YOUR ESSENTIAL GUIDE TO COLLABORATIVE PROJECT DELIVERY MODELS

Trends in alternative models for building design collaboration

AUTODESK.

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Project delivery is increasingly collaborative

Reflecting a trend towards a more integrated approach to design and construction, the AEC industry is prioritizing the development of collaborative processes with external parties and also looking closely at alternative models of project delivery.

Design-Bid-Build (DBB) is the traditional and most commonly used project delivery model. Comprising three linear phases: design, bid, and build; it creates a clear separation between the design and construction phases

Project owners appoint a team of architects in the first instance, to prepare the design and bid documents, including drawings, technical specifications, and work schedules. They then invite contractors to respond to a Request for Proposal (RFP) to manage the build, usually on a single-stage, competitive basis. Typically, but not always, the criteria for selection of a contractor is the lowest price.

This tried and tested model has a few key advantages for the owner. Because they sign off the drawings before the bid process begins, owners have a good idea of the final quality of the design. They retain a large amount of control and can tweak the designs to alter the outcome once the project is underway, albeit for additional cost. Also, DBB is relatively low risk because the contractors take financial responsibility for the build phase.

However, it does have its limitations. There is no opportunity for the architect and contractor to collaborate during the design phase. Miscommunication between the owner, the architect and the contractor is common. As such, construction costs can spiral out of control as design conflicts only become apparent and must be addressed during the build phase. Also, some believe selecting the lowest bidder compromises quality, since the contractor selects materials and approaches with profit in mind.

While there is still a place for DBB, owners, architects and contractors are increasingly selecting more collaborative alternative project delivery models. In these models, all parties work together earlier on in the design phase, enabling them to address and resolve potential issues before construction begins, delivering better-designed buildings faster and more cost-effectively.

We've put together this essential guide to help you navigate these less familiar models. It outlines the advantages of the most popular approaches, as well as the potential pitfalls, to help you evaluate the relevance of alternative project delivery models and decide whether your next project is better suited to a more collaborative approach.

COLLABORATIVE DESIGN PROJECT DELIVERY MODELS

Design-Build

DESIGN-BUILD
What is Design-Build?

In contrast to a traditional Design-Bid-Build (DBB) approach, in which the architect and contractor bid separately, Design-Build (DB) requires both parties to bid on a project together. DB agreements can take on many forms, including contractor led, architect led, integrated or joint venture.

Generally, DB projects are contractor led, based on an agreement between the owner and the contractor, with the contractor appointing a team of architects to complete the design. The owner can either hire the contractor to oversee the design work, or if they want more influence, they can employ a team of architects to produce an initial design, and then appoint a contractor to finalize and then carry out the build.

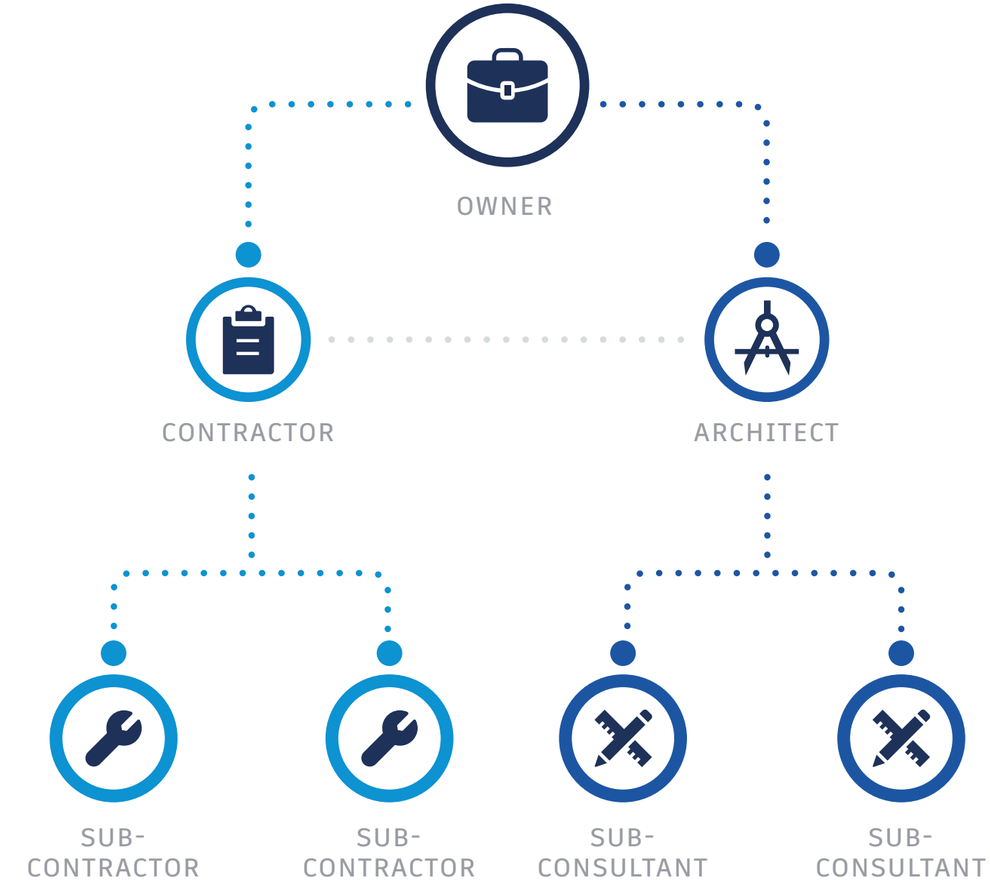
Alternatively, but less commonly, DB projects can be architect led, based on a contract between the owner and the architect, in which the owner appoints an architect to oversee both the design and the build.

