Industry Perceptions on Public Sector Construction Delivery Methods

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The public construction sector in the United States has predominantly used the traditional delivery method, also known as design-bid-build, to obtain and deliver projects. Accurately assessing the direction of the public construction sector must include analysis of the emergence of Public-Private Partnerships (P3) and alternative delivery methods. P3 projects in the United States are relatively new, an emerging trend from the late 2000s as an innovative way to utilize private capital to finance public projects, beyond a typical bond sale. Alternative delivery methods refer to any project award or management arrangement other than the typical design-bid-build, lump sum, competitive bidding process typical of public sector construction projects. The emergence of these trends are an attempt to improve upon the traditional process of public sector construction projects by improving financing options and project delivery issues including but not limited to overall cost, time to completion, and project quality. Construction companies engaging in these types of projects assume a large amount of risk in satisfaction of their contract with the public entity. Their perspective is important to improving the process of public construction. Contractors favor design-bid-build on traditionally financed public projects, but favor Integrated Project Delivery on P3 projects.

Key Words: Public Works, Financing, Public-Private Partnerships, Survey, Delivery

Introduction

The public construction sector in the United States has predominantly used the traditional delivery method, also known as design-bid-build, to obtain and deliver projects. Accurately assessing the direction of the public construction sector must include analysis of the emergence of Public-Private Partnerships (P3) and alternative delivery methods. . P3 projects in the United States are relatively new, an emerging trend from the late 2000s as an innovative way to use private capital to finance public projects, beyond a typical bond sale. Alternative delivery methods refer to any project award or management arrangement other than the typical design-bid-build, lump sum, competitive bidding process typical of public sector construction projects. The emergence of these trends have been an attempt to improve upon the traditional process of public sector construction projects by improving financing options and project delivery issues including but not limited to overall cost, time to completion, and project quality. Construction companies engaging in these types of projects assume a large amount of risk in satisfaction of their contract with the public entity. Their perspective is important to improving the process of public construction. The objective of this paper is to present contractor perceptions of the benefits of different delivery methods for public projects financed traditionally or as a P3.

Background

Municipalities at the local, state, and federal levels regularly engage in building projects on behalf of their constituents, consisting of all citizens within a jurisdiction, known commonly as the “public”. These projects serve many purposes for the benefit of the public, paid for by tax dollars collected from the public. These projects take the form of buildings like municipal buildings or schools, or infrastructure such as highways and water treatment plants,, or military such as naval bases. Governance by public officials, those elected, appointed, and employed by a given municipality are charged with the effective and economical stewardship of public funds and the public welfare. There have been many mechanisms used to finance these projects, such as cash, bond sales, and public-private-partnerships in particular. In addition to a range of different financing options there are a number of delivery methods used on public works as well. These include Design-bid-build, Design-build, Integrated Project Delivery, and Construction Management At-Risk. Construction companies arrange themselves to effectively complete construction projects with owners that are both public and private. Understanding the value of different financing methods, effectiveness of different delivery methods, the need for public works, examples of certain P3

projects in the building and infrastructure categories, and the perspectives of public contractors based on their experience can all be analyzed to be most effective for these public projects and the benefit of the municipalities.

Financing

Public works offers a variety of different financing options, with the traditional procurement method and Public-Private Partnership being the two most popular in the industry today. The differences in financing that a P3 offers compared to a traditionally-funded public project are stark. According to the U.S. Department of Transportation, traditional procurement of public projects sees private contractors constructing projects based on a public design with public financing, then turning them over to the public sector upon completion for operations and maintenance (Decorla-Souza, Sullivan, 2017). Much of this places major risk on public agencies and taxpayers in general, as the burden of funding is spread out across the public rather than a centralized developer as in a private project. To ensure the contractor performs work up to par, many government agencies require a cash performance bond that provides funding for remedies in the event the contracted work is not completed in the manner it was contracted to be completed (Webb, 2017). The government agency building the project determines how large the cash bond will be, and will require it to qualify various bidders of the project,

As opposed to the public-centered risks of traditionally-funded public projects, P3 projects attempt to allocate financial risk to investors and away from the general public. P3 projects typically have a private developer fund large portions of design and construction costs, and may have another private company signed to operate and maintain the building for a set number of years before it is officially turned over to the public agency that commissioned the project's building. This sort of P3 structure, known as Design-Build-Finance-Operate-and-Maintain (DBFOM), has become much of the standard in the P3 sector of Public projects, as it alleviates much of the Public risk and transfers it to the Private sector, and uses a delivery method that closely resembles IPD. To compensate for the added risk, private developers and operators are often given rights to toll concessions for a set number of years if it is an infrastructure or land rights for further development if it is a multi-use building built in a metro-area. P3 projects can also be used with Design-bid-build or Design-build delivery methods, though less risk is diverted to the private sector under these methods. P3 can offer accelerated project delivery, may enable longer term view of asset management, could provide access to additional capital, and may also reduce public cost and/or debt requirements (Decorla-Souza, Sullivan, 2017. The potential advantages of P3 are also met with some possible downsides as well, including increased administrative costs and management time, lack of revenue for States, and may not be the most cost-effective procurement if all parties are not aligned perfectly on the concept of a P3 .

