

# 35 YEARS OF PUBLIC CAPITAL BUDGETING: A REVIEW AND FUTURE RESEARCH AGENDA

Natalia Ermasova  
Politics and Public Administration Unit  
Governors State University

## ABSTRACT

*This paper reviews a large number of works published over the past 35 years on public capital budgeting. The purpose of this paper is to provide a more comprehensive analysis of research on capital budgeting. Through this review, this study seeks to critically analyze the literature on the public capital budgeting, identify the research gaps, and set future research agenda based on those gaps. Our study presents a review of 106 academic studies on this topic. The main finding is that constructs, such as international capital budgeting, infrastructure maintenance, cross-state and cross-local municipalities' analysis, need further attention. This study found that there is a lack of literature that examines how the federal, state, and local governments cope with challenges and pressures during economic decline. Future studies could examine the effects of economic decline during and after Covid-19 pandemic on changes in capital budgeting practices in different countries on national, regional and local levels. The paper is intended as a resource for researchers, practitioners, and policymakers, focusing on public capital budgeting issues.*

**Keywords:** capital budgeting, capital management, capital infrastructure, capital investments; infrastructure maintenance; review

## 1. INTRODUCTION

Many researchers suggest that comprehensive literature reviews on different scholarly topics help to identify the research gaps and set future research agenda (Bozeman, 1984; Paul and Benito, 2018; Paul, Parthasarathy and Gupta, 2017; Rosado-Serrano and Dikova, 2018). According to Srithongrung, Yusuf and Kritz (2019), "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" (p.2). Meta-analysis is needed for the area of capital budgeting because of the importance of public capital expenditures, the scope of capital financing, and the condition of capital infrastructure. Many scholars highlight the importance of capital budgeting research (Bozeman, 1984; Chen, 2016, 2018; Pagano and Perry, 2008; Srithongrung, Ermasova and Yusuf, 2019; Steiss, 2005; van der Hoek, 1996; Wie and Srithongrung, 2017). Recent notable studies (e.g., Chen, 2016, 2017, 2018; Srithongrung,

2018; Srithongrung, Ermasova, and Yusuf, 2019) provide new dimensions to capital budgeting issues in public budgeting research. However, the researchers need to pay more attention to some unexplored areas in capital budgeting field.

This paper was written based on study and suggestion by Bozeman (1984) who provided history and future directions for research on capital budgeting. However, since 1984, government practices have been changed. This study is the comprehensive review on capital budgeting covering 35 years of research (between the years 1984 and 2018). This research has examined normative and empirical studies based on all the articles published in well-regarded academic journals with an impact factor score of at least 1.0.

This study enriches the existing literature by reviewing public capital budgeting studies, highlighting the major contributions, and identifying impactful articles and authors based on citation analysis. Finally, we highlight knowledge gaps, offer directions for future research, and discuss implications for capital budgeting practice.

## 2.METHODOLOGY

Systematic literature review method was employed for this review of public capital budgeting studies. To select the journals for literature review, the author of this study used two methods. First, journals reviewed included those nominated in Ranking of Public Economics Journals by Pujol (2008). Pujol (2008) used “an alternative way to rank journals based on the publishing behavior of top-ranked authors” (p.55). Second, this study used the ranking SCImago Journal & Country Rank by SCImago (2018) to select additional journals for systematic literature review. The SCImago Journal & Country Rank includes the journals’ scientific indicators developed from the information contained in the Scopus® database. For this study, journals were selected by subject area (Economics, Econometrics and Finance; Social Sciences thematic areas), subject category (Policy and Law; Political Science and International Relations; Public Administration; Business and International Management; Business, Management and Accounting; Economics and Econometrics; Finance; Industrial Relations specific subject categories) and were compared separately. SCImago Journal Indicator is a measure of journal’s impact that expresses the average number of weighted citations received in selected year by manuscripts published in journal in last three years (SCImago, 2018). We selected academically refereed public finance, economics, public policy and public administration journals that have SCImago Journal Indicator higher than 1.0 and added these journals to first group of journals from Ranking of Public Economics Journals by Pujol (2008).

Our research highlighted the findings from prior studies, compared and contrasted salient characteristics in the articles that were published in selected public finance journals and public administration journals: Public Budgeting & Finance, Public Finance and Management, Public Works Management & Policy, Journal of Public Budgeting, Accounting & Financial Management, Public Works Management & Policy, International Journal of Public Administration, European Journal of Political Economy, State and Local Government Review, Government Finance Review, Public Administration and Development, Journal of Economic Growth, Harvard Business Review, International Public Management Review, Financial Review, Journal of Urban Economics, and Journal of Accounting and Public Policy from the mid-1980s through 2018. Most articles were located online using the following databases and publisher sites: Web of Science, Google scholar, Wiley Interscience, ABI/Inform, Ebsco, Business Source Premier, JSTOR, Cabell's, Emerald, Oxford Journals, Sage, and ScienceDirect. The sample was extended with a forward search in Web of Science and Google Scholar looking for potentially relevant studies on capital budgeting and management. In this study were used different search combinations and variations of the term 'Capital budgeting', 'Capital management', 'Public Capital Budget', 'Capital Infrastructure' including capital federal budget, state capital budgeting, local budgeting, public infrastructure, capital investments, public investments, public budgeting— all in relation to capital budgeting and management.

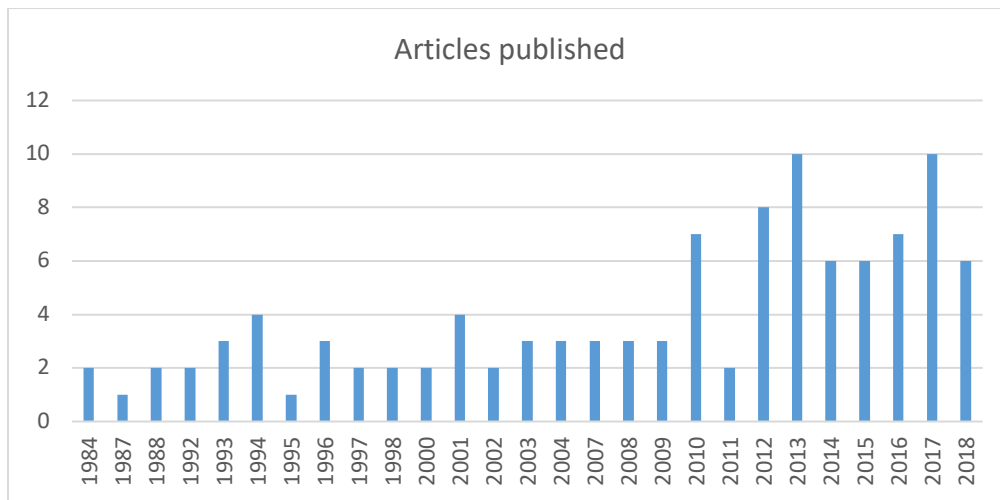
The raw data set of several hundred studies on public capital budgeting was first reduced for overlapping search hits. On this stage, we searched for keywords and analyzed Abstracts in the remaining results. In this study we restrict ourselves to articles with the term public capital budgeting and management included in the title/abstract/keywords to minimize the sample bias to the least possible extent. This yielded an overall raw sample of 229 working papers and studies which were analyzed in more detail by examining the full paper.

On next stage, we analyzed the full papers and dropped ninety-three papers because these articles contained 'capital infrastructure' and/or 'capital investments' in private sector but not in public sector. On final step, we dropped thirty studies because they did not contain a relevant 'Public capital budgeting and management' categorization. These thirty studies were on accounting, appropriations and/or legal issues in capital budgeting.