Benefits of DB

With DB, either the architect or the contactor takes full responsibility for the delivery of the project, which is an appealing proposition for many owners. Dealing with only one party saves the owner time and can reduce the number of errors resulting from miscommunication.

The DB approach is particularly suited to projects with very tight schedules because the build phase can start before the design phase is complete. Projects can be divided and delivered in a modular way to achieve completion. For example, there may be several wings to a hospital build. With DB it's possible to design one wing and get the build for this underway, before moving on to the design for wing two.

Because the architect and contractor work together throughout the entire project, they are better able to predict and control costs. This benefits the owner, since they can establish a guaranteed maximum, fixed price early on. Subsequent changes in budget are rare, and generally only happen due to unforeseen circumstances or if the owner makes an additional request. Owners can also benefit from lower costs during the build phase, because the architect team designs with cost efficiency in mind.



Limitations of DB

DB is still a relatively unfamiliar model for many owners, architects and contractors. Collaborating earlier in the design phase means all parties must take on new responsibilities and find new ways of working. It's important that everyone clearly defines and communicates expectations from the beginning, to minimize conflicts further down the road.

Owners must come to terms with the fact that they are choosing the best team rather than the best individual architect and contractor. Trust is also a factor. Since there are very few checks regarding change orders, payments and subcontractor negotiations, all parties must establish a high degree of trust with one another.

Ir. Ives Veelaert, Autodesk's Technical Sales Specialist, AEC EMEA, says DB projects can, by their very nature, deliver more standardized results. "The lead contractor probably has a list of subcontractors they work with on a regular basis, which can mean projects all start to look the same. They use the same doors, the same windows and so on. The owner may prefer a different style of door, but with DB they have little influence over these decisions," he says.

Although DB projects are generally considered to be more stable in terms of minimizing changes and avoiding additional costs, when revisions are needed they can prove expensive. Contractors can, in theory, charge what they like, since additional costs are not subject to competition.

Julien Drouet, Autodesk's Senior Technical Sales Specialist, AEC EMEA, says: "DB may not always deliver the best price, since the absence of a bid process between the design and build phases means there's not as much competition in the first instance."

Best uses for DB

DB is best used for large, very specialized or highly technical projects where the owner has a clear vision of what's required before the design phase – for example, hospitals, and nuclear or military facilities.

"With these projects, costs can change significantly depending on choices made early on in the design phase. It makes perfect sense to select a DB delivery route so contractors are engaged early on and can advise on the implications of design choices," says Julien Drouet.

Ives Veelaert adds: "These projects are very complicated and extremely expensive. If owners do not have a clear vision and design agreed upfront, they will end up having to make changes during the costly build phase. These changes can be so crippling they run the risk of derailing or even bankrupting the project."

DB is also a great approach when deadlines are tight, since there's no time-consuming bid process between the design and build phases.

