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# How can procurement create (sustainable) public value under the Bipartisan Infrastructure Deal?

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## Abstract

The economic response of the US government to the COVID-19 pandemic envisions massive investment in infrastructure construction. Yet, governments contract out public works and might lack the capacity to meet the increased demand for new construction. Drawing on a mix of survey and interview data, we identify critical deficiencies in contract capacity that might lead to a loss of public resources and further erode trust in the government. We propose a plan for restructuring public procurement systems and offer solutions around four foci: collaboration, training, flexibility, and sustainability. This transformation path would enhance government contract capacity and use markets to signal a demand for sustainable infrastructure and create public value in line with the strategic objectives of the Bipartisan Infrastructure Deal.

## Evidence for Practice

- The Bipartisan Infrastructure Deal (BID) of 2021 appropriates billions of dollars to rebuild the nation's aging infrastructure and is a potential game-changer for the US economy.
- Governments rely on contractors for public works, and the increased demand might strain existing local, state, and federal procurement systems. The lack of contract capacity can result in poor project execution, a waste of public money, corruption, and erosion of trust.
- The weaknesses of current contract management are rooted in the shortage of qualified procurement staff, thin quasi-markets for government goods and services, and scarce market research on construction pricing.
- Reimagining public procurement entails strengthening contract capacity by collaboration with suppliers and using markets to create demand for environment-friendly and socially responsible production of goods and services.

## INTRODUCTION

In November 2021, the nation celebrated the passage of the Bipartisan Infrastructure Deal (BID), a sweeping reform aiming to fix the nation's aging infrastructure and jumpstart the economy. The bill appropriated \$550 billion in new infrastructure spending for a total of \$1.2 trillion in the next 5 years to rebuild roads, bridges, and rails and improve telecommunication infrastructure. Now that the

celebration of bill passage is over, it is time for sobering questions.

Public organizations do not design and build infrastructure or other public works alone. They foot the bill but contract the work to the private sector. This phenomenon has been referred to as "hybrid government" because it takes the efforts of multiple parties across the sector lines (Christensen & Lægheid, 2011). Although the government has outsourced public works for centuries,

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procurement and contract management have become increasingly complex. This is especially true for infrastructure contracting, a laborious task requiring a professional capacity that procurement systems might currently lack (Koppenjan & Enserink, 2009).

Scholars have long warned about inadequate government contract management and project governance (e.g., Joaquin & Greitens, 2012; Johnston, 2010; Kort & Klijn, 2011; Stanton, 2008). In a sense, the BID represents a double-edged sword. On the one hand, it is a potential game-changer for the US economy after the COVID-19 pandemic slowdown. The bill can unprecedentedly improve the infrastructure after years of inadequate investments in roads, rail, airports, ports, bridges, broadband connectivity lines, and water pipelines and create 800,000 new jobs by 2025 (Moody's Analytics, 2021). On the other hand, public agencies currently face procurement and contract management deficiencies coupled with labor supply shortages that might preclude them from delivering on the BID's objectives. The lack of organizational capacity impacts the whole process—from bidding to project execution and monitoring—and can result in a waste of money, corruption, and a decline in public trust (Dimand, 2022). By raising awareness about these imminent challenges, we seek to open a dialogue on how governments could reform their procurement systems to maximize the BID benefits and create sustainable public value.

## THE CONSTRUCTION SECTOR AND THE ECONOMIC RECOVERY FROM COVID-19

Before the COVID-19 pandemic, the US economy was producing at unprecedented rates, with quarterly Gross Domestic Product (GDP) growth of 2–3% and a marked increase in employment and minimum wage (Center on Budget and Policy Priorities, 2022). More than any prior economic recession, the pandemic affected specific industries (e.g., labor-intensive ones) while leaving others relatively unscathed (e.g., those using information and virtual technologies). The construction sector was severely hit (Maani & Galea, 2020), which generated significant adverse effects for the economy (U.S. Bureau of Labor Statistics). Over the last 20 years, construction in the United States contributed between 3.4% and 5% of GDP (U.S. Department of Commerce, 2022), and the investment made by this industry has been closely linked to economic growth (Nasir et al., 2014). While designating construction workers as essential has helped the industry stay afloat, new post-pandemic challenges created a perfect storm throughout 2020 and 2021. On the supply side, social distancing restrictions, the impossibility of operating construction sites at full capacity, short staffing due to shrinking labor markets, and raw materials price increases, among others, limited the output of the sector and affected the completion of large-scale projects

(Alsharif et al., 2021; Love et al., 2021). On the demand side, governments worldwide had to postpone infrastructure investments due to pandemic-related budget shortfalls (Buckley, 2020). Because the public sector is the primary buyer for many construction companies, this further stalled the industry. In the United States, public spending on commercial construction projects plunged from \$4.09 to \$3.54 billion (–13.5%). Similar figures are projected for 2022 (U.S. Census Bureau, 2022).

