Revitalizing Pennsylvania's infrastructure: local public-private partnerships as the key to bridging the gap with a case study for local public-private transportation partnerships

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ABSTRACT

Pennsylvania's aging transportation infrastructure has long been a cause for concern, with bridges, highways, and other vital components approaching the end of their serviceable lifespans. The state's infrastructure, one of the nation's oldest, is in dire need of repair and replacement, particularly in the case of bridges, many of which are over 50 years old and in poor condition. However, the financial investment required for this task is substantial, posing challenges within the state's budget constraints. To address this infrastructure crisis, an amendment to Pennsylvania's existing legislation, Act 88, is proposed. This amendment would permit local governments to engage in Public-Private Transportation Partnerships (P3s), leveraging private sector financial resources and expertise. Such partnerships could provide solutions to budgetary and funding challenges, particularly in the context of locally owned bridge repair and replacement projects. The selected cases are evaluated against various performance criteria, such as value, pricing, budgeting, public accountability, regulatory control, and capacity, offering a comprehensive assessment of the potential benefits of local government participation in P3 transportation projects.

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Introduction

Pennsylvania stands at a critical juncture, facing the dual issues of crumbling transportation infrastructure and untapped opportunities. The state's roads, bridges, and vital infrastructure are deteriorating rapidly, outpacing available funds for repairs and replacements. Neglecting this problem could lead to vehicle damage, lengthy detours, delays, increased user fees, accidents, and even fatalities. On the other hand, there's a viable solution. Pennsylvania can amend the existing legislation, Act 88, to empower local governments to access much-needed funding through Public-Private Transportation Partnerships (P3s). This amendment would expand P3 collaboration beyond the Department of Transportation, allowing local governments to engage in P3 contracts with private partners. This strategic shift holds the potential to address local transportation infrastructure deficiencies swiftly, sharing project risks, and ensuring more efficient, cost-effective repairs.

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By amending Act 88, Pennsylvania can extend the use of P3s to local governments, enabling them to secure timely and sufficient transportation infrastructure funding. This decision marks a pivotal moment for state and local stakeholders to harness the effectiveness of Public-Private Transportation Partnerships and overcome their funding challenges.

Pennsylvania faces a pressing infrastructure issue, notably with its bridges and rural roads. With lackluster grades of 'C-' for infrastructure and 'D+', the need for action is evident (American Society of Civil Engineers, 2022). The American Road & Transportation Builders Association reports that Pennsylvania has the second-highest number of structurally deficient bridges in the country. Out of 23,166 bridges in the state, 3,198 require immediate repair, reflecting 13.8% of all bridges. Local municipalities own 6,487 of these bridges, with 47% of them classified as structurally deficient or functionally obsolete (American Road & Transportation Builders Association, 2023). Current legislation limiting Public-Private Partnerships (P3s) to PennDOT-owned entities hampers funding efforts for these bridges.

Neglected repairs can lead to catastrophic consequences, exemplified by the collapse of the Forbes Avenue bridge in Pittsburgh. Budget constraints resulted in the postponement of necessary maintenance, leading to the bridge's collapse, injuries, and the monumental task of rebuilding. Pennsylvania's bridge crisis isn't just an inconvenience; it poses severe safety risks and demands legislative changes and funding solutions” (Thomas, 2022).

Pennsylvania's transportation infrastructure problem is only exacerbated by its unmet funding needs. The Commonwealth's Transportation Revenue Options Commission estimated it will cost $3.9 billion annually to repair all the locally owned and structurally deficient bridges (Vigina, 2022). This cost is expected to increase if repairs continue to go overlooked and bridge deficiencies increase. Additionally, local municipalities have few funding options to address these growing concerns. Thus, there is often an overreliance on federal programs like the Surface Transportation Block Grant Program (STBG), Bridges of the Federal-Aid System Program (BOF), and the IIJA Bridge Investment Program (Vigina, 2022). Locales may also implement user fees like tolls to recoup monies spent on repairs. However, this is generally not well received by the community. Finally, locales may rely on State or local municipality funds for repairs. However, State funding through PennDOT is often limited when federal funds have been secured (Vigina, 2022). Thus, locales’ resource scarcity constrains the need to repair structurally deficient bridges.

Pennsylvania confronts a dire transportation infrastructure crisis, ranking among the nation's worst (American Road & Transportation Builders Association, 2023). To combat this pressing challenge, while addressing associated funding issues, local government Transportation P3s offer a ray of hope. However, a substantial roadblock exists in the form of Act 88 of 2012, a Pennsylvania law that currently hinders local government participation (Pennsylvania Department of Transportation, 2013).