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Senior Technical Sales Specialist
AEC EMEA
Autodesk

Integrated Project Delivery

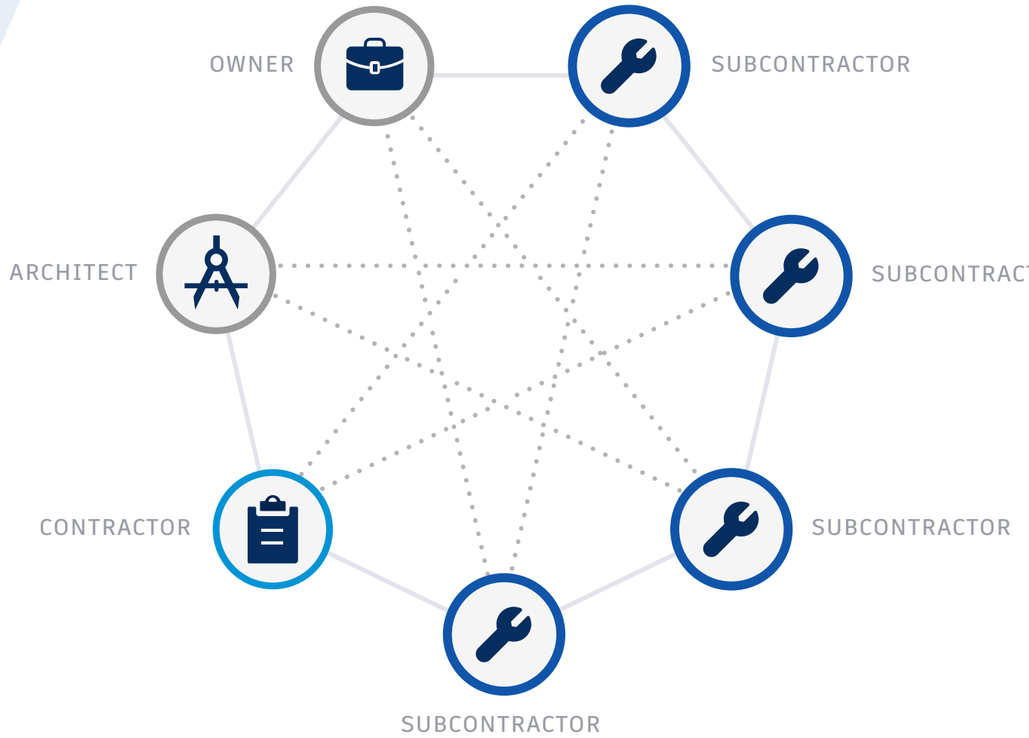
What is Integrated Project Delivery?

Integrated Project Delivery (IPD) is a relatively new delivery model, only gaining popularity in the last decade. It's like Design-Build (DB) in the sense that all parties work closely together from the outset. The key difference is that the owner takes a much more active role and must remain highly involved throughout. In an IPD approach, the owner, architect and contractor enter one contract and function as a collaborative team to design and build the project.

"IPD represents a radical departure from traditional delivery methods that isolate responsibilities, liabilities, communication, risks and rewards with contracts that often lack incentives to work toward a successful project for everyone", explains Gregory R. Andre, Partner at Chicago Law Firm K&L Gates. "Parties to an IPD team have incentives to do what is best for the project, rather than what is best for themselves. To motivate the design and construction team and get the best performance out of them, IPD generally favors a 'carrot' approach; whereas, traditional delivery methods generally use a 'stick' approach".1

Using the talents and expertise of all participants and typically utilizing Building Information Management (BIM) processes, IPD can lead to highly efficient and streamlined project delivery. Technology has contributed to the rise in popularity of this model, by bringing together disparate teams and enabling them to collaborate around a shared goal.

"IPD is an evolving delivery method based on broad concepts that can be customized on a project-by-project basis. There is no such thing as one way to do a project by IPD, and there is no need for a rigid definition of it. When a group decides to form a partnership and act as partners, they are free to define their relationship as they wish, and IPD is much the same," says Gregory R. Andre.



Benefits of IPD

IPD provides opportunities for increasing efficiency and improving results through cross-functional collaboration. Responsibilities and decisions are shared, resulting in shared goals. Better communication reduces the risk of design errors and omissions. When team members meet regularly, in the real or the virtual world, to share their ideas, all parties are kept up to date, meaning there should, in theory, be no unexpected delays or surprise costs. IPD speeds up project delivery since the amount of time wasted is kept to a minimum. Using BIM processes means project owners benefit from even greater efficiencies, through initial cost savings and further down the line through reduced costs during the operation and maintenance of the building. Since there's a central repository of information, parties find it easier to carry forward the learnings from one project to the next.

