

2019

A Systematic Public Capital Management and Budgeting Process

Arwiphawee Srithongrung

Juita-Elena (Wie) Yusuf
Old Dominion University, jyusuf@odu.edu

Kenneth A. Kriz

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Srithongrung, Arwiphawee; Yusuf, Juita-Elena (Wie); and Kriz, Kenneth A., "A Systematic Public Capital Management and Budgeting Process" (2019). *School of Public Service Faculty Publications*. 41.
https://digitalcommons.odu.edu/publicservice_pubs/41

Original Publication Citation

Srithongrung, A., Yusuf, J. W., & Kriz, K. A. (2019). A Systematic Public Capital Management and Budgeting Process. In A. Srithongrung, N. Ermasova, & J. Yusuf (Eds.), *Capital Management and Budgeting in the Public Sector* (pp. 1-22). Hershey, PA: IGI Global. doi:10.4018/978-1-5225-7329-6.ch001

Capital Management and Budgeting in the Public Sector

Arwiphawee Srithongrung
University of Illinois at Springfield, USA

Natalia B. Ermasova
Governors State University, USA

Juita-Elena (Wie) Yusuf
Old Dominion University, USA

A volume in the Advances in Public Policy and
Administration (APPA) Book Series



Published in the United States of America by

IGI Global
Business Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA, USA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: <http://www.igi-global.com>

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Library of Congress Cataloging-in-Publication Data

Names: Srithongrung, Arwiphawee, editor. | Ermasova, Natalia, editor. | Yusuf, Juita-Elena Wie, 1976- editor.

Title: Capital management and budgeting in the public sector / Arwiphawee Srithongrung, Natalia B. Ermasova, and Juita-Elena (Wie) Yusuf, editors.

Description: Hershey, PA : Business Science Reference, [2019]

Identifiers: LCCN 2018023856 | ISBN 9781522573296 (hardcover) | ISBN 9781522573302 (ebook)

Subjects: LCSH: Budget. | Capital budget. | Public investments. | Finance, Public.

Classification: LCC HJ2005 .C358 2019 | DDC 352.4/8--dc23 LC record available at <https://lcn.loc.gov/2018023856>

This book is published in the IGI Global book series Advances in Public Policy and Administration (APPA) (ISSN: 2475-6644; eISSN: 2475-6652)

British Cataloguing in Publication Data

A Cataloguing in Publication record for this book is available from the British Library.

All work contributed to this book is new, previously-unpublished material. The views expressed in this book are those of the authors, but not necessarily of the publisher.

For electronic access to this publication, please contact: eresources@igi-global.com.

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Chapter 1

A Systematic Public Capital Management and Budgeting Process

Arwiphawee Srithongrung

University of Illinois at Springfield, USA

Juita-Elena (Wie) Yusuf

 <https://orcid.org/0000-0003-3599-1417>

Old Dominion University, USA

Kenneth A. Kriz

 <https://orcid.org/0000-0001-8050-8506>

University of Illinois at Springfield, USA

ABSTRACT

This chapter introduces the readers to a public capital management and budgeting process and its role in generating public infrastructure networks. The main purpose of the chapter is to describe the normative public capital management and budgeting practices that are recommended by the public finance literature. These normative practices are segregated into four main components: (1) long-term capital planning, (2) capital budgeting and financial management, (3) capital project execution and project management, and (4) infrastructure maintenance. Given that the literature recommends specific practices to maximize efficiency in public capital spending, the four main components, combined, are referred to as the systematic capital management and budgeting process. The systematic process discussed in detail in this chapter is used as a common framework for each of the 12 country case studies in describing their respective public capital management and budgeting practices.

DOI: 10.4018/978-1-5225-7329-6.ch001

A Systematic Public Capital Management and Budgeting Process

INTRODUCTION

Public infrastructure systems, such as roads, highways, government buildings, sewerage and water systems, school facilities, police and fire stations, and recreational parks, generate economic and social benefits. At the national level, public infrastructure such as highway networks, the electrical grid, telephone lines and towers, water and sewage systems, and fiber optic lines increase national productivity through two pathways. In the first pathway, national public infrastructure subsidizes private production costs through better services with lower transportation, utility, and communication costs. Through the second pathway, national public infrastructure systems can attract more foreign investment. At the subnational level (i.e., state, county, city, districts), public infrastructure adds valuable amenities into a community, thus increasing housing values and expanding local property tax bases (Yinger, Bloom, Börsch-Supan, Ladd, 1988). At this level, public infrastructure also plays an important role in cushioning local economies, for example, by attracting new businesses and employment into a community (Srithongrung & Kriz, 2012). Public infrastructure plays a critical role in promoting economic growth and development (Munnell, 1992) and in fulfilling basic public health and safety needs (Pagano & Perry, 2008). In the USA, increased interstate highway spending significantly increased economic growth through increased earnings in the manufacturing, retail trade, services, and utilities sectors (Chandra and Thompson (2000)). At the subnational level, many empirical studies have found that public capital spending enhances local economic growth given that public infrastructure, such as roads, bridges, and government buildings, is another input in the local production process (Holtz-Eakin & Schwartz, 1995; Lobo & Rantisi, 1999; Storm & Feiock, 1999; Moomaw, Mullen & Williams, 2002). Further, U.S. states adopting systematic capital budgeting and management practices saw increased public capital stocks and faster economic growth rates in the short run (Srithongrung, 2008).

Given the high value, long lifespan, and tangible nature of capital assets, comprehensive and systematic planning, management, and maintenance efforts are very important (Pagano & Perry, 2008; Steiss, 2005). Coupled with the importance of public infrastructure for national and subnational economies, public capital management and budgeting processes should be carefully and systematically practiced so that a government can meet the public infrastructure needs of society while maintaining strong financial condition. Theoretically, the normative literature suggests that careful and systematic public capital management and budgeting should include four main components: (1) long-term capital planning, (2) capital budgeting and financial management, (3) project execution, and (4) infrastructure maintenance. This systematic approach to capital planning and management introduces efficiency and effectiveness to public investment (Srithongrung, 2008; Wigfall & Lynch, 2003). “Infrastructure management that is based on comprehensive capital planning, effective project oversight, and adequate asset preservation can benefit the economy and society” (Jimenez & Pagano, 2012, p. 125).

THE NORMATIVE FRAMEWORK FOR A SYSTEMATIC CAPITAL MANAGEMENT AND BUDGETING PROCESS

Providing facilities and services for the public good is one of the principle functions of government (Steiss, 2005). Public capital budgeting is defined as a “process or system of administrative procedures which relate long-term capital improvement program with the methods which will be used to pay for those improvements and provides for the implementation of these long-term financial and physical plans”