This restriction looms large, considering that P3s offer a vital avenue for resource-constrained public entities to tap into private sector support. These partnerships encompass shared financial responsibilities, with private partners negotiating risk premiums for their involvement. Their roles can span maintenance, operation, financing, and the development of new facilities. When executed effectively, P3s expedite large capital projects while mitigating risk for the state or local municipalities. To chart a course beyond this predicament, amending Act 88 of 2012 emerges as a potential solution. This research delves into the benefits and implications of such an amendment, enabling Pennsylvania’s localities to partake in P3 partnerships for the swift repair of structurally deficient bridges and roads. Additionally, by drawing insights from best practices in other states’ transportation P3s, this study evaluates the potential advantages and policy challenges associated with adopting such an amendment in Pennsylvania.

**Literature Review**

This comprehensive review offers a multifaceted examination of Public-Private Partnerships (P3s), encompassing their landscape, legislation, economics, and political dimensions. Legislative aspects, crucial for encouraging or constraining private sector investments in P3s, come to the forefront. In the context of Pennsylvania, Act 88 of 2012 stands as an obstacle, limiting local government participation and necessitating legislative adjustments. Additionally, the aging infrastructure, particularly infrastructure dating back to the 1950s, presents a significant challenge, affecting transportation and, by extension, the state's economy. Furthermore, the intersection of public agencies and private partners within P3s introduces complex political dynamics. These political intricacies are pivotal in steering successful projects. These insights collectively establish a robust foundation for a more profound exploration of P3 projects and inform the analytical framework that follows, offering a cohesive perspective on the multifaceted world of P3s.

**Legislative**

Geddes and Wagner's work emphasizes the importance of P3s legislation while also examining its potential to generate societal benefits versus serving as a government solution to financial constraints, particularly in reducing government debt. Although their article dates back to 2012, it remains relevant to Pennsylvania's experience, highlighting the impact of excluding local governments from P3s and its effects on private investments in the state. Furthermore, in a comprehensive study spanning two decades from 1996 to 2016, Martin identifies connections between P3s legislative policies, procurement regulations, and project terminations. However, the study lacks control variables, potentially overlooking other influencing factors.

Meanwhile, Meletiadis' comparative analysis between the United Kingdom and the United States sheds light on distinct P3 implementation mechanisms, including legislative authorizations, project duration, and executive reporting duties, with practical
examples from P3 projects. While a direct comparison between the two nations may be complicated due to differing political systems, this research underscores the importance of studying both to enhance P3 legislation in Pennsylvania. Collectively, these insights contribute to the ongoing discussion on P3s legislation and its implications for Pennsylvania, emphasizing the potential benefits of amending Act 88 of 2012 to accommodate local governments and address the state’s infrastructure and financial challenges more effectively.

Economic

The aging infrastructure from the 1950s in Pennsylvania poses a significant economic threat, exacerbated by budget constraints. In this context, Garvin's (2010) study is pivotal as it sheds light on the slow growth of Public-Private Partnerships (P3s) in the United States, examining their economic and political implications. Garvin's work offers a global perspective on P3 projects, emphasizing the alignment of these projects with public interests and the attraction of private sector participation. Levy's (2011) research underscores the importance of private sector involvement in P3s to address funding shortages. While Levy's book provides valuable insights into P3 best practices in the United States, it's important to consider that it was published in 2011 and may require updates.

Together, these studies contribute significantly to the P3s discourse in Pennsylvania, highlighting the need for a robust framework that addresses infrastructure and financial challenges, safeguards public interests, and fosters private-sector engagement.

Legislative/Economic

Iseki, Eckert, Uchida, Dunn, and Taylor's (2009) analysis of U.S. P3 legislation and state laws provides valuable insights into the legal framework of P3 projects. Their work categorizes state legislation into essential areas, shedding light on the complex legal regulations governing P3s. This study is a crucial resource for understanding the legal aspects of P3 ventures. The study's relevance extends to the challenges posed by federal and state regulations, highlighting the intricate legal landscape surrounding P3 projects. Pennsylvania's experience with limitations imposed by P3 statutes is a critical point of consideration. Although the study predates Act 88 of 2012, it remains a fundamental reference for understanding the legislative intricacies of P3s, especially for Pennsylvania.

Economic/Political

Different from Iseki, Eckert, Uchida, Dunn, and Taylor's, Osei and Chan (2015) highlight crucial success factors in Public-Private Transportation Partnerships (P3s), including risk allocation, procurement transparency, and strong private consortiums. Despite some limitations, their insights are valuable for U.S. P3 adoption. Equally important, Reinhardt (2011) provides a comprehensive view of the history, structure, and challenges in U.S. transportation P3s, offering essential historical context and identifying potential project obstacles. Comparatively, Soomro and Zhang focus on P3 project failures, mainly in developing countries. While not directly applicable to the U.S., their study shares lessons from past failures and risk mitigation mechanisms for partnerships.

In summary, these studies enhance our understanding of P3s, offering guidance on best practices, history, challenges, and lessons learned. Despite limitations, they contribute to a holistic perspective on P3s and their potential in the U.S.