Our final sample was 106 studies. Based on database of 106 articles we divided our study into different time periods. We found 39 articles that were published during 1984–2007 and 67 articles during 2007–2018. The research on capital budgeting research has significantly increased from 2012 to 2018 and almost doubled, compared to the time period 2007–2011. The number of capital budgeting studies published from 2010 to 2018 also increased compared to the previous 10 years. The number of capital budgeting research articles published between the years 2013 and 2017 has almost doubled, compared to the corresponding previous 5-year time period (Figure 1). One of the reasons for this growth is the increased significance of public capital budgeting research.

The author conducted the systematic literature review, a knowledge-stock analysis (Biemans et al., 2007) and citation analysis (Culnan, 1987) to evaluate the evolution of research and major trends in public capital budgeting. Accord-

**Figure 1. Articles distribution per years of publications on capital budgeting**



*Source: Created by author*

ing to Calabretta, Durisin and Ogliengo, 2011) “citation frequency can be regarded as a proxy for an article’s influence on a field, as frequently cited works are likely to be more influential on the development of future research” (p.13). By using these methods together, this study provides an accurate description of the contents and the evolution of research in a field (Calabretta et al., 2011; Ramos-Rodriguez and Ruiz-Navarro, 2004). It allows us to discover the conceptual roots of the field and to pave the way for future advancements (Culnan, 1987).

## 2. PREVIOUS RESEARCH

The results section has been divided into different parts: (1) review of overall contributions of capital budgeting studies, (2) examination of the main journals that published capital budgeting and management, and (3) citation analysis.

### *Capital budgeting definitions*

It is reasonable to start by identifying the meaning of capital budgeting because there is some diversity across academic and practical discussions. A rich literature on budgeting provides multiple definitions of capital budgeting (Ammar, Duncombe and Wright, 2001; Bunch, 1996; Hillhouse and Howard, 1963; Hush and Peroff, 1986; Lyden and Lindenberg, 1983; McClain, 1966; Moak and Gordon, 1965; Mikesell, 2007). Table 1 provides constructs and definitions used in capital budgeting.

Research in the time reviewed provides important insights into the characteristics of capital budgeting, but it mostly captures the duration, main components, and the algorithms of capital budgeting. While the definitions differ on details, common elements include (i) focus on capital investment, (ii) long-term perspective, (iii) separation of capital asset acquisition from entity operating budget (a dual budget rather than a unitary budget), and (iv) a regularized review procedure. According to Hyde (2002), capital budgeting, in common with budgeting overall, is “partly political, partly economic, partly accounting, and partly administrative” (p.1). The Office of Management and Budget (2017) defines federal capital assets as “land, structures, equipment, intellectual property (e.g., software), and information technology (including IT service contracts) used by the Federal Government and having an estimated useful life of two years or more” (p.1). Many scholars analyze capital budgeting as a managerial and administrative process (Calia, 2001; Chan, 2004; Khan and Hildreth, 2002; Pagano, 1984; Richard and Daniel, 2001). Premchand (2007) suggests that “capital budgets in governments have multiple roles: as instruments of compensatory fiscal policy, as windows on the net worth of public bodies, and as vehicles for development” (p.89).

**Table 1. Definitions of Capital Budgeting**

<b>References</b>	<b>Definition of capital budgeting</b>
Moak and Gordon (1965)	The capital budget is a device to bring functional programs into relationships that can be linked to the availability of resources and subjected to political and managerial approval.
McClain (1966, p.10)	"A unified series of steps for the development of a documented work program for priority-based building (and equipment purchase) projects, covering a five or six year period; for linking the program with a formal plan of financing; and the carrying out of the program according to a definite work schedule."
Hillhouse and Howard (1963, p.1)	"Capital budgeting is a process or system of administrative procedures that relates a long-term capital improvement program (CIP) to the methods that will be used to pay for those improvements and provide for the implementation of these long-term financial and physical plans."
Johnson (1970, p.1)	"Capital investment means the sacrifice of immediate satisfaction for some future expected satisfaction."
Steiss (1975, p.11-12)	The capital facilities planning process. "The capital budget is the document with a one-year life span of allotments for capital projects which is published along with the regular operating budget."
Hoyle (1978)	Capital budgeting is at the heart of virtually all financial planning
Aronson and Schwartz (2004)	A capital outlay is an expenditure of significant value that results in the acquisition of or the addition to a fixed asset.
Lyden and Lindenberg (1983, p.173)	"The entire long-range planning process is the capital budgeting process since the outcome of concern to us is the capital budget—the five- to six-year document. It is the one-year portion of this budget that appears with the operating budget as the annual portion of the capital budget."
Hush and Peroff (1986, p.70)	Capital budget is "characterized by the extent to which capital spending is presented, enacted and analyzed separately from other spending."
Ammar, Duncombe, and Wright (2001, p.47)	"Capital budgeting and capital management are crucial components of any government financial management system."
Bland (2007, p.152)	"Capital budgeting encompasses a much broader function in public financial management, including the process of reviewing projects and ranking them in the capital budget document."
Mikesell (2007, p.288, 296).	"Capital expenditures purchase physical assets that are expected to provide services for several years; the outlay will yield benefits in the future without having to repeat the purchase. Capital spending also includes capital improvement or rehabilitation of physical assets that extends or enhances the useful life of these assets."

Source: Prepared by the author based on Ermasova (2012, 2013)

Based on analysis of capital budgeting definitions, the author proposes following definition of capital budgeting: *Capital budgeting is the process used for acquisition of long-life, high price public infrastructure that should include the following information for each capital project: description of the project's purpose, project prioritization, estimated project costs, identified funding sources, timetable for project's completion, links to Capital Improvement Plan (CIP) and comprehensive plan, the economic and social impact of the project.*

*Theoretical approaches and constructs used in the capital budgeting research*

Based on the literature on capital budgeting, a list was created in which the constructs that are used most are ranked and classified (Table 2).

**Table 2. Main theoretical approaches and constructs used in capital budgeting research (1984–2018)**

Theory/Construct	Number of Studies	Authors*
Components of capital budgeting	54	Ammar, Duncombe, and Wright, 2001; Bland, 2007; Beckett-Camarata, 2003; Boex, Martinez-Vazquez, and McNab, 2000; Bohn and Inman, 1996; Chen, 2014, 2016, 2018; Dorotinsky, 2008; Dowall, 2001; Dupont-Morales, and Harris, 1994; Farazmand and Neill, 1996; Halachmi and Sekwat, 1997; Hamel and Prahalad, 1989; Hush and Peroff, 1986; Hyde, 2002; Ermasova, 2012, 2013; Marcelo, Mandri-Perrott, House, and Schwartz, 2016; Mintzberg and Waters, 1985; Pagano, 1984; Premchand, 2006; Schick, 2008; Srithorgung, 2008, 2018; Walt and Barenbaum, 2007; Wie and Srithongrung, 2017
Dual budgeting	28	Bland, 2007; Bunch, 1996; Hwan Chung, 2013; Ermasova, 2013; Jacobs, 2009; Mikesell, 2007; Mintzberg and Waters, 1985; Premchand, 1983; Srithorgung, 2018; Vogt, 2004
Investments in public infrastructure and problems of maintenance	25	Afonso, 2014; Chen, 2014, 2016, 2018; Chen and Bartle, 2017; Dabla-Norris, Brumby, Kyobe, Mills, and Papageorgiou, 2013; Dowall, 2001; Ebdon, 2007; Ermasova, 2013; Frankel and Wachs, 2017; Jimenez and Pagano, 2010; Klasse, 2018; Pagano and Perry, 2008; Pritchett, 2000; Srithorgung, 2008, 2018; Srithongrung and Kriz, 2012; Srithorgung, Ermasova and Yusuf, 2019
Capital budgeting at state and local levels	11	Afonso, 2014; Ammar, Duncombe, and Wright, 2001; Beckett-Camarata, 2003; Chen, 2014, 2016, 2018; Forrester, 1993; Halachmi and Sekwat, 1997; Hina, Matkin, and Morse, 2017; Hwan Chung, 2013; Ermasova, 2012, 2013; King, 1995; Millar, 1988; Pagano and Perry, 2008; Marlowe, 2013; Millar, 1988; Poterba, 1994; O'Toole and Stipak, 1988; Shybalkina and Bifulco, 2019; Srithongrung, 2008, 2010, 2018
International capital budgeting	9	Chan, 2004; Dabla-Norris et al., 2013; Lewis and Osterman, 2011; Pritchett, 2000; Stanley and Block, 1984; van der Hoek, P. 1996
Capital budgeting during economic downturn	8	Afonso, 2014; Behn, 1985; Dougherty and Klase, 2009; Ermasova, 2013; Hyde, 2002; Kovner and Lusk, 2010; Miller, 1983; Scorcone and Plerhoples, 2010