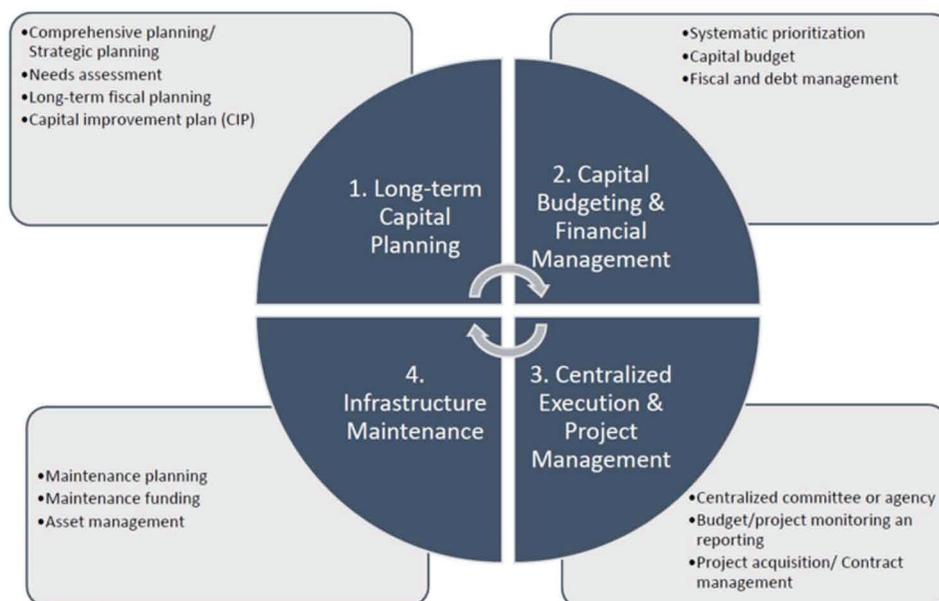
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(Howard, 1973). The capital budgeting literature recommends a systematic capital management and budgeting process (Gatti, 2012; Mikesell, 1999). Ebdon (2004), for example, identifies three essential components of a capital management system: capital planning and budgeting, project management, and asset maintenance. Ammar, Duncombe, and Wright (2001) suggest that the capital management and budgeting process should be comprised of four main components: long-term capital planning, capital budgeting and financial management, execution and project management, and infrastructure maintenance. These components combine fundamental decision-making and detailed action plans that a government will follow to manage its public infrastructure. Building on the literature, we suggest a normative, systematic capital management and budgeting process that can be organized into four components: (1) long-term capital planning, (2) capital budgeting and financial management, (3) centralized execution and project management, and (4) infrastructure maintenance. Figure 1 presents these four main components. The first two components – long-term capital planning and capital budgeting and financial management – comprise the pre-commitment stages of public investment, while centralized execution and project management occur during the post-commitment stage, and infrastructure maintenance reflects the post-completion stage (Jacobs, 2008; Spackman, 2001). Importantly, while each component can be considered separately, the strength of the overall capital management and budgeting system depends on all activities in each of the components (Ebdon, 2004; Ammar et al, 2001).

Long-Term Capital Planning

The first component of the systematic capital management and budgeting process is long-term capital planning which involves four key elements: strategic and comprehensive planning, needs assessment, long-term fiscal planning, and a capital improvement plan. The comprehensive plan (or master plan)

Figure 1. A normative model of the capital management and budgeting process
 Source: Srithongrung (2006), adapted from Ammar et al. (2001)



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provides a broad policy spelling out future land use and the objectives of community expansion and containment over a relatively lengthy period (Srithongrung, 2006). Strategic planning refers to setting specific strategies that will make the best use of available resources in moving from the present stage to the future stage inspired by the comprehensive plans (Srithongrung, 2006). The goals, objectives, and strategies identified in the strategic plan will have implications for capital needs and provide the basis for identifying capital requirements (Beckett-Camarata, 2008; Robinson, 1993). The literature emphasizes the importance of coordinating capital planning with the strategic and comprehensive plans (Ammar et al., 2001; Beckett-Camarata, 2003; Dowall, 2001; Halachmi & Sekwat, 1997; Mikesell, 1999; Price, 2002; Robinson, 1993), and a good comprehensive plan should contain a capital component (Ammar et al., 2001; Mikesell, 1999). As such, a strategic and comprehensive capital plan will be based on a variety of long-term factors, such as estimates of population growth, demographics and changes in demographics, changes in the underlying economic base, transportation growth, technological changes, and the needs and demands of the citizens (Dowall, 2001; Jimenez & Pagano, 2012; Mikesell, 1999; Stich & Eagle, 2005).

A needs assessment can be used to link comprehensive planning and strategic planning to capital investment needs. The needs assessment should include an assessment of capital assets and the organization's mission, strategic planning, and programmatic-based activities. Information about existing assets is important for determining capital resources that are currently available and the resources that are needed (U.S. General Accounting Office, 1998). According to the U.S. National Advisory Council on State and Local Budgeting (NACSLB), assessment of capital assets as a best practice includes inventorying capital assets and assessing the conditions of these assets and the factors that could affect the need for or ability to maintain the assets in the future (Westerman & Casey, 2007).

Long-term capital planning must include long-term fiscal planning, which is comprised of revenues, expenditures, and debt burden forecasts; otherwise, capital project acquisition would be impossible (Ammar et al., 2001; Aronson & Schwartz, 2004). A government should project its future revenues from different sources including tax and non-tax revenues (such as road user fees and charges, earmarked taxes, and other public service fees), potential external grants, and long-term debt to identify the aggregated level of public resources (Steiss, 2005). This aggregated level of public resources needs to be separated from annual operational spending so that public investment is not competing with public consumption in the resource allocation and decision-making processes. Long-term financial projections should identify the aggregate amount of resources available for public capital projects in each year, based on the individual sources of revenue (Singhvi, 1996). Furthermore, in long-term capital planning, the benefits of a public capital project should be carefully matched with its sources of public funding (Aronson & Schwartz, 2004). For example, a toll road should be used to finance public roads, earmarked restaurant taxes should be used to finance a local entertainment complex or a baseball stadium, and local property taxes should be used to finance local fire stations. This is done to ensure that the public dollars spent correspond with the benefits received (Fisher, 2016). In other words, the match between public project benefits and sources of funding assures that social costs are distributed in an efficient manner.

Effective long-term capital planning that incorporates strategic and comprehensive planning with needs assessment and long-term fiscal planning should encompass the following activities (Ammar et al., 2001; Ebdon, 2004; Government Performance Project, 2005; National Association of State Budgeting Officers, 1999; 2014; Srithongrung, 2006):

- Identification of capital needs and projections that are based on current and projected statistics of capital inventories, demographic, and economic conditions;

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- Development of capital inventories;
- Identification of capital needs and projections for a five-year period with longer-term projections presented for programs with reasonably predictable longer-term needs;
- Identification of capital needs and projections that are presented independently of financing requirements or opportunities;
- Comprehensive assessment of capital project cost and financing;
- Determination of the full financial burden and funding opportunities of programs and of individual projects, considering external resources such as grants and aids; and
- Analysis of alternative methods of financing capital programs and projects are described and assessed, including debt financing and use of current revenues.

If the above activities are carefully practiced, a government should be able to establish a Capital Improvement Program (CIP), which is “a list of the major capital projects and acquisitions needed over a five- to six-year period, appropriation of expenditures to be incurred by the identified projects, financial sources for the project funding, and the impacts of the projected outcomes on the future operating budget” (Vogt, 2004, p. 19). An effective CIP should not only identify the location, scale, and timing of capital projects and include a fiscal plan to fund the projects but also include the impacts of a capital projects (Beckett-Camarata, 2008). An essential feature of the CIP is that it apportions capital expenditures across the years covered by the CIP. Since the CIP ranks projects in priority order, it is considered an important blue print for a government to understand its capital needs and to direct government execution (Beckett-Camarata, 2008). The CIP facilitates systematic government investment by answering two managerial questions: (1) when to invest in what projects, and (2) how to finance the projects over a multiple-year period (usually around 5-6 years). Furthermore, in a transparent capital budgeting process, the CIP contains descriptions of the capital projects, their justification, and a glossary or user’s guide (Ammar et al., 2001). The process for developing the CIP should also provide opportunities for stakeholder involvement (Westerman & Casey, 2007).

The public capital budgeting and financial management literature recommends the activities in this first component because long-term planning promotes investment efficiency by targeting types and locations for capital resources allocation (Gatti, 2012; Srithongrun, 2006; Steiss & Nwagwu, 2001). Comprehensive planning is expected to provide public infrastructure that supports economic development in the community (Gianakis & McCue, 1999). The CIP lays a foundation for capital investment in a multi-year time frame so that management can schedule investment timing in a way that corresponds to resource availability and construction phases (Moak & Killian, 1963). Finally, capital planning is useful in justifying the proposed capital projects, and hence preventing arbitrary cuts that often occur when political projects with low-ranked priorities are requested for investment in the first year (Adams, 1998). A case study from the U.S. state of Minnesota found that capital planning and the CIP document alleviate “one-shot” and “on-the-spot” decisions that are haphazard and politically driven (King 1995).