Limitations of IPD

As many architects and contractors are still unfamiliar with the IPD delivery model, and those who are familiar with it may not have yet worked on a IPD project, for most, IPD involves a learning process. In some instances, this involves training on new technology and often a good dose of persuasion. Contractors are involved in the design phase, and architects in the build phase. This merging of traditionally distinct roles means that IPD contracts legally bind both parties into a single entity, and risk that is usually given to one party is now spread across all parties. In some instances, highly capable architects and contractors may refuse to take part in IPD due to the risk of having their compensation vary with the success of the overall project, some of which is out of their control.

Using the IPD model doesn't automatically mean team members trust each other. All parties will need to invest a significant amount of time in getting to know each other, including acknowledging each other's working styles and forgiving each other for their weaknesses to develop a good working relationship. Strong management and leadership is essential to ensure all parties participate actively and equally.

Owners may have trouble in financing projects since IPD is also a new concept for lenders, some of whom may not yet trust the approach. Also, getting all the core IPD team members to agree on one form of multi-party agreement is an inherently troublesome process that could take time. Ives Veelaert says: "The lack of a legal framework for IPD can be very off-putting and many are scared to put in place a contract without this sort of standardized guidance. In reality, however, it can be done and the rewards make the process more than worthwhile."

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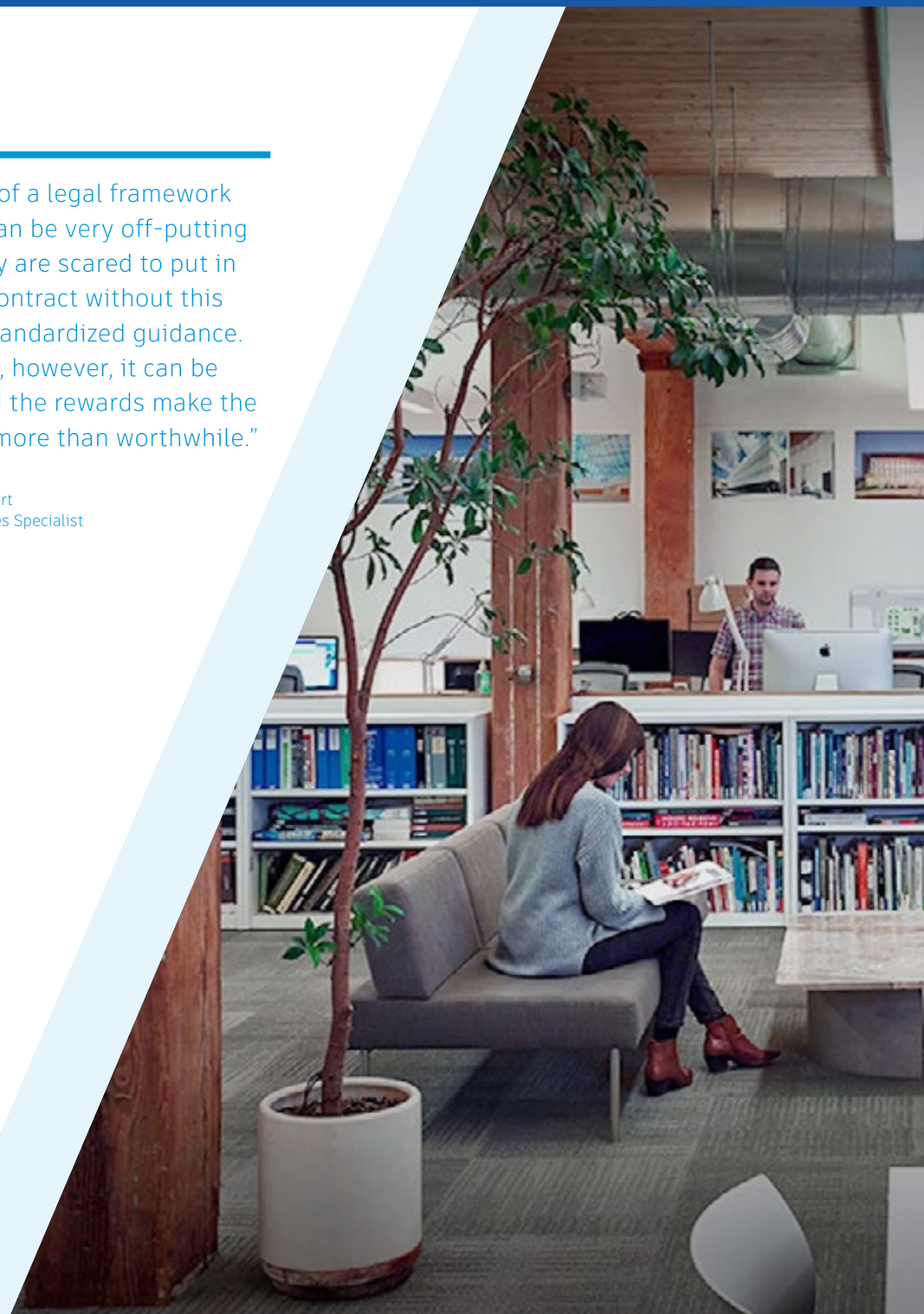

