

Enabling Mechanisms for Development of Highway Public-Private-Partnership Projects in the United States

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Involvement of the private sector in financing highway projects in the form of public-private partnerships (P3s) is subject to various limitations and challenges that affect state departments of transportation (DOTs) P3 project planning and development, and limit the expansion of the US highway P3 market. Public and private sector stakeholders need to have a better understanding of opportunities for improvement that can contribute to the US highway P3 market growth and promote excellence in P3 project planning and development. The main objective of this study is to identify and explore opportunities that can help state DOTs facilitate transportation planning and financial structuring of highway P3s. Following interviews with sixteen P3 industry experts, we categorize the enabling solutions and recommendations for development of highway P3s into: (1) Enabling financial mechanisms; and (2) Management and organizational recommendations. The recommended enabling mechanisms are then analyzed in detail. Results indicate that P3 developers and contractors can significantly benefit from financial flexibility offered by accounts receivable purchase agreements. Asset-based financing and securitization offers state DOTs financial flexibility and utilizes local interest in P3 projects. Further, state DOTs can also establish mature and transparent P3 programs in order to attract interested investors and promote the partnership culture between the public and private stakeholders. Finally, it is recommended that state DOTs pursue development and procurement of P3 project portfolios to reduce transaction costs and promote competition.

Keywords: Public-Private Partnerships, Project Finance, Highway Projects, Departments of Transportation, Innovative Project Delivery Systems

Introduction

The maintenance and expansion of the aging US transportation infrastructure, an essential component of the economy, faces significant funding and financing challenges. According to the report card for America's infrastructure, investments between 2008 to 2028 in the nation's highways need to rise \$80 billion annually and reach an estimated \$170 billion dollars (ASCE 2014). In this time of crisis, involvement of private sector in financing highway projects in the form of public-private partnerships (P3s) helps state DOTs bridge funding gaps, leverage financial resources, and expedite delivery of projects (NSTIFC 2009). The federal highway administration (FHWA) has established the office of "innovative program delivery" (IPD) in order to promote excellence in project finance and delivery, and encourage state DOTs to better utilize P3s and project finance methods for highway projects. However, several state DOTs are still at experimental stages of using P3s and only a few have developed mature P3 programs. Since 1989, 56 highway P3 projects worth \$46 billion were developed in the US that involved some type of private financing (PWF 2014).

The P3 project planning and development process is subject to various limitations and challenges. State DOTs face a myriad of issues, such as project financing challenges, negative public perceptions and local opposition, and political instability (Mallet 2008). These challenges adversely affect state DOTs' P3 project planning and development practice and limit the expansion of the US P3 market. Both the public and private sector stakeholders need to have a better understanding of opportunities for improvement that can contribute to the US P3 market

growth and promote excellence in P3 project planning and development. As it pertains to enabling mechanisms for development of highway P3s, Garvin (2010) notes that in order for the US to become a major P3 market, public agencies need to thoughtfully develop P3 projects and bridge the knowledge gap with the international community. Angelides and Xenidis (2009) find that raising adequate institutional funds, dependable project revenue streams and proper government guarantees provide safety for private investors, and therefore support new generation of P3s. DeCorla-Souza et al. (2013) highlight the significance of proper financial structuring, financial risk sharing, and compensation mechanisms in successful P3 project planning. Monk et al. (2012) recommend that project planning for highway P3s in the US can benefit from flexibility in NEPA studies and permitting. Further, they highlight the role of the private sector in financial structuring of P3 and developing innovative alternatives for P3 projects. A study of P3s in US transportation by Papajohn et al. (2011) finds that legal authority and flexibility, transparency with the public, and finding an appropriate balance of risk and reward can boost the US P3 market. Finally, a synthesis of public sector decision-making for P3s conducted by Buxbaum and Ortiz (2009) reports that while a framework or process for P3 investment valuation and procurement contributes to P3 project development, public concerns and misperceptions can negatively affect P3 projects.

Considering the necessity for investments in the US transportation infrastructure and major challenges of P3 project development, there is a need for a study to identify and explore enabling mechanisms for development of highway P3s. Hence, the main objective of this study is to identify and explore opportunities that can help state DOTs facilitate transportation planning and financial structuring of highway P3s. The recommended opportunities for improvement are categorized as follows: (1) Enabling financial mechanisms; and (2) Management and organization recommendations. These opportunities were identified and validated through an interview with 16 industry experts in the US. We then study the relevant literature and provide in-depth discussions for the proposed opportunities. The next section explains the methodology used to develop interviews and conduct this research. The interview results and analysis are described under two subsequent sections before conclusions are presented in the last section.