In the second part of 2021, the federal government rolled out several initiatives to refuel the nation's economy. As a result, agencies at all levels have commenced programs to support new construction and bolster economic activity and employment. Some major initiatives include:

- The US Department of Transportation plans to invest \$906 million in infrastructure through the Infrastructure for Rebuilding America discretionary grant program. A total of 20 projects in 20 states will receive funding to improve highways, bridges, ports, and railroads (U.S. Department of Transportation, 2022).
- The Federal Aviation Administration is financing infrastructure improvements in 405 airports through more than \$1.2 billion in airport safety and infrastructure grants (Forconstructionpros.com, 2020).
- Illinois has announced \$39.5 million in new grants for 27 capital projects in underserved communities across the state (Illinois Department of Commerce & Economic Opportunity, 2020).
- Arizona's Pima County has approved \$55 million to repair about 127 miles of local roads, 45 miles of collector and arterials, and \$165 million for local capital projects (Demers, 2020).
- The Port of Seattle Commission plans to proceed with about 20 projects worth approximately \$1.5 billion (Port Technology International Team, 2020).

The BID, passed in November 2021, represents the most significant recent infrastructure reform. *“Because of today's vote, state and local officials will be able to invest in a more efficient supply chain network. Ultimately, these new infrastructure investments will provide a needed boost for the construction industry while making our economy more efficient”* (AGC The Construction Association, 2021). This statement by a construction official reflects the enthusiasm about the new opportunities opened by the bill. The projected construction costs were further increased after the bill's passage, reaching over \$2 trillion in 2025 (FMI, 2022).

## THE BID'S POTENTIAL FOR VALUE CREATION

The BID covers a multitude of local, state, and nationwide projects, including roads and bridges, public transit, freight, passenger rail, drinking, and wastewater infrastructure, ports,

and airports (The White House, 2021). It also allocates money for “the new economy,” such as broadband deployment and adoption, grid security and resiliency, and clean energy. If appropriately managed, the funding allocated through the bill can bring about a wave of construction projects commissioned by governments at all levels and increase the quality and value of the delivered projects. Below, we identify four potential BID benefits for the US economy, *informed by current construction management and public administration research*.

## National development and new job creation

The construction industry delivers the physical infrastructure that enables the functioning of other sectors. Infrastructure projects are also highly labor-intensive and bring new jobs to the area (Heintz et al., 2009). The BID envisions 700,000+ new jobs yearly in construction, manufacturing, and transportation (The White House, 2021).

## Increased competition and project delivery quality

Governments have long struggled to attract best-in-class suppliers, who find it more profitable to work with industrial buyers. Small and medium companies are also severely underrepresented in government contracts. Such firms often do not even compete for large public works considering their chances of being selected too slim given the government’s focus on cost and price (Patrucco et al., 2021). Widely recognized as a problem, the lack of competition in construction procurement can cause corruption in the procurement process, mismanagement of funds, and poor project performance, including delays, cost overrun, and low quality (Locatelli et al., 2017). Given its principles, structure, and size, the BID could significantly stimulate government-supplier collaboration under the auspices of public-private partnerships (Kort & Klijn, 2011) and attract a broader pool of companies to bid for government contracts and even relocate for infrastructure projects. This, in turn, could result in more competitive offers and a better quality of project delivery.

## Growth in rural communities

Infrastructure projects spur local socioeconomic growth (Pavel et al., 2018). Small and medium construction companies are more willing to tackle projects in rural communities that satisfy basic infrastructure needs (e.g., healthcare and educational facilities or transportation works). Such projects could induce the growth of local small-medium businesses and boost regional economic development. The main objective of the BID is to bring more projects to these traditionally neglected areas. Besides improving the

infrastructure, safety, and local economy, it will also stimulate more participation from small and medium businesses.