Landscape

Hakim, Clark, and Blackstone's 2022 review delves into Public-Private Transportation Partnerships (P3s), focusing on their significance in transportation, specifically concerning roads, bridges, and parking infrastructure. The review outlines the pros and cons of P3s and showcases global projects in Europe, India, Colombia, Mexico, and Spain. Additionally, it highlights the legal dimension of P3s, advocating for amendments to Act 88 of 2012 in Pennsylvania to involve local governments in addressing infrastructure issues. This revised legislation has the potential to transform private sector involvement in infrastructure revitalization, making it pivotal for transportation development. Overall, this extensive review provides a comprehensive understanding of P3s and serves as a foundation for further research and policy development in the domain of public-private transportation partnerships.

IA: An amendment to Act 88 of 2012 to enable P3 transportation projects for Pennsylvania local governments will help repair or replace structurally deficient bridges.

IB: An amendment to Act 88 of 2012 to enable P3 transportation projects for Pennsylvania local governments local municipalities will not help repair or replace structurally deficient bridges.

Methodology

This research aims to find solutions regarding the structural deficiency of Pennsylvanians' transportation infrastructure and the existing $2.2 funding gap that hinders the commencement of repairs. Thus, the research questions that are intended to be answered include:

In what ways will an amendment to Act 88 of 2012 support Pennsylvanian localities' ability to repair deteriorating bridges using P3s? And what enabling legislation best practices have other states used to overcome the current Pennsylvania Act 88's shortcomings?
Learning from other states' best practices and their policies for P3s is imperative to understand if such partnerships will attract investment from the private sector. In addition, it will further highlight any elements present in P3 policies that need to be amended for such projects to be successful.

As it stands, Act 88 of 2012 prevents localities from engaging in P3s in Pennsylvania; with this in mind, this research uses a Descriptive, Multi-Case (Cross-Case) analysis seeks to describe what an amendment to this law that allows local municipalities to enter into P3 transportation projections might do to help solve the budgetary and funding challenges that are present for needed locally owned bridge repairs and replacements. It will first analyze three P3S bridge projects from comparable municipalities in the U.S. The sample will be selected based on the multi-case study designs. Next, the cases potentially revealing the research questions will be chosen (Yin, 2018). Accordingly, this study will select three cases, and the unit analysis of this research is P3s for transportation infrastructure projects. These multi-case studies will then be evaluated against (5) criteria in a Descriptive Multi-Case Analysis to assess how successful or unsuccessful such projects were. This analysis will further illuminate the amount of risk involved with such partnerships. Some specific risk examples include the inability of the legal system or the market to handle private partner bankrupt P3s, the loss of administrative or regulatory control, or even the potential sizeable losses for commercial lenders and public agencies (Hakim et al., 2022). Therefore, the (5) criteria specified in our Descriptive Multi-Case Analysis will assist the study in incorporating best practices from each instance that will assess the vantage point from several cases to generate unbiased recommendations (Yin, 2018).

i. Full and fair value: the valuation of public assets is full and fair value for the use of the property (0= the valuation of assets does not represent a full or fair value, 5 = the valuation of assets does represent both a full and fair value)

ii. Reasonable pricing: private sector profit agreement is set within reason there is due burden to the public with unwarranted expenses, excessive fees, or high toll increases (0 = P3 contract sets unreasonably high-profit agreements for the private partner, 5= P3 contract sets low but fair profit agreements for the private partner)

iii. Responsible budgeting: the budget set has adopted financing rules that prevent a disproportionate shift of current capital costs onto future taxpayers (0= P3 contract allocates a high proportion of current capital costs onto future taxpayers, 5 = P3 contract ensures a low to zero proportion of current capital costs onto future taxpayers)

iv. Public accountability: public organization remains transparent and accountable to the public regarding the project's financials and future user fees the public will absorb (0= public organization does not maintain transparency with the public regarding the project's financials, 5 = public organization ensures full transparency and input from the public regarding the project's financials)

v. Administrative & Regulatory Control: public organization retains sufficient control over project to ensure the mission and values of the agency are not compromised (0= the private partner has full administrative control over the project, 5 = public organization has full administrative control over the project)

vi. Capacity: public organization retains sufficient support from political and legislative stakeholders to obtain an approval for the P3 project (0= public organization did not have support from political or legislative stakeholders, 5 = public organization maintained full support from all political and legislative stakeholders)

Each case will be evaluated based on each criterion and assigned a rank between 0 (the P3 project was unsuccessful in achieving this value) – 5 (the P3 project was exceedingly successful in achieving this value). This process will highlight best practices for such P3 projects from other comparable municipalities. Subsequently, following the selection of cases, the study seeks to forecast different results for anticipatable reasons (a theoretical application) and similar results (a literal replication). Since this study needs to address whether Pennsylvanian local government municipalities have the capacity to enter such partnerships, best practices from comparable municipalities need to be established; thus, examining case studies is the most appropriate research method. A case study is an empirical method that explores a contemporary phenomenon (the “case”) in detail and within its real-world setting (Yin, 2018). The more researchers attempt to describe contemporaneous circumstances (e.g., “how” or “why”) and demand an extended, in-depth explanation of some social phenomena that operate, the more significant case study methods will be (Yin, 2018). The descriptive multi-case analysis research method will be used to empirically rank case studies according to the above-mentioned criteria. Considering its significance, this multi-case study will compare (3) comparable municipalities. Afterward, directions for potential solutions are offered and discussed. Through this method, this study will assess the following hypotheses:

1A: An amendment to Act 88 of 2012 to enable P3 transportation projects for Pennsylvania local governments will help repair or replace structurally deficient bridges.

