

Integrated Project Delivery: Complicated Collaboration or Improbable Panacea

William A. Moylan¹, PhD, PMP and Nadia Arafah², ABD

^{1/2}College of Technology, Eastern Michigan University, Ypsilanti, Michigan 48197

Abstract

Integrated Project Delivery (IPD) is different from traditional construction project delivery methods. IPD requires early involvement of key parties with sharing of decision-making, control and project risks. Removing the associated liability encourages the parties to focus on producing the best, economical design while executing the construction efficiently and effectively. In IPD, the facility owner pays for direct costs and overhead, theoretically striped of profit. The risk of losing money is minimal with the opportunity to share in net budget savings. IPD seems like a panacea; however, skeptics remain. The typical designer and constructor, both pragmatic by nature, are distrustful of unproven methods. IPD seems complicated to those not attuned to creative problem solving. IPD participants must be trusting and trustworthy, able to collaborate and cooperate, and, communicate ethically and sincerely – not common traits of the construction industry. The paper compares and contrasts these positive and negative aspects of IPD.

Introduction

Integrated Project Delivery (IPD) has been touted with both raves and reservation as a construction project delivery method. IPD boasts better buildings thanks to multiparty contracting with trustworthy partners. However, detractors warn that IPD remains as complicated as it is collaborative.

In IPD, project risks are shared equally among the multiparty contract entities and offers subsequent profit sharing from any positive budget balances. Removing the associated liability encourages the parties to focus on producing an economical design and executing the construction activity efficiently and effectively. The IPD project is organized like a business with early involvement of key players with shared team decision-making and control. Orientation [onboarding] is critical because IPD's approach, process and vocabulary are different from the normal project delivery methods. In IPD, the facility owner pays all contract signatories' direct costs and overhead, theoretically striped of profit. The team of designers and contractors contribute to a profit pool, based on a target price. The risk of losing money is minimal with the opportunity to share in the net budget savings (i.e., profit). Moreover, IPD offers opportunities for repeat business with trusted partners.

However, skeptics remain. The typical designer and constructor, both pragmatic by nature, has honed their business skills from the school of hard knocks. IPD seems complicated to those not attuned to team-based, creative problem solving. IPD participants must be technically knowledgeable with the requisite business savvy, be good at ‘playing well’ with others, and exhibit good communication skills; not the typical tool-kit of the A/E designer and construction manager.

The paper reviews the background of IPD including requirements, compares and contrasts the positive and negative aspects of IPD, and, suggests recommended practices to ensure the best brick for the buck from IPD.

Background – Constructed Facility Project Delivery

The methods and means by which the Constructor delivers the completed facility [the “how”] based on the design of the Architect / Engineer [the “what”] is important.

Construction Contractual Arrangements

In construction, the contract type will vary over the project life cycle. Typically, reimbursable contracts are used for the conceptual and design work at the beginning of the project, and fixed-price contracts are preferred for the construction work. The following factors affect the selection of the contract type for a specific work package: level of detail available, urgency of the procurement, level of competition desired, level of competition available, and, organization’s risk utility or tolerance.

The major types of construction contracts (PMI, 2008) are as follows:

Fixed-price or lump-sum contracts. The contractor performs the work for a fixed, lump-sum price according to the contract bid package.

Unit-rate contracts. The contractor performs the work for specified unit rates.

Cost-reimbursable contracts. The contractor performs the work on a reimbursable cost basis plus a professional fee. The fee can be a fixed amount, a percentage of the costs up to a target amount, an incentive amount, or, other variations.

Time and materials contracts. The contractor is reimbursed for the time spent and resources expended on the work performed.

Facility Project Delivery Approaches

In construction, a project delivery method refers to selecting the best strategy for project execution, including the project procurement activities. The strategic decisions made at this point determine which portions of the project are best suited

for a particular execution approach depending upon a number of factors such as degree of definition, schedule, and cost requirements and uniqueness of requirement.

