle of assets is a process of enforcing laws and regulations of fixed asset management. The major components of life-cycle management, such as planning, acquisition, asset use, operation and maintenance, planning, and disposal, are under legal and regulatory constraints. In the planning phase, insufficient attention paid to the mission statement and asset performance measures suggested that respondents did not effectively implement measures to encourage high efficiency and effectiveness, which is an element in Organization of Management. Moreover, management throughout the life cycle is strengthened by human capital strategies. However, in the management information system, a number of elements related to capital asset management, such as remaining useful life, insurance, and annual operating costs, are not used by a high percentage of respondents. Most of the factors except appeals and performance in management throughout life cycle were audited and overseen.

Human capital management is regulated by laws and regulations. It is correlated with capacity building, management process, and monitoring and integrity. Strategic human capital planning enhances and supplements organizational goal setting and fulfillment of management objectives. The sustainable employee development programs (see Table 6) promoted service provision throughout an asset's life cycle. In addition, employees' work and performance were monitored to meet code of ethics and performance standards.

The mail survey results revealed that the establishment of an effective fixed asset management information system is dependent on legal and regulatory requirements and organization forms of fixed asset management. Seventy-four percent of respondents have legal and regulatory requirements for a centralized record management system of all fixed assets. The respondent states adopted a mixed approach to manage their major categories of fixed assets. These characteristics determined that the fixed asset management information system of state government might not collect sufficient reliable data to become a central mechanism. The survey results suggested that the respondents include did not have some fundamental elements in their information system; and some states, including Connecticut, Wyoming, Massachusetts, Maine, Tennessee and Louisiana, did not use their information system for making decisions regarding asset acquisition, disposition, financial input, and financial reporting.

Monitoring, integrity, and auditing depended on legal and regulatory requirements and, in return, promoted compliance with laws and regulations. Monitoring, integrity, and auditing were correlated with the management process, information collection, and human resources management. Contract monitoring, financial accountability monitoring, and compliance with laws and regulations were related to management process, information resources, and legal and regulatory framework. Internal control and audit systems, professional ethics, and anti-corruption measures enhanced human development training and ensure organizational performance.

Overall, the cornerstones of the comprehensive public asset management system are correlated in that each identified factor interacts with other factors in the system. Analyses reveal that the interaction between factors is direct or indirect, strong or weak. However, in particular cases, less frequently used factors may play an

indispensable role in capital asset management of a state government.

CONCLUSION

This research has established the comprehensive public asset management system based on current fixed asset management frameworks and public procurement systems currently in practice. Because the comprehensive public asset management system involves a wide variety of components, the survey questionnaire covered only the major components of capital asset management at the state government level. Analysis of survey results has revealed that the capital asset management at the state government level significantly supports the comprehensive public asset management system. The six identified cornerstones are correlated in that legal and regulatory requirements provide authorities, organization, resources, and working principles while other cornerstones deal with different and indispensable areas that act upon each other to attain the goals and objectives of fixed asset management.

The survey results indicated that capital asset management at the state government level has been experiencing strategic changes and reforms. A number of state governments tend to sell state-owned office buildings and lease them back to save money on a short-term basis. However, a long-term lease tends to increase costs of using properties (Taylor, 2010). This may contribute to financial pressure in the long run. This research did not explore in depth each area of capital asset management at the state government level. Further research may delve into particular areas of capital asset management to find practices that are more appropriate and add them to the management toolkit. Further research may also look into capital state management in particular states to help identify critical issues and to provide appropriate resolutions. Significant practices may serve as guidance for capital asset management in other states.

NOTES

1. Legal and regulatory requirements regarding capital asset management:

    1) Fixed asset acquisition
    2) Fixed asset use

3) Fixed asset operation & maintenance
4) Fixed asset disposal
5) Fixed asset insurance
6) Fixed asset valuation
7) Regular reporting of fixed assets
8) Fixed asset planning, e.g. need analysis, budget
9) Centralized registration (legal title) of fixed assets
10) Centralized record management system
11) Leasing real property from the private sector
12) Capitalization policies including thresholds
13) Fixed asset supply
14) Anti-corruption
15) Professional ethics
16) Audit and control
17) Responsibilities of fixed asset managers
18) Fixed asset performance evaluation

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