1B: An amendment to Act 88 of 2012 to enable P3 transportation projects for Pennsylvania local governments and local municipalities will not help repair or replace structurally deficient bridges.
Table 1: Analytical Framework

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Analytic Framework</th>
<th>Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic</td>
<td>How much funding is needed to address the deteriorating locally owned bridge problem?</td>
<td>Local municipal capital budgets and capital improvement plans</td>
</tr>
<tr>
<td></td>
<td>How much potential financing can be attained through P3s for local bridge projects?</td>
<td>State capital budgets and capital improvement plans.</td>
</tr>
<tr>
<td></td>
<td>What successful funding examples exist for other relevant cases in neighboring states?</td>
<td>Peer-reviewed journals.</td>
</tr>
<tr>
<td>Political</td>
<td>Which political parties or interest groups support an amendment to Act 88 of 2012?</td>
<td>Peer-reviewed journals.</td>
</tr>
<tr>
<td></td>
<td>Which political parties or interest groups generally support P3s?</td>
<td>News reports.</td>
</tr>
<tr>
<td></td>
<td>What public support exists for P3 for transportation projects?</td>
<td>News reports.</td>
</tr>
<tr>
<td>Landscape Analysis</td>
<td>Considering neighboring states, what successful examples of local P3 bridge projects exist?</td>
<td>City or local municipality plans</td>
</tr>
<tr>
<td></td>
<td>Considering neighboring states, what unsuccessful examples of local P3 bridge projects exist?</td>
<td>Peer-reviewed journals.</td>
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<tr>
<td></td>
<td>City or local municipality plans</td>
<td>News reports.</td>
</tr>
<tr>
<td>Bureaucracy</td>
<td>What changes to Act 88 of 2012 need to be made for this to be a feasible recommendation?</td>
<td>City or local municipality plans</td>
</tr>
<tr>
<td></td>
<td>Which stakeholders need to support an amendment for it to pass?</td>
<td>Peer-reviewed journals.</td>
</tr>
<tr>
<td></td>
<td>What stakeholders are responsible for implementation, oversight, and enforcement?</td>
<td>News reports.</td>
</tr>
</tbody>
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Source: Author 2023

Findings and Discussions

The following section details the analysis and findings of the descriptive multi-case analysis. This analysis consists of three P3 bridge replacement projects, including the Lesner Bridge in Virginia Beach, VA, Purdon Road Bridge in Nevada, CA, and the Sixth Street Viaduct in Los Angeles, CA. These cases were chosen as a purposive sample because they are each locally owned bridges and the replacement projects were fully funded by sources other than city funding. Each P3 was rated according to the following criteria: full and fair value, reasonable pricing, responsible budgeting, public accountability, administrative & regulatory control, and capacity. These ratings served to demonstrate the success or challenges with the bridge replacements, the local municipalities' ability to secure funding, their ability to remain transparent with their constituents, and enabling legislation or stakeholders that increased their capacity for completing the project successfully.

This analysis will demonstrate the potential success that local municipalities can have when engaging in P3 projects. These findings will further serve to make an appropriate recommendation for appropriate legislation in Pennsylvania that will support local governments in repairing or replacing structurally deficient locally owned bridges.

The Cases

The Lesner Bridge, City of Virginia Beach, VA Case

The reconstructed Lesner Bridge replaced the John A. Lesner Bridge, which was deemed structurally deficient and functionally outdated owing to its placement in a highly corrosive coastal climate and southern Virginia's population expansion (VDOT, 2013). The bridge substitute work has presented several challenges for the City of Virginia Beach, which include obtaining funding to complete the comprehensive work needed for the structure, working in such a highly corrosive coastal environment, and maintaining zero reduction in traffic volumes throughout the period of the bridge's building projects. To go forward in the construction planning process, the City had to work with the Federal Highway Administration and the Virginia Department of Transportation (VDOT) in the early stages of the project.