The growing need for public works in the United States has grown exponentially over the last decade, as American infrastructure grows further outdated every year. According to a 2016 report on public and P3 projects done by accounting firm PricewaterhouseCoopers, it is estimated that the infrastructure sector of the United States needs $3.6 trillion in the years ahead, thus spurring billions of dollars worth of traditional public projects and P3 deals in the country. As P3 is being looked to for infrastructure repair, the report also notes that P3 is being used on broadband networks, civic and wastewater projects, sports stadiums, and building of schools and also. The versatility of P3s is becoming more evident in an American market that has far too long relied on the Traditional Design-Bid-Build Method, and it is not just the financing benefits that are increasing its popularity. The report interviews Director of the Colorado Department of Transportation David Spector, who explains ,"You don't do a P3 because you don't have the money. You do it because you've looked at the lifecycle cost of the asset, and you've looked at benefits and costs that go beyond the financial side" (PricewaterhouseCoopers, 2016). Analyzing all the lifecycle costs in a project, especially for P3s being compared to Traditional public projects, is a main reason P3s are becoming more notorious in the public sector. The report analyzes the example of University of California at Merced's recent P3 project, where construction costs ran slightly higher than estimated, but long-term operating costs and financing costs were lower so the overall project cost was affordable in the long run (PricewaterhouseCoopers, 2016). Julie Kim, program director of Stanford University's Global Projects Center, notes that, "In traditional public sector infrastructure projects, a standard analysis usually misses a lot of hidden costs" (PricewaterhouseCoopers, 2016). This is part of the reason that P3s can cost the government as much as 20% less than a traditional design-bid-build model," according to DJ Gribbin, national director of strategic consulting at HDR, a large American engineering company (PricewaterhouseCoopers, 2016).

To understand how P3 projects can be used in place of traditionally-financed projects, examples in both the building and infrastructure categories must be examined. One example of P3 being used on the non-infrastructure level is Clark Construction's P3 build of the Long Beach Civic Center in Long Beach, California, which was the first municipal design-build-finance-operate-maintain (DBFOM) contract in North America (Clark, 2020). The Long Beach Civic Center was a joint venture between the City of Long Beach, the public agency, Plenary Edgemoor Infrastructure & Real Estate, a private co-developer/operator, and Clark and its subcontractors as the private contractor, thus becoming a combination between public infrastructure and private development. The project itself was built for $428.3 million within three years of breaking ground and is to be operated by Edgemoor for forty years before being turned over in-full to the City of Long Beach. (Clark, 2020) Though not necessarily an infrastructure project, the Civic Center was a major upgrade over the previous buildings serving as City Hall and showcased that a P3 project can work with local agencies in the United States such as cities and not just large, federal or state agencies alike. The cost savings from a late schedule is also shown here; early collaboration between all parties involved assisted in minimal schedule impacts and a lower cost of $428.3 million rather than the $520 million that was originally estimated to be constructed for (Plenary-Edgemoor, 2020). It might seem odd for a private developer to enter into an agreement for a Civic Center to be constructed, but Plenary-Edgemoor assisted in the funding in order to eventually construct a mixed-use project with several mixed-use, high rise buildings to be built. (Plenary-Edgemoor, 2020) This illustrates the potential gains private developers have when they enter contracts with public entities in certain P3 deals; the developer will often get land incentives or decreased property taxes on the land in order to build future projects for cheaper.

Nifrikios Meletiadis lists a number of examples of various types of P3 project structures in his 2018 book, *Public-Private Partnerships and Constitutional Law*, which looks at P3 models in both the United Kingdom and United States in order to see how their layout coincides with legal precedent. Meletiadis notes that much of the early P3's in the United States have been mostly infrastructure related, as longer project times and higher project costs for these projects lead to public agencies wanting to incorporate private developers for part of the funding. One of the most prominent examples Meletiadis gives of a classic U.S. P3 infrastructure project is that of the Chicago Skyway project. The Chicago Skyway P3, agreed in 2004 between Illinois Highway Authority as the public partner and the Skyway Concession Company, the private developer, was set to last 99 years and cost $1.83 billion (Meletiadis, 2020). In the agreement, operations and maintenance responsibilities were awarded to the private concessions company, as well as toll revenues for part of the concessions period before being handed over to the Illinois Highway Authority. According to Chicago Metropolitan Agency for Planning (CMAP, 2020), a 2010 financial report found that one of the private concessionaire, Macquarie Atlas Roads, earned $13.5 million in revenues against $1.95 million in expenses on the Chicago Skyway, leading to a profit margin of 86 percent (CMAP, 2020). This demonstrable profit margin for one of the private entities in this particular P3 shows how much a private company can profit when a P3 is properly implemented in an infrastructure project. The incentive to allow the private contractor to receive tolls draws private developers into P3's, and their profit margins tend to increase by the year as tolls are generally allowed to be increased after a certain number of years of a contract (Meletiadis, 2020). The incentives created by use of P3 on certain infrastructure and municipal projects spur all parties of a contract to accomplish their goals often ahead of schedule and for less cost than estimated, a major plus side of a financing method that is looking to overtake traditional, lump-sum financing as the preferred method in public projects.