Note: \*Full references available from the authors

Source: Prepared by the author

### *Components of capital budgeting*

The most commonly used construct in capital budgeting studies was components of capital budgeting, with over 54 appearances. Ammar, Duncombe, and Wright (2001) divided capital budgeting into four components: “the planning document, operating budget link, project selection, decision-making and capital planning process” (p.50). Many scholars suggest that economic forecasting and planning should be important prerequisites for capital planning (Ammar et al., 2001; Beckett-Camarata, 2003, 2008; Boex, Martinez-Vazquez, and McNab, 2000; Bohn and Inman, 1996; Dowall, 2001; Farazmand and Neill, 1996; Halachmi and Sekwat, 1997; Mikesell, 2007; Price, 2002; Robinson, 1993; Srithongrung, Ermasova and Yusuf, 2019).

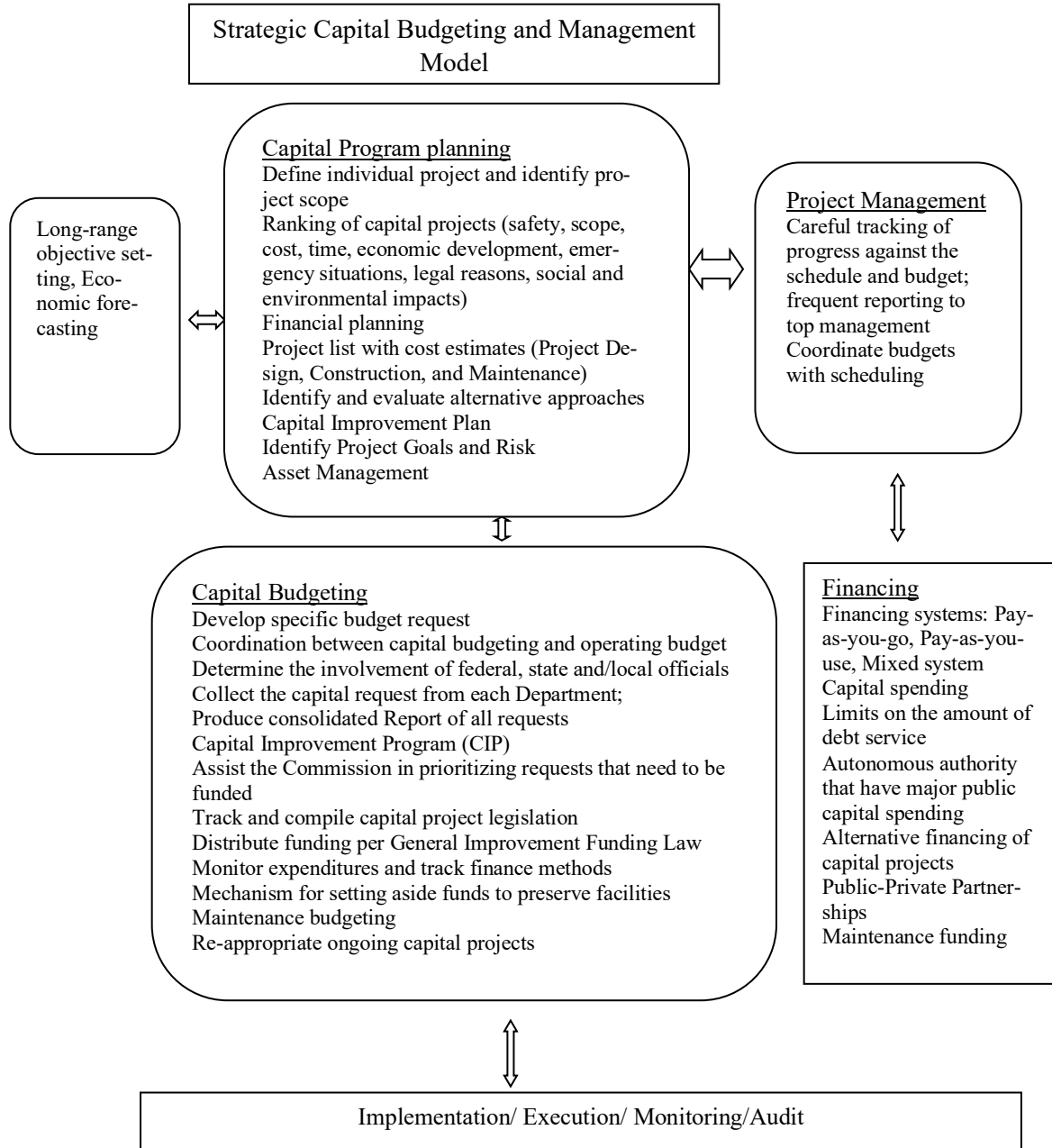
Srithongrung (2008, p.83) noted that a strategic capital management approach leads to better infrastructure investment, and enhances economic performance since public infrastructure is an input in production processes. Srithongrung (2008) found that “highly systematic capital management programs positively alter the relationship between the state's capital spending levels and the state's economic growth rate, it also promotes investment efficiency and effectiveness through a centralized, future oriented, and analysis-based approach” (p.84).

### *Strategic Capital Budgeting and Management Model*

Many scholars suggest the normative model of rational capital management practices, including multi-year capital planning, project management, and infrastructure assessment programs to improve efficiency and effectiveness in public investment (Aronson and Schwartz, 2004; Dupont-Morales and Harris, 1994; Ermasova, 2012, 2013; Frankel and Wachs, 2017; Jacobs, 2008; Srithongrung, 2008, 2018; Srithongrung, Ermasova, and Yusuf, 2019; Yusuf and Srithongrung, 2017). Based on author's definition of capital budgeting and the normative model of rational capital management practices, this study proposes Strategic Capital Budgeting and Management Model (Figure 2).



**Figure 2. Strategic Capital Budgeting and Management Model**



Source: Created by the author based on Ammar, Duncombe, and Wright (2001); Ermasova (2012, 2013); Srithongrung, Ermasova, and Yusuf (2019)

Strategic Capital Budgeting and Management Model contains long-range objective setting (LROS), forecasting, capital planning, management, capital budgeting, implementation/execution/monitoring, and audit. . This Model could be implemented for improvement of capital budgeting in the USA and other countries.

This model proposed a capital budgeting model that suggests a way to combine planning, budgeting, financing, and implementation processes that ensure long-term budget balance and thus, a sustainable fiscal status, based on current fiscal conditions, political situations, environmental changes, and future trends. Implementing Strategic Capital Budgeting and Management Model would lead to better capital infrastructure investment, promote investment efficiency and enhance economic performance.

### *Dual budgeting*

The second commonly used construct in capital budgeting studies was dual budgeting (or budgeting separately for current and capital expenditures), with over 28 appearances. Dual budgeting originated in European countries in the late 1930s (Premchand, 1983; Jacobs, 2009). Although capital asset acquisition may be handled within a unified budget process that maintains little distinction between operating and capital expenditures, a capital budget process normally envisions a dual budget, one track involving choices about operating expenditures and one track involving acquisition of long-life assets.