Capital Budgeting and Financial Management

The CIP must be annually revised to update capital project needs, remove funded projects and add new projects. In general, the capital projects proposed in the annual capital budget document are first-year projects listed in the CIP (Robinson, 1993). The capital budget is “a plan of proposed outlays and the means of financing them for the current fiscal period” (Moak & Hillhouse, 1975, p.2). The capital budget

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“provides a mechanism to smooth out peaks and valleys, regularize construction activity in an effort to avoid local bottlenecks that can delay projects and inflate their cost, avoid excessive drains on the tax base when projects must be paid for, and balance spending with the resources available within political, economic, and legal tax and debt limits” (Mikesell, 1999, p. 226). The Government Finance Officers Association (GFOA) recommends state and local governments in the U.S. prepare a separate capital budget and include the following information for each project: description of the project’s purpose, estimated total project costs and costs for the budget period, identified funding sources, timetable for completion, links to other plans (such as strategic plan or comprehensive plan), and the operating impact of the project (Government Finance Officers Association, 2016). Essentially, a community that has a capital budget that is *separate* from its operational budget is better able to focus on the capital resource allocation process. This is because capital projects have long-term benefits and should be financed through long-term debt (Mikesell, 2017). If the community does not separate the capital budget from the operational budget, short-term consumption will be competing with long-term investment, resulting in inefficient and ineffective use of public resources (Murdick & Deming, 1968).

In addition to annual budgeting, the systematic capital management and budgeting process includes two other elements: project prioritization and fiscal and debt management. The normative literature suggests that governments should prioritize capital projects and maintain prudential fiscal and debt management. The first activity is intended to match resources with needs, while the second is intended to promote fiscal stability, maintain and improve the government’s bond rating, and maintain an optimal balance between investment and consumption expenditures. Capital needs generally exceed public capital resources; thus, project prioritization is necessary. Systematic project prioritization supports evidence-based decision-making by including an extensive set of capital projects and applying a wide set of criteria reflecting project benefits, the needs for spending effectiveness, public values, and legitimacy for relatively large public spending (Marcelo, Mandri-Perrott, House, and Schwartz, 2016). Given the needs for evidence, comprehensiveness, effectiveness, value, and legitimacy, governments should establish a systematic project prioritization process. This process should include clear and objective criteria for project selection that reflect community priorities and investment targets. The process should facilitate consistent comparison of proposed capital projects based on criteria determined to be important by the community or jurisdiction (Ammar et al., 2001; Ebdon, 2004; Robinson, 1993) and improve objectivity in decision making (Calia, 2001). For state and local governments in the USA, the Government Finance Officers Association (GFOA, 2016) recommends including information on how capital projects are evaluated and prioritized in the capital budget.

Cost-benefit analysis is the main method for systematic project selection, allowing a government to compare the benefits of the projects with investment costs, while adding policy effectiveness and social values into decision-making through the measurement of social benefits (Burger & Hawkesworth, 2013). There are various cost-benefit analysis measures available for governments, including net present value (NPV), benefit-cost ratio (BCR), payback period, and internal rate of return (IRR). The NPV and BCR are superior to the payback period, given that they account for time-value money, which is an opportunity cost in committing capital resources to a public project (Mikesell, 2017). The BCR is not appropriate for comparing projects with relatively small cost, as the benefit-cost ratio of the projects will be inflated. NPV is the most useful approach to the public projects since it does not use cost size to standardize the public projects and incorporates time value money of the projects. In the USA, the federal government requires departments and agencies proposing capital projects submitting cost-benefit analysis to use discount factors for time-value money announced by the Office of Management and Budget – OMB’s

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Circular No. A-94, “Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs.” In South African state-owned companies, NPV and IRR were the most common cost-benefit analysis methods (Hall and Mutshutshu, 2013). Among Canadian municipal governments, payback period was the dominant measure (Chan, 2004). However, at the subnational level, there is some evidence suggesting that cost benefit analysis is not used in project prioritization processes due to technical capacity limitation in measuring the benefits of the public projects (Stanley & Block, 1984).

Beyond cost-benefit analysis, multiple-criteria decision techniques are often used to prioritize public projects at the subnational level in the USA. The techniques range from simple project ranking criteria to weighting systems in which each criterion is assigned a weight based on public values. Tables 1 and 2 present a simple project prioritization approach using multiple criteria and a weighting system, respectively. In the simple project prioritization approach (Table 1), budget analysts and agency heads proposing capital projects answer questions such as whether the project is legally required, reduces hazards, enhances the executive’s policy priorities, and supports the economic environment, and the consequences of not funding the projects. Cost-benefit analysis results are included (the sixth criterion in Table 1). Then all scores would be combined as shown in the table.

In the weighting system, each criterion is assigned different points and weights are based on community values. Table 2 presents the weighting system used by Chatham County, North Carolina (USA) to prioritize the capital projects (Vogt, 2004). As an example of the system, the operating budget impact criterion is assigned 15 points, and its weight equals to 11.34 percent. The operating budget impact is defined as whether the project will decrease future operating expenses. The financing criterion is defined as the extent to which a project can be financed with non-general fund revenue sources. It has an equal score and weight to those of the operating budget impact. This suggests that the County is concerned about its financial condition after committing to large capital projects and hence, reflects such values into its prioritization criterion’s scores and weight. The simplest ranking criteria is a set of subjective categories containing such criterion as “Essential, Desirable, Acceptable, and Deferrable”. This type of system is often found in local governments in the USA (Tigue, 1996). The multiple-criteria project prioritization system has several benefits, including allowing a government to prioritize its projects based on its community’s goals, making best use of available information across the set of proposed projects, and encouraging explicit *ex ante* identification of decision criteria (Marcelo et al., 2016). Based on

Table 1. Simple project ranking system using multiple criteria

Rating Question	Clearly No Clearly Yes						
	0	1	2	3	4	5	6
Is the request legally mandated?	0	1	2	3	4	5	6
Does the request eliminate or reduce a hazard or a threat to public health or safety?	0	1	2	3	4	5	6
Does the request fit with or advance the goals and objectives of the governing board?	0	1	2	3	4	5	6
Does the project support economic development in the community?	0	1	2	3	4	5	6
Would the consequences be severe if the request were not funded?	0	1	2	3	4	5	6
Do the benefits balance or exceed the cost?	0	1/1	2/1	3/1	4/1	5/1	6/1
Total score or rating	0						36

Source: Vogt, 2004.

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Table 2. Weighted project prioritization system

Rating Criteria	Definition	Maximum Points	Percentage Weighting
Functional area priority	Priority of project among requests in functional area: 5 for top-ranked project to 0 for any project ranked sixth or below priority.	5	3.79
Safety	Extent to which project eliminates, prevents, or reduces an immediate hazard to safety.	14	10.61
Mandates	Extent to which project helps county meet existing or new mandates.	13	9.83
Timing/Linkages	Extent to which project is timely, a continuation of a project currently under way related to other high-priority projects, etc.	12	9.09
Economic Impact	Extent to which project enhances economic development in county, while it protects the environment, or directly or indirectly adds to the tax base.	11	8.33
Efficiencies	Extent to which project contributes to savings in county operating or capital spending.	10	7.58
Maintaining current level of service	Extent to which project is necessary for county to continue to provide one or more services at current standards.	9	6.82
Improving access	Extent to which project improves the quality of existing services.	8	6.1
Service Improvement	Extent to which project improves the quality of existing services.	7	5.3
Service addition	Extent to which project increases the quantity of existing services.	3	2.3
Operating budget impact	Project that decrease future operating expenses receive a positive score, ranging from 0 to 15. Projects that have no effect on operating expenses receive a score of 0. Projects that increase operating expenses score anywhere from 0 to -15.	0-15, 0, or 0-(-15)	11.34
Community support and county long-term plans	Extent to which project has broad and/or string support from the community and is consistent with the county strategic plan or other long-term plans.	10	7.58
Financing	Extent to which project can be financed with non-general fund revenue sources.	15	11.34
Maximum points, all categories		132	100

Source: Vogt, 2004.

these benefits, the World Bank also recommends the multi-criteria project ranking approach (Marcelo et al., 2016).