Benefits for uses of IPD

"IPD is best suited for largely undefined, complex or unique private sector projects where the owner has specific ideas or requirements for how the building will be operated and used. For example, corporate headquarters, museums, hospitals, research and development facilities, and industrial plants like production lines," explains Julien Drouet. "These sorts of projects, particularly if there are tight time constraints, will benefit most from the collaborative, teamwork approach of IPD."

For these reasons, some do not consider IPD to be an appropriate delivery method for smaller, fixed design, high-volume projects such as housing estates, supermarkets and other big box retailers. Ives Veelaert disagrees: "Smaller residential type projects tend to be very repetitive. If one system works well with one build, it can be reused for future projects. IPD, with its central information hub, makes it easier to share knowledge between projects. While it is easier to prove the return on investment on larger projects, IPD still offers huge benefits for smaller projects."

Public projects are generally excluded from going down the IPD route, due to the lack of a bidding component.

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COLLABORATIVE DESIGN PROJECT DELIVERY MODELS

Joint-Venture

Joint-Venture

What is a Joint-Venture?

A Joint-Venture (JV) is a collaborative and commercial enterprise undertaken jointly by two or more parties. Each generally has a need, or brings skills and expertise, which are central to the development and success of the business they create – for example owner, architect and contractor. Each party then shares the associated risks and rewards.

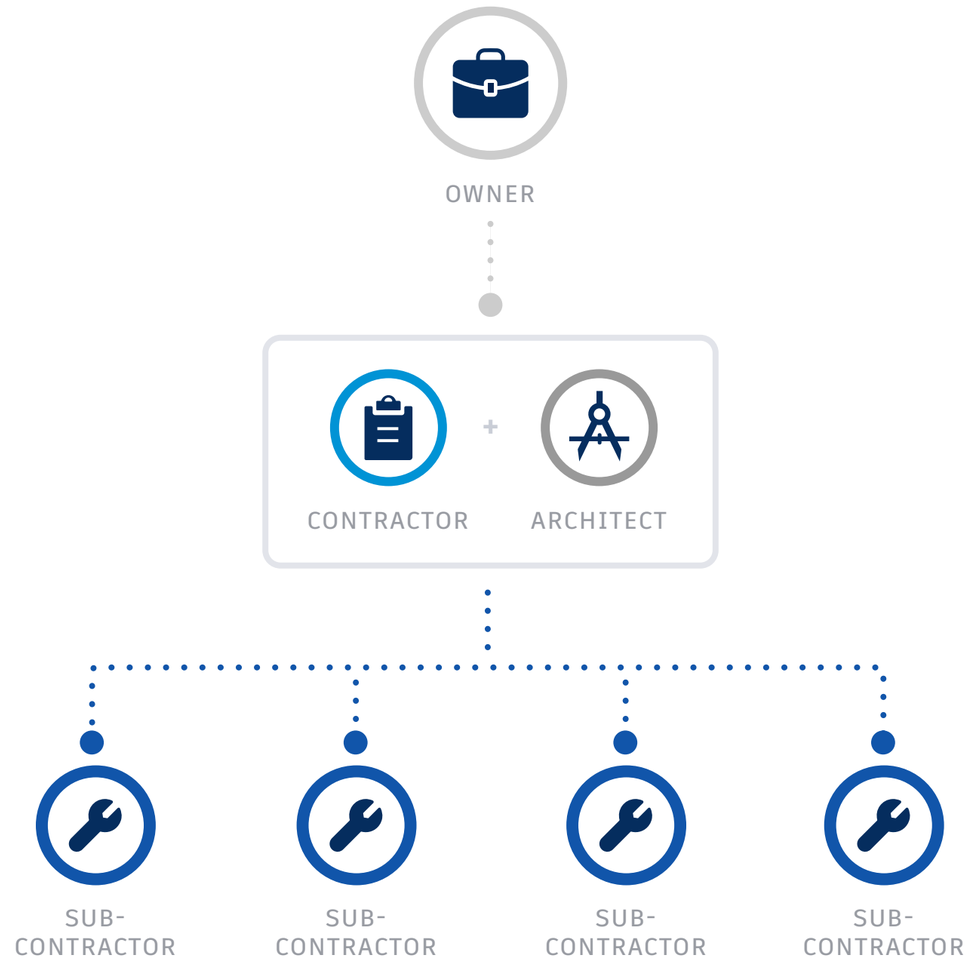
It is vital that the parties have a 'shared vision' about the objectives for the JV and that staff take the time and effort to build strong working relationships. To ensure success, it is also recommended that the involved parties put in place collaborative working practices and shared technology platforms.