## Boost technological advancement

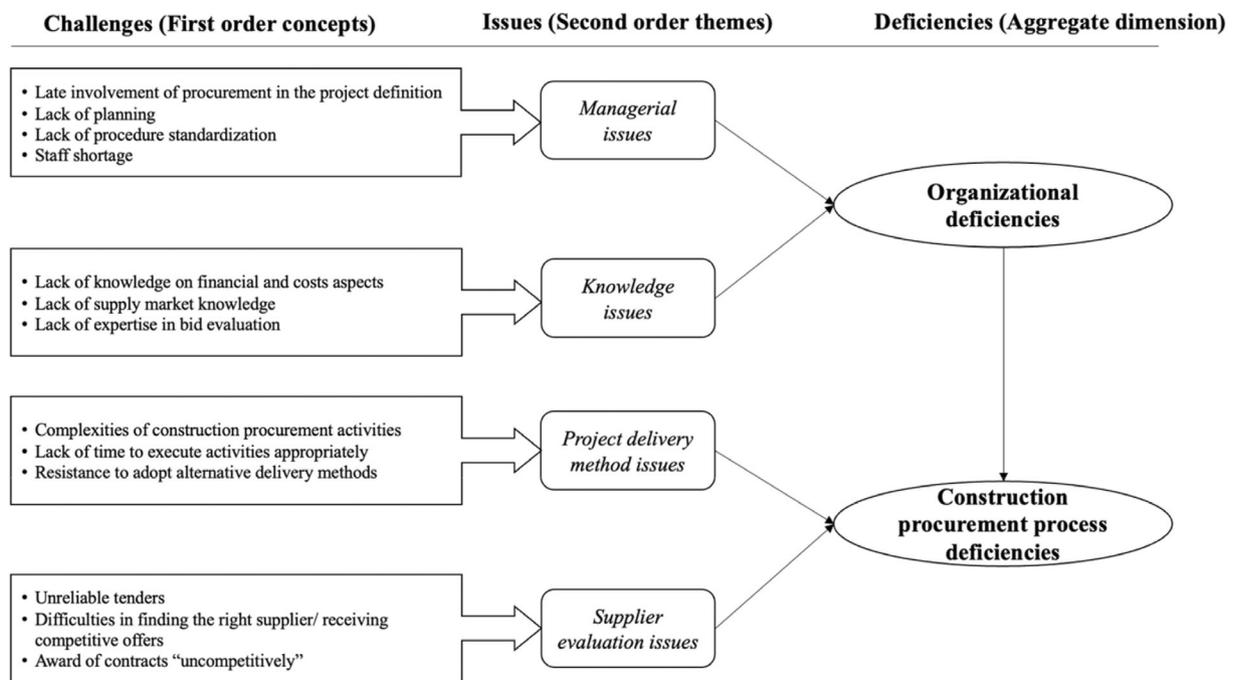
The construction sector holds a high technical potential (Agarwal et al., 2016). Some companies have already adopted solutions for productivity roadblocks and optimization gaps, but a large-scale adoption is yet to happen. As the primary buyer of the industry, governments can encourage technology usage by introducing ad-hoc contract incentives (McKinsey & Company, 2019). The BID represents the perfect scenario to boost technological advancement and the diffusion of hardware technologies, such as construction drones and trackers that enhance productivity and security on project sites.

To produce these benefits, the BID requires that public organizations adopt new rules in contracting out construction projects. First, per the *Build America, Buy America Act*, projects funded with federal infrastructure assistance should use locally sourced iron, steel, construction materials, and manufactured products. If contractors cannot source a project domestically, procurement officials must carefully evaluate the possibility of awarding waivers. To qualify for a waiver, contractors must demonstrate that local rules are “inconsistent with the public interest, not available in sufficient and reasonably available quantities of satisfactory quality, and/or if domestic products will increase the cost of the overall project by more than 25%.” Second, the *Make it in America Act* adds new requirements to enhance transparency and accountability. One example is a centralized website to publicize the requests and conceded waivers and facilitate interaction between manufacturers and contractors (MadeinAmerica.com, n.d.; Alliance for American Manufacturing, n.d.).

With its potential benefits and new rules for doing business, the reform will open a new era for construction companies, but it will likely have a profound effect on the demand side as well. The availability of infrastructure funding and new rules means that public organizations must pull off significant “hybrid government” capabilities to procure, contract, and execute the public works envisioned in the bill. In the end, materializing this “potential” value depends on the government’s ability to make good decisions when contracting out infrastructure projects.

## DEFICIENCIES IN PROCUREMENT AND CONTRACTING CAPACITY: EVIDENCE FROM THE FIELD

The increased demand for construction projects, combined with the new requirements to buy domestically and deliver on the BID strategic objectives, poses a fundamental question: Do government procurement systems possess the capacity to face the new challenges?



**FIGURE 1** Deficiencies of construction procurement systems

We rely on quantitative and qualitative data collected from the field to answer this question. Specifically, we surveyed US officials tasked with procurement, construction, and facility management in various types of public organizations. The collected data reveals the magnitude of construction contracts and projects, delivery methods, transaction costs associated with contract solicitation, and the challenges before contract and relationship governance. Appendix A outlines the survey design, our data collection, and the results from 362 responses. Semi-structured interviews with 30 public officers responsible for construction procurement in their organizations complement the survey data. Appendix B depicts the interview process and provides illustrative quotes. These data allow us to elaborate on the critical deficiencies public procurement systems face in construction contracting. We distinguish between two types of deficiencies—organization-wide and construction-specific. Figure 1 shows the groups split into subthemes: managerial and knowledge deficiencies for the organization-wide one; and project delivery methods and supplier evaluation deficiencies for the construction-specific one.

As a methodological note to Figure 1, the flow structure follows Gioia et al.'s (2013) data analysis approach. Specifically, we differentiate among challenges (first-order concepts), issues (second-order themes), and deficiencies (aggregate dimensions).

## ORGANIZATIONAL DEFICIENCIES

Many procurement officials consider procurement and contract management of their agencies ineffective and

indicate knowledge and capacity gaps preventing them from handling construction projects efficiently and effectively. Respondents point to a lack of human capital to design and monitor contracts and cope with administrative work. Having sufficient staff is essential for managing complex projects. The issue of severe labor shortages is further amplified by limited strategic planning for construction procurement:

Our biggest headache [is] the lack of planning and the demand for a quick turnaround on [project] jobs. (Construction Manager, State Government)

While planning is typically reserved for high-value projects (those above \$0.5 million), our data show that such projects represent a small portion of annual contracts (around 30%). This implies that the remaining projects are, by and large, managed in an unstructured way.