Mikesell (2011) pointed out three differences between capital spending and spending for current operations: “(1) capital assets decisions have future impact and thus merit extraordinary care; (2) capital assets usually have high price tags and their purchase may destabilize the finances of a government, and (3) capital asset purchases tend to occur at irregular intervals and may need special attention in regard to scheduling” (p.289). According to Mikesell (2007), a distinct capital budget has four advantages: (1) improve “both the efficiency and equity of providing and financing non-recurrent projects with long-term service flows,” (2) integrate capital plans with the social, financial, and political environment, (3) smooth tax rates over time, (4) regulate the provision of capital projects that have a long life (10 or 15 years) and have “a high price tag relative to the relative to the resources of the governing unit, and (3) are non-recurrent” (pp.289-290, 245). According to Srithongrungrung (2018), “adopting a separate capital budget as a special tool to review capital projects can reduce capital spending volatility. Likewise, using dedicated revenue for capital projects to finance total outlay can reduce volatility” (p.65).

There is no separate capital budgeting at the federal level in the USA. However, most state and local governments have adopted dual budgeting (Bunch, 1996;

Hwan Chung, 2013). The coordination of capital and operating expenditures, whether in unified or dual budgets, is an important feature of the capital budgeting process. Coordination occurs in many states and local governments by including the impact the request has on the operating budget in every capital request. Hwan Chung (2013) suggests that it is “important to look at various capital budgeting practices in local governments since a separate capital budget as different budget format and structure affects budgetary decisions, thus leading to different levels of investment in public infrastructure” (p.617).

Budget analysts play a key role in coordinating operating and capital budgets. The same program needs to use both capital and operating budget requests, and these two budgets affect each other. Projects and spending approved in the capital budget influence future operating budgets. Decisions made in the operating budget to improve or expand services can necessitate future expansion of capital facilities or the acquisition of major new pieces of equipment (Vogt, 2004). Bland (2007, p.153.) described the importance of the timing to the capital budget cycle:

*“One advantage of preparing the capital budget in the operating budget off-season (countercyclical to the operating budget cycle) is that it distributes the workload for staff more evenly throughout the year. Even under the best of circumstances, preparing an operating budget requires enormous amounts of energy and time; adding to this workload the task of drafting a capital budget.”*

Other authors argue that there are important disadvantages to have a separate capital budgeting process and dual budgets. While there are several nuances to the arguments, they may be generally summarized as the following. First, adding a second budget process and procedures reduces transparency in the expenditure process. Unifying all expenditures for particular purposes gives all participants in the process – executive, legislative, and the public – a better understanding about what is being proposed and executed that would be the case if the full picture is available only by combining the information from two disparate processes.

Second, placing all long-life asset proposals in a separate document and process adds to the bias toward borrowing to finance those acquisitions and, hence, toward addition deficit finance, even when financing with current revenues is both feasible and reasonable (as when a recurrent asset acquisition is involved). Governments need no additional incentives for deficit finance and, hence, dual budgets are unlikely to improve the condition of fiscal management.

Third, all of the evaluation and analytic advantages associated with separate capital budgets can be achieved within the framework of a unified budget. These advantages do not require the disadvantages of a dual budget to be put in place. Finally, the assets being acquired in the capital budget are place-specific and, usually, expensive. That means that the capital budget would become ground zero for manipulation to get projects in particular legislative districts for political advantage.

#### *Investments in public infrastructure*

The third most commonly used construct was investments in public infrastructure and problem of underinvestment in it. Ebdon (2007) suggests that “capital assets need to be maintained in good working order to prevent excessive long-term costs and safety hazards. This requires good information systems and regular, comprehensive condition assessments to determine the status of assets, the cost of maintaining them in good condition, and the financing available to pay for the maintenance needs” (p.66). Many authors pointed out the importance of investments in public infrastructure and maintenance planning capital infrastructure (Afonso, 2014; American Society of Civil Engineers, 2013, 2017; Chen, 2014, 2016, 2017; Chen and Bartle, 2017; Dowall, 2001; Ebdon, 2007; Ermasova, 2012, 2013; Frankel and Wachs, 2017; Jimenez and Pagano, 2010; Klasse, 2018; Pagano and Perry, 2008; Pritchett, 2000; Srithorgung, 2008, 2018; Srithongrung and Kriz, 2012).

Many scholars suggest that countries should increase their investments in infrastructure (Dabla-Norris, Brumby, Kyobe, Mills, and Papageorgiou, 2013; Ermasova and Ebdon, 2019; Jimenez and Pagano, 2010; Pagano and Perry, 2008; Srithorgung, Ermasova and Yusuf, 2019; Stanley and Block, 1984; Werling and Horst, 2014) and improve asset maintenance and priority ranking (Dowall, 2001; Ebdon, 2007; Ermasova, 2012, 2013; Srithongrung, Ermasova, and Yusuf, 2019; Werling and Horst, 2014).

#### *Capital budgeting at state and local levels*

Some researchers analyze the practice of capital budgeting at the state level (Chapman, 2008; Chen, 2014, 2016, 2018; Hwan Chung, 2013; Ermasova, 2012, 2013; King, 1995; Poterba, 1994; Shybalkina and Bifulco, 2019; Srithongrung, 2008, 2010, 2018), in U.S. cities (Doss, 1984; Rowan and Hillman, 1996), and in municipalities in the U.S. (Beckett-Camarata, 2003; Forrester, 1983; Hina, Matkin, and Morse, 2017; Kovari, 2016; Marlowe, 2013).

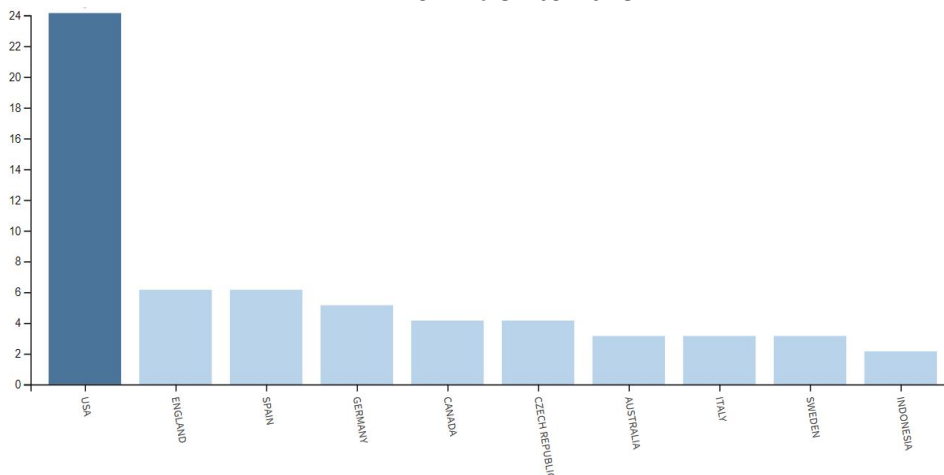
Beckett-Camarata (2003) proves that that strategic planning and capital budgeting have important influence on financial performance in the municipalities. Hina, Matkin, and Morse (2017) explore collaborative capital budgeting in U.S. local governments and highlight that “a large portion of capital planning, acquisition, and maintenance occurs through collaboration between two or more local governments” (p.230). Marlowe (2013) suggest that local governments can set capital priorities strategically in their reforms but they should adapt the reforms to changing political circumstances in local governments.

This study found that most studies on capital budgeting focused on a single state. Few researchers explored local capital budgeting. Municipal capital budgeting was not explored sufficiently by the previous literature. Previous studies of capital management highlight good budgeting policies, typically based on best-practice case studies or current practices in state or local governments (Millar, 1988; Forrester, 1993, Bozeman, 1984). There is need for cross-state and cross-local governments analysis of capital budgeting and management.

#### *International capital budgeting*

This study found that USA, England, Spain, Germany and Canada were the home countries that were most commonly studied in public capital budgeting literature. Other studies have also examined capital budgeting from Czech Republic, Australia, and Italy (Figure 2).