Alternative project delivery methods (PMI, 2008) include the following:

Design-bid-build (traditional method). The design and the construction functions are performed by separate organizations. This is the traditional construction method where the construction is solicited by way of competitive bidding after the design is essentially complete.

Design-build. The responsibility for both design and construction is obtained from a single source.

Turn-key. The contractor has overall responsibility for delivering the project to an owner, providing all services for initial concept, design, purchasing, construction, commissioning, and start-up.

Construction management. The construction management (CM) entity manages the overall functions of the project including design, bidding, purchasing, and construction. The CM can execute the construction on an agency or on an at-risk basis. During construction, the at-risk CM functions much like a general contractor with their subcontractors; whereas, the agency CM manages the work of prime contractors and their subcontractors.

Single-source, non-competitive. In cases where the construction requirements are unique or where there is only one source for the desired result, a negotiated contract with the source is the usual way of accomplishing this.

Design-build-operate-maintain-transfer (DBOM). This method encompasses the design-build method with the added feature of time scaled functions for operating and maintaining the product after construction is completed. After the DBOM contract is completed, the product is transferred to the buyer, and/or another contract is procured for continuation of the operating and maintaining functions.

The next section reviews the requirements of IPD, a new constructed facility delivery approach that requires the facility owner, designer, and constructors all to change from their traditional roles into a new arrangement of cohesive collaboration.

IPD – A New Delivery Approach of Collaboration and Trust

Simply put, Integrated Project Delivery [IPD] throws out the traditional rules of the construction game. In an ENR cover story (June 10, 2015), the title tells the story - “Raves and Reservations: Integrated project delivery zealots boast better buildings thanks to multiparty contracting but warn the IPD remains as complicated as it is collaborative.” The IPD discussion/debate note several game-changing points. First, IPD requires sharing project risks as a team among the multiparty contract entities. Removing liability encourages the parties to focus on producing an economical design and executing efficiently and effectively as possible. Second, each project organized much like a business with early involvement of key players, and, team decision making and control. For newcomers, orientation [called onboarding] is critical because IPD’s approach, process and vocabulary are vastly different from the

normal project delivery methods [Design-Bid-Build, CM at Risk, Design-Build]. And thirdly, in IPD, the facility owner pay signatories' direct costs and overhead, theoretically striped of profit. Designers and contractors contribute to a profit pool, based on a target price. The risk of losing money is minimal (ENR). The sharing of project risks, especially the "waiver of liability" associated costs, offers significant rewards for the team partners. The brave new world of IPD beckons.

Working Definition of IPD

According to the AIA California Council (2007/2010), Integrated Project Delivery (IPD) in working environments is described as a project delivery strategy that integrates people, systems, business structures, and disciplines into a manner that collaboratively manages the expertise of all participants in the project in order to reduce waste and optimize efficiency. Integrated Project Delivery principles can be implemented into a variety of contractual forms, and the Integrated Project Delivery team usually includes members outside of the basic triad of owner, designer, and contractor. Responsibilities are usually on the most qualified member of the IPD team with decisions being made on a "best for project" basis (NSBA, 2010).

AIA's working definition of IPD has three main steps: First, the integrated practice is defined. Using the computer aided design (CAD) technologies such as the Building Information Modeling (BIM) is recommended in the stage to allow efficiency in the workflow. Second, the Essential Principles are and collaboration policies should be set as necessary and the compliance should be enforced with in the IPD team. Finally, project workflow should be cleared and started by the Integrated Team and concluding with Integrated Closeout (AIA/CC, 2010).

IPD Methodology

According to the *Integrated Project Delivery For Public and Private Owner's Manual* (2010), IPD offers a tiered approach to collaboration based on three levels. The three levels show the usual spectrum through which owners move. Authoritative constraints, policy limitations, and cultural barriers, are some of the factors that affect where on this collaboration spectrum the owner will be.

