P3 Infrastructure Project Bundling

Abstract:

Public-Private Partnerships (P3s) offer a stable, well-established method for completing infrastructure projects on time and on budget. Determining if they are better than a traditional build method rests on a quasi-objective view of whether or not the benefits of risk being alleviated from the government in a P3 outweigh the costs (both financially and qualitatively). If we assume the P3 concept to be valid, I suggest the model can best be employed by bundling small to medium-sized infrastructure projects and implementing them as P3s because bundling P3s provides favourable value for money. As municipal roads hold a massive portion of Canada’s infrastructure deficit and are mostly set up as piecemeal traditional build projects at present, they are a frontrunner candidate for this method. I suggest Toronto as the next suitable municipality to implement this operation due to its large infrastructure deficit and its sizeable budget, which is large enough to generate economies of scale.
In this essay I am going to advocate for the bundling of multiple smaller infrastructure projects and executing them as a larger public private partnership (P3). More specifically, I suggest bundling local road infrastructure projects into large P3s because local roads are in greatest need of repair. Bundling must be done in large municipalities to generate enough return on risk transference outlined in the value for money analysis (VFM) to justify the concept. A prime candidate is Toronto. This does not necessarily have to be done through P3 Canada, but I suggest that it deliver this option due to its size, resources, and expertise. I address criticisms to the bundling model: that bundling is risky and economically inefficient, and that it hurts medium-sized contractors. I reject the first as only applying to the traditional infrastructure procurement method, and concede the second to be valid, but of little concern based on a comparison of advantages and disadvantages. I conclude by addressing criticisms to the P3 model in general.

P3s are ‘long-term, performance based approaches to procuring public infrastructure that can enhance government’s ability to hold the private sector accountable for public assets over their entire lifespan’\(^1\). Risks associated with a traditional infrastructure development are transferred from the public sector to private sector companies. These risks include costs of all forms such as those attributed to running past a deadline, unexpected material needs, schedule delays, and unknown defects in the asset. There is one all-encompassing contract for the entire process, and a large portion of it is paid out over a long period of time, and only if the asset is maintained well and performs as expected. In addition, any potential bonus for completion is not secured until the asset has been finalized to acceptable standards. This is known as the ‘whole life cycle’ approach. Because the private company is accountable for the entire life of the asset, they assume responsibility for problems of poor design, poor construction, poor maintenance, or any other issues that may manifest during or after construction.

When a company submits a proposal to P3 Canada, or any other P3 governing body, they undergo a VFM. The VFM is a comparison of total project costs including financing costs, ancillary costs, capital base costs, and risks between a shadow bid and the public sector comparator. The comparator is the public sector balance sheet including a set of factors (costs, etc.) at one point in time. The shadow bid is the private sector mirror image balance sheet, including all of the same factors at the same point in time. If the shadow bid costs are lower than the comparator, the P3 project is said to give a positive value for money to the taxpayer, and should move forward as a P3. Importantly, the major portion of the VFM assesses the value of risk transfer from the public sector to the private sector. In this way, risk plays the central role in assessing the validity of a P3. This is because P3s cost on average 16% more for general costs, and 3% more for lawyers and consultants than the public sector comparator\(^2\). As a result, the risk transference must justify the extra cost of P3s. These costs will always be greater than the traditional method because:

1. The private company must be compensated with a risk premium for shouldering the majority of the total risk in the project.
2. The private company must use their own financing methods that have higher interest rates than those available to the government (ex. the bank of Canada in the case of P3 Canada).
3. P3 contracts cost more to monitor and develop than conventional infrastructure contracts.

Therefore, the entire determination of whether or not a P3 is a valid model depends upon whether or not the risk transference is worth the added costs. Auditor assessments demonstrate that over the long run, this reduced risk for the federal government provides for a better financial return compared to employing traditional infrastructure development schemes – based on their risk value factors\(^3\). These risk value factors can be somewhat subjective and may be derived from “experience in project delivery, external cost consultants and industry experts, and stakeholder input” – Infrastructure Ontario\(^4\). Some of the specific risks in the VFM include design risk, construction risk, availability risk, demand risk, operational/maintenance risk, residual value risk, and financing risk. Consequently, the somewhat subjective value we give to these risk features will determine whether or not the P3 concept is worthwhile. I will not address this idea beyond framing the issue because there is no concretely correct answer. I will only add that the risk measurement tools are part of general accounting procedures that are deemed valid and widely used (see figure below - demonstrating risk calculation and corresponding significance of the risk calculation in a P3 Canada bridge construction project)\(^5\), and that there are usually secondary checks in place to assess the fairness and correctness of the VFM analysis\(^6\).

![Risk Calculation Diagram](image)

An example of a P3 v public sector VFM comparison demonstrating the significance of risk in the VFM assessment.