Delivery Methods

Although Design-Bid-Build and Integrated Project Delivery are focused upon the most. Design-bid-build (DBB) or Traditional Building, remains the most popular delivery method for all public projects (El Amsar, Hanna, Loh, 2013). In DBB, an owner hires a designer, either an architect or engineering firm, to design a project through drawings, then will take that design and open it to bid. General contractors will submit lump-sum bids for the project, and usually the lowest qualified bid will win on a public project (Ling,Chan,Chong, EE, 2004). The designer oversees the work of the general contractor throughout construction, and on a public project the public owner typically needs to approve all changes and submittals as well, leading to longer project durations and lead times for some materials and systems (Ling,Chan,Chong, EE, 2004).

While DBB has been the norm in the industry for much of construction's history, Design-build has become exponentially popular as technology improves and the industry evolved. Design-build merges the designer and general contractor into one party whom the owner has one direct contract to (Songer, 1997). An owner decides to

build a project and will request proposals instead of bids from Design-build firms or agreements, which include both notes on pricing and building design opposed to bids which do not alter project design (Songer, 1997). Owners typically will choose the proposal that provides the best value for the project without sacrificing design elements (Songer, 1997). Design-build is known to be more cost and time efficient than DBB, due to increased collaboration with the designer and contractor, although is also notorious for increasing risks to the owner, as they lose the owner loses the advantage of having another party oversee construction.

Integrated Project Delivery (IPD) is very similar in many regards to Design-build, albeit slightly more complex. Becoming more prevalent in the last decade, IPD sees an owner select an architect, engineer, and construction manager/contractor before a project even begins (El Amsar, Hanna, Loh, 2013). The owner merges the Owner, Designer, and Contractor all into one contract known as an Integrated Form of Agreement (IFOA) which is meant to increase collaboration throughout all phases of construction. The IFOA also incentivizes all parties involved to deliver the project ahead of schedule and below budget through multiple contract bonuses for efficient work, thus typically causing IPD projects to finish quickly and at cheaper costs (El Amsar, Hanna, Loh, 2013). This delivery method is great for collaboration between the owner, designer, and contractor, and diverts more risk away from the owner as well. However, IPD is still a new delivery method, and a complex one at that, thus many owners may strive for a simpler contract to avoid confusion in the construction process (El Amsar, Hanna, Loh, 2013).

One delivery method that shifts a majority of the risk from the owner to the builder is Construction Management At-Risk (CMAR), which focuses on an owner choosing a construction manager to deliver a project within a predefined schedule and price, typically through a guaranteed maximum price (GMP) form of contract (Al-Sayegh, 2008). The construction manager (CM) then provides input to the owner during construction and becomes the general contractor when construction begins (Al-Sayegh, 2008). This method is great when time is of the utmost importance, and allows the owner to nearly remove themselves from the construction process in total. However, much of the risk goes directly to the CM,which could cause the CM to possibly exceed the GMP and possibly fall behind schedule (Al-Sayegh, 2008).

Methodology

An anonymous online survey was developed to assess construction professionals' perceptions of delivery methods for public construction projects. The survey includes fifteen questions delivered electronically, distributed to members of the Construction Management Advisory Council (CMAC) at California Polytechnic State University (Cal Poly) representing the construction industry in California and across the United States. The questions were developed to assess demographic information, document outcomes, and investigate perceptions concerning publicly funded and P3 projects and the data was extracted for analysis. Of the fifteen questions asked, eight are multiple choice, two are yes/no formatted, two are Likert ratings meant to gauge perceptions on a range of public project configurations, two are rankings of different delivery methods in public sector projects, and an open-ended free response asking for general feedback on P3 arrangements and Public sector construction. The questions were as follows:

1. What is your position in the industry?
2. How many years have you worked in the Construction Industry
3. What is your firm's primary source of revenue?
4. What is your firm's primary role on construction projects?
5. Have you ever worked on a publicly funded project?
6. What percent of your firm's work annually is from publicly funded projects?
7. Of the following delivery methods, which ones have you experienced on a publicly funded project?
8. Rank the following delivery methods based on which one you prefer to use on a publicly funded project.
9. Have you ever worked on a public-private partnership?
10. What percent of your firm's work annually is from public-private partnership funded projects?
11. Of the following delivery methods, which ones have you experienced on a public-private partnership funded project?
12. Rank the following delivery methods based on which one you prefer to use on a public-private partnership funded project.