Research Methodology

The interview research method was employed in this study to gain insight from practitioners on the state-of-practice with respect to highway P3s. Further, the interviews enabled us to engage the interviewees in active conversation and document intriguing arguments on various aspects of project finance in the US, specifically major challenges and enabling mechanisms. The interview questionnaire was designed considering critical issues, such as the decision-making process for P3 project development, the major challenges of P3 project development, the opportunities to improve the current state-of-practice, and next generation of highway P3s in the US. Examples of questions that were asked include the following:

- Briefly describe the P3 decision-making process in your organization.
 - Private sector: Describe strategic decision-making and proposal development
 - Public sector: Describe project planning, procurement, and development process
- What are the major challenges to highway P3 project development in the US?
- What opportunities are available that can help both the public and private sector improve the current state-of-practice?
- What are the major components of the next generation of P3s in the US?

A total of 20 structured interviews (19 phone and 1 in person) were conducted that involved P3 experts from the following organizations: State DOTs, development companies, investment banks, financial consultants, legal consultants, and think tanks. During the one-hour interviews, every attempt was made to avoid diversions on the research objectives. The results of the interview findings were then presented to a panel of 5 P3 experts to further validate the study findings. We categorize the enabling solutions and recommendations for development of highway P3 projects into the following two groups: (1) Enabling financial mechanisms; and (2) Management and organizational recommendations. Substantial evidence from the literature is provided on how these mechanism and/or recommendations have the potential to enhance development of highway P3 projects.

Enabling Financial Mechanisms for Development of P3 Projects

Accounts Receivable Purchase Agreements

Accounts receivable purchase agreement or factoring is a globally accepted method of raising capital for short-term financing needs. Factoring involves selling a firm's accounts receivable along with the collection risks to a financial institution (i.e. bank), also known as the factor, at a discount or for a prescribed fee plus interest (Chen and Chen 2012). Accounts receivable financing on the other hand, involves raising debt using the accounts receivable as the collateral. One upper level executive stated: "the ability to sell receivables or construction invoices (accounts receivable purchase agreements) by the developer/contractor increases cash availability and ensures that bank's credit facilities are not counted as debt on the developer/contractor balance sheets". With approximately \$10 trillion worth of accounts receivable on financial statements of US companies, factoring is employed by several industries, such as retail, manufacturing, and production (Katz 2011). For instance, Moussawi-Haidar et al. (2014) find that engaging into supplier-retailer trade credit coordination results in a win-win situation to all parties involved in the retail supply chain. Buzacott and Zhang (2004) study the effects of factoring on operations decisions. They find that banks experience less risk with factoring, while retailers enjoy higher returns compared to when they use their own capital. However, the construction industry has not yet employed factoring for accounts receivable or invoices of major highway construction contracts (Chen and Chen 2012).

Factoring of construction invoices requires flawless coordination between the agency, the factor (i.e. bank or other financial institution), and the private entity (i.e. the project developer) for the benefit of the project regardless of the factor's recourse rights against the developer/contractor or the agency. Expedited cash reimbursements permit the contractor to compensate subcontractors and maintain strong balance sheet. The bank in return may provide the developer, and in some instances the involved subcontractors with loan discounts. Factoring of construction invoices are dependent upon approval of the agency, which are subject to quality assurance/quality control and independent verification of the quality of the delivered work items. If approved, the contractor can then seek immediate cash reimbursements from the bank. Figure 1 presents the structure of a P3 agreement that allows factoring of invoices. A financial structure that resembles factoring was used on the "Texas SH 183 Managed Lanes" project. The comprehensive development agreement issued by Texas DOT includes a deferred design and construction cost component (worth \$200 million) that can be sold to credited financial institutions under a factoring agreement (TxDOT 2014).