**Figure 2. Countries studied in capital budgeting researches from 1984 to 2018**



Source: Prepared by the author

Some researchers, instead of focusing on a single home country, studied multiple countries worldwide (Bertelli and John, 2013; Ermasova and Mikesell, 2019; Lewis and Osterman, 2011; Srithorgung, Ermasova, and Yusuf, 2019; Stanley and Block, 1984; van der Hoek, 1996). Several studies analyze capital spending decisions in the USA (e.g., Balsdon, Bruner, and Rueben, 2003; Chen, 2014, 2016, 2017; Chen and Bartle, 2017; Choudhury, Clingermayer, and Dasse, 2003; Ebdon, 2004, 2007; Ermasova and Ebdon, 2019), in Europe (van der Hoek, 1996), UK (Bertelli and John, 2013), in Indonesia (Lewis and Osterman, 2011), Canadian municipal governments (Chan, 2004), in Germany (Ermasova, 2019), and in developing countries (Ceka, 2019; Dabla-Norris et al., 2013; Guzman, 2019; Ermasova and Ermasova, 2019; Pritchett, 2000). In 2019, was published first comprehensive analysis of multinational capital budgeting in 12 countries (Srithorgung, Ermasova, and Yusuf, 2019).

This study found that most international capital budgeting studies focused on a single country. Future studies should do cross-country analysis either for a group of countries (post-communist countries, developed countries, developing countries, countries with highest ranking of public infrastructure, etc.) or for two countries with similar or dissimilar features. Future meta-studies for the area of international capital budgeting should incorporate the changes in capital budgeting practices in different countries over time.

#### *Capital budgeting during economic downturn*

The effect of economic decline on state fiscal capacity over time has been increasingly negative, indicating that in the modern era, state revenue systems remain vulnerable and less flexible under fiscal stress (Mikesell, 2007). Research in the time reviewed proposed cutback management during economic decline (Behn, 1985; Dougherty and Klase, 2009; Hyde, 2002; Levine, Rubin, and Wolohojian, 1981; Miller, 1983; Rubin and Willoughby, 2009; Scorcone and Plerhoples, 2010; Thurmaier and Gosling, 2008).

Levine, Rubin, and Wolohojian (1981) proposed the administrative response model of cutback management, which shows that cut-back management begins with broad, across-the-board cuts and then moves on to targeted capital program eliminations as the severity of revenue restrictions increases. Rubin and Willoughby (2009) proved that the cutback strategies chosen depend on economic circumstances, as might be expected according to the fiscal pressure and administrative response models of cutback management. In negative-budgeting, weak or

slow-growth (sometimes called *slowth*) environments, the nexus between tax payments for public revenues and budget benefits for public expenditures must be reestablished (Hyde, 2002).

Ermasova (2012) found that states with shorter-term capital budgets exhibited a higher probability of adopting administration innovations in their capital budgeting processes in response to the economic downturn compared to states with longer-term budgets. Kovner and Lusk (2010) proposed a sustainability budgeting model that suggests a way to combine budgeting and the planning process to achieve inflows relative to outflows that ensure long-term budget balance and a sustainable fiscal status. This study found that there is a need for research that examines how the federal, state and local governments cope with challenges and pressures during economic downturn. Future studies could analyze the changes in capital budgeting, management and financing during the Covid-19 pandemic and economic downturn in different countries on national, state and local levels.

#### 4. CITATION ANALYSIS

##### *Authors*

Besides analysis of theories, methods, countries, and journals, etc., this study provides a citation analysis, in an attempt to identify the most influential articles on public capital budgeting and management. This citation analysis was based on total number of citations and weighted citation scores for all papers and rank ordered them. In this study were computed and included annual average weighted citation score because this controls for the age of an article. A list of the articles with the highest number of total citation and average weighted citation scores is presented in Table 3 (in decreasing order).

The most cited articles (as on March, 5, 2019) are Poterba (1994; 372 citations), Dabla-Norris, Brumby, Kyobe, Mills, and Papageorgiou (2012; 296 citations), Stanley and Block (1984; 144 citations) and Bohn and Inman (1996; 138 citations).

**Table 3. Most cited articles on capital budgeting (as on 5 March, 2019)**

Rank no.	Author(s)	Year published	Total citation	Average weighted citation score
1	Poterba, J.	1994	372	15
2	Dabla-Norris, E., Brumby, J., Kyobe, A., Mills, Z., and Pageorgiou, C.	2012	296	34.8
3	Stanley, M.T. and Block, S.B.	1984	144	4
4	Bohn, H. and Inman, R.P.	1996	138	5.75
5	Boex, J.L, Martinez-Vazquez, J., and McNab, R.M.	2000	68	3.4
6	Howlett, M.	1998	60	2.7
7	Ammar A., Duncombe R., and Wright A.	2001	55	0.9
8	Chan, Y.-C. L.	2004	50	3.1
9	Pagano, M. and Perry, D.	2008	49	4.1
10	Srithongrun, A.	2008	29	2.4

*Source:* Prepared by the author

### *Journals*

This study systematically examines public capital budgeting research analyzing 106 articles published during 1984–2019. Table 4 lists the main journal outlets. The most cited articles are published in Public Budgeting & Finance, Public Finance and Management, Public Works Management & Policy, and European Journal of Political Economy (Table 4). Table 4 lists the main journal outlets based on number of published articles. This study found that the maximum number of articles (26) was published by the Public Budgeting & Finance. This result is logical as Public Budgeting & Finance is the oldest outlet public finance journal compared to other journals included in Table 4.



**Table 4. Main outlets of citations and number of articles on public capital budgeting (as on 5 March, 2019)**

Journal name	Number of citations	% of total citations (1899 to total citations)	Number of articles	% of total publications
Public Budgeting & Finance	306	16.1	26	24.5
Public finance and management	246	12.9	14	13.2
Public Works Management & Policy	139	7.3	9	8.5
European Journal of Political Economy	81	4.2	3	3.4
Journal of Public Budgeting, Accounting & Financial Management	36	1.8	12	11.3
Government Finance Review	26	1.3	4	3.8

*Source:* Prepared by the author

Majority publications (24.5%) were published in Public Budgeting & Finance (26 articles of 106 articles in our sample). Public Finance and Management (13.2%), Journal of Public Budgeting, Accounting & Financial Management (11.3%), Public Works Management & Policy (8.5%), and Journal of Accounting and Public Policy (8.5%) are other main journals that published public capital budgeting studies (Table 4).

Based on this analysis, this study observed that Public Budgeting & Finance, Public Finance and Management, Public Works Management & Policy, and Journal of Public Budgeting, Accounting & Financial Management were the main outlets for analysis of public capital budgeting issues in public finance research publications.

## 5. CONCLUSION AND DIRECTIONS FOR FUTURE RESEARCH

This paper analyzes different types of theoretical and methodological approaches of research on capital budgeting and management. It is essential to continue studying public capital budgeting because of the growing role of public infrastructure. This paper has reported on a substantial body of 106 academic research papers involving capital budgeting since the mid-1980s to 2018, and has organized that material into theoretical and empirical research categories. The main finding of this study is that effectively managing and budgeting capital expenditures are

among the most pressing challenges to contemporary governments and the efforts require comprehensive and systematic planning, financing, centralized execution and project management, and infrastructure maintenance.

Despite the exploratory nature of this study, our findings contribute to the extant capital budgeting literature in several ways. First, this paper has provided substantial information on a wide range of theoretical and empirical topics in public capital budgeting to serve as a foundation for future research on any of these topics. This paper offers an extensive review of publications on capital budgeting organized by topics that would also be likely subjects for future research. The results we offer in this study help the new researchers in capital budgeting domain to grasp the key points and understand the main capital budgeting issues in public finance research. From a theoretical perspective, this study contributes to the public finance literature on capital budgeting. The content of this paper should help provide researchers and others with an understanding of capital budgeting in public finance research.

