Kansai University Review of Business and Commerce
No. 24 (March 2025), pp. 1–12.

A Framework for Economic, Social, and Technical Valuation of Public Facilities: Multilateral Evaluation Using Public Sector Accounting Information

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Abstract

Although public sector accounting standards were standardized in 2016 and almost all local governments in Japan prepare financial statements based on double-entry bookkeeping and accrual accounting, some argue that public sector accounting information remains unused. However, no organization can be properly managed without accounting information and the fact that public sector accounting information is not being put to use suggests that public sector decision-making methods may be ineffective. This raises the following question: How to maintain and renew public facilities against a backdrop of severe financial constraints and declining population? It is necessary to prioritize the management of public facilities by considering social and economic values, such as service unit costs and life cycle costs. This study examines a multilateral evaluation framework for public facilities using public sector accounting information.

Keywords: public facility management, local government accounting, financial and non-financial information, capital improvement plan

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1. Introduction

Although the "unified public sector accounting standards" (Touitsuteki na Kijun, in Japanese) were standardized for local governments incorporating double-entry bookkeeping and accrual accounting in 2016, public sector accounting information is still not fully utilized in public management in Japan. Against a backdrop of increasing financial constraints and declining population, there is a need to use public sector accounting information in the management of public facilities. However, there is a gap between the statutory useful life of a fixed asset as shown in the books and the actual period of use (Ministry of Internal Affairs and Communications, 2016). Additionally, local governments are tasked only with preparing financial documents and maintaining fixed asset ledgers; they lack the time to consider how to utilize fixed asset data.

However, some studies, such as Mizude et al. (2015) and Uchiyama et al. (2015), have used indicators based on public sector accounting to manage public facilities. In practice, there have been initiatives such as Suita City, which actively uses public sector accounting information for the use of public property and preserving and maintaining city-owned buildings in cooperation with the accounting and asset management offices (Matsuo, 2018).

In addition, public facilities provide social values, such as regional partnership, life safety, and disaster prevention, in addition to their original intended use. However, in a tight financial situation, there is a need to improve operational efficiency and consolidation or elimination of some facilities, and establish evaluation criteria and priority according to the "individual facility plans" (Kobetsu Shisetsu Keikaku, in Japanese). In this study, we develop a method of evaluating public facilities by combining public sector accounting and non-financial information that can be easily understood by local residents and other interested parties.

2. Challenges facing public facility management

In April 2014, the Ministry of Internal Affairs and Communications (Soumusho, in Japanese) issued the "Promotion of Comprehensive and Systematic Management of Public Facilities," which requested all local governments to formulate a "comprehensive management plan for public facilities" (Koukyo Shisetsutou Sougo Kanri Keikaku, in Japanese), in response to the deterioration in public facilities, which had become an urgent issue in light of fiscal tightening and declining population. Furthermore, to reduce renewal and maintenance costs and equalize the annual budget for public facili-

ties, it was requested that individual facility plans be formulated by FY2020[1].

The Ministry of Internal Affairs and Communications (2016, p. 7) suggests that public sector accounting information, which incorporates double-entry bookkeeping and accrual accounting, can be used to estimate deterioration of assets and the number of years left for debt redemption. Furthermore, as Hokimoto and Matsuo (2020) point out, rational decision-making based on life cycle costs would be promoted if a shift from conventional ex-post maintenance to "planned maintenance and decision optimization intended management" occurs. In this respect, public sector accounting information can improve the management of public facilities[2].

However, Minami (2016, p. 10) argues that during the preparation of the comprehensive management plan for public facilities, there is no discussion on "what is the role of public facilities in the first place, whether it is necessary to review the assumptions of their users and usage forms, and the appropriate relationship between operation and expenses or usage fees." Furthermore, Shimada (2022, p. 36) points out that there is a risk of ignoring viable alternatives by becoming caught up in the idea that "reduction of total floor space means the abolition and consolidation of public facilities."

Therefore, as Shimada (2022, pp. 42–44) points out, public facilities must be developed, maintained, and renewed from multiple viewpoints, such as "utility, function, regional circumstances, and change in times." For this purpose, Hokimoto et al. (2023) argues that it is necessary to integrate technical information into public sector accounting information while considering non-financial information, including social and environmental aspects, and build consensus with local residents.

In the conventional public facility management based on the current budget system, approval by the council, which represents local residents, is considered consensus building, while mid- to long-term financial and non-financial information regarding public facilities is not sufficiently considered. However, against a backdrop of a severe financial crunch and declining population, local governments are faced with the challenge of enhancing the functions of public facilities while maintaining or reducing their size. There is no overnight solution to this complex problem, but to start, this study presents a basic framework for a multilateral evaluation of public facilities.

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1) During the COVID-19 pandemic, the deadline for the development of individual facility plans was extended till FY2023.