For fiscal and debt management, the normative literature advocates budgetary forecasts, debt affordability analysis, and clear debt and financial management policies in capital financing. First, governments should conduct multi-year revenue and expenditure forecasting to identify net cash flow (total projected revenue minus total projected operating expenditures). The net cash flow is then compared with capital investment expenditures required in future years as identified in the CIP. This activity marries capital planning to fiscal planning. It also helps governments locate gaps between capital needs and resources and to prepare financially for increasing capital project demands. Multi-year fiscal forecasting indicates the government’s capacity for capital funding and thus, whether the activity will be beneficial in promoting fiscal stability (Aronson & Schwartz, 2004). Spackman (2002), following the guidelines of the OECD (Richard & Daniel, 2001; The World Bank, 1998), recommends the medium-term budget framework which forms the basis for multi-year spending ceilings for capital budgeting, especially for developing and transitional economies whose government budgets are prepared once a year.

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Second, debt affordability analysis should be conducted before issuing bonds to ensure that the amount of debt does not exceed the ability of the tax and revenue base (Johansen & Cooper, 2007; GFOA, 2001; Vogt 2004, Steiss, 2005). Debt affordability analysis involves calculating debt or debt service obligation on a per capita basis or as a ratio to total revenues or expenditures and a ratio to local property taxes. The per capita debt burden is not comprehensive given that it does not tie any income or financial capacity of a jurisdiction in paying debt services. However, such an approach is used often since it is convenient to benchmark debt levels in a jurisdiction with another. The ratio of debt service to total revenue or expenditure is used often in the U.S. state governments since it presents debt capacity relative to a state government's budget sizes (Vogt, 2004). The ratio of total net outstanding debt to property value is used often at the municipal levels in the USA since it is directly tied with the sources to pay debt services and is also convenient in comparing with statutory debt limits in which local governments in the USA are often subject to (Braun, 2006). In the USA, the two common approaches that are used to judge whether a government's debt obligation is too high are: (1) comparing per capita debt with other similar governments or to a group average (e.g., national average) and (2) using benchmarks, such as debt service as a percent of operating expenditures that is considered low if 5 percent or less, moderate if less than 10 percent, and high if more than 15 percent (Simonsen, Robbins & Brown, 2003). In addition to calculating debt burden, debt affordability should also be tied to characteristics of the community, such as population size, wealth, growth rate, and attitudes toward taxation and debt (Johansen & Cooper, 2007; Vogt 2004).

Third, governments should maintain an operating reserve (i.e., a "rainy-day" fund) to cover unanticipated revenue shortfalls or unexpected expenditures. Fitch (2002) suggests that the appropriate size of the rainy-day fund depends on a government's revenues, expenditures, and the economic environment. Governments should have clear debt management policies such as debt limits and debt disclosure. Sub-national governments in the U.S. that issue municipal debt must comply with Securities and Exchange Commission (SEC) Rule 15c2-12, which requires that bond issuing governments must submit annual financial information and provide notice of certain events material to their bonds or notes. Fitch (2002) also suggests that "superior debt disclosure" should be conducted. In addition to complying with the Rule 15c2-12, debt disclosure should include not only the management's discussion and analysis section of the financial report but also supplementary information, including economic outlook, demographic trends, net outstanding debts, and tax assessments.

Finally, governments should establish a clear guideline for capital financing, e.g., what kinds of public projects should be financed through current revenue (e.g., taxes, external grants and user charges as well as earmarked taxes) and what kinds of public projects should be financed through long-term debt. Table 3 presents capital financing methods, types of public projects suitable for each method, and advantages and disadvantages of each method. Mikesell (2017) suggests that public capital projects which have long useful lives and generate long-term benefits to the public (e.g., roads and bridges as well as public facilities) should be financed through long-term debts with debt service coming from general revenues or taxes. In the U.S., the interest on most bonds issued by state and local governments for a public purpose are not subject to federal income taxes and state income taxes to the extent that the bondholder is a resident of the state where the government is located. Public projects that are secured by a dedicated revenue stream, such as public utility plants and sewerage systems using user charges, should be financed by revenue bonds. Public projects that have relatively short useful lives, such as police cars, equipment, or computer software, should be financed through current revenue. Vogt (2004) observes that relatively fast-growing communities tend to use borrowing to finance about 80 percent of total capital projects given that the community will experience economic growth. Meanwhile, communities with

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Table 3. Summary of public capital financing methods

<i>Funding Mechanism and Assets/Projects</i>	<i>Advantages</i>	<i>Disadvantages</i>
<p><i>Pay As You Go (PAYGO)</i></p> <ul style="list-style-type: none"> • Assets that are not expensive, have short useful lives, benefit is achieved early, requiring matching local funds • Projects that can be reasonably phased given annual expenditures 	<ul style="list-style-type: none"> • Saves interest and other issuance costs • Preserves financial flexibility • Protects borrowing capacity • Enhances credit quality 	<ul style="list-style-type: none"> • Generally insufficient for capital needs • Discourages intergenerational equity • Creates uneven flow of issuing debt
<p><i>Tax-Exempt Bonds</i></p> <ul style="list-style-type: none"> • Assets with long useful lives • Projects that are expensive to acquire or that exceed the capacity of the PAYGO program 	<ul style="list-style-type: none"> • Permits acquisition of assets as needed • Promotes intergenerational equity • Smooths capital expenditures 	<ul style="list-style-type: none"> • Adds financial and administrative costs of procuring capital assets
<p><i>Certificates of Participation</i></p> <ul style="list-style-type: none"> • Projects that are expensive to acquire or that exceed the capacity of the PAYGO program • Purchases of equipment, buildings, real property 	<ul style="list-style-type: none"> • Permits acquisition of assets as needed • Voter approval not needed 	<ul style="list-style-type: none"> • Higher interest costs relative to issuing debt
<p><i>Grants</i></p> <ul style="list-style-type: none"> • Assets qualifying for grant assistance (e.g., transportation projects) 	<ul style="list-style-type: none"> • Expands size of capital program with little or no cost to local taxpayers 	<ul style="list-style-type: none"> • Limited amounts • Availability may not coincide with priorities • Administrative or compliance costs
<p><i>Impact Fees/ Exactions</i></p> <ul style="list-style-type: none"> • Projects benefitting new developments (e.g., water, sewer, and transportation facilities) 	<ul style="list-style-type: none"> • Initial capital outlay can be funded at no cost to taxpayers 	<ul style="list-style-type: none"> • Does not address ongoing maintenance or replacement costs • May be politically unpopular
<p><i>Revolving Loan Programs</i></p> <ul style="list-style-type: none"> • Assets qualifying for loan assistance (e.g., wastewater treatment projects) 	<ul style="list-style-type: none"> • May lower financing costs 	<ul style="list-style-type: none"> • Availability may not coincide with priorities • Administrative or reporting costs
<p><i>State Bond Banks</i></p> <ul style="list-style-type: none"> • Projects of small governments appropriate for debt financing 	<ul style="list-style-type: none"> • May lower financing costs 	<ul style="list-style-type: none"> • May not be available when needed • May impose burdensome requirements
<p><i>Public/Private Partnerships</i></p> <ul style="list-style-type: none"> • Projects appropriate for franchising agreements, service contracts, or joint development 	<ul style="list-style-type: none"> • Lowers capital and/or operating costs 	<ul style="list-style-type: none"> • Additional staff resources to negotiate, coordinate, monitor
<p><i>Private Contributions</i></p> <ul style="list-style-type: none"> • Facilities adjacent to private properties 	<ul style="list-style-type: none"> • Lowers capital and/or operating costs 	<ul style="list-style-type: none"> • Additional staff resources to identify contributors and coordinate activities

Source: Adapted from Tighe (1996)

slower growth rates will tend to use current revenues for about half of their capital project needs, while at the same time looking to employ innovative financing strategies.

Innovative financing methods such as Certificates of Participation (COPs) are often used by communities that have little borrowing capacity available, at least under legal debt limits (most states limit the amount of debt that municipalities can issue) or who have other difficulties accessing the long-term debt market. In a COP arrangement, a government leases property or equipment from a private party (known as the lessor), which acquires the property through issuing debt; the government then leases the property and makes payments to the lessor, who then makes the debt payments (with a mark-up).