The emergence of huge construction projects in the Middle East and Asia, and PF2 – the latest iteration of the Private Finance Initiative in the UK, are increasing the popularity of the JV project delivery model.

JVs can be set up in various ways, using different corporate structures, depending on the degree to which the parties wish to integrate.

It is very important that the structure, resourcing and governance of the JV is clear from the outset. Some of the most common structures for JVs are:

- A limited liability company (Ltd), in which companies A and B get together to create a new company with a separate identity with, for example, a 50/50 ownership split
- A conventional partnership, in which equity is owned by two or more parties who are jointly and separately liable for all the debts of the business
- A limited liability partnership (LLP) where the liability for debts is limited to the amount of the investment
- A contractual agreement



In addition to the structure, it's also important for the involved parties to consider the various tax implications

Rupert Rawcliffe, Director of Corporate Finance at tax and consulting firm Grant Thornton, explains: "If the JV includes councils or local and central government, extra care needs to be taken as these bodies typically benefit from tax exemptions if they carry out their own activities. These tax exemptions can also extend to Stamp Duty Land Tax (SDLT) on land purchases.

"While a JV company (Ltd) is subject to tax, as a distinct legal body other types of JV such as conventional partnerships and LLPs are tax-transparent. This means that the JV is not subject to tax itself – instead the JV partners pay tax per their own circumstances. Thus, tax-transparent entities are often favored. That said, limited companies offer other commercial advantages and the benefit of tax groupings (subject to ownership percentages)."[2]

Benefits of a JV

JVs are an effective way for smaller companies to deliver large projects through combined skills, resources and experience. By doing so, they can secure work on projects that they would otherwise be unable to operate under their own steam. Ives Veelaert notes that in his native Belgium many smaller architects and contractors start to form JVs with trusted partners when they want to move up from smaller residential projects to work on much larger scale builds.

Sometimes the cost of starting a new project is extremely high. In these instances, a JV can help to mitigate risk by sharing it across two or more equally invested parties. They then share the resulting profits.

Limitations of a JV

The most common reasons for the failure of a JV are the ineffective sharing of information and a lack of an effective procedure for dealing with issues before they become a problem. A report by property consultancy EC Harris warns that one in five construction joint ventures in the UK ends in a dispute between parties.

This is primarily a result of failing to properly administer the contract, failing to understand or comply with contractual obligations, owner imposed change, conflicting interests and incomplete or unsubstantiated claims.[3]

JVs can succeed, but for them to do so it's essential to outline the roles and responsibilities of each party from the outset and to put in place good governance to resolve any problems before they become critical.

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Best for uses for a JV

JVs are best suited to delivering very large projects which benefit from pooled expertise and resources. They are a very useful vehicle for smaller niche companies wishing to secure larger projects. Conversely, they are also beneficial for larger companies who wish to acquire new resources or benefit from the expertise of a smaller company.

Since different countries have different laws and regulations, forming a JV with a local company is a useful approach for any company wishing to access building projects in overseas markets.