This P3 project scored (3) points for full and fair value since the project cost surpassed the budget; despite the price overrun, the project was completed as planned. The total project cost is anticipated to be 95 million USD, with 10.2 million spent on project design, 14.3 million on utilities, and 70.5 million on construction. Yet, the project costs 115 million dollars (Wojtowicz, 2015). Additionally, because the authority included the public in the planning process, this project achieved a (4) grade for public accountability. The community also participated in the National Environmental Policy Act (NEPA) process. Because of the public participation, the local community felt a strong feeling of ownership and pride in the project (Clark Nexsen, 2021). As a result, this initiative can serve as a model for community engagement.
The City of Virginia Beach was so determined to have the project up and running as soon as possible that it offered to pay for the engineering work (StackPath, 2019). On the other hand, the government failed to control the budget, which caused a cost overrun for this project. Additionally, the project's completion was delayed for about a year and a half; the project was finished on December 12, 2018, rather than the intended date of June 13, 2017. For that reason, this project scored points for administrative and regulatory control (Wojtowicz, 2015). Further, this project has a capacity rating of four, given that the Governor paid 80 million dollars to support it, and the City supported the project's initial design (10.2 million) (VDOT, 2013).

Additionally, this P3 project receives a (4) rating for reasonable pricing since no toll is imposed, and until now, the bridge has remained free. Despite the cost overrun (20 million) of this project (VDOT, 2013), for responsible budgeting, this project rated as a (4) rating because this project delivers significant benefits to the local community and the region as a whole, such as increased safety, capacity, economic development, and aesthetic value. Furthermore, the project increased emergency response, connection, transportation options, resilience, and traffic flow.

Ultimately, this initiative is successful since it benefits the community. The Virginia Department of Transportation (VDOT), the City of Virginia Beach, the Hampton Roads Transportation Accountability Commission (HRTAC), the Coastal Virginia Wildlife Observatory (CVWO), environmental agencies, residents, and businesses are all key players in this project. VDOT, as the lead agency, is in charge of managing the project's planning, design, and construction. HRTAC ensures the Lesser Bridge project aligns with the community's aims and objectives. Additionally, the CVWO and environmental organizations provide assistance on project design and implementation to ensure that the project is environmentally benign and causes as little harm to wildlife as possible. And Local people and businesses are also heavily involved in the project, providing feedback on project design and implementation and raising concerns about issues such as traffic, noise, and access to the beach and waterways. Although this project experienced a delay and cost overrun, overall, this project can be a good project for the design, environmental impact study, public involvement, economic impact on the community, and positive feedback from the community.

The Purdon Road Bridge, CA Case

The Purdon Road Bridge was built in 1945 to provide an adequate crossing for residents over Shady Creek. Although very successful in supporting Nevada county residents, decades of metal erosion and bridge fatigue have resulted in severely decayed trusses and an inability to maintain their original carrying capacity. That is, "the timber railing and rail posts [were] loose with sagging connecting points while the entire apparatus exhibit[ed] heavy distress, the inspection states. Many bolstering elements of the truss [were] bent, loose, or warped" (The Union, 2013). Further, the bridge sustained many functional and aesthetic challenges due to its location and lack of regular maintenance. Specifically, to maintain appropriate maintenance, the land surrounding the bridge needed to be sandblasted, and sufficient attention was required to ensure metal flakes from the bridge did not end up in Shady Creek. Thus, recent inspections demonstrated that "the bridge [had] exceeded its useful life and [did] not meet current County and Caltrans design standards for structural components and load carrying capacity. As a result, the bridge has been classified as "Structurally Deficient" and in need of replacement" (YubaNet, 2018).

Thus in 2016, the Nevada County Department of Public Works submitted its proposal to receive bridge replacement funding through the Federal Highway Bridge Program (HBP). After an inspection with Quincy Engineering, the project was estimated to cost $2.2 million, which was approved to be fully funded through HBP funds. Once approved for funding, the county sought private partners to complete the project's design and construction. Resultantly, "the County Board of Supervisors awarded a contract to Viking Construction on June 26, 2018, for a total construction cost of approximately 1.8 million dollars" (YubaNet, 2018).

This P3 receives a rating of (4) for full and fair value because the estimated project costs aligned with the actuated costs and original contract awards to Viking Construction. That is, the estimated construction costs were evaluated at $1.6 million (Quincy Engineering, 2016), and the contract awarded to Viking was not to exceed $1.8 million, indicating the property's full and fair value. Further, this P3 receives a rating of (4) for reasonable pricing because the original funding application included an 11.47% of toll credit; however, Purdon Road remains a free road for all consumers. Although toll credit "rewards states that spend their toll revenue on projects that would otherwise require federal-aid support" (Federal Highway Administration, 2019), Nevada County has yet to institute any tolls for the Purdon Road Bridge. Thus, the private partner will not receive unreasonably high profits from this project.