Another innovative capital financing method used by state governments in the U.S. is creating a state revolving fund. In this method, a state government issues long-term bonds and then lends the bond proceeds, along with other financing sources, such as a portion of general revenue, federal grants and

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special taxes, to local governments with relatively low interest rates. Repayments by the local government help to “recapitalize” the revolving fund. This financial tool is often used to help small governments in the U.S. obtain financing for sanitation public projects, such as water plants and sewerage systems (Levine & Augustino, 1994).

Other innovative financing methods used by U.S. subnational governments include impact fees and bond banks. Impact fees are widely used in California as communities are expanding rapidly while referenda passed by citizens restricted the growth of property tax revenues. Impact fees are development fees collected from commercial and residential developers with the revenues being used to pay for debt service on debt issued to make public improvements demanded by individuals living or working in the development. State bond banks are state entities that borrow to capitalize themselves, and then give loans to local (generally smaller) governments who would normally borrow at higher interest rates. This mechanism is similar to revolving loan funds in that local governments can borrow at lower rates and with lower costs of issuance due to economies of scale. Public-private partnerships (PPP) are a method used to finance public projects through franchising agreement, service contracts, or joint development. The PPP helps a government adopt public projects in a timely manner, share risks and technologies with its private partners, and save project acquisition cost, but it may add staff time in managing contracts (Tigue, 1996).

King (1995) observes that systematic capital budgeting and financial management practices support an investment policy goal (i.e., investment effectiveness). The practices provide a mechanism to finance multi-year capital programs without having to alter them for unstable fiscal situations. Furthermore, the practices help enhance bond ratings, which in turn reduces project acquisition cost. For example, in the U.S., well-constructed, project prioritization criteria helped the State of Minnesota stay focused on its investment proposals, using critical versus strategic criteria to prevent the government from committing to unbalanced capital spending between new and maintenance projects. The critical criteria directed the government to focus on repairing and replacing obsolete facilities to save future maintenance cost, reducing infrastructure backlogs, and reducing the need to develop public projects on an emergency basis. The strategic criteria helped the government focus on new construction to strategically expand public infrastructure systems.

Forte (1989) observes that a good forecast helps a government invest in capital projects at a stable rate across time. A government investing at a stable rate does not need to increase tax rates (Forte, 1989), yielding taxpayers’ and voters’ satisfaction, while at the same time being responsive to public needs. For example, the City of McKinney, Texas identified \$21 million in capital resources without increasing taxes by conducting a debt affordability analysis, budgetary forecast, and debt service capacity study (Forte, 1989). Darr (1998) asserts that because of debt management policies, including statutory debt limits, rainy day funds, and innovative capital financing, the Commonwealth of Virginia has been able to preserve its superior bond rating profile over a 30-year period. The Virginia state government created a diversified fund reserve to support the operating budget during recessions and for use in financing capital projects when interest rates were high. For some state governments in the U.S., operational costs of new facilities are incorporated into the evaluation of capital project proposals. In others, the annual budget document is likely to have a special section that presents major capital projects and acquisitions that are up for approval and funding that year (Ermasova, 2013). Through their commitment to long-range fiscal planning, governments can ensure fiscal discipline and stable infrastructure funding by maintaining an optimal balance between consumption and investment.

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Centralized Execution and Project Management

The centralized execution and project management component of the systematic capital management and budgeting process is an essential step that ensures capital projects are delivered on time and within budget (Ammar et al., 2001). The normative literature recommends that governments identify a central committee or agency to supervise project construction, monitor project performance, track the use of funds, and report funded project progress to the public and central government (Dupont-Morales & Harris, 1994; Government Performance Project, 2005; Westerman, 2004; Sermier & Macone, 1993). This recommendation is based on the idea that centralized project management increases government accountability, capital program effectiveness, and funding efficiency (Sermier & Macone, 1993). Furthermore, Burger and Hawkesworth (2013) suggest that strong oversight and review by a central authority may mitigate perverse incentives and budget maximization tendencies.

Project management by itself is also a key element of a systematic approach to capital management and budgeting. Project management concerns the implementation of decisions made during capital planning. With this component, government seeks to minimize delays, cost overruns, threats to worker and citizen safety, and other problems by detecting such issues in a timely way and correcting them quickly (Ebdon, 2004; Jimenez & Pagano, 2012). The key to strong project management is careful monitoring of progress against the schedule and budget and frequent reporting of project status (through management reports) at both the agency and central levels. The project monitoring reports should include information such as percent of project completed, percent of project budget expended, progress on key project milestone, contract status information (including time remaining and percentage used), revenue and expenditure activities, cash flow and investment maturities, funding commitment, available appropriation, and comparison of results in relation to established performance measures (GFOA, 2007). In addition, delay estimates, budget overruns, revised cost estimates, and overrun explanations should also be included in projects status report (Dupont-Morales & Harris, 1994).

The Government Finance Officers Association (2017) recommends that governments in the U.S. regularly monitor capital projects' financial and project activity. The best practices for project monitoring include the following activities (Government Finance Officers Association, 2017):

- Confirmation that a project plan exists that identifies all required resources and milestone work products and assurance that it is being followed.
- Confirmation that the project's scope has been clearly identified and the project stays within scope or that changes to scope have been made consistent with an established process.
- A review of project-related financial transactions to support budget review, auditing, and asset management.
- A review of expenditures.
- A review of project retainages, warranties, or other conditional performance schedules.
- Review of encumbrances and estimates of planned expenditure activity.
- Confirmation of continued availability and appropriateness of revenue sources.
- Confirmation of the adequacy of cash flow.
- Review of the timing of investment maturities disbursements.
- Review of sources and project uses of bond proceeds and grants.
- Results compared to established measures of performance.

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Governments tend to contract out large project acquisition for several reasons. Theoretically, for competitive and transparent bidding processes, multiple producers are competing for contracts; the best contractor who can deliver public projects at lowest cost with highest quality in a shortest time frame would be awarded the contract (Savas, 2000; Dastidar & Mukherjee, 2014). Contracting out promotes efficiency through economies of scales, since public projects may require several administrative units. It is argued that once the contractors are responsible for project management, a government can have a reasonably sized administrative team to monitor contractors' performance rather than managing the projects itself (Savas, 2000). In capital project management, risks are defined as "the potentials for realization of unwanted, negative consequences of an event" (Baldry, 1998, p. 36). Public capital projects have different risks than private projects. For example,

- Commencement, execution and completion of a project rely on the higher authority of a public organization, which may not be the direct sponsor of the project. For example, a large expressway project may be contracted by the Department of Transportation; however, project initiation may depend on elected and appointed officers in a legislative body;
- Profits are not a major goal of public projects. The benefits sought are usually public benefits except when the public project can serve the public while at the same time generating some tangible revenue in terms of by-products (e.g., utilities);
- A broad range of procurement methods are involved, including commercial contracts, lease purchases and PPPs;
- Success in project management and acquisition is defined according to citizen and stakeholder perspectives, including functional satisfaction, aesthetic merits, environmental impacts and hazard removal. Monetary benefits of the project are rarely a focus;
- Project implementation is conducted within the public domain and is subject to formal review by statutory bodies and informal scrutiny by the media and the public. (Baldry, 1998, p. 36).

Given such characteristics, Baldry (1998) observes that public organizations possessing good project management skills tend to be aware of and recognize the broad impacts of risks while coordinating contracts. A government skilled in project management is aware that it may have to underwrite significant financial resources that arise due to exigencies such as postponement, cancellation, or non-performance of the contracted projects. Such events may have damaging effects on public service delivery (Baldry, 1998). These risks are retained within a government and should be added to the project cost as contingencies. Public organizations may try to reduce risk by carefully writing contract terms to establish the culture, relationship, and expectation with the private sector to avoid future risk exposure (Baldry, 1998). Research suggests that in contract management, project risks are fewer and more manageable when a government contracts with businesses that have similar management cultures and values (Liu, Meng & Fellows, 2015).

Effective project implementation can be achieved if governments detect and address problems in capital project execution as early as possible. Project monitoring prevents cost overruns for large and time-consuming projects, thus increasing funding efficiency. Performance measurement can be implemented in several ways, including measuring cost per unit output and identifying project outcomes, such as a community economic growth and tax base expansion. It is important to note that output is different than outcomes. Output is directly related to public capital project implementation processes.