JVs are also an effective way to share costs and risk and enable smaller companies to benefit from the credibility and financial stability of larger companies.

Rupert Rawcliffe explains: “For example, one issue that companies face in a downturn is maintaining a healthy balance sheet. Businesses with a wealth of experience and near-perfect credentials can be turned down for work due to a poor balance sheet. Particularly in the construction industry, a client wants to know that if something goes wrong a company can ‘make good’.”

By forming a JV with a larger company with a strong balance sheet, it’s possible for a smaller company to present itself as having a healthier balance sheet, to secure work.

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COLLABORATIVE DESIGN PROJECT DELIVERY MODELS

Public-Private Partnerships

Public-Private Partnerships

What is a Public-Private Partnership?

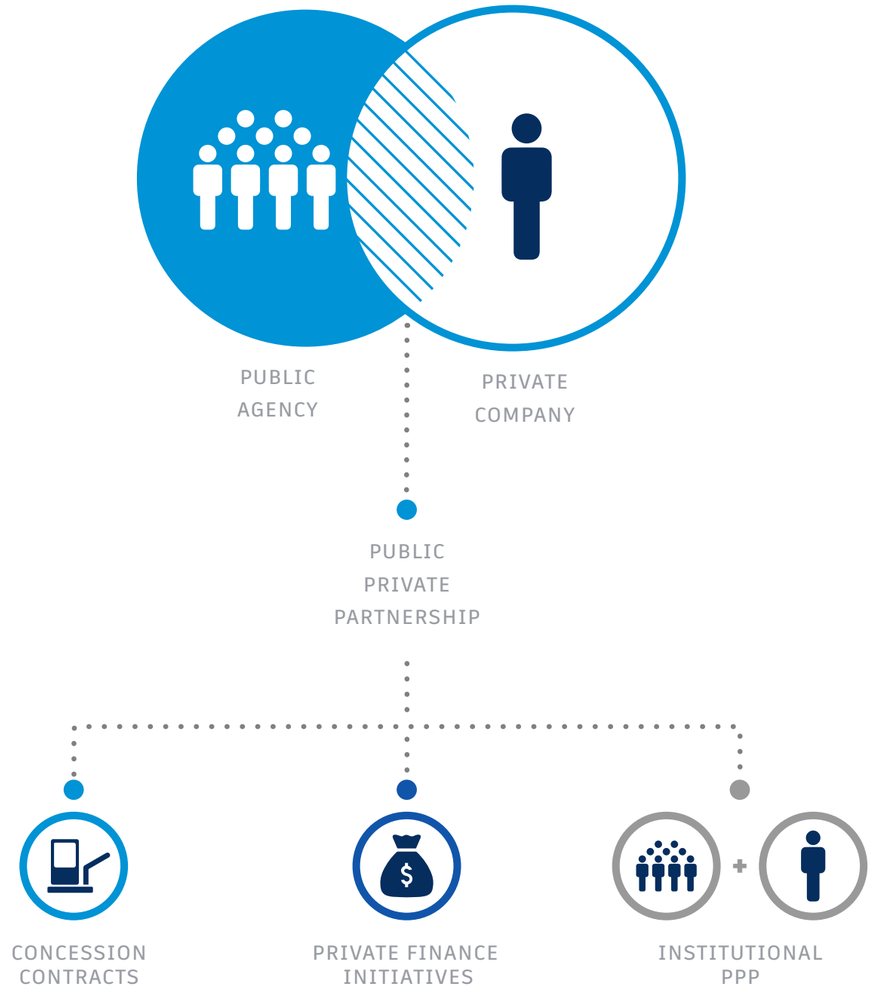
A JA Public-Private Partnership (PPP or P3) or Alternative Financing and Procurement (AFP) as it is known in Canada, is a partnership between a government entity – either central or local government – and a private corporation who then funds, builds and, in many instances, operates and maintains public buildings or infrastructure. In return the public entity makes an annual payment and can regulate to maintain proper operation.

PPPs first appeared in the UK in the 1990s, devised on the premise that private corporations are better placed and more efficient at providing services than public entities, thus delivering greater value for tax payers' money.

PPPs are now popular throughout the UK, Ireland, the Netherlands, Portugal, and Spain. Beyond Europe PPPs are increasing in popularity in the Middle East, South Africa, Japan, Australia and Canada, but are only slowly gaining ground in the United States.