13. Please select the delivery method below that you prefer to address the following factors on a publicly funded project.
14. Please select the delivery method below that you prefer to address the following factors on a public-private partnership funded project.
15. Please provide any additional thoughts you would like to share on Public project delivery methods or Public-Private Partnerships.

Demographics

The first two questions are demographics about the respondent pool regarding position and experience in the construction industry.The first question asked to the participating contractors, "What is your position in the industry?" is meant to gauge the groups and experience levels of the survey's participants, as varied positions in the industry lead to a more diverse survey sample. A survey with a varied amount of positions is desired to increase sample diversity. However, respondents that are higher level positions, such as executive or project manager, would increase the credibility of the survey as well. The second question asked for years of experience working in the construction industry, building off of the ethos of the first question. The more experience in the construction industry, the better in terms of the survey. This as well would increase the credibility of results if the average years of experience was higher.

Traditional Public Project Experience and Perceptions

Questions Three to Ten help categorize the firm experience and respondent experience of the sample pool. The third question attempts to gauge the main revenue stream of the firms the respondents work to establish relevance to the public sector projects being discussed. While most firms surveyed do not rely solely on public works, firms with even small or moderate amounts are desired to be part of the survey. Having firms with higher portions of public work would help give a better read towards the topics of the survey. The fourth question was to see what firms the respondents work for on a construction project.Question five was meant to gauge if the respondents of the sample had a great deal of experience working on the subject matter at hand: public projects. Question six was asked in order to understand how large a portion of a firm's revenue traditional public projects make-up. Question seven was mainly asked to see how popular certain delivery methods were on public projects. Additionally, this question assisted in verifying if some of the research done on delivery methods of traditional public projects was accurate. Question eight was a forced-rank question and was asked in order to see the true preferences of the industry on which delivery methods are better for a traditionally-funded public project.Question nine helped to gauge the accuracy on the claim that P3 projects are experiencing an increase in popularity among contractors by asking if the respondents had worked on P3 projects before.Question ten was asked in order to understand how large a portion of a firm's revenue P3 projects make-up.

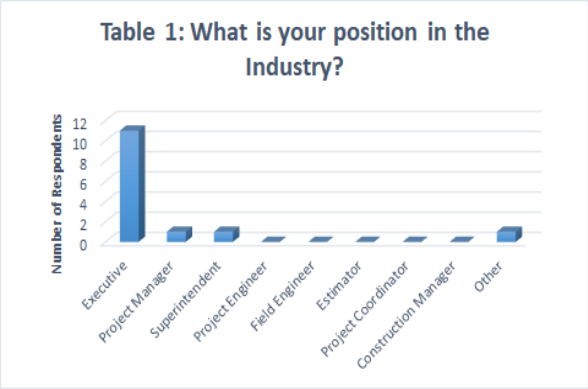
Public-Private Partnership Experience and Perceptions

Questions Eleven through Fifteen focused on respondents' experiences of P3 projects and direct comparisons between multiple delivery methods on both traditionally-financed and P3 projects. Question Eleven was mainly asked to see how popular certain delivery methods were on P3 projects, additionally assisting in verifying if some of the research done on delivery methods of P3 projects was accurate. Question Twelve was a forced-rank question, and was asked in order to gauge the true preferences of the industry on which delivery methods are better for a public-private partnership. Question Thirteen asked respondents to choose between the two methods for which one they would prefer to use to address a set of factors on a traditionally financed public project in order to directly compare Design-bid-build to Integrated Project Delivery. The factors were, as follows: Cost Management, Schedule Management, Scope Management, Subcontractor Performance, Safety Management, Quality Management, Owner Satisfaction, their firm's performance, their employee's satisfaction, and Overall Project Value. This question was asked to directly compare two very popular and different delivery methods on traditionally-funded public projects in order to see which the industry prefers to use to address certain factors during construction. Question Fourteen asked respondents to choose between the two methods for which one they would prefer to use to address the same set of factors used in Question Thirteen on a Public-Private Partnership in order to directly compare Design-bid-build to Integrated Project Delivery. This question was asked to directly compare two very popular and different delivery methods on P3 projects in order to see which the industry prefers to use to address certain factors during

construction. Question Fifteen was mainly asked in order to get any perceptions that were not provided in the rest of the set of questions.

Survey Findings

The survey responses collected over a two week period from 14 members of CMAC that responded to the survey are listed below.