The three Collaboration Levels are: (a) *Collaboration Level One*: Typical collaboration, contracts are not required; (b) *Collaboration Level Two*: Enhanced, some contractual collaboration requirements; (c) *Collaboration Level Three*: Required, requires a multi-party contract.

Conventional design development has workflow boundaries that do not align with a collaborative process. In general, integrated project delivery will result in greater intensity with enhanced of the team involvement in the early phases of design. In the integrated project, design will flow from a) determining the project goals, to b) what will be built, then to c) how the design will be realized, as shown in Figure 1 in the Appendix (AIA/CC, 2010).

IPD Phases. IPD is a cradle-to-grave methodology, involving all parties inclusively and exclusively for the complete length of the project from the initial inclination for facility expansion by the owner into facilities management. The IPD eight-phase process is: (1) Conceptualization phase [expanded programming], (2) Criteria design phase [expanded schematic design], (3) Detailed design phase [expanded design development], (4) Implementation documents phase [construction documents], (5) Agency review phase, (6) Buyout phase, (7) Construction phase, and (8) Closeout phase. (AIA, 2007). IPD is similar to the design/build delivery approach, with the caveat of the involvement of all key parties working together from the onset at the conceptualization phase.

IPD Essential Principals. The foundation of IPD is built on collaboration. Successful IPD endeavors require the following essential principals in order to live well and prosper: (a) mutual respect, (b) mutual benefit, (c) early goal definition, (d) enhanced communication, (e) clearly defined open standards, (f) appropriate technology, (g) high performance, and, (h) leadership (AIA, 2007). These principals are not easily acquired and require significant investments in time and effort to initiate, develop and then sustain.

The IPD method is based on the team principles of trust, shared risk and creative collaboration. The next section will review the benefits of the IPD process.

IPD Benefits

The benefits of IPD are evident in improved project execution – improvements in budget performance [cost], time efficiency [schedule], and facility serviceability [quality]. In addition, the integrated team approach will benefit the participants as to a more satisfying project experience based on trusting relationships and a lean approach [less waste] to the construction of the facility.

Improved Project Execution

Improved project execution comes from improvements in better cost budget performance, improved time efficiency, and overall facility quality.

Cost Budget Performance. In the IPD approach, the cost structure is developed earlier and in greater detail than a conventional project. Costs may be linked to Building Information Model [BIM] to allow rapid assessment of design decisions. Cost structure is accessible to parties to evaluate areas where greatest improvements are possible.

IPD promises significant cost savings over traditional delivery methods, like Design-Bid-Build [DBB]. With IPD, value is added and continuous improvement is achieved by the teamwork approach and participation by all core team members, including the contractor, from the inception of the project. Savings of up to 30% in

the cost of construction can be achieved where integrated teams promoted continuous improvement over a series of construction projects (RJO, 2015)

Execution Time Efficiency. Taking an integrated approach can speed up project delivery. Better communication and shared risks can help reduce the amount of time wasted normally wasted on senseless bickering over non-essential items, allowing teams to deliver projects on time if not ahead of schedule. However, until IPD becomes a mainstream delivery method with a widely recognized organizational and legal structure, the extra time required to assemble the appropriate team upfront could be considered a detraction.

Overall Quality of the Facility. By owning both the design intent as well as budget and schedule performance, the entire team is compelled to focus on the overall quality of the completed facility instead of making conflicting changes for the individual company's best interest. The integrated approach leverages the entire brain trust of the team partners to produce the optimal facility in balanced terms of serviceability [function] and aesthetics [form].

Trusting Partnerships

The leadership traits of trust, integrity, and people-orientation are critical to success in the construction industry (James, 2002). IPD builds on the trust among the partners, which is essential in any design-construction endeavor.

For the IPD approach to truly succeed, the individual team members must believe that they are working for the project instead of their respective companies. Individuals must be ready, willing and able to accept all project responsibilities jointly. Trusting partnerships leads to improved team relations with less waste in effort and minimal aggravation.