There are three main categories of PPP:

- Concession contracts, where a private corporation provides a concession on behalf of a public authority, for which the public pays them. For example, a private corporation may agree to fund the construction of a highway under the agreement that it will then receive a specific percentage of the revenue that is generated from user tolls;
- Private Finance Initiatives (PFI), where a private sector company finances and provides a public service that might include construction, maintenance and operation, for which they are paid by a public authority over a set period;
- Institutional PPP where a Joint Venture is established by a public entity and a private corporation to provide a public service.



Benefits of a PPP

JMany believe PPPs deliver higher-quality buildings and infrastructure than traditional government-only models. Julien Drouet explains: “In a PPP, contractors are involved from the outset and are sensitive to the fact that they have to use high-quality materials and designs, as they are also responsible for the operation and maintenance over the long term. They know that better installations lead to higher profits.”

For the public entity, the key advantages are finance-related. There is no need for them to pay upfront rather, they can spread the costs over many years. This enables them to fund extensive building and infrastructure projects without substantial tax rises and without the investment appearing as government debt.

In the past, without a PPP agreement public sector construction projects have tended to overrun and go massively over budget. Under a PPP, the government entity measures the performance of the private corporation in delivering a project by a fixed date and for a fixed price. If they deviate from this schedule in any way, they must pay compensation to the public entity. This provides huge motivation for them to finish projects on time.

Limitations of a PPP

There are many advantages to the PPP model but there are also disadvantages associated with entering a partnership, and most of these seem to fall with the public entity. For example, the motivations that drive private corporations to operate as efficiently as possible can also lead to corners being cut when it comes to operation and maintenance. This could cause problems further down the line, particularly when, at some point, the public entity takes over the operation of the building or infrastructure or tries to find a new operator when the contract has ended.

Public partners also need to be wary of unequal partnerships where the expertise is primarily in the private corporation. This could make it difficult for the public entity to assess proposals and costs for accuracy. Also, public partners should watch out when awarding large and unique PPP contracts. Since there may only be a select number of private corporations big enough or specialized enough to take on the project, a lack of competitiveness may lead to higher costs.

Best uses for a PPP

The PPP delivery model is best suited to large-scale public sector building projects with a capital cost of over USD 25 million or infrastructure projects like bridges or highways where a toll can be charged.

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COLLABORATIVE DESIGN PROJECT DELIVERY MODELS

Conclusion

Delivery models at a glance

PROJECT DELIVERY MODEL	BENEFITS	BEST FOR
Design-Build Generally, contractor-led project based on an agreement with owner in which contractor appoints and manages the project team	Collaboration early in the design phase helps manage costs and timeline	Large, very specialized or highly technical projects
Integrated Project Delivery (IPD) Owner, architect, and contractor enter one contract and function as a collaborative team to design and build a project	Shared responsibilities, decisions, and goals, resulting in faster project delivery	Complex private sector projects where owner has specific ideas or requirements
Joint Venture (JV) Collaborative and commercial enterprise undertaken jointly by two or more parties which share risks and rewards	Effective way for smaller companies to deliver large projects by combining skills with other firms	Very large projects that benefits from pooled expertise and resources
Public-Private Partnership (PPP or P3) Partnership between government entity and private corporation that funds, builds and may operate public buildings or infrastructure	Involving contractors from the beginning can contribute to higher-quality buildings. Costs can be spread over time and do not appear as government debt	Large-scale public sector building projects with capital cost over USD 25 million

CONCLUSION

Choosing the best delivery model for your project is an important decision, and you may feel tempted, or indeed pressured, to fall back on tried and tested routes. Sometimes traditional models like Design-Bid-Build (DBB) may be the most appropriate; however, at other times it may be that there's a more collaborative model that could better meet the goals and requirements of your project.

The decision should be based on numerous factors, including the budget and schedule; the complexity of the project; the owner's level and areas of expertise; and the amount of risk they are prepared to take on. Hopefully this guide has gone some way toward explaining the various options available and how they are best applied. And next time, you may decide to push the envelope and try something new.

Find out how Autodesk technology can underpin your collaborative project delivery model by providing centralized access to BIM data in the cloud.

FIND OUT MORE

LEARN MORE ABOUT THE AUTODESK SOLUTION FOR CLOUD-ENABLED BIM COLLABORATION

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