There is no standardization, to look up stuff [previous construction procurement procedures] in there... (Superintendent of Public Works, Local Government)

Interviewees agree that the desired timeline to procure construction projects is around 2 months, though it can vary from project to project. Table 1 presents a different reality. Procuring construction projects stretches beyond the intended timelines in over 75% of the cases, sometimes leading to service delivery that no longer fits the needs. Regulatory controls (like the Federal Acquisition

**TABLE 1** Construction procurement characteristics in surveyed public organizations

Annual spending			Number of contracted projects			Number of employees			Time to procure a project		
<1 M	23	6.4%	<25	175	48.3%	<2	61	20.7%	<2 weeks	5	1.4%
1–5 M	47	13.0%	25–50	84	23.2%	2–4	96	32.7%	2–4 weeks	21	5.8%
5–10 M	51	14.1%	51–75	31	8.6%	5–7	73	24.8%	1–2 months	59	16.3%
10–50 M	102	28.1%	76–100	25	6.9%	8–10	32	10.9%	2–4 months	83	22.9%
>50 M	139	38.4%	>100	47	13.0%	> 10	32	10.9%	>4 months	194	53.6%

Regulation) that seek to ensure compliance often introduce significant delays. Extensive administrative work involved in contract design and management, coupled with labor shortages, has caused further interruptions. As a result, pre-bidding and bidding periods can last over a half year, slowing down projects potentially requiring urgent attention.

Our interviewees report missed opportunities for federal funding due to the inability to compress the duration of the construction procurement process:

Given the constraints of funding through the Cares Act, the timing was extremely tight. We started [the process] in October of last year. By October 31st, we had gotten permits for three projects. The funds were to terminate on December 31st. That left us two months with various holidays to get these projects contracted. It was extremely difficult managing that tight schedule, managing multiple trades working simultaneously, [and] dealing with the shortage of various materials. [All] that put us out until early February. (Deputy Director of Public Works, County Government)

Problems also stem from the fragmentation of authority over contracting decisions for construction projects. Procurement offices govern those decisions only in a few organizations.<sup>1</sup> At the state level, for example, the Department of Transportation, Department of Management Services, Division of Real Estate, and Division of Facility Management can grant infrastructure contracts, with the procurement office having only administrative or no involvement.

[Procurement] is not brought into the process early enough. Department heads do not want to change [that]. (Purchasing Manager, Local Government)

Such fragmented decision-making complicates contract management and oversight and impedes process standardization.

It is frustrating the time it takes to get things done—bureaucratic problems [and] going

through far too many approval groups. Routing the papers makes you want to pull your hair out. (Purchasing Manager, Local Government)

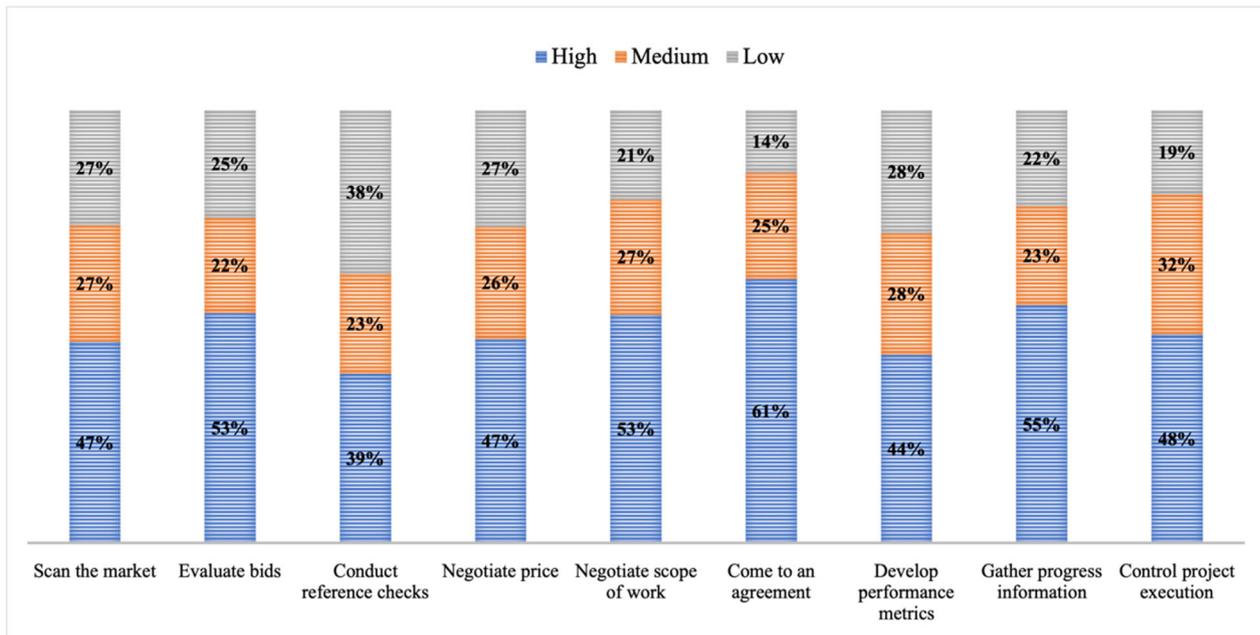
While departments might be more familiar with the context, and their input is invaluable in designing contract solicitations, infrastructure procurement is an uphill task that requires professional expertise and skills. Our data indicate that these qualities are not always present in the procurement unit or other departments. To improve the value created through construction procurement, interviewees emphasized the need for (1) a better understanding of the financial and cost aspects of construction projects and contracts, (2) gathering supply market intelligence, and (3) developing expertise in bid evaluation.