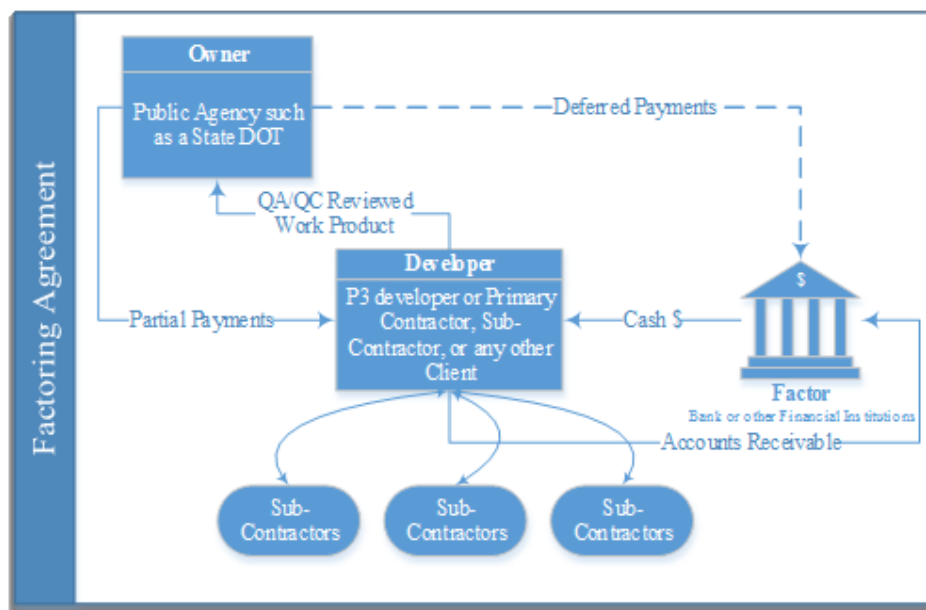


Figure 1: Structure of a P3 contract with ARP agreement.

Asset-Based Financing and Securitization

Asset-based financing and securitization methods involve raising funds either through a financial institution or in the bond market using the future project revenues (Fabozzi and Nahlik 2012). These funds (i.e. bond proceeds or loans) are considered debt and limit the issuing entity's (i.e. either the state or the project company) debt capacity. In design-build-finance agreements where projects do not have a source of revenue, such as tolls or availability payments, asset-based financing or securitization may seem inappropriate. However, using the deferred payment mechanism and through a conduit bond issuer, state DOTs can pledge bond repayments and deliver projects using proceeds from municipal bonds. The proceeds of these bonds are used by the developer in a non-debt form and appear neither on the balance sheet of the project company nor the state DOT. Repayment of these bonds are backed by future state funding (using deferred payment mechanism) and they are considered rather low risk.

Perhaps because of the limited effectiveness of this method in moving debt off the balance sheet, it is not a significant feature of the P3 market (Yescombe 2007). Lim et al (2005) find that despite the limited debt disclosure, bond yields in the market reflect off balance sheet obligations of the project company. One interviewee mentioned that "the US bond rating agencies and investment banking needs to be familiarized with asset-based financing mechanisms". The Florida DOT (FDOT) in collaboration with a local public entity (i.e. Florida Municipal Loan Council) utilized a similar financing structure on two design-build-finance contracts, the SR 9B project and I-95 (from SR 406 to SR 44) improvements (FDOT 2014). The financing portion of the design-build-finance agreement involved using the proceeds of bonds issued by a local public entity (i.e. conduit bond issuer) for design and construction costs without recourse against the joint ventures. The Florida DOT retained the payment responsibility for the bonds, while the proceeds were kept off the balance sheet of both the joint ventures and the state DOT. However, the major drawback of this approach is the lack of flexibility in project prioritization in future years due to debt-like obligations of the state DOT.

Management and Organizational Recommendations for Development of P3 Projects

P3 Program Organization and Transparent Project Planning

Nine of the interviewees (60%) stated that the conventional long-range statewide transportation planning process and development of state transportation improvement programs in state DOTs lacks proper alignment with basic P3 project development needs. The interviewees noted that transparency at the planning and budgeting phase can contribute to market predictability for the private sector. For instance, Virginia DOT's (VDOT) has established an office dedicated to P3 projects (PPTA) primarily concerned with prioritization, selection, development, and procurement of P3 projects. Similarly, TxDOT has established the strategic projects division dedicated to procurement of P3 projects under comprehensive development agreements (CDAs). The statutes in Texas identify a list of projects that are suitable for CDAs and require technical and budgetary reviews prior to project selection. While VDOT has a centralized approach to P3 project delivery, TxDOT has decided to proceed with a project-oriented CDA process. Both state DOTs have configured their planning process for P3 projects and have evolved to become the best practices of P3 project delivery. DeCorla-Souza (2013) finds that transparency should be maintained beyond the decision-making and procurement phases, particularly during the operation phase. Examples of P3s that include public disclosure agreements with respect to finances and performance are the "Indiana Toll Road" and "SR-125" in California (DeCorla-Souza 2013). One of the interviewees highlighted the importance of state DOTs' P3 program maturity and transparency in sending the proper signals for investors that P3 projects are real. Finally, 10 of the interviewees (67%) mentioned that risks associated with tenure and stability of elected officials and political will of the authorities can undermine planning efforts and send negative signal to investors.