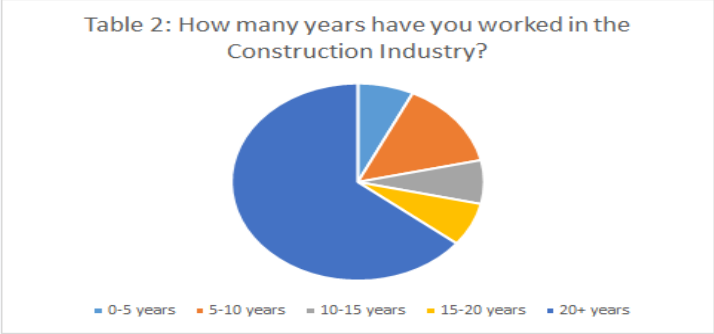
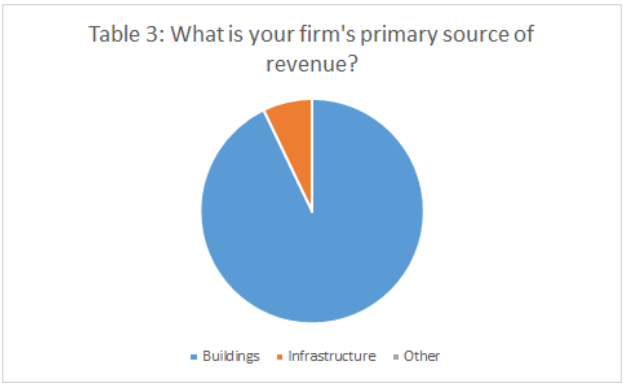
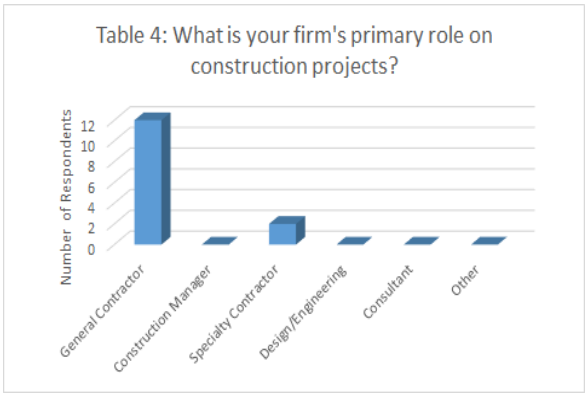


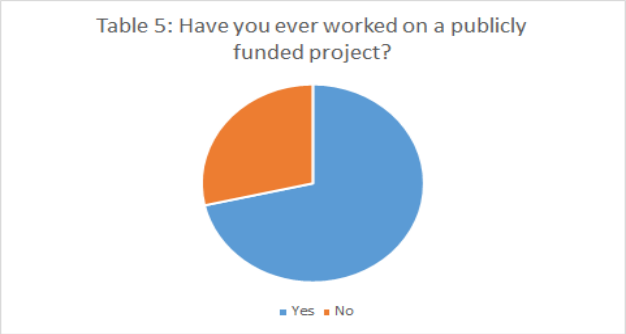
Table 1 showed that eleven of the fourteen respondents to the survey are industry executives, while one is a Project Manager, one is a superintendent, and one is a Building Information Modeling (BIM) Manager. There were no project engineers, estimators, project coordinators, or construction managers in the survey pool. Question Two found that, of the fourteen respondents, nine have worked in the industry for over 20 years, one has worked in it between 15-20 years, one has worked in construction between 10-15 years, 2 have worked in construction 5-10 years, and one has been in the industry between 0-5 years. The results further show that the majority of respondents have extensive experience in the construction industry, with 78.6% of total respondents having at least over a decade of construction experience.

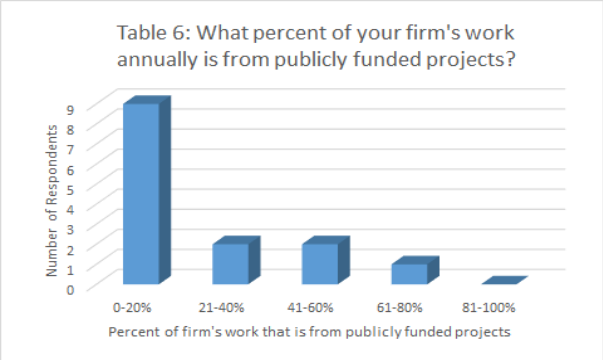
Table 3 shows the results of Question Three, to which 13 out of 14 respondents answered that their firm primarily works in the buildings sector of construction rather than infrastructure. Question four's results saw 12 out of 14 respondents' firms work as a general contractor with just two working as specialty contractors.





Question Five saw ten out of fourteen respondents answer "yes" with just 4 having never worked on a public project. Question Six asked, "What percent of your firm's work annually is from publicly funded projects?" to which there were various answers. nine out of fourteen respondents said 0-20% of their firm's work was from public projects, with 2 saying 21-40%, 2 saying 42-60%, and 1 responding 61-80%.