We are never sure they [procurement] are getting the best price. We use our own historical knowledge to determine if the price sounds reasonable. When getting three quotes, we simply compare them to determine the market price. (Director of Facility Management, School District)

### CONSTRUCTION PROCUREMENT PROCESS DEFICIENCIES

Our informants also identified deficiencies specific to the construction procurement process. Figure 2 presents the most challenging and time-consuming issues, as seen by the survey respondents. Evaluating suppliers' bids, reaching an agreement about project specifications, and gathering information on project progress are among the most pressing.

The deficiencies combined with the massive procurement pace for construction projects, the lack of strategic planning, and qualified staff have two significant implications. First, public agencies will likely resort to more traditional and lengthy project delivery methods. One such method is Design-Bid-Build (DBB), where each phase needs to end before the next begins. Traditional delivery methods have been criticized for inefficiency and corruption (Messick, 2020). Only a third of our respondents indicate familiarity/use of alternative project delivery methods,



**FIGURE 2** Challenges in public construction procurement (Respondents were asked to what extent each construction procurement activity is difficult and/or time-consuming, where 1 = strongly disagree and 5 = strongly agree. These were recoded as high (4 and 5), medium (3), and low (1 and 2).

such as Indefinite Delivery Indefinite Quantity (IDIQ) or Job Order Contracting (JOC) that allow for the completion of multiple projects through a single competitively awarded contract. The reluctance of managers to leave their “comfort zone” seems to limit the application of new approaches that could alleviate the issues associated with traditional delivery.

I have tried to push a JOC state bid project, but my higher-ups would not allow it. I wanted to work with a company we worked with in the past. Selfishly, it would have made it easier on my side. I have not been able to push through a state contract for anything bigger than \$100k; I have always had to go through a bid process. (Director of Parks and Recreation, Local Government)

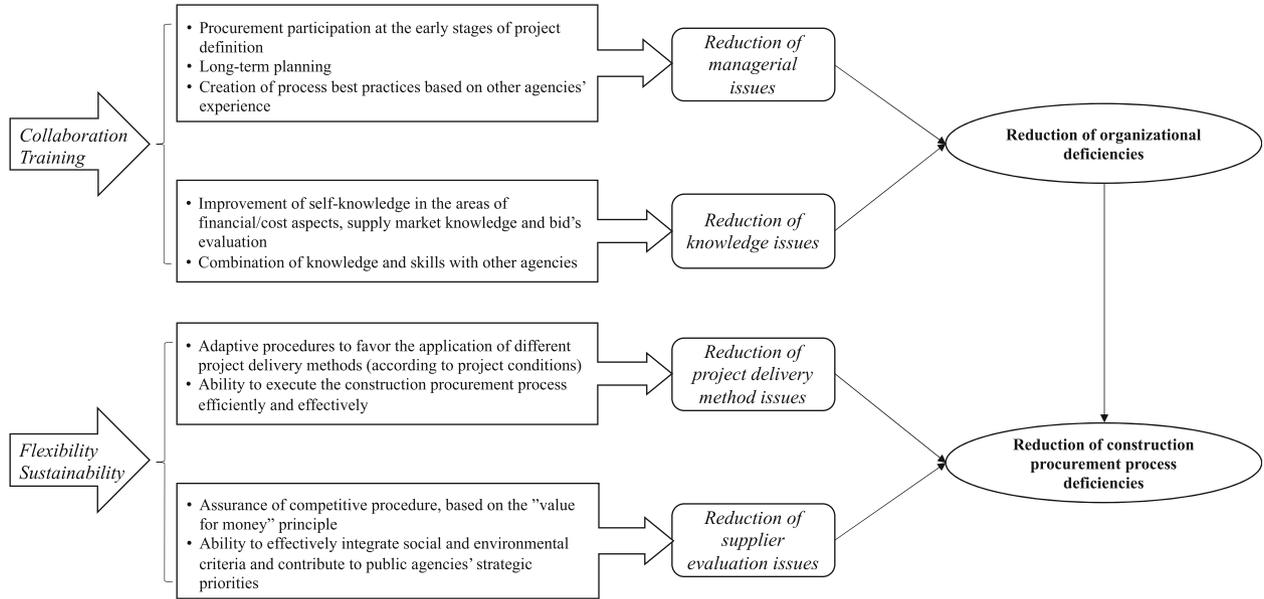
Second, public organizations will likely struggle to secure the best price or award the best supplier. Although federal regulations require that agencies ensure “fair and reasonable” prices with contractors, our data show that competitive pricing is rarely achieved in thin markets. The main reasons are the inability to (1) design competitive bids (based on reliable cost estimates) and (2) attract reliable suppliers for construction projects. That is why contracts are often awarded noncompetitively:

The last project we bid on was a 9-acre pocket park. We had the prebid meeting, and close to 10 people signed in from 10 different

places. In the long run, we only received two bids. We thought we would get at least five to have a good idea of what we would deal with. With only two, it turned out [the selected contractor] to be a company that we had worked with in the past. (Director, Parks and Recreation, Local Government)

## SOLVING THE PROCUREMENT CAPACITY CHALLENGE: SUGGESTIONS FOR SYSTEM REIMAGINE

Given the current procurement deficiencies, the BID offers an opportunity for reflection on how to address them moving forward. Historically, outsourcing sought to solve the issues of bureaucratic inefficiency and inject market mechanisms into the government’s provision of goods and services. The goal has been to make the government more efficient. While important, efficiency is not the only goal. The theory and years of experience have taught us that markets produce efficient outcomes. However, research in public administration (e.g., Brunjes, 2022; Mackintosh, 1997) once and again indicates that markets for government goods and services remain incomplete, plagued with issues of limited competition, imperfect information, and preference substitution between the priorities of government providers and consumer choices.<sup>2</sup> Important questions now arise: How should we think about efficiency in the current era? What values should be emphasized to enhance public service delivery? How



**FIGURE 3** Proposed solutions to procurement system deficiencies

can we leverage the efficiency of markets to create and deliver public value? Below, we identify four critical foci (illustrated in Figure 3) that could guide governments in system reimaginging.

**COLLABORATION**

Given what we know about markets for public goods, governments might achieve higher efficiency by seeking collaboration rather than market competition. While competitive bidding remains an integral part of the selection process, contract awards should be decided holistically. Governments often contract with the same vendors for years and, as a result, know how to achieve the best product from them.

Collaborative governance research offers ample evidence that cross-sectoral partnership helps solve complex public problems (e.g., Kalesnikaite & Neshkova, 2021; Sørensen & Torfing, 2021). In the context of construction procurement, public organizations could explore the potential of collaboration to increase the value of public service delivery. As our interviewees note, collaborative approaches can strategically nurture their relationships with private and nonprofit contractors and involve them early in the process—in contract solicitation and design—to speed up the process. Governments could also join resources with other public entities through, for example, cooperative purchasing. Only a few agencies in our sample (below 10%) use collaborative procurement for construction projects. Yet, those who do, prize it for increasing coordination, allowing organizations to tap resources they do not possess, expanding social capital, improving conflict and risk management, and boosting

compliance with local and national regulations (Douglas & Ansell, 2021).

When we piggyback on contracts done through other agencies, there is less effort... somebody else did the procurement work; we just need to customize what already exists. It is very efficient, and once it is underway, it is easier to control and monitor projects. (Purchasing Manager, School District)

Increasing the use of alternative project delivery methods can also enhance collaboration. While, traditionally, public organizations have collaborated with suppliers using variations of DBB (e.g., through public-private partnership schemes<sup>3</sup>), the BID presents an opportunity to explore collaborating through other methods. One example is JOC which builds on performance-based contracting to incentivize local suppliers and delivery quality (Patrucco & Dimand, 2021). While underutilized (87 survey respondents and six interviewees use it for procuring construction projects), JOC promises public entities more effective governance of contractor relationships, better communication, less opportunistic behavior, and superior project outcomes than traditional DBB (Sanderson et al., 2018).

**TRAINING**

Training positively correlates with performance management reform implementation (Kroll & Moynihan, 2015). Administrations who undergo such training pay more attention to performance data and strategic planning in

their decision-making process. In the face of the new pressures following the BID, governments could boost their contracting capacity by providing professional training for procurement and contract officials. Our data suggest that these training efforts should focus on supply chain management (e.g., alternative delivery methods), project management (e.g., impact on the environment), and transaction costs management.

Small municipalities need real-world training. There is no one doing that or teaching anyone. You can follow this manual to a tee, but it will not help you. There are tips and tricks everyone could benefit from. (Chief Procurement Officer, Local Government)

## FLEXIBILITY

As construction and infrastructure projects often span years, they tend to operate in changing environments (e.g., Demirel et al., 2017). Based on the COVID-19 experience, our informants call for procurement systems to increase transparency and flexibility over the contract lifecycle.

With COVID, things are not as consistent. I think as a person who holds a contract, as a lead agency, it is helpful to see what projects are going on. A dashboard would be helpful in that sense. (Deputy Commissioner, Local Government)

Managers should also seek a balance between satisfying the multitude of new BID rules and leaving room for contract managers to use professional judgment. This reinforces our previous point about the need to boost procurement and contract expertise, especially at the state and local levels. Our informants suggest that contracts should include flexible control mechanisms allowing parties to respond to changing conditions. Utilizing an IDIQ contract, for example, let agencies establish competitively bid prices upfront and procure multiple projects over a specific period. This eliminates the need to repeat the bidding procedure for every project and shortens the procurement process. Thus, managers should closely evaluate the type of contract for each project and resort to demanding types, such as DBB, only when necessary.