2) Kaganova et al. (2006, pp. 11–15) point to the following worldwide issue of public asset management before undertaking public sector accounting reforms: (1) lack of a central policy framework, (2) fragmented management of public property assets, (3) economic inefficiencies associated with public property, (4) lack of information needed for managing property portfolios, and (5) lack of transparency and accountability.

3. Approach to a multilateral evaluation of public facilities

To develop a framework for multilateral evaluation of public facilities, we first refer to the preparation manual for Commonwealth of Massachusetts' Capital Improvement Plan (CIP) (Commonwealth of Massachusetts, 2016).

In Massachusetts, local governments discuss their budgets, laws, and other significant subjects for the upcoming year during the annual town meetings[3]; hence, the local government's CIP committee develops a capital improvement plan based on a preparation manual formulated by the state government and puts forth the plan during town meetings. The CIP is a blueprint for planning local government capital expenditures and the responsibility of local officials tasked with coordinating community planning, fiscal capacity, and physical development projects[4].

The CIP consists of a capital budget and a capital program. The capital budget is a spending plan for the next fiscal year for tangible assets that meet certain requirements (e.g., more than $25,000 and a useful life of more than 5 years). The capital program is the capital expenditure plan for the next 5 years from the capital budget. The CIP preparation manual requires the chief financial officer and department heads to evaluate and prioritize public facility management based on the following criteria (City of Pittsfield website, p. 48):

(a) Required by state or federal laws or regulations
(b) Supports adopted plans, goals, objectives, and policies
(c) Stabilizes or reduces operating costs
(d) Replaces a clearly obsolete facility or makes better use of an existing facility
(e) Maintains or improves productivity or existing standards of service
(f) Eliminates a hazard to public health and safety
(g) Directly benefits the City's economic base by increasing property values
(h) Provides new programs having social, cultural, historic, economic, or aesthetic value
(i) Uses outside financing sources, such as grants

In Japan, comprehensive management plans for public and individual facilities aim

3) In town meetings, local residents gather to vote on local policies and budgets, and there are two types of meetings, namely, the "traditional open town meeting" in which all voters participate and the "representative town meeting" in which only representatives of residents have voting rights (Toyama 2018, p. 123).

4) Okawa (2022, p. 28) argues that the fundamental problem in Japan's budget system is that "capital receipts and expenditures" as expressed in the CIP are not distinguished from "operational receipts and expenditures," resulting in fiscal management that attempts to balance the overall fund balance. Therefore, Okawa suggests that a "double-budgeting system" should be introduced to clarify the difference between stocks and flows.

to reduce and stabilize local governments' financial burden and realize the optimal location of public facilities by systematically renewing, consolidating, and extending their service life in response to changes in usage demand due to population decline (Ministry of Internal Affairs and Communications, 2014). In this respect, the focus is on the economic perspective.

In contrast, the Massachusetts' CIP preparation manual requires that public facilities should be managed from the economic perspective as well as social and environmental perspectives. For example, point (b) above stipulates that the development of public facilities should be consistent with the overall plans, goals, objectives, and policies of the local government. Point (g) stipulates that the economic foundation and attractiveness of a community should be enhanced by maintaining and expanding the functions of individual facilities and increasing the value of public facilities. Point (h) stipulates that public facilities should have social, cultural, historical, economic, and aesthetic value and that implemented programs must enhance these values.

Therefore, public facilities must maintain their functions and have a vision of how to improve the value of a region by presenting a policy and plan of the kind of regional society to form, how to develop public facilities, and what functions they should have. In this context, envisioning how to improve the value of a region itself is necessary, and public sector accounting information is indispensable in considering and discussing the alternatives to consider when improving the value of a region. Therefore, if public facility management continues based on ex-post conservation, which is the traditional budget system in Japan, the role of public sector accounting information may have to be limited as Hokimoto and Matsuo (2020, p. 100) mentioned.

4. Multilateral evaluation framework and public sector accounting information

Introducing a multilateral evaluation of public facility management in a short period when the current budget system of local governments continues to be used is challenging. Therefore, this study presents a framework for multilateral evaluation of public facilities to organize ideas before inception.

As regards the evaluation aspects to be used, the triple bottom line may be applicable as it is a widely used concept of social responsibility. The first is economic value, which current management plans already emphasize. The second is social value, which is also presented in the Massachusetts CIP preparation manual.

While the major concern about environmental value in the corporate sector is the management of waste and carbon dioxide emissions, such value in the public sector can be regarded as part of social value concerning the living environment. Furthermore, per

the Ministry of Internal Affairs and Communications (2016, pp. 10–11), technical information is essential to maintain functioning and safety and estimate deterioration of public facilities.