For Question Eight, Design-build was selected over Design-bid-build as the top choice for preferred delivery method on a publicly funded project, with 34% of respondents answering they had experienced design-build on public works while 28% said they had experienced design-bid-build. To round out the answers, 18% said they had used Integrated Project Delivery on public projects while 18% responded that they had used Construction Management At Risk on public works. Design-build tied for the most popular first-choice choice with design-bid-build; each of these delivery methods respectfully received 41.7%. Design-build, however, was also the most popular second-choice choice, with it receiving 50% of the available second choice responses, 8.3% of third choice responses, and no last choice responses. Design-bid-build received 33.3% of the second choice responses, 8.3% of third choice responses, and 16.7% of the last choice responses.Construction Management at Risk was the most popular third choice, receiving 58.3% of the third choice responses, while Integrated Project Delivery was the least popular choice, with 58.3% of the fourth choice responses going to IPD

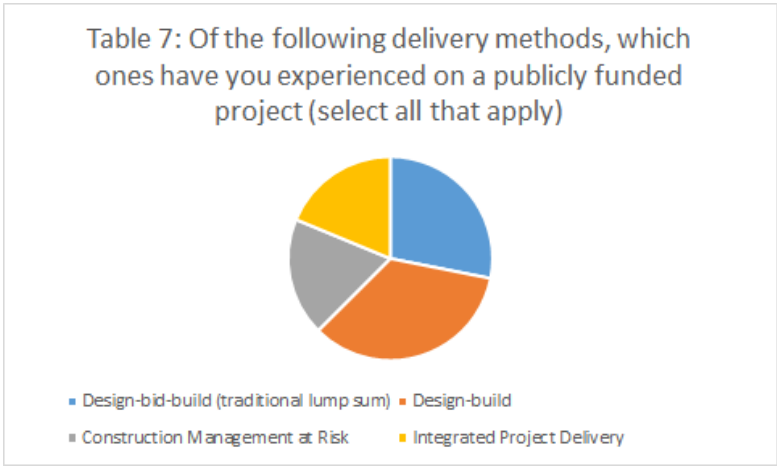
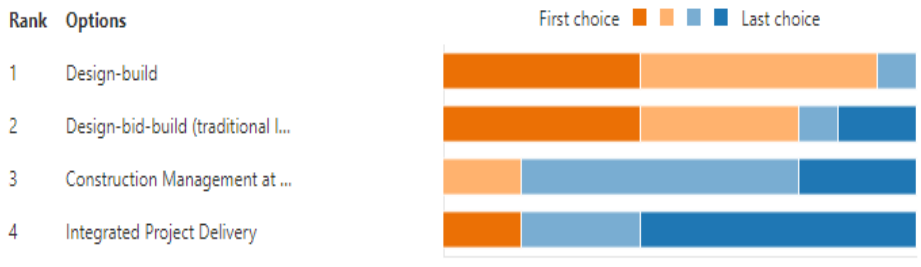
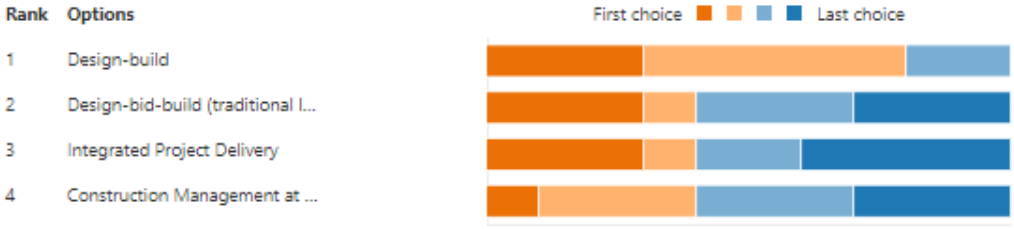


Table 8: Rank the following delivery methods based on which one you prefer to use on a publicly funded project.