## SUSTAINABILITY

The BID strengthens governments' purchasing power. Being the most prominent buyer on the market, the government can use its purchasing power to create demand for sustainable production of goods and services. Although not perfect, government quasi-markets—like all markets—respond to demand and do so efficiently. In this sense, agencies

could use the nature of markets to generate demand for products that minimize the negative imprint on the environment and improve social equity (Hafsa et al., 2021). Using purchasing and contracting to achieve social and environmental policy goals is known as sustainable public procurement (Alkadry et al., 2019). Examples include quotas for small businesses and companies owned by women and minorities and requirements to buy local and ensure socially responsible supply chains.

Given the BID's massive financial boost and local sourcing requirements, there is a critical opportunity to repurpose government procurement to create market demand for sustainability (Fiorino, 2010). Less complex project delivery methods can also aid in achieving such objectives. They can stimulate participation from local small businesses and let government organizations meet, track, and exceed their inclusion targets.

## CONCLUDING REMARKS

Infrastructure works worldwide are notorious for their staggering inefficiencies. The McKinsey Global Institute (2017) has estimated over \$270 billion in losses globally due to construction inefficiencies during the last 5 years. With the recently passed BID, millions of dollars are at stake for US public agencies (Statista, n.d.), putting their procurement systems under great scrutiny. Based on quantitative and qualitative data from the field, this viewpoint identified two types of deficiencies faced by current procurement systems—organization-wide and construction-specific. We offer recommendations to aid policymakers and public managers in mitigating these deficiencies and recalibrating the procurement process for the construction industry. Specifically, our potential solutions center around four pillars—collaboration, training, flexibility, and sustainability. If correctly managed, the influx of funds through the BID can be a game-changer for the US economy after the COVID slowdown and can lead to job creation, better project delivery quality, growth in rural communities, and diffusion of new technologies.

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to fund market research on construction project delivery method challenges and opportunities.

## ENDNOTES

- <sup>1</sup> State procurement offices in Iowa, Maryland, Minnesota, New Mexico, South Carolina, Vermont, Washington, and West Virginia govern contracting decisions for building construction only; in DC for highway construction only; and in Hawaii, Illinois, New Hampshire, and Rhode Island for both building and highway construction (NASPO Survey of State Procurement Practices (NASPO, 2018).
- <sup>2</sup> Smith and Meier (1995) and Lowery (1998) draw on education vouchers to show how the government's preference for quality education gets replaced by consumers' preference for religious services and racial segregation.
- <sup>3</sup> A public-private partnership (PPP) can be considered an innovative project delivery model that builds upon the strengths of the design-build delivery (DBB) method. In this sense, PPP is a particular case of DBB.

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## APPENDIX A

### Survey Data Collection and Sample Characteristics

We designed and administered the survey from May to September 2021 to assess the current challenges public procurement systems face in contracting construction projects. The questions are informed by the extant literature at the intersection of supply chain management, construction management, and public administration. The questionnaire was pre-tested with 12 senior procurement officers before being distributed. Based on the feedback, we refined the survey items. Our target population

was public officers tasked with procuring construction projects. Thus, study participants were not necessarily familiar with the potential implications of the BID or its technical aspects. While still not passed at the time of the survey, the BID was already in the works and actively debated in the news media. To reach more organizations, we distributed the survey through the professional networks of two organizations—NIGP: The Institute for Public Procurement and Gordian. The study was sent to about 5000 respondents, 612 initiated responses, and 362 completed the survey (a response rate of about 7%). Table A1 reports the respondent characteristics.

**TABLE A1** Characteristics of surveyed construction procurement officials

Years in the position			Public organization type			Total procurement employees		
<b>1–5 years</b>	<b>80</b>	<b>22.1%</b>	<b>Local government</b>	<b>158</b>	<b>43.7%</b>	<b>&lt; 3</b>	<b>63</b>	<b>17.40%</b>
6–10 years	126	34.8%	State government	49	13.5%	3–5	85	23.5%
11–15 years	49	13.5%	Education institution	46	12.7%	6–10	71	19.6%
>15 years	107	29.6%	Healthcare provider	75	20.7%	11–20	51	14.1%
			Other public entity	34	9.4%	>20	92	25.4%

APPENDIX B

Semi-Structured Interviews

We conducted semi-structured interviews with 30 senior public officers tasked with construction procurement in their organizations. The sample included directors (e.g., Planning and Development, Parks and Recreation, Public Works, Maintenance and Construction, and Public Services), facility managers, and purchasing managers. The interview questions inquired about (1) the

characteristics of the construction procurement process, (2) the main issues and challenges that procurement officers face, (3) the project delivery methods used, and (4) suggestions for improving construction procurement. The interview data were analyzed using an inductive approach—specific challenges discussed by the interviewees were grouped under broader issues and categorized as either organization-wide or construction-specific procurement system deficiencies. Table B1 contains the coding scheme and exemplary quotes.