The following is a prototype of an evaluation framework for public facilities from the perspectives of economic, social, and technical values (Table 1). These evaluation items do not necessarily mean that all of them should be evaluated comprehensively and regularly, but they have been organized from various reference materials to show the concept when conducting public facilities evaluation.

Table 1: Multilateral Framework for Public Facilities Evaluation

Evaluation aspect	Evaluation item	Evaluation criteria	Description	Reference
Economic value	Degree of depreciation	Accumulated depreciation ratio of tangible fixed assets	Accumulated depreciation ratio based on the statutory useful life to the acquisition cost of public facilities	Ministry of Internal Affairs and Communications (2016)
	Economic service life	Actual or predicted usage period	The number of years that the cost of repair and maintenance and other expenses for continued use exceeds the cost of reconstruction	Kurobe City (website)
	Life cycle cost	Estimation of predicted future costs	All costs from planning, design, and construction to operation, maintenance, and demolition of properties	Hokimoto and Matsuo (2020)
	Service provision cost	Service cost per unit	Full cost of providing one unit of service	Ministry of Internal Affairs and Communications (2016)
	Utilization	Number of users, utilization rate	Whether the facility is effectively used in accordance with its purpose of establishment	Hokimoto and Matsuo (2020)
	Investment effects	Cost-benefit analysis	Benefit-cost ratio (B/C) of public facilities	Ministry of Land, Infrastructure, Transport and Tourism (2023a)

Social value	Purpose of establishment	The comprehensive plan of the local government and individual facility plans, dialogue with local residents	The roles and functions that the facility was originally intended for, consistent with various plans	City of Pittsfield (website)
	Functional service life		The number of years in which the purpose of use changes or becomes obsolete due to innovations in technology or improvements in social requirements	Kurobe City (website)
	Regional circumstances		Fairness, ubiquity, and substitutability regarding regional allocation of public facilities and the specific needs of public facilities in a region	Shimada (2022)
	Culture, art, history, environment, landscape		Increase in population and tax revenues by improving the attractiveness of a city and increase in land, property, and brand values	City of Pittsfield (website)
	User satisfaction	User survey	Comfort, productivity, and satisfaction of facility users	Japan Facility Management Promotion Association (2018)
	Traffic and number of visitors	Number of footfalls and visitors	Community hubs and gathering places, attractive events	Yuasa and Ikebe (2018)
Technical value	Physical life expectancy	Physical usage period	The number of years that the building frame and its components deteriorate because of physical or chemical causes and fall below the minimum required performance	Kurobe City (website)
	Structure and safety	Safety investigation	Structural, seismic, and disaster-resistant performance	Tsutsumi and Mizude (2022)
	Degree of deterioration	Deterioration diagnostic survey	The physical life span and degree of deterioration of facilities, maintaining their functionality and safety	Shimada (2022)
	Maintenance	Repair and renovation records	Systematic implementation of renovation and repair work by considering economic and physical useful life	Ministry of Internal Affairs and Communications (2016)

(1) Economic value

Economic value focuses on the number of years of economic use of public facilities, operating costs, usage conditions and efficiency of use, and investment effects.

Economic value is linked closely to public sector accounting information. For example, the accumulated depreciation ratio of tangible fixed assets is calculated based on accounting depreciation. However, in the public sector accounting system of local governments, statutory useful life is used to calculate depreciation, but many assets continue to be used even after the end of their statutory useful life.

Although life cycle costs are not directly derived from public sector accounting information, they can be estimated using predicted future costs. During fiscal tightening, there is an increased need to use full-cost-based service provision costs, which include depreciation and retirement allowances, in decisions regarding public investment or consolidation of public facilities. Therefore, although several local government officials say, "It is unclear how to utilize public sector accounting information," under Japan's traditional budget system, the public sector may inevitably be forced to utilize public sector accounting information if its decision-making assumptions change.

Furthermore, as the *raison d'etre* of local governments is to "promote the welfare of residents" (Article 2, Paragraph 14 of the Local Autonomy Act), the results of public services cannot be measured only by financial information. As such, attempts have been made to monitor the degree of use of public facilities[5] and measure investment effects that take "social cost-benefit" into account in a broad range of areas in other countries. However, in Japan, social aspects are not incorporated into the cost-benefit analysis under the assumption that a cost-benefit analysis is conducted mainly on economic aspects[6].

(2) Social value

Social value focuses on the functions that public facilities should originally fulfill (such as education, welfare, and healthcare), local community needs, the cultural and environmental significance of facilities, and a place for human interaction and accumulation of local resources.

Social value hardly relates to public sector accounting information and is evaluated based on non-financial information. For example, a facility's purpose is not limited to its function but can also be an organic element of the city design that a local government

5) Osaka prefecture and some other local governments use unique accounting standards in parallel with the unified public sector accounting standards, which stipulate impairment accounting for public facilities whose use has declined.