The traditional method for procuring infrastructure projects is known as ‘design-bid-build’ (DBB). Under this method, the government has a large prepared set of specifications for an asset and they turn them over to the contractor with the best bid. Unfortunately for the government, this model necessitates the government assume responsibility for all of the risks such as design flaws and cost over-runs. Moreover, they do not have much control over the scheduled completion date. Once construction has been completed, the performance of the asset is the full responsibility of the government or any third party operator they may have hired to carry out the operations. P3 relationships on the other hand, differ on three basic qualities – financing, maintenance, and operation. There are many technical P3 relationships with variants on each of these qualities, but the most relevant
three relationships are those that P3 Canada employs\textsuperscript{7}. The first model is the design-build-finance (DBF) model. It is similar to the DBB model, except the financial burden for construction costs and risks is transferred to the private sector. Often a large portion of payment from the government is only granted upon successful completion of the asset. The design-build-finance-maintain (DBFM) model is much like the DBF model, except the company is also responsible for maintaining the asset through its entire life cycle, helping to ensure quality. The design-build-finance-operate-maintain (DBFOM) model is much like the DBFM model, except the company is also responsible for operating the asset after completion. This helps to ensure private-sector efficiency for operation, keeps money flowing in the private sector, and depending on whether or not the private company is itself profiting from the operation, may be part of the financial deal between P3 Canada and the private contractor. Each of these models can be singular, large-scale projects such as bridges or subway systems, or bundled projects such as pipelines or a set of multiple roads.

Bundling is the practice of combining otherwise separate smaller ventures into one larger infrastructure project. This is done for two reasons: to save money and improve performance. Cost savings come from the use of fewer personnel (ex. the skilled labour can be spread out) and exercising economies of scale (ex. leveraging materials suppliers for lower prices). Performance improvements come from multiple areas such as increased responsiveness and flexibility, consistency of service levels, and more efficient use of capital equipment\textsuperscript{8}. However, it is not without its drawbacks.

Critics suggest that bundling all of the government’s risk into one contract poses the potential for catastrophic consequences. Hypothetically, instead of 1/5 projects failing, going over budget, experiencing work delays, or delivering a faulty product, the larger venture that is five times the size suffers the failure. This reasoning suggests that it is therefore more desirable to spread the risk out among multiple smaller companies to better leverage the risk in the government’s favour. Akin to diversifying a stock portfolio, it is better to spread risk out among a variety of different stocks, or companies in the case of multiple construction projects. These criticisms are valid and factually supported\textsuperscript{9}. However, they are only valid for the traditional DBB model.

I suggest that these criticisms do not hold for bundling of P3 projects, and that bundling is a financially beneficial method when delivered as a P3 if the P3 requirements for size and sufficient risk transference are met. This is because the risk is almost entirely laid on the contractor in a P3 relationship. Instead of risk flowing from the contractors to the government, the risk flows from the government to the contractors (in the form of a risk premium), meaning that the weaknesses of bundling for the government actually become strengths. There is more inherent risk transference in a bundled P3 project than any other singular, unified project (such as a bridge construction). This suggests a greater value for the government. Or, to put it another way, a bigger ‘bang for buck’ for their risk premium. Although, as I will demonstrate below, the risk premium is larger from bundling, it has benefits of economies of scale. The figure below demonstrates that more risk is transferred when bundled compared to diversifying. This is beneficial in a P3 relationship. Furthermore, the risks from multiple smaller companies operating as P3s to complete a project may not be large enough to justify the government offering them as P3s.
On the left, the figure demonstrates that it is better to diversify a non-P3 relationship because it spreads out the risk onto multiple companies. In practice, an example of this might be a large highway project contracted as a traditional DBB model. Consider two types of DBB contracts: one between the government and a single, large construction company, and 5 separate smaller companies each holding separate contracts with the government. If for example, the single, large company goes over budget, the consequences will be more severe for the government than if one of the smaller companies goes over budget. This is because diversification implies a decrease in risk.

On the right, the figure demonstrates it is better to bundle a P3 relationship because it provides more value to the government than multiple individual P3 contracts. It does this because in both the 5 individual P3 contracts, and in the singular contract, risk is almost entirely on the private companies. This means that the diversification does not matter from the point of view of the government. If one of the 5 individual contracts goes over budget, or the large singular contract goes over budget, it is the responsibility of the company to finance the error. The difference in this case are the economies of scale the larger company receives will allow them to cut down on costs more than the 5 smaller individual P3s. Additionally, the non-bundled P3 projects taken individually, may not offer enough risk to warrant a government P3 relationship. However, a large enough risk transfer might be achieved if partnered with a single company. In addition to economies of scale, the government will receive all the qualitative benefits from this large P3 relationship such as greater control, increased flexibility, etc.