Moreover, this P3 project receives a rating of (3) for reasonable budgeting because of the 11.47% toll credit included in the funding application. Thus, there remains an expectation that future taxpayers may take on the burden of some project costs. This has yet to be instituted, so this burden's severity remains unknown. Further, this P3 project receives a rating of (2) for public accountability because although there was public support for this bridge replacement, there was misinformation shared about the project's potential costs. In 2013, during a rehabilitation effort for Purdon Road Bridge, the Chairman of the Board of Supervisors and other elected officials publicly debated a replacement effort for the bridge and shared that the project would cost over $5 million (The Union, 2013). "Chairman of the Board of Supervisors Hank Weston said Purdon Bridge is old and the county has considered an outright replacement, but the project has repeatedly proved cost prohibitive" (The Union, 2013). This misinformation demonstrates that Nevada County was not fully transparent about the project's financials with the public.

This P3 project receives a rating of (4) for administrative & regulatory control because Nevada County maintained sufficient control throughout the project. This control was primarily due to the county's ability to achieve full funding through the federal HBP instead
of its private partner, Viking Construction. Finally, this project receives a (4) for capacity because it received full support from key stakeholders, including Nevada County Department of Public Works, Caltrans (Department of Transportation), and Quincy Engineering. The political landscape and liberal perspectives of key stakeholders also influenced this project. That is, Nevada County maintains democratic and liberal-leaning legislation and attitudes, propelling its ability to seek federal funding for this project without much resistance from the public or other key stakeholders.

The Sixth Street Viaduct, California Case

The 6th Street Viaduct was built in 1932 to connect the West Arts District and Boyle Heights in California. The 3,500 ft (about 1.07 km) crossing ensured sufficient roadway over the Los Angeles River, including wide sidewalks and multiple railroad tracks. “It was one of a set of fourteen historic structures crossing the Los Angeles River, and the longest of these structures (Sixth Street Viaduct Replacement Project, 2018). The bridge is owned and maintained by the City of Los Angeles and was an important infrastructure for its community. However, over the years, the bridge suffered from alkali-silica; this chemical reaction caused deterioration in the concrete. Further, “besides the material deterioration and lack of structural strength, the bridge also has geometric design and safety deficiencies, which necessitated a complete replacement of the structure” (Road Traffic Technology, 2018). The concrete's erosion and design deficiencies led to its classification as structurally deficient.

As a result of the bridge's structural deficiencies, the City of Los Angeles' Bureau of Engineering and Bureau of Contract Administration partnered to embark upon its largest bridge replacement project. The City initially estimated the project costs at $140 million, but those costs quickly swelled to $440 million in part due to the contracts awarded to the HNTB consortium, which was responsible for the design, engineering, and construction of the replacement bridge. The new design will preserve the original iconic archway design but will become pedestrian- and cyclist-friendly, ensuring residents retain adequate access to green spaces. That is, “A new 12-acre public park running below the bridge, accessible by multiple stairways and a monumental helical bike ramp, will provide access to much-needed recreational fields with restrooms and café, the L.A. River, public art, and a programmed arts plaza” (HNTB, 2021).

This P3 receives a rating of (2) for full and fair value because the original estimated costs were grossly underestimated at a $300 million difference. That is, the new design of the viaduct went beyond a simple bridge replacement which greatly added to the cost projections HNTB was awarded in their contract. “We are talking about a reconstruction project which, when originally proposed, was estimated to cost around $140 million, which has since morphed and ballooned into over $440 million; a project which is consuming 2/3rds of the entire infrastructure development budget of the City of Los Angeles” (Gonzales & Gonzales, 2017). Further, this P3 receives a rating of (4) for reasonable pricing because no tolls or toll credits were listed in the original contract with HNTB. This lack of tolls was due to the City's ability to achieve full funding through federal and State grants. That is, “it is funded by the Federal Highway Transportation Administration and the California Department of Transportation, as well as City funds (Sixth Street Viaduct Replacement Project, 2018). This secured funding helped to ensure that future taxpayers would not bear the burden of project costs through tolls or user fees.

Additionally, this P3 receives a rating of (4) for responsible budgeting because although there was an additional $300 million added to project costs, the bulk of these expenses went to benefits for drivers, pedestrians, and cyclists that were not present in the original bridge design. These benefits included an arts plaza, a new viaduct park, and widened roadways over the Los Angeles River for residents. That is, “it will also feature new roadway shoulders and wider sidewalks. In addition, the curves along the stretch will be removed, a safety median buffer will be placed, and bicycle and pedestrian pathways complying with the Americans with Disabilities Act will be built” (Road Traffic Technology, 2018). Further, this P3 receives a rating of (3) for public accountability because the public was only minimally informed about the projects' finances and allowed to provide input. This caused much contention between the Boyle community and L.A.’s Bureau of Engineering. For example, one report about the community meetings held on the project reported that although “community members gathered in droves at a recent public briefing to learn about the updates in the Sixth Street Viaduct Replacement Project...some residents felt as if their questions were answered, while others argued that specific details to their inquiries were not provided” (Ho, 2021). This demonstrates that the City of Los Angeles did not remain fully transparent with its constituency about the project and its financials.