Second, this research expends knowledge of capital budgeting for practicing planners, developers, budget analytics, debt managers, and policy makers in the areas of capital planning, prioritization, maintenance, and capital budgeting. This review of the literature could provide public managers with a longitudinal perspective on how the institutional environment have and continue to affect their capital budgeting processes, how their organizational structures and processes have evolved, and how these circumstances have affected capital management. In addition, this study provides a valuable starting point for future research on international capital budgeting.

Among the opportunities for future research in the area of capital budgeting, cross-state and cross-local governments analysis needs further attention. The governments should put great priority on the development of high-quality capital infrastructure that increase the quality of economic life. There is the need for cases with best examples for public capital resource allocation and project selection on state and local levels. Future studies would need to do cross-state and cross-local governments analysis of capital budgeting that would provide a clear picture of capital budgeting at the state and local levels. Future studies could provide recommendations for policy makers, budget analyst, and debt managers on how to better manage capital infrastructure, as well as by providing links to best practices in implementing these recommendations by exploring innovative solutions in capital budgeting and financing.

This study found that there is a lack of literature that examines how the federal, state and local governments cope with challenges and pressures during economic decline. Economic decline during and after Covid-19 pandemic is a reason for the widening gap between available fiscal resources and needs for capital infrastructure financing. According to Ermasova (2012), this gap can “lead to concern that capital expenditure commitments made during more stable years could no longer be continued” (p.5). Future studies could examine the effects of economic decline during and after Covid-19 pandemic on changes in capital budgeting practices in different countries on national, regional and local levels. By focusing on a state government's policies and capital budgeting practices, future analysis could provide not only an evaluation of the individual states' capital budgeting processes, but it is also an analysis of tendencies in capital budgeting processes across all states during the period of economic decline. The specific focus of future studies could be the adoption of administrative innovations in capital budgeting processes at the state and local levels during the Covid-19 pandemic and economic downturn.

In the future publications, capital infrastructure needs and maintenance may be viewed in a broader perspective than they have been in the past. Future debates on appropriate capital maintenance should address issues such as depreciation and the valuation of assets, but also the types of information that might be helpful in assessing the service potential needs associated with capital infrastructure. In light of the urgent capital infrastructure challenges that society faces, it appears essential that federal, state and local governments need to improve capital budgeting and management. Future studies should analyze the maintenance planning, asset management and accounting for public capital assets that would be based on historical records of investment, major repairs, and depreciation rates.

We feel the need for robust analysis of international public capital budgeting and investments. Future studies should do cross-country analysis of capital budgeting from a large number of countries either for a group of countries (post-communist countries, developed countries, developing countries, countries with highest ranking of public infrastructure, etc.) or for two countries with similar or dissimilar features. Future studies could test for the influence of different political and economic factors on the capital budgeting processes. For example, the future studies could analyze how the Marshall Plan after World War II or current developmental policies the European Union have interregional and inter-country plans for developing capital infrastructure. The specific focus of future studies could be the changes in capital budgeting and financing during the Covid-19 pandemic and economic downturn in different countries.

Another interesting direction for future research is assessing the relevance of public capital budgeting research to public policy makers, budget directors and practitioners. The influence of academic capital budgeting research on capital budgeting and managerial practices remains mostly unexplored in our study. Although, this study shows that journals have significantly increased publishing of empirical research, especially in the last twenty years, more attention should be spent on studies with clear practical relevance (state and local government cases, articles on the best examples of capital budgeting, etc.) and on examining whether more can be done for policy makers, debt managers, budget analysts and directors.

### ACKNOWLEDGEMENT

We would like to thank the anonymous referees for their thoughtful comments.

### REFERENCES

Afonso, W. (2014) "Local Government Capital Spending During and After Recessions: A Cause for Concern?", *International Journal of Public Administration*, 37(8):494-505.

American Society of Civil Engineers (2013) Failure to Act: The Impact of Current Infrastructure Investment on America's Economic Future, assessed May 2, 2018 ([https://www.asce.org/uploadedFiles/Issues\\_and\\_Advocacy/Our\\_Initiatives/Infrastructure/Content\\_Pieces/failure-to-act-economic-impact-summary-report.pdf](https://www.asce.org/uploadedFiles/Issues_and_Advocacy/Our_Initiatives/Infrastructure/Content_Pieces/failure-to-act-economic-impact-summary-report.pdf)).

American Society of Civil Engineers (2017) The Infrastructure Report Card, assessed May 2, 2018 (<https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/Grades-Chart.png>).

Ammar, A., R. Duncombe and A. Wright (2001) "Evaluating Capital Management: A New Approach", *Public Budgeting and Finance*, 2(1):47-69.

Aronson, R. and E. Schwartz (2004) "Capital Budgeting", in: R. Aronson and E. Schwartz (eds) *Management policies in Local Government*, 4th ed., Washington, D.C.: ICMA, pp. 217-233.

Balsdon, E., E. Brunner and K. Rueben (2003) "Private demands for public capital: evidence from school bond referenda", *Journal of Urban Economics*, 54(3):610-638.

Beckett-Camarata, E. (2003) "An Examination of the Relationship between the Municipal Strategic Plan and the Capital Budget and its Effect of Financial Performance", *Journal of Public Budgeting, Accounting, and Financial Management*, 15(1):1-23.

Beckett-Camarata, J. (2008) "Capital Budgeting", in: J. Rabin (ed), *Encyclopedia of Public Administration and Public Policy*, New York, NY: Taylor & Francis, pp. 3-9.

Behn, R. (1985) "Cutback budgeting", *Journal of Policy Analysis and Management*, 5(2):155-177.

Bertelli, A. and P. John (2013) "Public Policy Investment: Risk and Return in British Politics", *British Journal of Political Science*, 43(1):741-773.

Biemans, W., A. Griffin and R. Moenaert (2007) "Twenty years of the journal of product innovation management: History, participants, and knowledge stocks and flows", *Journal of Product Innovation Management*, 24(3):193-213.

Bland, R.L. (2007) *A revenue guide for local government*, Washington, DC: ICMA.

Boex, J.L, J. Martinez-Vazquez and R.M. McNab (2000) "Multi-Year Budgeting: A Review of International Practices and Lessons for Developing and Transitional Economies", *Public Budgeting and Finance*, 6(3):91-112.

Bohn, H. and R. Inman (1996) "Balanced-budget rules and public deficits: evidence from the U.S. states", *Carnegie-Rochester Conference Series on Public Policy*, 45(1):13-76.

Bozeman, L. (1984) "The Capital Budget: History and Future Directions", *Public Budgeting & Finance*, 3(1):18-30.

Bunch, B. (1996) "Current Practices and Issues in Capital Budgeting and Reporting", *Public Budgeting & Finance*, 7(3):7-25.

Calabretta, G., B. Durisin and M. Ogliengo (2011) "Uncovering the Intellectual Structure of Research in Business Ethics: A Journey Through the History, the Classics, and the Pillars of Journal of Business Ethics", *Journal of Business Ethics*, 104(1):499-524.

Calia, R. (2001) "Are all public spending programs equal? Priority setting approaches for government budgeting", *Government Finance Review*, 17(4):18-28.

Ceka, E. (2019) "The Case of Public Capital Budgeting and Management Process in Moldova", in: A. Srithongrung, N. Ermasova and W. Yusuf (2019), *Capital Management and Budgeting in the Public Sector*, Hershey, Pennsylvania: IGI Global, pp.134-156.

Chan, Y. (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.

Chapman, J. (2008) "State and Local Fiscal Sustainability: The Challenges", *Public Administration Review*, 68(1):115-131.

Chen, C. (2014) "Measuring state highway sustainability: taking the fiscal dimension into account", *Public Works Management and Policy*, 19 (3):255-276.