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For example, the number of daily passengers for a transit project is an output measure. Outcomes, on the other hand, are impacts of the public project and are indirectly related to the public capital investment. For example, clean air, reduced traffic congestion, and reduced commute time from residential areas to business areas are outcomes of transit projects. Outcome measures capture both the effect of the public capital project and the values of the community, while output measures reflect efficiency and effectiveness in capital project planning and implementation. Performance measurement should include both types of measures in capturing program effectiveness and efficiency (Kamensky, 1993). In addition to quantitative measurement, the Government Finance Officers Association (GFOA, 2007) recommends that an organization responsible for project acquisition should solicit stakeholder feedback to aid in designing and implementing projects. The GFOA (2007) recommends that in addition to output and outcome measurement, a government should conduct performance review for project acquisition to assess the following:

- Project acquisition is closed out appropriately with all systems used to manage, monitor, and report on the project;
- All remaining contract encumbrances are properly handled;
- Established procedures for user acceptance of the project are functioning and final project completion procedures have been followed;
- All reporting requirements by grantors and bond covenants have been completed;
- Project data is properly recorded on fixed asset schedules and government capital assets are added to the account for future tracking; and
- Project acquisition is disclosed, properly documented, and reported.

Performance measurement and evaluation is important in the project execution phase because it provides information to help project managers adjust their capital-related activities (Kamensky, 1993). This information helps officials understand how projects are accomplished and helps managers choose the least costly projects from all projects that serve similar goals. Interviews with former budget analysts, department heads, and the Planning Director of the Illinois (USA) Department of Transportation (IDOT) revealed the perception that centralized project management can yield investment effectiveness through two mechanisms: (1) by detecting construction problems and assuring that construction meets standards, and (2) by providing information that facilitates a new round of capital planning (Srihongrun, 2006). The Government Performance Project or GPP (2005) also reported that IDOT practices in centralized monitoring for project execution helped in detecting cost overruns and project inefficiency, and enhancing the quality of construction work. The GPP (2005) further noted that IDOT can correct delays and safety compliance within approximately two to three weeks for poor quality and cost overruns, and one to two months for project inefficiency and cost delays.

Infrastructure Maintenance

Once completed, capital assets are consumed and used for their designated purposes. Existing capital will decay, requiring on-going and preventive maintenance, and eventually will need to be replaced. Once a government decides to invest in a specific infrastructure, it is responsible for maintaining the facility in proper condition (Jimenez & Pagano, 2012). Asset maintenance is important for maximizing the use of capital assets, especially since operating and maintaining costs can far exceed the initial cost

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(Ebdon, 2004). The infrastructure maintenance component of the systematic capital management and budgeting process is comprised of two main activities: maintenance planning and maintenance funding (Ammar et al., 2001).

Maintenance planning involves conducting public asset management by evaluating the conditions and useful life of public infrastructure, projecting the capacity of public facilities in the current and future years, and finally, comparing its service capacity to current and future usage. Regular condition assessment is important for establishing capital planning and establishing a CIP based on actual needs. Maintenance planning, on the other hand, is tied directly to the assessment of the condition of the capital stock, using an asset management system (Pagano, 1984). By dedicating more funding to maintenance, governments can defer capital investment needs and avoid larger, more expensive capital project needs in the future. A maintenance plan should include actions and expenditures that extend the useful life of capital assets, including upgrades and replacements of building systems such as structures, enclosures, mechanical, plumbing, and electrical systems (Pagano, 1984). To perform good asset maintenance, governments need regularly updated information to know what they own and the condition of their assets. In the U.S., the majority of the states have developed asset management systems “designed to assess the condition of and to estimate the intensity and timing of maintenance and repair investments for facilities in transportation, corrections, office buildings, the state capitol, libraries and parks, and recreation” (Jimenez & Pagano, 2012, pp. 132-133).

Table 4 presents four commonly used methods of capital asset inventory determination: engineering assessment, performance measurement, service impact indicators, and perpetual inventory methods (Tigue, 1998). Engineering assessment, such as road and bridge condition evaluation, is used when service quality of the public infrastructure is the focus. Methods of engineering assessment can be arbitrary, and the comprehensibility of results may be confined to professional groups. Performance measurement generally focuses on quantity of output. The strength of this method is that it can be readily tied to the demand for capital projects. The disadvantage of this method is that it does not focus on quality of public projects. The service impact indicator is a type of outcome mentioned previously. This method incorpo-

Table 4. Capital asset inventory approaches

METHOD AND UNDERLYING CONCEPT	EXAMPLES	ADVANTAGES	DISADVANTAGES
Engineering Assessment (focus on service quality)	Bridge condition rating ranging from 0-10, Road pavement thickness, Deferred maintenance (\$), Infrastructure backlog (\$)	Focuses on quality of service rather than quantity	Can be costly, can be subjective if not done by technical specialists
Performance Measurement (focus on service quantity or output)	Per capita lane miles, numbers of population per 1,000 square footage, number of service calls for water line repairs/month	Focuses on capacity to serve citizens, can be easily tied with master plan and community profile data	Excludes quality of public infrastructure system
Service Impact Indicator (focus on service impact or outcome)	Commuting times to work, Annual % increase in housing units/ business permits	Involves both quality and quantity dimensions	Not necessarily related to service levels
Perpetual Inventory Method (focus on accounting)	Record of capital outlays in the past period, applied appreciate rate and useful life of each assets	Practical	Needs good records/book keeping

Source: Excerpted and adapted from Tigue (1996)

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rates both quantity and quality of public infrastructure. However, given that the outcome is the impact of the projects, the linkage between the project and a social outcome is not always explicit. Finally, the perpetual inventory method is an accounting method in which capital project expenditure is recorded throughout time, and a depreciation rate is applied in order to yield the monetary value of public stock. This method requires good bookkeeping which some governments cannot afford.

Maintenance funding involves setting aside public resources for repair and replacement. This practice helps a government reduce project costs by avoiding long-term debt with relatively high interest rates, especially when an emergency occurs and a public project must be implemented immediately. For example, a local bridge may become damaged in a natural disaster and require immediate repair. In this situation, a maintenance fund could be accessed to make a large down payment and thereby reduce the amount of debt that needs to be issued. Maintenance funding can also help a government avoid accumulating public infrastructure backlogs since annual repairs can extend the useful life of a project. Pagano (1984) and Jacob (2008) suggest that linking capital and operating budgets provides assurance that maintenance funding is undertaken. For example, by using dedicated revenues to finance public facility depreciation, a government will be able to ensure annual appropriation for a regular maintenance schedule (Afonso, 2014).

In the state of Illinois, USA, maintenance planning is an indispensable element of the agency proposal development process. Condition assessment information is used to justify project proposals and communicate needs to upper-level managers and elected officials (Srithongrung, 2006). The state central budget office supports maintenance funding, both in terms of prioritization and earmarking funds for this purpose. Additionally, in terms of higher education infrastructure, the earmarked funds help relieve the need for higher education projects, which compete with corrections projects at the state level, as both types of facilities are funded by the same sources. According to Srithongrung (2006), the Illinois experience illustrates two points: (1) maintenance funding must be continuously supported by top-level management to effectively relieve emergency needs, and (2) when the capital renewal fund and a regular fund (for programmatic purposes) are separated, the projects that serve different purposes (maintenance versus programmatic) do not compete against each other, which allows a focus on strategic and programmatic planning.

More recently, several U.S. states have moved maintenance from the capital budget into the departmental operating budgets. Other states have developed a system to rate maintenance projects as part of the effort to preserve facilities, for example, by placing additional emphasis on the planning and execution of preventive maintenance (Ermasova, 2013). The Oregon (USA) Department of Administrative Services uses an atypical financing system for maintenance – it recovers funds for preservation through “uniform rent” charges to agencies. Statutory mechanisms exist for agencies that own facilities to include in their budgets what would effectively be an internal rent charge. Agencies could then set aside these rents in a separate fund for use in addressing capital needs, such as replacing systems at the end of their useful life or by providing ongoing maintenance. State governments have funded maintenance using various budget approaches, such as: (1) including maintenance in the operating budget; (2) including maintenance in the capital budget; (3) including most routine maintenance (except maintenance for building renewal) funding in the operating budget; and (4) having a separate appropriation bill or a special maintenance and repair budget (Ermasova, 2013).