Improved Team Relations. The symbiotic relationship that exists between IPD and trust is axiomatic. Trusting relationships are a requirement for IPD to function [system-based trust], and, IPD communication augmented with trusting behavioral principles [cognition-based trust] (Pishdad-Bozogi & Beliveau, 2016).

IPD allows for creative problem solving and subsequent profit sharing. Long term, successful IPD endeavors offer future opportunities for repeat business with trusted partners. Trusting partnerships require open/honest communications among the team partners. The esprit décor tone of the team allows for collaborative instead of combative relationships. IPD is complicated to the new comers; participants must be technically knowledgeable with business savvy, be good at 'playing well' with others, exhibit good oral & written communication skills.

Less Waste. Utilizing the IPD process engages heartily the principles of *lean construction*, which offer two main advantages over the traditional design-bid and design-build processes. The IPD approach reduces waste. The IPD project will have

reduced waste in the design and construction processes as much as twenty percent over the traditional approach. Further, IPD increases the reliability of the planning process. The IPD project eliminates the inability to plan work reliably and effectively by removing the unpredictability of the workflow (LC, 2014).

Challenges Using the IPD approach

The IPD approach challenges the facility owner, the designer and the constructors alike. Overall, it is critical that all three entities; i.e., the Facility Owner, Designer and Constructor, equally agree on the contract as well as believe in the process. The IPD differences in contractual obligations and consensus teaming versus the traditional adversary approach, gives rise to fundamental cultural shifts and non-conventional project experience that must be addressed, or at least admitted by the project participants (NASFA, 2014). IPD is a brave new world.

Facility Owners

The Construction Owners Association of America [COAA] note their members high interest in the cost savings and improved facility quality offered by IPD, but are reluctant in complete endorsement. The facility owner must lead the paradigm shift, including exhibit of willingness to change, take risks, and develop a culture of trust. (COAA, 2016)

As the farmer opined about a talking mule – everything is fine as long as the mule remembers who owns the farm. Is the facility owner willing to take this leap to share their “farm” [project control] with the “livestock” [designers, constructors and the construction trades]? The large, sophisticated facility owner with a significant facilities portfolio will very likely enjoy the benefits of IPD. Conversely, the casual developer without the significant investment in fixed assets will not consider IPD worth the effort.

Designers

In IPD, all participants are working together in the early stages of the project where goals are set. Information is shared, efficiency is optimized, and team members are project-focused instead of profession-focused, all in an effort to reduce risk and build harmony. However, the IPD approach changes the perceptions of the team members concerning joint responsibility of risks for the design and the construction work. The construction contractors now assume design responsibility, and, the designer deals with the means and methods used during construction. These unfamiliar risks must be considered when using IPD (PSU, 2016).

For the designer, the IPD process requires a higher level of effort early in the project as compared to their traditional modus operandi. The design firm, accepting expanded up-front responsibilities, needs to balance the elevated level of effort with suitable fee structure. Moreover, the designer’s responsibilities do not end with

providing suitable documents for construction (PSU, 2016). The Architect/Engineer has a roles and responsibilities overlap with the construction firms and trades throughout the complete project life cycle.

Construction Firm

The Construction Association of Michigan [CAM], the oldest construction builders and traders association in the USA, identified four areas of concern with IPD for construction firms: funding, contract language, lack of collaboration, and, workforce. The same four issues can be said of the traditional project approaches, which are inefficient, adversarial and expensive. How can the constructor win?

First, the construction management firm and key trade contractors are involved at the onset with the facility owner and the designer, and, are selected based on their qualifications rather than lowest price. The integration of the team can be increased by co-location of all key members of different disciplines in one location, and, the use of Building Information Modeling [BIM]. The use of BIM requires significant investment in set-up time and upfront training, which the tradition contractor is not interested in expending (Kelly & Ilozor, 2016). Hence, the benefits of IPD / BIM do not accrue easily [no pain / no gain].