**Bundling**

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<tr>
<th>Bundled Business</th>
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<th>1 2 3 4 5</th>
<th>GOV.</th>
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<tr>
<td><strong>Risk</strong></td>
<td>Not as good as</td>
<td>The model changes under a P3</td>
<td>Not as good as</td>
<td>Less Value</td>
<td>More Value</td>
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<td>Bundled Business</td>
<td>GOV.</td>
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Note: *On the left, orange represents total risk to the government. On the right, green represents total value from risk transfer.*
Although diversification does not matter for the government in the two P3 situations from the point of view of the government’s probability to incur a risk, it does matter in valuing the risk premium. As bundling centralizes and enhances risk with the larger company, they will be able to demand a larger risk premium than the summation of the 5 individual P3 contracts. However, economies of scale and the other benefits of the P3 relationship will help to mitigate this, and provide good value to the government.

The reasoning is the same as when the government chooses to offer a large bridge construction to one company as a P3 instead of many smaller companies. There would be a loss of control and economies of scale. It is more beneficial to pay the larger risk premium, which will be mitigated by the economies of scale and qualitative benefits. The P3 bundling suggestion is similar, only instead of seeing a road network (for example) as numerous separate projects, see it as a single large P3 deliverable project like a bridge (which is not seen as numerous separate projects), receiving the benefits of economies of scale and qualitative benefits.

Concerning qualitative benefits, in addition to simplicity of management and direction, offering a large P3 may help to avoid political reprisal. Bundling projects will eliminate the chance of political reprisal from any one small contract. In terms of the contractors’ benefit, the government will always be able to pay, and if the job is done well, it presents the opportunity for future employment in an industry that will always have a need to satisfy – a financially palatable notion.

I suggest that if we accept the P3 concept, and were to exercise the bundling method, it can best be used in the case of municipal roads. According to the 2012 Canadian infrastructure report, municipal roads represent the greatest need for infrastructure redevelopment, with 52.6% of municipal roads ranking as fair or below (see figure below). It is estimated that repairing these roads to an acceptable level would cost $91.1 billion, which is more than all the other categories on the report combined.
Infrastructure Canada demonstrating that municipal roads require urgent attention.

This suggests that the most efficient P3 bundling process should be in regards to municipal roads. They:

1. Present the greatest infrastructure need, meaning that the potential payoffs from successful bundling would be largest in this area of infrastructure.
2. Present the largest cost and proportion of the overall problem – implying the economies of scale might best be reached under this method.
3. Are highly representative of the current piecemeal approach to infrastructure development, making them a primary starting point for the concept.
4. Are relatively homogenous projects. Unlike other infrastructure ventures, the complexity of municipal roads does not vary significantly from project to project.

This suggests the administration of multiple projects for one company would be easier in this case than in others, due to the fact they can use largely the same materials, machinery, labour, or expertise, etc. to deliver the product.

It is important to note that this is only the most fitting current application of the P3 bundling method. It should not be taken to represent the only application of P3 bundling, as there are numerous potential applications. Some of these other areas might include large-scale public housing restorations, or watermane infrastructure.

Bundling roads infrastructure and delivering it as a P3 is not a new concept. P3 Canada is currently working on the Regina Bypass Project in Regina, Saskatchewan. The project plans to deliver new local roads, service roads, and overpasses in the hopes that people will be able to travel around Regina faster and safer (see figure below). The project will be delivered as DBFOM, take three and a half years to develop, and require a 30-year maintenance and operation term. The contractor is also eligible to receive $200 million in federal funding. If successful, it will serve as a fitting example of a successful P3 bundling.
municipal roads infrastructure project. If it is not completed to specifications set out in the contract, fines and penalties will be imposed, thereby compensating would-be users. Importantly, we do not need to wait for project completion to assess its success. The risk has already been transferred, meaning all of the relevant knowledge required to assess this method for other large urban centers is known.

The Regina Bypass. An example of a bundled municipal roads P3 Canada project.

I suggest that P3 Canada expand the use of bundling and deliver comprehensive municipal road P3 projects in Toronto. In 2015 the city spent $270 million on roads and bridges, $230 million on sewers and watermanes, and $62 million on flood protection, all through mostly DBB models and a few smaller P3 ventures at the municipal level. Unlike most of Canada, Toronto’s infrastructure spending on municipal roads at $270 million is large enough to warrant delivery through P3 Canada. The economies of scale and risk transference, especially considering the importance for deadlines due to congestion in Toronto, are large enough to make it a worthwhile P3 Canada project best delivered as a single bundled P3. It is not realistic to expect all of the $270 million per annum in municipal roads to be offered for the P3 contractor due to factors like existing contracts and the need to protect contractor businesses in Toronto, but a sizeable portion would be enough to make it worthwhile. Conceivably there are even local candidates in Toronto worthy of consideration. The P3 Canada bundling Toronto option is by no means complete and deserves further investigation, but it serves as a useful starting point, and an apt representation of what more P3 bundling options might look like.