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CONCLUSION

This chapter introduces the systematic capital management and budgeting process which is used as a framework in describing public capital management and budgeting practices in each of the twelve country case studies included in this book. The systematic capital management and budgeting process is comprised of four main components: long-term capital planning, capital budgeting and financial management, centralized execution and project management, and infrastructure maintenance. This systematic process, as recommended by the literature, parallels the strategic management process in which a government's strategic goal is utilized to frame courses of action (Koteen, 1989). A systematic approach to capital management and budgeting should enhance public spending efficiency given that practices encompassed in a systematic process sets the directions for government in deciding when to spend on a particular public project, where to locate the public project relative to public demands, how to finance projects and what should be done in project acquisition. As empirically shown by Srithongrung (2006; 2008), the resulting efficient public investment ensures quality infrastructure that can affectively enhance local economic growth.

REFERENCES

Adams, C. T. (1988). *The Politics of Capital Investment: The Case of Philadelphia*. Albany, NY: State University of New York Press.

Afonso, W. B. (2014). Local Government Capital Spending During and After Recessions: A Cause for Concern? *International Journal of Public Administration*, 37(8), 494–505. doi:10.1080/01900692.2013.865646

Ammar, S., Duncombe, W., & Wright, R. (2001). Evaluating capital management: A new approach. *Public Budgeting & Finance*, 21(4), 47–69. doi:10.1111/0275-1100.00058

Aronson, J. R., & Schwartz, E. (2004). *Management Policies in Local Government Finance* (5th ed.). Washington, DC: International National City/County Management Association.

Baldry, D. (1998). The Evaluation of risk management in public sector capital projects. *International Journal of Project Management*, 16(1), 35–41. doi:10.1016/S0263-7863(97)00015-X

Beckett-Camarata, J. (2003). An examination of the relationship between the municipal strategic plan and the capital budget and its effect on financial performance. *Journal of Public Budgeting, Accounting & Financial Management*, 15(1), 23–40.

Beckett-Camarata, J. (2008). Capital Budgeting. In J. Rabin (Ed.), *Encyclopedia of Public Administration and Public Policy*. Taylor & Francis.

Braun, P. J. (2006). Infrastructure Demands Versus Debts. In *Managing Local Government Finance*. International City and County Management Association (ICMA) Publishers.

Burger, P., & Hawkesworth, I. (2013). Capital Budgeting and Procurement Practices. *OECD Journal on Budgeting*, 13(1), 57–104. doi:10.1787/budget-13-5k3w580lh1q7

A Systematic Public Capital Management and Budgeting Process

- Calia, R. (2001). Are all public spending programs equal? Priority setting approaches for government budgeting. *Government Finance Review*, 17(4), 18–18.
- Chan, Y.-C. L. (2004). Use of Capital Budgeting Techniques and an Analytic Approach to Capital Investment Decisions in Canadian Municipal Governments. *Public Budgeting & Finance*, 24(2), 40–58. doi:10.1111/j.0275-1100.2004.02402003.x
- Chandra, A., & Thompson, E. (2000). Does public infrastructure affect economic activity? Evidence from rural interstate highway system. *Journal of Regional Science*, 27(3), 419–437.
- Darr, D. (1998). The Benefits of Long-Range Capital Planning—The Virginia Experience. *Public Budgeting & Finance*, 18(3), 42–53. doi:10.1046/j.0275-1100.1998.01141.x
- Dastidar, K. G., & Mukherjee, D. (2014). Corruption in delegated public procurement auctions. *European Journal of Political Economy*, 35, 122–127. doi:10.1016/j.ejpoleco.2014.05.003
- Dowall, D. E. (2001). Rethinking statewide infrastructure policies: Lessons from California and beyond. *Public Works Management & Policy*, 6(1), 5–17. doi:10.1177/1087724X0161002
- Dupont-Morales, M. A., & Harris, J. E. (1994). Strengthening Accountability: Incorporating Strategic Planning and Performance Measurement into Budgeting. *Public Productivity & Management Review*, 17(3), 231–239. doi:10.2307/3380655
- Ebdon, C. (2004). Capital Management Practices in U.S. Counties. *Public Works Management & Policy*, 8(3), 192–202. doi:10.1177/1087724X03259604
- Ermasova, N. (2013). The capital budgeting at the state level during the Great Recession: The results of survey. *State & Local Government Review*, 45(2), 119–130. doi:10.1177/0160323X13487079
- Fisher, R. C. (2016). *State and local public finance*. New York: Routledge.
- Forte, D. (1989). From reactive to proactive fiscal planning: The results of strategic planning in McKinney, Texas. *Government Finance Review*, 54(4), 7–11.
- Gatti, S. (2012). *Project Finance in Theory and Practice: Designing, Structuring, and Financing Private and Public Projects*. Waltham, MA: Elsevier.
- Gianakis, G. A., & McCue, C. P. (1999). *Local government budgeting: A managerial approach*. Westport, CT: Quorum Books.
- Government Finance Officer Association—GFOA. (2007). *Best Practice in Capital Project Monitoring and Reporting*. Retrieved October 15, 2018, from <http://www.gfoa.org/capital-project-monitoring-and-reporting>
- Government Finance Officers Association. (2001). *GFOA Recommended Practices: Debt Management. Recommended Practices for State and Local Governments: 89-127 (Development of a Debt Policy, revised 2003)*. Retrieved from <http://www.gfoa.org/services/rp/debt/debtmanagement-policy.pdf>
- Government Finance Officers Association. (2016). *GFOA Best Practice: Incorporating the Capital Budget into the Budget Document* Retrieved from <http://www.gfoa.org/incorporating-capital-budget-budget-document>

A Systematic Public Capital Management and Budgeting Process

Government Finance Officers Association. (2017). *GFOA Best Practice: Capital Project Monitoring and Reporting*. Retrieved from <http://www.gfoa.org/capital-project-monitoring-and-reporting>

Government Performance Project—GPP. (2005). *Grading the States 2005: A look inside*. Retrieved September 13, 2005, from <http://results.gpponline.org/States.aspx>

Halachmi, A., & Sekwat, A. (1997). Strategic capital budgeting and planning: Prospects at the county level. *Journal of Public Budgeting, Accounting & Financial Management*, 8(4), 578.

Hall, J. H., & Mutshutshu, T. (2013). Capital budgeting techniques employed by selected South African state-owned companies. *Corporate Ownership & Control*, 10(2), 177–187.

Holtz-Eakin, D., & Schwartz, A. (1995a). Infrastructure in a structural model of economic growth. *Regional Science and Urban Economics*, 25(2), 131–151. doi:10.1016/0166-0462(94)02080-Z

Howard, K. (1973). *Changing state budgeting*. Lexington, KY: Council of State Government.

Jacobs, D. F. (2008). *A review of capital budgeting practices*. IMF Working Paper, WP/08/160. International Monetary Fund.

Jimenez, B. S., & Pagano, M. A. (2012). What Factors Affect Management Quality? State Infrastructure Management and the Government Performance Project. *Public Works Management & Policy*, 17(2), 124–151. doi:10.1177/1087724X11419308

Johansen, E., & Cooper, J. H. (2007). Common Funding Options for Capital Projects. In J. P. Casey & M. J. Mucha (Eds.), *Capital Project Planning and Evaluation: Expanding the Role of the Finance Officer* (Vol. 8, pp. 59–80). Chicago, IL: Government Finance Officers Association.

Kamensky, J. (1993). Program performance measures: Designing a system to manage for results. *Public Productivity & Management Review*, 16(4), 395–402. doi:10.2307/3381017

King, L. M. (1995). Operating and capital budget reform in Minnesota: Managing public finances like the future matters. *Government Finance Review*, 11(1), 7–10.

Koteen, J. (1989). *Strategic Management in Public and Non-profit Organizations*. Praeger.