Although intuitively, the aspects of early involvement, co-location and teaming all seem very beneficial for all involved; the constructor is leery, at best, and likely highly skeptical of unproven methods without a means for recourse if things do not work out (CMAA, 2015).

Conclusions

In conclusion, the relational contracting approach of IPD offers the benefits of improved project performance [better quality, faster completion time and lower overall cost] and trusting partnership [improved team relations and less waste]. These benefits outweigh the costs of early involvement with detailed planning, team development [onboarding], investment in BIM [technology], and, shared risks [waiver of liability].

The true test of IPD will be the improvements in long term relationships amongst the partners that leads to repeat business. Trusting partnerships, endemic to IPD, fosters the ethical relations that leads to long-term profitability. The IPD "integrity chain" (James, 2002) links integrity in the process, trust amongst the members, and repeat business based on satisfactory performance and quality, and, a profitable relationship for each of the parties. Keeping strong egos in check will continue to a challenge, be it the overtly controlling facility owner, creative architect, or independent minded contractor. People are people. IPD will be a continuing study of creating possibilities for improved constructed facilities through collaborative cooperation. IPD is both the complicated collaboration and improbable panacea.

Unlike the design–build project delivery method which typically places the contractor in the leading role on a building project, IPD represents a collaboration concept where the entire building team including the owner, architect, general contractor, building engineers, fabricators, and subcontractors work collaboratively throughout the construction process. This collaborative approach allows informed decision making early in the project where the most value can be created. IPD combines ideas from integrated practice and lean construction to solve several problems in contemporary construction such as low productivity and waste, time overruns, quality issues, and conflicts during construction among the key stakeholders of owner, architect and contractor. The close collaboration eliminates a great deal of waste in the design, and allows data sharing directly between the design and construction team eliminating a large barrier to increased productivity in construction.

References

- Engineering News-Record* (June 10, 2015), “Raves and Reservations” cover story, pg. 14-20.
- Integrated Project Delivery – A Working Definition* (Rep. No. Version 2). (2007, June 13). Retrieved January 10, 2017, from AIA California Council website: <http://aiacc.org/wp-content/uploads/2010/07/A-Working-Definition-V2-final.pdf>
- Integrated Project Delivery For Public and Private Owners,(2010) https://www.nsba.org/sites/default/files/file/03_xb_Powell_Keith_Discussion_Solicitations_Minutes_Cost_Sheet.pdf
- Integrated Project Delivery: A Guide* (Rep. No. Version 1). (2007). Retrieved February 5, 2017, from AIA National, AIA California Council website: https://info.aia.org/SiteObjects/files/IPD_Guide_2007.pdf
- James, R. E. (2002). The integrity chain: The link to profitability in construction. Raleigh, NC: FMI Corporation.
- Kelly, D., & Ilozor, B. (2016). A Quantitative Study of the Relationship between Project Performance and BIM Use on Commercial Construction Projects in the USA. *International Journal of Construction Education and Research*, 1-16. doi:10.1080/15578771.2016.1202355
- Lean Project delivery guide* (Rep.). (2014). Retrieved February 19, 2017, from UHS website: <https://www.leanconstruction.org/media/docs/deliveryGuide/UHSLeanGuide.pdf>
- Manning, R. (2012). *Challenges, Benefits, & Risks Associated with Integrated Project Delivery and Building Information Modeling* (Unpublished master's thesis). The University of Kansas . doi:10.1.1.914.8971
- Nikles, R., & O'Donnell, R. (2012, May & June). Integrated Project Delivery and the Cost Curve: Are the Metrics In? *MAGAZINE OF THE ASSOCIATED GENERAL CONTRACTORS OF CALIFORNIA*. Retrieved March 2, 2017, from https://www.rjo.com/PDF/Integrated_Project-Delivery.pdf
- Pishdad-Bozorgi, P., & Beliveau, Y. J. (2016). Symbiotic Relationships between Integrated Project Delivery (IPD) and Trust. *International Journal of*

Construction Education and Research, 12(3), 179-192.
doi:10.1080/15578771.2015.1118170

Project Management Institute [PMI], (2008). *Construction Extension to the PMBOK Guide Third Edition - Second Edition*. Newtown Square, PA.