The criticisms of this particular method are the loss of small to medium-level employers. In the same way that Wal-Mart or Target are criticized for infringing on the market share of small box stores, employing massive P3 companies to run what would otherwise be small projects would cut out smaller contractors. This criticism is the tragedy of economies of scale; a disadvantage that comes with higher productivity. This effect is
true for all P3 bundling concepts, but may be amplified in the case of the municipal roads suggestion. Many small-medium scale contractors rely exclusively on the local road construction market, whereas the ‘stormwater’ infrastructure may only be an offshoot task of a local construction company.

As in the case of Wal-Mart, Target, or even Uber more recently, we must answer the question of whether or not we are willing to protect smaller business in spite of the fact it may not suit our overall goals. In the case of businesses that rely on economies of scale, productivity is sacrificed. This in turn has a negative effect on consumer prices and economic output. In terms of P3s, protecting small to medium-sized employers will not suit the goal of risk transference.

Canada has a tendency to protect small business in spite of the fact they are trying to attract more corporate investment through decreased corporate income taxes. These are incompatible objectives and it seems that the corporate investments are on the losing side, which is not overall more beneficial for Canada’s economy. The tendency to safeguard Canadian small business is a contributor to the divergence in economic productivity growth trends between Canada and the US that began in the year 2000 (see figure below)\(^\text{13}\). If we were to invest more in larger companies, it would generate greater capital stock, and close the gap on our labour productivity. I would suggest that we begin to break away from this small business mentality and move towards larger corporate thinking, which will be better for the Canadian economy overall. A first step should be towards P3 bundling.

![Labour productivity: Canada and the US](image)

_Divergence in labour productivity growth trends between Canada and the US._

Some may also raise the criticism that P3 bundling will cause a loss of:

1. Local employment.
2. Local materials.
Neither of these criticisms are valid. It is not economically beneficial for most large infrastructure projects to employ outside labour or materials, because transportation and shipping costs would be economically inefficient. To an extent, this should mitigate some of the impacts of the previous criticisms because it is mostly the employers of the medium-sized contractor companies that are cut out who will be economically hurt. It is not the same as Wal-Mart or Target, businesses based on the idea of shipping their materials into the local economy.

Also, there is the possibility that some of these P3 bundled companies are going to be foreign, thereby seeing foreign companies benefit from Canadian tax payer dollars. While this is true, the current government agenda is to induce more foreign direct investment. It is one of the reasons Canadians have cut the corporate income tax rate to its current levels. Therefore, I would not consider this a valid criticism.

Finally, there is the criticism inherent to all P3s in general, regardless of the bundling concept. I have not attempted to advocate for the suitability of P3 risk transference in this paper, but I will address the main criticism, as it is worthwhile to further the argument. This is the debate as to whether or not risk transference is worth paying a larger amount to the contractor as compared to the traditional asset. It is a concern about what we value at any given point in time. I believe there is no concrete solution, and there probably never will be. However, it is important to remember that Canadian P3s live up to strict accounting and industry standards, and that concerns about the validity of P3s need not center around factual validity. Figures are often independently checked twice during and after the VFM process. If then we assume P3s are a valid enterprise based on our subjective values inherent in risk assessment, I believe we can move forward on the bundling model argument.

I have demonstrated that the success of P3s hinge on their risk transference assessment in their cost-benefit analysis (their VFM), which will always be somewhat subjective. Within the P3 paradigm, bundling of projects is a proper strategy to further leverage risk in favor of the government because bundled projects (i.e. a road network) provides good value to the government. Practically speaking, bundling of P3 projects in the Canadian system is best done with P3 Canada on municipal roads. This is because P3 Canada is large enough to employ economies of scale to a greater degree than any other P3 group in Canada, and municipal roads represent by far the greatest portion of Canada’s infrastructure deficit. They are also homogenous projects, meaning they can be completed in much the same way in multiple areas, employing the same materials, the same employees, etc. Other P3 bundling municipal roads infrastructure projects are in operation, but there is still a lot of unused potential for this method to reduce the Canadian infrastructure deficit. I suggest the next prime candidate is Toronto, because it has a massive infrastructure deficit and spends enough on municipal roads infrastructure to justify the conditions required for P3 Canada risk transference. In any massive project, it is better to first pick the low hanging fruit. In this case, the low hanging fruit is municipal roads infrastructure, the most accessible fruit tree is Toronto, the best way to pick is through bundling, and the best picker is P3 Canada.
References:

Footnotes:


10. “Canadian Infrastructure Report Card,” Infrastructure Canada, last modified 2012,