Levine, S., & Augustino, J. (1994). State revolving funds: A model for financing drinking water programs. *Government Finance Review*, 12, 26–44.

Liu, J., Meng, F., & Fellows, R. (2015). An exploratory study of understanding project risk management from the perspective of national culture. *International Journal of Project Management*, 33(3), 564–575. doi:10.1016/j.ijproman.2014.08.004

Lobo, J., & Rantisi, N. (1999). Investment in infrastructure as determinant of metropolitan productivity. *Growth and Change*, 30(1), 106–127. doi:10.1111/0017-4815.00106

Marcelo, D., Mandri-Perrott, C., House, S., & Schwartz, J. (2016). *An Alternative Approach to Project Selection: The Infrastructure Prioritization Framework*. World Bank Working Paper.

Mikesell, J. L. (1999). *Fiscal administration: Analysis and applications for the public sector* (5th ed.). New York: Harcourt Brace College Publishers.

A Systematic Public Capital Management and Budgeting Process

- Mikesell, J. L. (2017). *Fiscal administration* (10th ed.). Boston, MA: Cengage Learning.
- Moak, L., & Hillhouse, A. (1975). *Concepts and practices in local government finance*. Chicago, IL: Municipal Finance Officer Association.
- Moak, L. L., & Killian, K. W. (1963). *Capital programming and capital budgeting*. Chicago, IL: Municipal Finance Officer Association.
- Moomaw, R., Mullen, K., & Williams, M. (2002). Human and knowledge capital: A contribution to empirics of state economic growth. *American Economic Journal*, 30(1), 48–59.
- Munnell, A. H. (1992). Policy Watch: Infrastructure Investment and Economic Growth. *The Journal of Economic Perspectives*, 6(4), 189–198. doi:10.1257/jep.6.4.189
- Murdick, R. G., & Deming, D. D. (1968). *The Management of Capital Expenditures*. New York City, NY: McGraw Hill.
- National Association of State Budget Officers (NASBO). (1999). *Capital budgeting in the States-paths to success: A comparative analysis of capital budgeting practices in the States*. Retrieved July 14, 2018, from <https://www.nasbo.org/mainsite/reports-data/capital-budgeting-in-the-states/capital-budgeting-archive>
- National Association of State Budget Officers (NASBO). (2014). *Capital budgeting in the States*. Retrieved July 14, 2018, from <https://higherlogicdownload.s3.amazonaws.com/NASBO/9d2d2db1-c943-4f1b-b750-0fca152d64c2/UploadedImages/Reports/Capital%20Budgeting%20in%20the%20States.pdf>
- Pagano, M. A. (1984). Notes on capital budgeting. *Public Budgeting & Finance*, 4(3), 31–40. doi:10.1111/1540-5850.00648
- Pagano, M. A., & Perry, D. (2008). Financing Infrastructure in the 21st Century City. *Public Works Management & Policy*, 13(1), 22–38. doi:10.1177/1087724X08321015
- Price, W. (2002). Innovation in Public Finance: Implications for the Nations Infrastructure. *Public Works Management & Policy*, 7(1), 63–78.
- Ratings, F. (2002). *The twelve habits of highly successful finance officers*. Retrieved April 15, 2006, from www.fitchratings.com
- Richard, A., & Daniel, T. (2001). *Managing Public Expenditure: A Reference Book for Transition Countries*. Paris: OECD Publishing.
- Robinson, S. G. (1993). Capital Planning and Budgeting. In J. E. Petersen & D. R. Strachota (Eds.), *Local Government Finance: Concepts and Practices* (pp. 65–84). Washington, DC: Government Finance Officers Association.
- Savas, E. S. (2000). *Privatization and Public-Private Partnerships*. New York: Seven Bridges Press.
- Sermier, E., & Marcone, P. (1993). The Challenge of Governing: Getting Things Done. *Public Productivity & Management Review*, 16(4), 409–414. doi:10.2307/3381019
- Simonsen, B., Robbins, M. D., & Brown, R. (2003). Debt affordability. In J. Rabin (Ed.), *Encyclopedia of Public Administration and Public Policy* (pp. 308–312). New York: Marcel Dekker.

A Systematic Public Capital Management and Budgeting Process

Singhvi, S. (1996). Using an affordability analysis to budget capital expenditure. *Healthcare Financial Management, 50*(6), 70–76. PMID:10158243

Spackman, M. (2001). Public investment and discounting in European Union member states. *OECD Journal on Budgeting, 1*(2), 213–260. doi:10.1787/budget-v1-art13-en

Spackman, M. (2002, April). *Multi-year Perspective in Budgeting and Public Investment Planning*. Draft background paper for discussion at session III.1 of the OECD Global Forum on Sustainable Development: Conference on Financing Environmental Dimension of Sustainable Development. Retrieved from <http://www.oecd.org/unitedkingdom/2081306.pdf>

Srithongrung, A. (2006). *The impact of state capital budget and management programs on state capital budget decisions and economic performance* (Unpublished D.P.A. Dissertation). Available from Dissertations & Theses @ University of Illinois at Springfield.

Srithongrung, A. (2008). The impacts of state capital management programs on state economic performance: An empirical analysis. *Public Budgeting & Finance, 28*(3), 83–107. doi:10.1111/j.1540-5850.2008.00912.x

Srithongrung, A., & Kriz, K. A. (2012). From Public Infrastructure to National Economic Growth: Do Systematic Investment Practices Matter? *International Public Management Review, 13*(2), 19–50.

Stanley, M. T., & Block, S. B. (1984). A survey of multinational capital budgeting. *Financial Review, 19*(1), 36–54. doi:10.1111/j.1540-6288.1984.tb01083.x

Steiss, A. W. (2005). *Strategic Facilities Planning: Capital Budgeting and Debt Administration*. Lanham, MD: Lexington Books.

Steiss, A. W., & Nwagwu, E. O. C. (2001). *Financial planning and management in public organizations*. New York: Marcel-Dekker.

Stich, B., & Eagle, K. (2005). Planning to Include the Public: Transportation Policy Implementation With Effective Citizen Involvement. *Public Works Management & Policy, 9*(4), 319–340. doi:10.1177/1087724X05275672

Storm, R., & Feiock, R. (1999). Economic development consequences of state support for higher education. *State & Local Government Review, 31*(2), 97–105. doi:10.1177/0160323X9903100204

The World Bank. (1998). *Public Expenditure Management Handbook*. Washington, DC: The International Bank for Reconstruction and Development.

The World Bank. (2018). *International LPI - Global Rankings 2018*. Retrieved from <https://lpi.worldbank.org/international/global?order=Infrastructure&sort=asc>

Tigue, P. (1996). *Capital Improvement Programming: A Guide for Smaller Governments*. Chicago, IL: Government Finance Officers Association.

U.S. General Accounting Office. (1998). *Executive Guide: Leading Practices in Capital Decision-Making*. Washington, DC: U.S. General Accounting Office. Retrieved from <https://www.gao.gov/special.pubs/ai99032.pdf>

A Systematic Public Capital Management and Budgeting Process

Vogt, A. J. (2004). *Capital budgeting and finance: A guide for local governments*. Washington, DC: International City/County Management Association.

Westerman, N. (2004). Managing the Capital Planning Cycle: Best Practice Examples of Effective Capital Program Management. *Government Finance Review*, 20(3), 26–32.

Westerman, N., & Casey, J. P. (2007). Cost Estimation and Budgeting. In J. P. Casey & M. J. Mucha (Eds.), *Capital Project Planning and Evaluation: Expanding the Role of the Finance Officer* (Vol. 8, pp. 27–44). Chicago: Government Finance Officers Association.

Wigfall, P., & Lynch, T. D. (2003). Capital Budgeting Practices in Local Governments. *Case Studies in Public Budgeting and Financial Management*, 241-252.

Yinger, J., Bloom, H., Börsch-Supan, A., & Ladd, H. (1988). *Property Taxes and House Values: The Theory and Estimation of Intra-jurisdictional Property Tax Capitalization*, *Studies in Urban Economics*. Boston: Academic Press.