Post, N. (2015, June 10). Integrated Project Delivery Can Work Well But Is Still No Utopia. Retrieved March 8, 2017, from <http://www.enr.com/articles/2449-integrated-project-delivery-can-work-well-but-is-still-no-utopia?v=preview>

Thomson, C. (2015). *Managing Integrated Project Delivery* [PDF]. McLean, VA : CMAA. Retrieved January 20, 2017, from https://cmaanet.org/files/shared/ng_Integrated_Project_Delivery__11-19-09__2_.pdf

Appendix

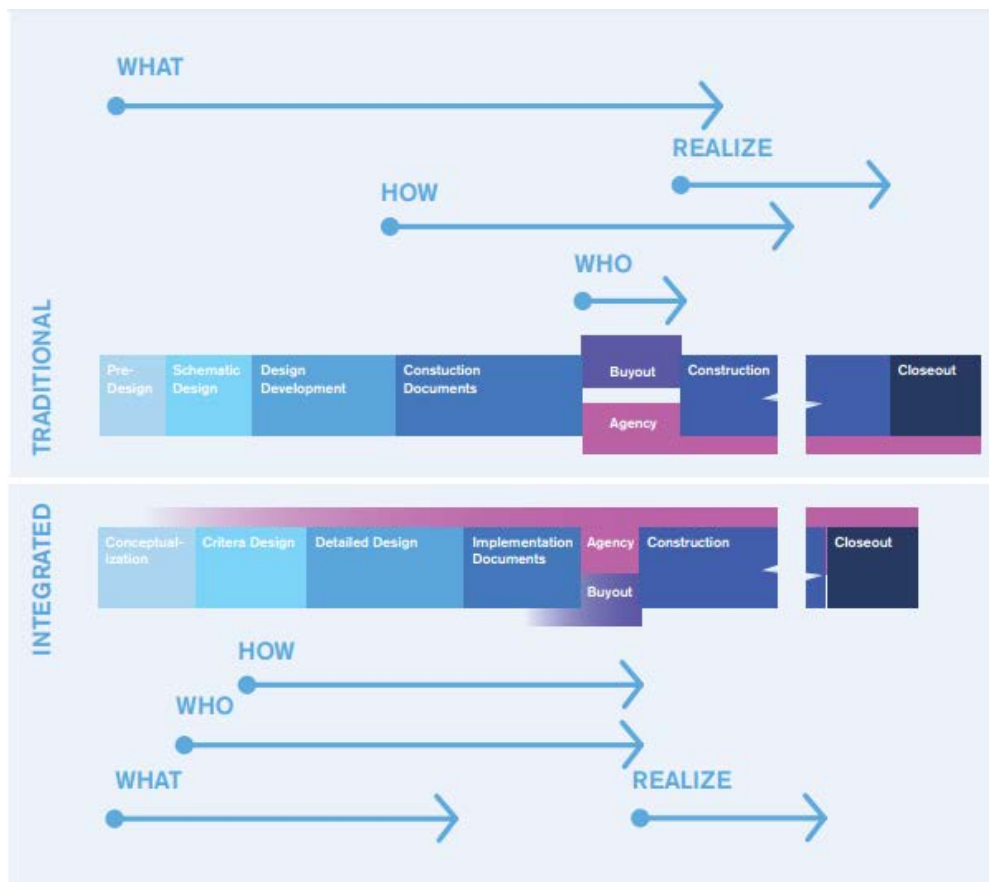


Figure 1: Comparison between the traditional design and Integrated Project Delivery (AIA, 2010)