Chen, C. (2016) "Effects of fiscal stress on state highway infrastructure finance: a composite index approach", *Municipal Finance Journal*, 37(2):1-28.

Chen, C. (2017) "Does money matter for infrastructure outcomes? The effects of public infrastructure finance on state infrastructure quality", *Journal of Public Budgeting, Accounting and Financial Management*, 29(3):375-408.

Chen, C. (2018) "Public infrastructure finance: symposium introduction", *Journal of Public Budgeting, Accounting and Financial Management*, 30(2):126-134.

Chen, C. and J.R. Bartle (2017) *Infrastructure finance: a guide for local government managers*, ICMA and GFOA Policy White Paper, Washington, DC, accessed January 5, 2019 (<https://icma.org/documents/infrastructure-financing-guide-local-government-managers>).

Choudhury, E., J. Clingermayer and C. Dasse (2003) An Analysis of Institutional and Political Factors Affecting State Capital Expenditure. *International Journal of Public Administration*, 26(4):373-398.

Culnan, M. J. (1987) Mapping the intellectual structure of MIS, 1980–1985: A co-citation analysis, *Management of Information System Quarterly*, 11(3):341–353.

Dabla-Norris, E., J. Brumby, A. Kyobe, Z. Mills and C. Papageorgiou (2012) “Investing in public investment: an index of public investment efficiency”, *Journal of Economic Growth*, 17(3):235-266.

Dougherty, M.J. and K. Klase (2009) “Fiscal retrenchment in state budgeting: revisiting cutback management in a new era”, *International Journal of Public Administration*, 32(7):593-619.

Dorotinsky, W. (2008) *Capital Budgeting and Public Financial Management – Part I and II*. IMF’s PFM Blog, accessed January 5, 2018 (<http://blog-pfm.imf.org>).

Doss, B. (1987) “The Use of Capital Budgeting Procedures in U.S. Cities”, *Public Budgeting and Finance*. 7(3):57–69.

Dowall, D. (2001) “Rethinking statewide infrastructure policies: Lessons from California and beyond”, *Public Works Management & Policy*, 6(1):5-17.

Dupont-Morales, M.A. and J. Harris (1994) “Strengthening Accountability: Incorporating Strategic Planning and Performance Measurement into Budgeting”, *Public Productivity & Management Review*, 17(3):231-239.

Ebdon, C. (2004) “Capital Management Practices in U.S. Counties”, *Public Works Management and Policy*, 8(3):192-202.

Ebdon, C. (2007) “Underpinning Government: Capital and Infrastructure Management in State and Local Government”, in: Patricia Ingraham (ed) *In Pursuit of Performance: Management Systems in State and Local Government*, Baltimore, MD: Johns Hopkins University Press, pp. 57-81.

Ermasova, N. (2012) *Capital budgeting at the state level: an empirical analysis from the economic downturn through the present*, PhD Dissertation, Bloomington, IN: SPEA, IU Publishing house.

Ermasova, N. (2013) “Capital Budgeting in the States After the Great Recession”, *State and Local Government Review*, 45(2):119-130.

Ermasova, N. (2019) “The Case of Public Capital Budgeting and Management Process in Germany”, in: A. Srithongrung, N. Ermasova and W. Yusuf (2019) *Capital Management and Budgeting in the Public Sector*, Hershey, Pennsylvania: IGI Global, pp. 49-73.

Ermasova, N. and C. Ebdon (2019) “Public Capital Budgeting and Management Processes in the United States”, in: A. Srithongrung, Ermasova, N., and W. Yusuf (eds) *Capital Management and Budgeting in the Public Sector*, Hershey, Pennsylvania: IGI Global, pp.23-48.

Ermasova, N. and P. Ermasova (2019) “Public Capital Budgeting and Management Processes in Russia”, in: A. Srithongrung, Ermasova, N., and W. Yusuf (eds) *Capital Management and Budgeting in the Public Sector*, Hershey, Pennsylvania: IGI Global, pp.113-133.

Ermasova, N. and Mikesell, J. (2019) “Public capital budgeting and management: The concept and its application in three important federations”, *Public Finance and Management*. 19(3):207-231.

Farazmand, A. and J.P. Neill (1996) “Capital Decision-Making: Analysis and Judgement”, *Public Budgeting and Financial Management*, 8 (3): 428–452.

Frankel, E. and M. Wachs (2017) “More Than Money: Infrastructure and Governance”, *Public Works Management and Policy*, 22(1):6-11.

Forrester, J. (1993) “Municipal Capital Budgeting: An Examination”, *Public Budgeting & Finance*, 7(1):85–103.

Government Finance Research Center (1983) “Building Prosperity: Financing Public Infrastructure for Economic Development”, Washington, DC: Government Finance Research Center.

Guzman, T. (2019) “The Case of Public Capital Budgeting and Management Process in Uzbekistan”, in: Srithongrung, A., Ermasova, N., and W. Yusuf (eds) *Capital Management and Budgeting in the Public Sector*, Hershey, Pennsylvania: IGI Global, pp.74-92.

Halachmi A. and A. Sekwat (1997) “Strategic Capital Budgeting and Planning: Prospects at the County Level”, *Public Budgeting and Financial Management*, 1(1):578–596.

Hamel, G. and C. Prahalad (1989) “Strategic intent”, *Harvard Business Review*, 6(3):67-76.



Hillhouse, A.M. and K. Howard (1963) *State Capital Budgeting*. Chicago, IL: Council of State Governments.

Hina, K., D. Matkin and R. Morse (2017) "Collaborative capital budgeting in U.S. local government", *Journal of Public Budgeting, Accounting & Financial Management*, 29(2):230-262.

Hoyle, J. (1978) "Mandatory Auditor Rotation: The Arguments and Alternative", *Journal of Accountancy*, 145(5):69-78.

Hyde, A. (2002) *Government Budgeting: Theory, process, and politics*. Belmont, CA: Wadsworth Publishing Company.

Hush, L.W. and K. Peroff (1988) "The Variety of State Capital Budgets". *Public Budgeting and Finance*, 3(1):67-79.

Hwan Chung, J. (2013) "Adoption of a separate capital budget in local governments: Empirical evidence from Georgia", *Journal of Public Budgeting, Accounting & Financial Management*, 25(4):617-643.

Jacobs, D.F. (2008) *A Review of Capital Budgeting Practices*. IMF Working Paper of Fiscal Affairs Department, assessed January 5, 2018 ([http://blog-pfm.imf.org/pfmblog/files/a\\_review\\_of\\_capital\\_budgeting\\_practices1.pdf](http://blog-pfm.imf.org/pfmblog/files/a_review_of_capital_budgeting_practices1.pdf))

Jimenez, B. and M. Pagano (2012) "What Factors Affect Management Quality? State Infrastructure Management and the Government Performance Project", *Public Works Management & Policy*, 17(2):124-151.

Johnson, R.W. (1970) *Capital Budgeting*. Dubuque, Iowa: Kendall/Hunt Publishing.

Khan A. and B. Hildreth (ed.) (2002) *Budget Theory in the Public sector*. New York, NY: Quorum Books.

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

Klasse, K. (2018) "The relationship between fiscal stress and patterns of state budgeting strategies used in cutback management in the last two U.S. recessions", *Public Finance and Management*, 18(1):39-63.

Kovari, J. (2016) "Applying punctuated equilibrium theory to municipal and county operating and capital budgets", *Journal of Public Budgeting, Accounting & Financial Management*, 28(4):405-435.

Kovner, C. and E. Lusk (2010) "The sustainability budgeting model: multiple model flexible budgeting using sustainability as the synthesizing criterion", *Nursing Economics*. 28(6):377-385.

Levine, C.H. I. Rubin and G. Wolohojian (1981) *The politics of retrenchment: how local governments manage fiscal stress*. Beverly Hills, Calif.: Sage Publications.

Lewis, B.D. and A. Osterman (2011) "Sub-national government capital spending in Indonesia: level, structure, and financing", *Public Administration and Development*, 31(3):149-158.