TABLE B1 Exemplary quotes for the themes emerged during the interviews with public officers

Deficiencies	Issues	Challenges (exemplary quotes)
Organizational deficiencies	Managerial issues	<p>Late involvement of procurement in the project definition: <i>“Procurement is brought in very late in the game, [when] decisions are already made and are underway. Sometimes we identify an alternative, but it is too late.”</i></p> <p>Lack of planning: <i>“Our biggest headache [is] the lack of planning and the demand for a quick turnaround on [project] jobs”</i></p> <p>Lack of procedure standardization: <i>“We need to streamline the procurement workflow in government—too many layers of bureaucracy and too many hands touch the same document; enhancements to a software dashboard would be great.”</i></p> <p><i>“There’s no standardization, to look up stuff in there”</i></p> <p>Staff shortages: <i>“Estimating is the heart. The accuracy estimation rate is 7%! We also have a big labor crisis, we do not have enough people to do the job.”</i></p> <p><i>“Our procurement office is 1.5 FTE, and it is overseen by the CFO. We have a \$300 million operating budget all run by a single person—this is a severe understaffing.”</i></p>
	Knowledge issues	<p>Lack of knowledge on financial and cost aspects: <i>“They [procurement] struggle with price accuracy. They do not know what something should cost so rely on the contractors.”</i></p> <p><i>“I have some spreadsheets for estimating unit costs, but it is a struggle. There have been changes in the last 12 months with COVID. I try to do my best with small projects, but for larger projects, I really need more people able to do a scope review (...) it really falls under me, but I do not have the capability to oversee it in a reliable way.”</i></p> <p>Lack of supply market knowledge: <i>“I do not think there’s any training availability. The (name of a program), all they tell you is the rote legal laws. (Name of another program), that’s a private group you can join, they fail at dispersing knowledge. Other than that, there is nothing. Small municipalities need real-world training. There’s no one doing that or teaching anyone. You can follow this manual to a tee, and it will not help you [to find the best supplier]. There are tips and tricks everyone could benefit from, in any state.”</i></p> <p>Lack of expertise in bid evaluation: <i>“We would love more expertise. None of us are experts. When I hit the light switch, I do not care how it works, I just want it to turn on.”</i></p>
Construction procurement process deficiencies	Project delivery method issues	<p>Complexities of the construction procurement process: <i>“We do not have a county government, so the state has a contracting portal where all the cities/towns can all post their bids and arrange it that way...it makes everything more complicated. We never know who’s going to show up and takes a lot to validate contractors...the lowest bidder is not always the most responsible bidder...I have seen projects done where the product is not what we really wanted because of the lowest bidder [we picked].”</i></p> <p><i>“The process itself is complicated when you get to larger projects, having to bid out for a month and a half. The other part is the process within the town, there are a number of approvals we need to get. It makes it pretty cumbersome. Sometimes it makes it tougher when you have to get all the documents scanned and signed.”</i></p> <p>Lack of time to execute activities appropriately: <i>“We are always in rush. It takes a long time to get a quote. We need prices and proposals sooner, so we can have more time to analyze them.”</i></p>

(Continues)

TABLE B 1 (Continued)

Deficiencies	Issues	Challenges (exemplary quotes)
	Supplier evaluation issues	<p>“We cross check bids across each other. We try to make sure we spell out exactly what we are looking for. We make sure the warranties cover what we need. We have created estimates on our own based on previous projects. We sometimes go to cost databases to get pricing.”</p> <p>Resistance to adopt alternative delivery methods:</p> <p>“If they [procurement] can use other tools outside of DBB this would be a game-changer. It would improve their process to get the same benefits as a developer.”</p> <p>“Just lack of experience with it [other project delivery methods]. We’ve done things a certain way for a long time, and it’s worked. We probably would need a lot better understanding of how it works and the benefits in order to get on board.”</p> <p>Unreliable tenders:</p> <p>“We’ve done a lot of bids, so we understand how it works. My concern with complex projects is more about getting competitive prices, not that I do not trust my contractors’ ability to develop a scope. We do an in-house estimate based on bids from the past three years. So, we usually get bids around what we estimate, but is it fair? We do not know.”</p> <p>Difficulties in finding the right suppliers/receiving competitive offers:</p> <p>“We are not able to design competitive processes. Sometimes we only get one bid. Not having enough participation from contractors. Once you have one contractor doing most of your stuff, contractors are less interested [to give you the best performance]. Restrictions from grant and loan requirements do not help.”</p> <p>“We do not find enough contractors to bid on a project”</p> <p>“There is a lack of people submitting their bids. Especially since COVID, it has been harder to get them. Contractors have crew shortages.”</p> <p>Award contracts “uncompetitively”:</p> <p>“We do all of our procurement ourselves; we do not have separate agencies...It is hard to get competitive prices and multiple bidders at a competitive rate.”</p> <p>“Sometimes you get a good price, sometimes it works out in your favor (like an auction) but other times it’s the flipside. They [the suppliers] know how it works and who is not going to go after the biz so they gouge you on price. The laws are designed to protect against fraud.”</p> <p>“Not getting competitive process [...]. Sometimes we only get one bid. We do not have enough participation from contractors. Once you have one contractor doing most of your stuff contractors are less interested.” [in bidding]</p>