Development and Procurement of Project Portfolios

Procurement of P3 projects, especially mega projects, involves significant legal and contractual challenges as well as high transaction costs. Salino and de Santos (2009) conducted a study on

transportation P3 projects and find that the project procurement procedure imposes significant transactions costs to both the public and private sectors. An early study by Dudkin and Vällilä (2005) concludes that the average P3 transaction costs for highway projects during the procurement is around 3% of the project value. Considering hurdles associated with legal and financial structuring of P3 projects and their transaction costs, investors and developers attempt to recover those costs during the project's life cycle. Seven of the interviewees (47%) stated: *"procurement of smaller P3 projects (typically less than \$200 million), where several contract parties are involved and transaction costs are high, neither improves the competition nor is economically feasible."* The major challenge is the issue of project size and recoverable transaction costs for bidders. Considering hurdles associated with legal and financial structuring of P3 projects and their transaction costs, investors and developers attempt to recover those costs during the project's life cycle. The interviewees recommended bundling of small projects into a P3 project portfolio to distribute the transaction costs of individual projects. Bundling projects into a program, results in significant transaction cost savings for the bidders and procurement costs for the state DOT, which has been previously experimented by the Missouri DOT's "Safe and Sound Program" to replace 800 bridges (FHWA 2014). Finally, a P3 project portfolio encourages competition and generates interest in the P3 market that can result in significant cost savings for the state DOT. The Pennsylvania DOT (PennDOT) decided to utilize private financing resources and accelerated bridge construction for replacement of 614 structurally deficient bridges through a P3 project portfolio as part of the "Rapid Bridge Replacement Project" designed to address over 4000 bridges in the state (Barnes and Cho 2014). The P3 contract involves an availability payment agreement to design, construct, finance and maintain the bridges at a prescribed level of performance and condition for 25-35 years (PennDOT 2014).

Conclusions

It is anticipated that private sector involvement in financing highway projects will continue to grow in the future. However, as the P3 market becomes increasingly competitive, state DOTs need to educate their employees, alleviate political instability, and facilitate planning and programming for the next generation of P3s. The interviews indicated that while several state DOTs are still experimenting with P3, some state DOTs, such as California, Florida, Texas, and Virginia, have established mature P3 programs for delivery of highway projects. In fact involvement of mature P3 programs in these state DOTs has expanded beyond the procurement phase and includes project selection, TIP/STIP planning, traffic and revenue studies, and financial structuring of P3 projects.

Interestingly, it was recognized that the challenges and limitations of P3 project development are common among the participants of the highway P3 market. There is great variation among state DOTs that results in autonomous P3 practice across the states. Further, political instability or lack of political commitment has resulted in canceling several highway P3 projects in the recent years. Finally, pushing down the funding and financing challenges to developers and contractors is likely to increase financial risks of P3 projects. These challenges, as highlighted by the interviewees, are a major source of risk for private sector participants and can discourage investors and competitors from involvement in high risk and turbulent markets (i.e. states with turbulent market conditions or politically instable) in favor of more developed markets (i.e. states with mature P3 programs). Table 1 presents a summary of the recommended enabling mechanisms based on the interview results.

Table 1
Recommended enabling mechanisms for development of highway P3s

Enabling Mechanisms	Mechanism Description Based on the Interview Results
Accounts Receivable Purchase Agreements	<ul style="list-style-type: none"> ➤ Factoring construction invoices as a solution to enhance the flexibility of the project team's balance sheet ➤ Not binding the schedule of payments and the repayment of certified accounts receivables to the final completion of the project (i.e., fixed schedule of repayment) ➤ Creating deferred payment certificates that are not subject to set-off or recourse against the contractor
Asset-Based Financing and Securitization	<ul style="list-style-type: none"> ➤ Using conduit bond issuing entities, such as counties, cities, or other local entities, to issue Private Activity Bonds (PABs) for project financing ➤ Executing contracts directly with state DOTs with repayment obligations subject to appropriation
P3 Program Organization and Transparent Project Planning	<ul style="list-style-type: none"> ➤ Incorporating alternative funding sources and innovative financing mechanisms consideration in the development of the TIP and the STIP ➤ Utilizing private sector expertise in project planning and NEPA studies ➤ Establishing a dedicated group or program for projects that involve private financing with adequate organizational resources ➤ Delegating authority to the dedicated private financing program
Development and Procurement of Project Portfolios	<ul style="list-style-type: none"> ➤ Bundling smaller projects to reduce the transaction costs and make private financing a more attractive alternative for the portfolio of the projects

This study provides relevant literature on several opportunities that were identified and explored following an interview with P3 industry experts. It is concluded that establishing a mature and transparent P3 program along with project portfolio development can enhance P3 program organization and project development, especially in states DOTs that are inexperienced with P3s. Further, additional opportunities in the area of financial structuring are recommend that can be utilized as enabling mechanisms for development of P3 projects. Further, state DOTs can use accounts receivable purchase agreements in order to attract local developers and contractors to smaller P3 projects in the (\$100 to \$200 million range). State DOTs can also enhance the P3 market in their states and deliver critical projects by involving regional entities in asset-based financing and securitization. The opportunities identified in this study are expected to contribute to the next generation of highway P3 projects in the US.

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