Lyden, F. and M. Lindenberg, M. (1983) *Public Budgeting in Theory and Practice*. New York, NY: Longman.

Marlowe, J. (2013) "Strategy, priority-setting, and municipal capital budget reform: Three cases from the great recession", *Journal of Public Budgeting, Accounting & Financial Management*, 25(4):693-718.

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

McClain, J.M. (1966) *Capital Budgeting in Selected States*. Lexington, Ky.: Bureau of Business Research, College of Commerce, University of Kentucky.

Mikesell, J. (2007) *Fiscal Administration: Analysis and Applications for the Public Sector*, Eighth Edition, Belmont, CA: Thomson Wadsworth.

Millar, A. (1988) "Selecting Capital Investment Projects for Local Governments", *Public Budgeting & Finance*, 3(1):63-77.

Miller, G.R. (1983) "Taking stock of a discipline", *Journal of Communication*, 33(3):31-41.

Mintzberg, H. and J. Waters (1985) "Of strategies, deliberate and emergent", *Strategic Management Journal*, 6(3):253-259.

Mintzberg, H. (1990) "The design school: reconsidering the basic premises of strategic management", *Strategic Management Journal*, 11(3):171-195.

Moak, L. and K. Gordon (1965) *Budgeting for Smaller Governmental Units*. Chicago: Municipal Finance Officers Association.

Moomaw, R.L., J.K Mullen and M. Williams (2002) "Human and Knowledge Capital: A Contribution to Empirics of State Economic Growth", *American Economic Journal*, 30(1):48-60.

Munnell, A.H. (1990) "How Does Public Infrastructure Affect Regional Economic Performance?" in: Munnell A.A. (ed) *Is There a Shortfall in Public Capital Investment?* Boston, MA: Federal Reserve Bank of Boston, pp. 23-34.

Office of Management and Budget (2017) *Circular A-11*, accessed April 15, 2018 ([https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/a11\\_current\\_year/a11\\_2017.pdf](https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/a11_current_year/a11_2017.pdf)).

O'Toole, D. and B. Stipak (1988) "Budgeting and Productivity Revisited: The Local Government Picture", *Public Productivity Review*, 12(1):1-12.

Pagano, M. and D. Perry (2008) "Financing Infrastructure in the 21<sup>st</sup> Century City", *Public Works Management & Policy*, 13(1):22-38.

Pagano, M.A. (1984) "Notes on capital budgeting", *Public Budgeting & Finance*, 4(3):31-40.

Paul, J., and G. Benito (2018) "A Review of research on outward foreign direct investment from emerging countries, including China: what do we know, how do we know, and where should we be heading?" *Asia Pacific Business Review*, 24(1):90-115.

Paul, J., S. Parthasarathy and P. Gupta (2017) "Exporting Challenges of SMEs: A Review and Future Research Agenda", *Journal of World Business*, 52(3):327-342.

Poterba, J. (1994) "State Responses to Fiscal Crises: The Effects of Budgetary Institutions and Politics", *Journal of Political Economy*, 102(5):799-821.

Premchand, A. (2007) "Capital Budgets: Theory and Practice/ Budgeting and Budgetary Institution", in: Shah, A. (ed) *Government budgeting*, Washington D.C.: The International Bank for Reconstruction and Development, pp. 91-113.

Price, W. (2002) "Innovation in Public Finance: Implications for the Nations Infrastructure", *Public Works Management & Policy*, 7(1):63-78.

Pritchett, L. (2000) "The tyranny of concepts: CUDIE (cumulated, depreciated, investment effort) is not capital", *Journal of Economic Growth*, 5(4):361-384.

Pujol, F. (2008) "Ranking Journals Following a Matching Model Approach: An Application to Public Economics Journals", *Public Economic Theory*. 10(1):55-76.

Ramos-Rodriguez, A. and J. Ruiz-Navarro (2004) "Changes in the intellectual structure of strategic management research: A bibliometric study of the strategic management journal, 1980–2000", *Strategic Management Journal*, 25(10):981–1004.

Richard, A. and T. Daniel (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*. Washington, DC: Government Finance Officers Association, pp. 65-84.

Rosado-Serrano, P. and D. Dikova (2018) "International Franchising: A Literature Review and Research Agenda", *Journal of Business Research*. 85(1):238-257.

Rowan, M. and N. Hillman (1996) "Reengineering capital budgeting", *Journal of Public Budgeting, Accounting & Financial Management*, 8(4):360-383.

Rubin, M.M. and K. Willoughby (2009) *State budget balancing strategies: riding into the future on lessons learned from the past*. 5th TAD Conference, Washington, DC.

SCImago (2018) SCImago Journal and country rank, accessed July 11, 2018 (<https://www.scimagojr.com/journalrank.php>).

Schick, A. (2008) "The road to PPB: The stages of budget reform", in: Rubin, I. (ed), *Public Budgeting. Policy, Process, and Politics*. New York, NY: Economics and Business, pp. 27-44.

Scorsone, E.A. and C. Plerhoples (2010) "Fiscal stress and cutback management amongst state and local governments: what have we learned and what remains to be learned?" *State and Local Government Review*, 42(1):171-179.

Shybalkina, I. and R. Bifulco (2019) "Does Participatory Budgeting Change the Share of Public Funding to Low Income Neighborhoods?" *Public Budgeting and Finance*, 39(1):45-66.

Srithongrung, A. (2008) "The Impacts of State Capital Management Programs on State Economic Performance", *Public Budgeting and Finance*, 28(3):83-107.

Srithongrung, A. (2010) "State Capital Improvement Programs and Institutional Arrangements for Capital Budgeting: The Case of Illinois", *Journal of Public Budgeting, Accounting and Financial Management*, 22(3):407-430.

Srithongrung, A. (2018) "Capital Budgeting and Management Practices: Smoothing Out Rough Spots in Government Outlays", *Public Budgeting and Finance*, 38(1):47-71.

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

Srithongrung, A., N. Ermasova and W. Yusuf (2019) *Capital Management and Budgeting in the Public Sector*, Hershey, Pennsylvania: IGI Global.

Srithongrung, A., W. Yusuf and K. Kriz (2019) "A Systematic Public Capital Management and Budgeting Process." in: Srithongrung, A., Ermasova, N., and W. Yusuf (eds) *Capital Management and Budgeting in the Public Sector*. Hershey, Pennsylvania: IGI Global, pp.1-22.

Stanley, M.T. and S. Block (1984) "A survey of multinational capital budgeting", *The Financial Review*, 19(1):36-54.

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

Steiss, J. (1975) *Local Government Finance*. Lexington, Mass.: Lexington Books.

Thurmaier K. and J. Gosling (2008) *Public Budgeting. Policy, Process, and Politics*. New York, NY: ME Sharpe Inc.

Walt, S. and L. Barenbaum (2007) “Real options and public sector capital project decision-making”, *Journal of Public Budgeting, Accounting & Financial Management*, 19(2):139-152.

Werling, J. and R. Horst (2014) “Catching Up: Greater Focus Needed to Achieve a More Competitive Infrastructure”. *National Association of Manufacturers*, accessed July 11, 2018 (<http://www.nam.org/Issues/Infrastructure/Surface-Infrastructure/Infrastructure-Full-Report-2014.pdf>).

Wie, J-E. and A. Srithongrung (2017) “Capital management: advancing theory and practice”, *Journal of Public Budgeting, Accounting & Financial Management*, 29(2):182-208.

van der Hoek, M.P. (1996) “Fund accounting and capital budgeting: European experiences”, *Journal of Public Budgeting, Accounting & Financial Management*, 8(1):26-46.

Vogt, J.A. (2004) *Capital Budget and Finance: A Guide for Local Governments*. NC: International City/County Management Association.

Reproduced with permission of copyright owner. Further reproduction prohibited without permission.