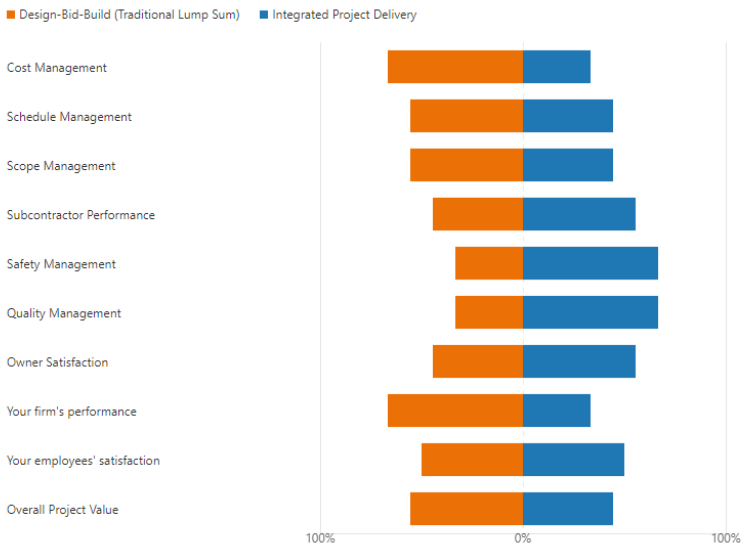
For Question Nine, nine out of fourteen respondents said “yes” that they had worked on a Public-Private Partnership, with just five saying “no”. Question Ten asked the respondents what percent of their firm’s work annually comes from P3, to which 93% of respondents answered “0-20%” with just one respondent answering 21-40%. Question Eleven showed that Construction Management At-Risk tied with Design-Build with 32% of the response as the most used delivery method for P3’s, with Design-bid-build coming in 3rd with 21% of the response and Integrated Project Delivery coming in last with 16% of the response. Question Twelve saw a three-way tie for most preferred delivery method on a P3 project, with Design-build, design-bid-build, and IPD each receiving 40% of the first choice responses. Design-build, however, received 50% of the second choice responses, while also receiving 20% of the third choice responses and no fourth choice responses. IPD, despite tying for the most first choice responses, also received the most last choice responses with 40% of fourth choice responses. CM At-Risk, while having a strong showing in the previous question, saw a more balanced share of the responses, with 10 % of the first choice response, 30% of the second choice response, 30% of the third choice response, and 30% of the last choice response.

Table 12: Rank the following delivery methods based on which one you prefer to use on a public-private partnership funded project (select all that apply)

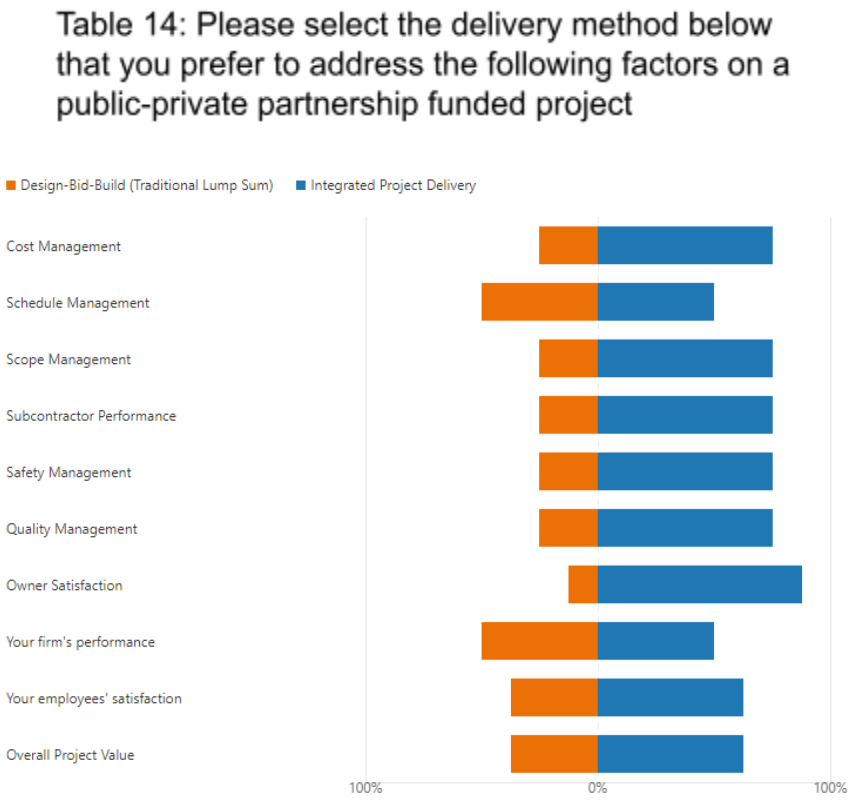


For Question Thirteen, five factors saw Design-bid-build win the majority of the responses, four saw IPD take the majorities, and one factor, Employee’s Satisfaction, was an even tie. Cost Management and Firm Performance saw massive wins for Design-bid-build. IPD scored very well with regards to Safety and Quality Management.

Table 13: Please select the delivery method below that you prefer to address the following factors on a publicly funded project



IPD was the most popular choice for eight of the ten factors asked in Question Fourteen, with only two factors being even ties, Schedule Management and Firm's Performance. IPD took decisive wins in every other category, with Owner's Satisfaction being the highest choice for IPD with 87.5% of the response.



Discussion

The various responses from members of CMAC was crucial in understanding the industry's true perceptions and feelings toward P3, IPD, the Traditional Method, and various other delivery methods incorporated into public works. The results from the first two questions showed a survey pool consisting of a majority with over 20+ years in the construction industry, many of whom also work as executives for their respective firms. This immediately boosted the credibility of the other question's results. It seemed to be the consensus that the Traditional Method is becoming outpaced as the number one choice for public projects by other sorts of alternative delivery methods, mainly being design build. It can be said that design-build is much more accessible for many owners, contractors and designers as the complexity of the method is not nearly as in depth as IPD has shown to be.