Moreover, this P3 receives a rating of (2) for administrative & regulatory control because the local city council was unable to sustain some of its values throughout the design and completion of this project. Specifically, the project neglected to ensure its most vulnerable and marginalized constituents' needs were met with this bridge replacement. “This all clearly demonstrates the complete failure on the part of our local leaders across the board to advocate for the needs of our disadvantaged community, which is most affected by this project; the neighborhood of Boyle Heights” (Gonzales & Gonzales, 2017). Meeting the needs of disadvantaged and disenfranchised communities should always remain a top priority for the City of Los Angeles. Finally, this P3 receives a rating of (5) for capacity because its key stakeholders provided full support for the project, including L.A.’s Bureau of Engineering, LA’s Bureau of Contract Administration, former Mayor Eric Garcetti, Caltrans (Department of Transportation), and L.A.’s local city council. This was primarily due to the liberal political views of these stakeholders and their general acceptance of federal grants for these kinds of projects.
The following section examines the P3 legislation and state programs that contributed to the success of the cases analyzed in our Descriptive Multi-Case Analysis. Without this legislation, local governments may find it exceedingly difficult to enter into P3 contracts, hire quality yet capable designers or engineers, or absorb risks associated with large capital projects. Thus, it is important to understand the various types of enabling legislation that allows local municipalities to enter into P3 agreements across the county. The following section will examine Virginia's and California's P3 legislation, the Virginia State of Good Repair program, and California's state bridge repair program.

Although it takes the same capability and capacity from key stakeholders to engage in P3 projects in both city and state governments, very few states have enacted legislation allowing city agencies to enter into such Public-Private Partnerships. These states include Nevada, Minnesota, Virginia, Texas, and California. That is, "while a network issue associated with fragmented adoption of PPPs and potential application of toll financing has to be carefully examined, there is no fundamental difference between local government and state government as long as both have the same level of capacity [capability] and knowledge for PPPs" (Iseki, Eckert, Uchida, & Dunn, 2009).

The Commonwealth of Virginia

Virginia holds a broad P3 policy to ensure its entire bridge inventory can attract private investments for maintenance, repair, or replacement. It was enacted in 1995 and allowed any "responsible public entity" to engage in P3 agreements with qualifying private partners. It "authorizes a private entity to develop and/or operate a qualifying transportation facility, subject to approval from and a comprehensive agreement with the responsible public entity" (Federal Highway Administration, 2022). A responsible public entity is defined as any local or regional public transportation agency that will operate the transportation infrastructure. This comprehensive legislation allows potential private partners to solicit local and regional municipalities for attractive P3 agreements. It further ensures that any public agency can acquire private investments, expertise, and services for capital projects not included in their annual budgets.

Additionally, one dominant theme is clear when examining California and Virginia's legislation. These states have implemented programs supporting local governments to repair or replace structurally deficient bridges using P3s. This state support is critical because local municipalities are often small and lack the capacity to raise funds with their scarce resources. For example, in Virginia, the state legislature passed the State of Good Repair (SGR) program designed to address the challenges with Virginia's deteriorating bridge inventory. That is, "The State of Good Repair (SGR) program provides funding for deteriorated NBI bridges in Poor Condition or otherwise known as structurally deficient (S.D.) for that bridges that are owned by the Virginia Department of Transportation (VDOT) and or localities” (Virginia Department of Transportation, 2023).

California

Although California has a somewhat limiting P3 legislation, it allows local and state government agencies to enter into P3 agreements for specific transportation capital projects. The restriction is primarily focused on tolls and user fees to ensure the burden to the public remains reasonable and responsible. Thus, the legislation "authorizes local governmental agencies to enter into agreements with private entities to study, plan, design, construct, develop, finance, maintain, rebuild, improve, repair and/or operate a variety of fee-producing infrastructure facilities, including rail, highway, bridge, tunnel or airport projects" (Federal Highway Administration, 2022). Therefore, local municipalities are allowed to attract private investments and services for their capital projects.

Moreover, in California, Governor Gavin Newsom has just passed a five-year bridge program that will allot $4.2 billion in funding for state and local agencies to repair or replace structurally deficient bridges. Specifically, California will receive $849.4 million this fiscal year – more than double the amount of any other state – and an estimated total of $4.2 billion over five years, to address highway bridge needs. Caltrans and local transportation agencies will target the funds to improve the nearly 1,500 bridges rated in
"poor" condition in the state" (Caltrans, 2022). These state programs make it possible for local municipalities to repair and replace locally owned bridges.