6) For example, according to the Ministry of Land, Infrastructure, Transport and Tourism (2023b, p. 1), "There are a wide variety of benefits associated with road maintenance, such as ease in traffic congestion and reduction in traffic accidents, improvements in driving comfort and roadside environment, provision of alternative routes in case of disasters, expansion in exchange opportunities, and increase in production, employment, and income associated with new locations." However, it is also said that the benefits to be considered in a cost-benefit analysis are now limited to "items that can be measured with sufficient accuracy and expressed in monetary terms based on current knowledge, such as reduction in travel time and expenses and reduction in traffic accidents."

should aim for. If a city becomes more attractive and lively, secondary effects, such as population inflow, increase in property values, and revitalization of economic and cultural activities, will follow.

However, to improve social value through public facilities, developing them strategically and systematically according to the "comprehensive plan of local government" (Sougo Keikaku, in Japanese) and the future city concept is necessary, rather than utilizing facilities in a perfunctory manner. Furthermore, Mori (2017, p. 28) argues that local residents should be allowed to "proactively engage" in the utilization and operation of public facilities through communication, such as resident dialogue.

Traditionally, the social value of public facilities has not been systematically evaluated, and a facility's significance is recognized when the council approves it. However, when building new public facilities is challenging and reorganization and consolidation of public facilities are required, the social value of public facilities should be systematically evaluated and used for consensus building with local residents.

(3) Technical value

Technical value refers to the physical use period, structure, safety, and disaster prevention performance, degree of deterioration, and maintenance status of public facilities.

Technical value is based on non-financial information obtained through safety and deterioration surveys and integral to maintaining sustainable services in public facilities. Additionally, as annual repairs and renovations are recorded in accounting records, devising new ways to keep maintenance records while linking them to accounting information becomes possible.

However, maintenance and management of facilities in Japan focus on maintaining a minimum of physical functions because of budget constraints; thus, "it may have become a norm to keep the budget small in one year by deceptively continuing to use the facility while making repairs without carrying out systematic repairs and renewal" as Hokimoto et al. (2023, p. 123) mentioned[7].

To cope with such problems, public sector accounting information should be utilized for public facility management, as suggested by the Ministry of Internal Affairs and Communications (2016). However, the degree of freedom in decision making regarding public facilities is severely restricted because of a lack of financial resources, and many

7) The lack of sufficient consideration of maintainability, regarding ease of maintenance, and whether the layout and size can be changed in response to changes in demand, at the initial design stage has also caused problems that lead to higher life cycle costs of public facilities (Yokota 2023, pp. 46–48). However, as this study focuses on the continuous use of public sector accounting information, including fixed asset data, considerations at the time of design have not been included in Table 1.

local governments are struggling with how to utilize public sector accounting information in managing public facilities.

5. Conclusion

Although public sector accounting standards have been standardized and almost all local governments now prepare financial statements based on double-entry bookkeeping and accrual accounting, there still remain some city staff or councilors who do not know how to use public sector accounting information or feel that it is useless because it is burdensome. However, an "organization" managed without the use of accounting information is inherently difficult to sustain, and public sector accounting information being inadequate suggests that there may be some problems with the public sector's current decision-making process.

Traditionally in Japan, public facilities have been maintained and renewed with an emphasis on technical value, but because of standardization of public sector accounting standards, it is now recognized that economic value is also important. However, if only the economic perspective is emphasized, current conventional budget information is not necessarily insufficient. When the importance and priority of facilities are indicated by considering the social value, using public sector accounting information for decision making in public facility management becomes essential, as the usefulness of accounting information lies in whether it allows the comparison of multiple options.

Therefore, it is necessary to clarify the vision at each stage of the process to realize true management of public facilities. What kind of community development should be aimed for? What kind of facilities need to be developed? How to maintain and renew each facility? The preliminary conclusion of this study is that it is essential to evaluate public facilities by organically linking the economic, social, and technical value perspectives.

However, this is only a prototype of an evaluation framework for public facility management when considering such an important issue and is not practically feasible as yet. We wish to improve the accuracy of this evaluation framework and explore its practical applicability by cooperating with some local governments.

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Acknowledgement: This article is a translation and revised version of "Framework of Economic, Social, and Technical Valuation for Public Facilities: Multiple Evaluation Approach Using Public Sector Accounting Information," *The Business Review of Kansai University (Shogaku Ronshu)*, 2024, 69(1), pp. 45–54 (in Japanese). This research was supported in part by a JSPS grants-in-aid for scientific research (KAKENHI 22K01804, PI: Hideaki Baba) and by the Institute of Economic and Political Studies, Kansai University (Public Finance and Public Sector Accounting Research Group, PI: Hiroaki Hayashi) and the Kansai University Secondary Fund for Research, 2024.