As for the direct comparisons between Design-bid-build and IPD, Design-bid-build was shown to be the slightly more popular choice to address many of the factors that come along with a traditionally financed public project. It was somewhat surprising that IPD only was one factor short of tying with Design-bid-build for most factors chosen by delivery method, as it was predicted that the Traditional Method would win for traditionally financed public works due to its notoriety. This serves as a testament to how far IPD has come in the public sector in the last fifteen years and the inroads it is making in the industry as a whole. For a traditionally funded public project, it was believed Design-bid-build would be the more popular choice for the majority of these factors, as it has been more widely used in the industry for longer than IPD has (Ling,Chan,Chong, EE, 2004). However, five factors saw Design-bid-build win the majority of the responses, four saw IPD take the majorities, and one factor, Employee's Satisfaction, was an even tie. Cost Management and Firm Performance saw massive wins for Design-bid-build, meaning the respondent's possibly thought that the safer and more reliable DBB was better for having direct oversight over costs and also for all of a firm's employees to perform better being that it is a more widely known

delivery method. IPD scored very well with regards to Safety and Quality Management, possibly due to the fact IFOA contracts of IPD are known to produce extremely high safety measures and promote higher quality work of the parties involved (El Asmar, Loh, 2013). Overall, IPD outperformed expectations on this question, though DBB was the slightly more popular choice among all the factors.

The most striking answer to the question posed, on using IPD on P3's as opposed to Design-bid-build, was found in the final survey question, to which IPD won the majority of responses in nearly every category for preferred delivery method on a P3 between itself and Design-bid-build. Based on the amount of research done in the Background section of this paper, it was believed IPD would perform well on Question Fourteen's comparison between IPD and DBB on P3 projects. This assumption held true through the data, as IPD was the most popular choice for eight of the ten factors, with only two factors being even ties, Schedule Management and Firm's Performance. This made sense, as both of these factors were picked more popularly for DBB in the previous question, and given the complexity of IPD a firm's performance might not be as high as expected as it would be under DBB (El Asmar, Loh, 2013). Regardless of the ties, IPD took decisive wins in every other category, with Owner's Satisfaction being the highest choice for IPD with 87.5% of the response.This was by far the question with the most lopsided results which succeeded expectations by far, as the margins between IPD and DBB were expected to be much thinner with IPD being the slightly more popular choice. Instead, IPD was the chosen delivery method for nine out of the ten factors with one being a tie. If the majority of respondents had not worked on P3 projects, this may be an outlier result due to insufficient sampling. However, the credibility of the sample pool's experience with both P3's and public works proves that this result was no outlier, and IPD is perhaps becoming preferred to be used on P3 projects much more so than DBB.

Conclusion

The public construction industry in the United States has predominantly used the Traditional Delivery Method, also known as Design-bid-build, to obtain and deliver projects. Accurately assessing the direction of the public construction sector must include analysis of the emergence of Public-Private Partnerships (P3) and alternative delivery methods. P3 projects in the United States are relatively new, an emerging trend from the late 2000s as an innovative way to utilize private capital to finance public projects, beyond a typical bond sale. Alternative delivery methods refer to any project award or management arrangement other than the typical design-bid-build, lump sum, competitive bidding process typical of public sector construction projects. The emergence of these trends is an attempt to improve upon the traditional process of public sector construction projects by improving financing options and project delivery issues including but not limited to overall cost, time to completion, and project quality. Construction companies engaging in these types of projects assume a large amount of risk in satisfaction of their contract with the public entity. The perspectives of public works contractors are important to improving the process of public construction. Results from the survey found that many contractors prefer alternative delivery methods, such as Design-build and Integrated Project Delivery over the Traditional Method for use on both traditionally funded public projects and P3 projects as well. Survey results found that contractors slightly chose Design-bid-build on traditionally financed public projects over Integrated Project Delivery, but overwhelmingly chose IPD over design-bid-build as the favored delivery method on P3 projects. Contractors are increasingly becoming more open to alternative delivery methods for public projects as a whole, and preferring design-bid-build on traditionally financed public projects while choosing Integrated Project Delivery for P3 projects.

Recommendations for Future Research

Although this research is credible due to the experience of the survey sample, more research on the topics of P3, IPD and public work as a whole is needed to test the true capabilities of newer methods on the public construction industry. Perhaps a survey on the same topic conducted in the near future would strengthen research, but only through using a survey pool who works almost exclusively in P3 and public works and with a larger sample size. The direct benefits of P3 projects for owners could be explored as well, as this was mostly focused on the contractor's perspectives of the industry. Specific contractor recommendations for improving P3 could also be touched upon, as this survey was mainly meant to gauge how contractors feel about public projects, and not true suggestions to make P3 projects more efficient.

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