**Conclusion**

This study sought to answer the following research questions:

*In what ways will an amendment to Act 88 of 2012 support Pennsylvania localities’ ability to repair deteriorating bridges using P3s? And what enabling legislation best practices have other states used to overcome the current Pennsylvania Act 88’s shortcomings?*

Through this research, it became evident that the condition of Pennsylvania's bridge inventory is strained both by its high percentage of structurally deficient or functionally obsolete bridges and the lack of resources available to repair them. This strain is even more difficult for local governments to overcome. That is, local municipalities are restricted both by smaller budgets that seldom allow for expensive large capital projects and less access to capable engineering or construction vendors for such work. Specifically, 47% of all locally owned bridges in Pennsylvania are deteriorating in need of a full replacement, which is estimated to cost $3.9 billion to address (Vigina, 2022). These challenges only worsen as time passes. That is, since locales lack the funding to address immediate bridge repairs, they commonly opt to overlook the needed repairs and the bridge deterioration continues to worsen. Structurally deficient bridges will inevitably lead to road closures, vehicle damage, and bridge collapses. Thus, it is exceedingly important to find appropriate solutions for Pennsylvania local governments to address their deteriorating bridge inventory.

Therefore, this study evaluated a public-private partnership solution for Pennsylvania's local bridge inventory challenges. Through a descriptive multi-case analysis, we sought to understand how comparable locales used P3 agreements to repair their deteriorating bridges and the best legislative practices that enabled their successes. After a close analysis of (3) cases and their states' subsequent P3 legislation, we conclude that hypothesis 1A has been proven: An amendment to Act 88 of 2012 to enable P3 transportation projects for Pennsylvania local governments will help repair or replace structurally deficient bridges. That is, both Virginia and California's P3 legislation enable any local or regional transportation public agency to engage in P3 agreements to attract private funding and services for bridge improvement capital projects. This allotment is based on the understanding that any public agency can acquire the capacity and capacity to successfully enter into P3 agreements if appropriately equipped. Specifically, "if public agencies other than the state Department of Transportation have the expertise to enter into these types of agreements, a state should provide them with the expressed ability to do so" (Iseki, Eckert, Uchida, & Dunn, 2009). Therefore, an amendment to Pennsylvania's Act 88 of 2012 will ensure that local Pennsylvanian municipalities can attract private investment, expertise, and services to support the repair or replacement of deteriorating bridges. The current legislative restriction only serves to keep these locales constrained by their budgets and the Commonwealth's bridge inventory in poor condition.

Moreover, our descriptive multi-case analysis produced three dominant best practices emerged that can help overcome the current Pennsylvania Act 88's shortcomings. The first is that P3 legislation must include local transportation agencies to ensure local municipalities' ability to appropriately maintain their bridge inventory. Although state agencies, including State Department of Transportation, may have a greater capacity to secure private partners and sustain administrative control throughout these capital projects, local transportation agencies can be equally equipped when provided adequate knowledge about P3s and support when acquiring funding. Simply, there is no difference between state and local transportation agencies' ability or capacity to successfully engage in P3s. This understanding is critical as it should inform a revision of Pennsylvania's Act 88 of 2012.

The second-best practice is that in addition to ensuring state P3 legislation includes local transportation agencies, state programs should also be created specifically to address bridge inventory challenges. Bridge repairs or replacements are both expensive and complex projects to undertake; thus, both state and local transportation agencies need wraparound support to ensure their success. The states analyzed in this study all created bridge repair programs that allocated substantial funding to improve the overall condition of their bridge inventory. These programs served to ensure that local municipalities have equitable access to federal and State funds and can enter into fair P3 agreements with private partners for their bridge improvement projects. Both Virginia's State of Good Repair (SGR) program and California's five-year bridge repair program work to equitably support state and local governments access funding and secure quality private partners to complete their bridge improvement projects successfully. Thus, it is recommended that Pennsylvania additionally consider developing a state program that will allocate funding for both state and local bridge improvement projects.

The third best practice is that moderate and liberal elected officials must lead the charge when pushing bridge repair programs as a state's political landscape heavily influences its ability to pass legislation that enables local governments to enter into P3s or secure necessary funding. That is, conservative ideologies are commonly opposed to increasing government funding; thus, it is important for key stakeholders and decision makers to retain moderate or liberal perspectives when attempting to pass bridge improvement program legislation which includes local government use of P3s for bridge repair/replacement. Considering the key Pennsylvania stakeholders involved in these decisions, this may be a challenging undertaking because the majority of other key stakeholders still retain a fiscally conservative ideology. These stakeholders include the Pennsylvania State Senate, Pennsylvania Turnpike Commission, and PennDOT. However, this should not deter the Commonwealth from moving forward with these recommendations. The conversation must also include the benefits to the P3 solution that will appeal to this conservative base including tolls and user
fees are not a requirement for project funding or revenue, private partners can initiate offers and proposals for locales. P3 legislation will bring competition and new private investment to the Commonwealth.

In sum, public-private partnerships are a viable solution to ensure the success of local government bridge repair or replacement projects. These partnerships connect public agencies with experienced and qualified private partners, can leverage the use of private financial resources and personnel, and can elevate the project's degree of excellence. Thus, Pennsylvania must consider this alternative as they are working to overcome its increasingly deteriorating locally-owned bridge inventory.

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